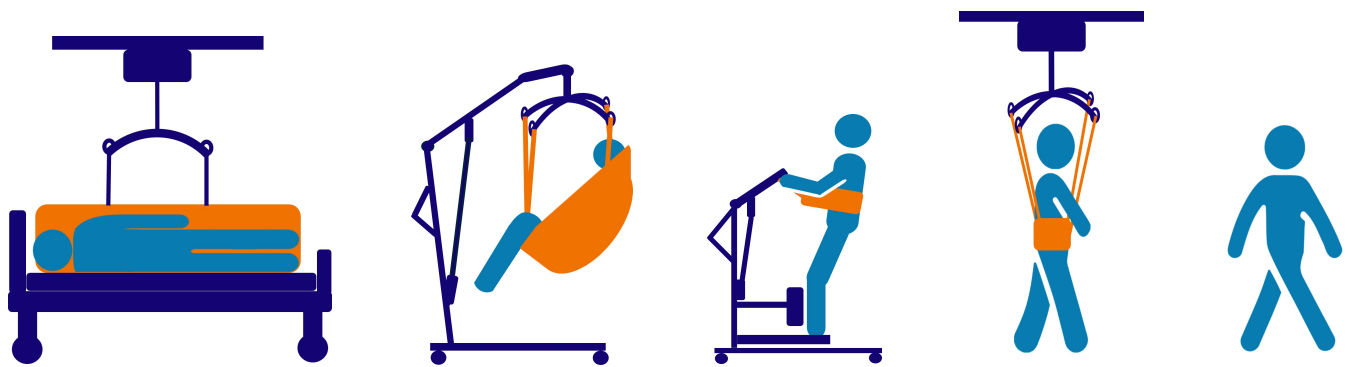




Nevada
Hospital
Association



Safe Patient Handling and Mobility: A Toolkit for Program Development

Lynda Enos, MS, BSN, RN, COHN-S, CPE

Disclaimer

The Nevada Hospital Association (NHA) and HumanFit, LLC have made every effort to ensure that the information contained in the *Safe Patient Handling and Mobility Toolkit* is accurate, current, and complete as of the publication date.

However, NHA, HumanFit, LLC, and the author **expressly disclaim any and all representations, warranties, or guarantees**, whether express or implied, regarding the accuracy, reliability, applicability, or completeness of the information or materials provided herein.

This toolkit is intended solely as a general educational and informational resource. It is not a substitute for professional medical judgment, clinical decision-making, or legal advice. The recommendations and materials presented should not be construed as establishing a standard of care, nor are they intended to replace the policies, procedures, or professional judgment of healthcare providers or organizations.

Each healthcare facility is solely responsible for evaluating and determining the appropriateness of any information or recommendations contained in this toolkit, and for ensuring compliance with all applicable federal, state, and local laws, regulations, accreditation standards, and professional guidelines.

Implementation of any practice or policy based on this toolkit is undertaken **at the sole discretion and risk of the user**.

NHA, HumanFit, LLC, and the author **assume no responsibility or liability for any injury, loss, damage, citation, claim, or other consequence** arising directly or indirectly from the use or misuse of the content contained in this publication, including but not limited to claims of negligence, regulatory action, or medical malpractice.

The inclusion of references to external sources, products, consultants, or organizations does not constitute or imply endorsement or recommendation by NHA, HumanFit, LLC, or the author. All such references are provided strictly for informational purposes. External websites and resources referenced herein were accessible as of the publication date; NHA, HumanFit, LLC, and the author make no representations regarding the ongoing availability, accuracy, or legal compliance of such content.

Users are responsible for remaining informed of current and emerging standards, regulations, and evidence-based practices relevant to their organization and jurisdiction.

Legal Notice: Use of this toolkit does not create any contractual or professional relationship between the user and NHA, HumanFit, LLC, or the author. Users should consult qualified legal counsel and clinical experts before implementing any policy, procedure, or practice derived from this material.

Reproduction and Use of Materials

Permission is granted to use such copyrighted material solely for non-commercial, instructional, personal, or scholarly purposes with proper citation. The material may be used and incorporated into other workplace safety and health programs on the condition that no fee may be charged for the subsequent use or adaptation of the material. Use of the material for any other purpose, particularly commercial use, without the prior express written permission of NHA and HumanFit, LLC is prohibited.

Safe Patient Handling and Mobility – How to use this Toolkit

This document may contain references to copyrighted material, the use of which may not have been specifically authorized by the copyright owner. Such material is used for educational and informational purposes under the principle of 'fair use'. All copyrighted materials remain the property of their respective copyright holders.

Photographs of SPHM technology used in this toolkit are identified with the names of their manufacturers. They are reprinted with permission from and copyrighted by the manufacturers, all rights reserved.

Suggested Citation

Enos, L. Safe Patient Handling and Mobility (SPHM): A Toolkit for Program Development. The Nevada Hospital Association, Reno, NV. November 2025. <https://www.nvha.net/safe-patient-handling-mobility/>

This Toolkit Was Written By:

Lynda Enos, RN, BSN, MS, COHN-S, CPE, Ergonomics/Human Factors Consultant, HumanFit, LLC.

Lynda is a certified occupational health nurse and certified professional ergonomist with over 30 years of work and consulting experience in industrial and health care ergonomics and safety. She holds an undergraduate degree in nursing and a graduate degree in human factors psychology/ergonomics from the University of Idaho.

She is a thought leader, published author and national and international speaker on safe patient handling and mobility (SPHM), healthcare ergonomics and workplace violence prevention (WPV).

Prior to working in occupational ergonomics, Lynda worked as a nurse-midwife, and as staff nurse in acute and community-based care.

Lynda has assisted numerous hospital systems, clinics, assisted living facilities, and home health and hospice services in the US to design, implement, and manage SPHM programs and ergonomics initiatives, often providing clinical support for several years per facility.

Lynda was a contributor for the 2013 and 2021 editions of the American Nurses Association (ANA) Interdisciplinary Safe Patient Handling and Mobility Standards. Most recently, she co-authored a white paper "*Safe Patient Handling and Mobility (SPHM): A Process to Protect Health Care Workers and Recipients*" that was published in November 2024 by the American Industrial Hygiene Association (AIHA), the Association of Safe Patient Handling Professionals (ASPHP), and ANA.

In 2014, Ms. Enos received the Ergonomics Professional of the Year Award from the Puget Sound Human Factors and Ergonomics society and in 2017 she received the Advocacy Award for Safe Patient Handling, awarded by the Tampa VA Research and Education Foundation and the Association of Safe Patient Handling Professionals.

On a personal note, Lynda sustained a back injury at the age of 19 while manually boosting a patient in bed as a student nurse. This experience, along with later work-related injuries, motivated her to advocate for the safety and well-being of nurses, other health care workers, and patients.

Acknowledgements

Photographs of SPHM technology included in this toolkit are identified with the names of their manufacturers. These photographs are solely for illustrative purposes and were provided courtesy of the organizations identified below. They are reprinted with permission from and copyrighted by the manufacturers, all rights reserved.

Alpha Modalities LLC

<https://alphamodalities.com/>

Designer and manufacturer of US-made washable, wipeable and single patient use (SPU) slings for ceiling, floor based and sit-to-stand lifts. Offers custom sizes, colors, and labeling.

Arjo Inc.

www.Arjo.com

Manufacturer of patient lifts, slings, and solutions for safe patient handling and mobility; medical beds and products for personal hygiene, disinfection, and effective prevention of pressure injury and venous thromboembolism prevention.

Baxter

www.hillrom.com/en/products-category/safe-patient-handling-and-mobility/

Manufacturer of patient lifts, slings, and solutions for safe patient handling and mobility; and a variety of medical diagnostic and monitoring technology, surgical equipment and tables, beds, stretchers and healthcare furniture.

Etac®

www.etac.com/en-us

Manufacturer of Molift patient lifts, slings, and solutions for safe patient handling and mobility; adaptable wheelchairs and assistive devices for bathroom and daily living; solutions for pressure care; pediatrics mobility solutions and accessories; and small aids for daily living.

Guldmann Inc.

<https://www.guldmann.com/us>

Manufacturer of patient lifts, slings, and solutions for safe patient handling and mobility.

Handicare- A Savaria Patient Care Company

<https://handicareusa.com/>

Manufacturer of patient lifts, slings, and solutions for safe patient handling and mobility, hygiene products for bathing and showering, medical beds, positioning aids, therapeutic surfaces and seating products.

HoverTech International

<https://hovertechinternational.com/>

Manufacturer of the air assist transfer and fall recovery devices - HOVERMATT® and HOVERJACK® and other pressure injury prevention and safe patient handling and mobility products. HoverTech is part of the Etac family of brands.

Safe Patient Handling and Mobility – How to use this Toolkit

IndeeLift®

<https://indeelift.com/>

Fall recovery and transfer solutions. The IndeeLift medical patient lift -floor to sit or stand provides a unique solution for quick, safe fall recovery and day-to-day patient handling transfers.

Seating Matters

<https://seatingmatters.com/>

Therapeutic seating specialists. Clinical Seating designed for comfort, support, and enhanced quality of life for the patient and the caregiver.

Seneca Devices

www.Senecadevices.com

Manufacturer of the EasyShift™ and EasyBoost™ patient repositioning solutions.

TR Equipment

<https://www.trequipment.com>

Shower trolleys and chairs, mobile bath lifts, assisted bathing products, rehabilitation walkers and powered bed movers.

Wright Products Inc.

www.wrightproductsinc.com

Manufacturer of Slipp®, for patient transfers.

Contents

The links below direct you to individual sections of the toolkit.
Each section includes a table of contents.

[How to Use This Toolkit](#)

[Section 1. Understanding Safe Patient Handling and Mobility \(SPHM\)](#)

[Section 2. Getting Started](#)

[Section 3. Hazard Identification and Assessment](#)

[Section 4. Hazard Control and Program Plan Development](#)

[Section 5. Hazard Control and Prevention SPHM Solutions](#)

[Section 6. Education and Training](#)

[Section 7. SPHM Program Implementation](#)

[Section 8. SPHM Program Evaluation](#)

[Section 9. SPHM Program Improvement and Sustainability](#)

[Section 10. SPHM Resources](#)



How to Use This Toolkit

Contents

Introduction	1
Purpose and Structure of the Toolkit.....	2
What This Toolkit is Not	3
Toolkit Structure	3
<i>Table i. Why SPHM Programs are Needed.</i>	7
Common Terms Used in This Toolkit	8

Introduction

The development of this toolkit arose in response to the need for guidance and tools to help hospitals and other health care entities in Nevada address the incidence of health care worker (HCW) injuries related to manual patient handling and the associated costs to staff, patients and the health care organizations. **Refer to Table i.**

There is considerable evidence to guide hospitals and other healthcare organizations in mitigating patient handling related injuries by implementing safe patient handling and mobility (SPHM) programs that include the use of mechanical patient lifts and assistive aids.

However, it was determined that a *single repository* of freely accessible information offering a detailed step-by-step guide on developing, implementing, and maintaining a cost-effective SPHM program would be beneficial for healthcare organizations in Nevada.

Nevada Hospital Association convened a SPHM advisory committee with representatives from over 20 hospital organizations of varying size, some of whom also offered long term care and home health services in Nevada. The committee assisted in defining the toolkit's scope at the start of development.

Tools and methods presented in this toolkit are founded on comprehensive review of existing safe patient handling related literature from the US and from other countries where SPHM has been thoroughly researched and implemented. The toolkit incorporates evidence-based best practices as well as relevant standards and guidelines, including those established by the American Nurses Association's (ANA) Safe Patient Handling and Mobility Interprofessional Standards Across the Care Continuum, the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH) and other professional health care and safety-related associations. Finally, the author leveraged her extensive background supporting numerous health care facilities in the development, implementation, and evaluation of SPHM programs.

The toolkit is intended to complement the following renowned safe patient handling and mobility publications:

- The American Nurses Association Safe Patient Handling and Mobility Interprofessional Standards Across the Care Continuum 2nd edition (2021). <https://www.nursingworld.org/nurses-books/safe-patient-handling-and-mobility-2nd-edition2/>

Safe Patient Handling and Mobility – How to Use This Toolkit

The eight evidence-based standards detailed in this publication guide development, implementation, and evaluation of an SPHM program and are incorporated throughout the toolkit. The elements of the ANA SPHM standard that correspond with SPHM program elements and sections in this toolkit are presented in **Section 1, Appendix B**.

- The Patient Handling and Mobility Assessments (PHAMA) (2nd ed.) Matz M, Celona J, Martin M, McCoskey K, Nelson GG. Facility Guidelines Institute (2019). https://www.fgiguideelines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf

This document details essential design criteria for supporting SPHM in healthcare facilities together with supplemental information that is referenced within the toolkit.

Purpose and Structure of the Toolkit

The purpose of this toolkit is to provide guidance with practical tools, resources, and information that can be used by hospitals, and other health care settings, to develop and sustain effective safe patient handling and mobility (SPHM) programs.

The contents aim to provide a step-by-step approach to developing a *new* or assessing and enhancing an *existing* SPHM program.

The toolkit will assist health care leadership, SPHM program coordinators or managers, SPHM committees and other stakeholders to:

- Evaluate the SPHM program and individual SPHM practices at their facility or within their organization, against current best practices to prevent staff and patient harms associated with manual patient handling.
- Identify a customized and targeted strategy to develop, implement, evaluate, and sustain a new SPHM program or enhance an existing program.
- Identify and engage stakeholders and enhance the culture of worker and patient safety.
- Enhance your SPHM program and policy by establishing processes that support patient safety initiatives such as fall prevention and early mobility.

This toolkit also serves as a resource for individuals new to SPHM who have responsibilities in program development and management to gain information about SPHM.

The toolkit is offered as a non-prescriptive guide to SPHM program development. The tools, resources, and guidance provided are designed for use in interprofessional environments and with various patient populations, including large or small hospital facilities, outpatient care areas, community settings, and home settings where patients require assistance with mobility.

They can be customized as needed to align with an organization's culture, resources, patient demographics and specific handling and mobility needs, physical environment, staff mix, and existing SPHM-related experience.

Detailed information about SPHM needs for specific patient populations, including patients of size or pediatric patients, is not included. However, **Section 10** provides SPHM-related information and resources for these groups and for non-hospital settings.

What This Toolkit is Not

The focus of this toolkit is SPHM program development. Detailed guidance regarding the application and instruction for use of SPHM technology is not included.

The categories of SPHM technology presented in the toolkit are not exhaustive. Information provided about SPHM technology serves as a *guide* for choosing suitable SPHM technology for a variety of care settings.

It is essential to consult the manufacturer's instructions and equipment manuals when selecting, utilizing, and maintaining SPHM technology. Caregivers must receive proper training in the use of all SPHM technology.

Toolkit Structure

OSHA's evidence-based strategies for management of occupational ergonomics, safety, and health programs, along with the ANA SPHM standards, form the foundation of the comprehensive approach described in this toolkit for developing a multifaceted SPHM program.

A process improvement approach that applies to the principles of high reliability and change management, as recommended by organizations including the Agency for Healthcare Research and Quality (AHRQ) and the International Institute for Healthcare Improvement (IHI), is incorporated into comprehensive program development and implementation strategies.

The toolkit is organized into sections and outlines a structured approach to SPHM development and implementation.

Sections 2-8 reference a set of tools that support the content and activities presented. Tools are downloadable and provided in several formats (e.g., Microsoft Word, Excel, and/or Adobe PDF), so that they can be used, and/or customized as needed.

Reference and resource materials relevant to the content of each toolkit section are also provided. Note that some resources and articles cited were published more than ten years ago. Despite their publication date, these materials have been included because they continue to provide valuable and relevant information applicable to current practices.

Tool i. *Safe Patient Handling and Mobility (SPHM) Program Development, Implementation & Evaluation: Suggested Sequence of Activities*, provides an overview of program steps in a flow chart format.



Quick Tip

Although this toolkit offers a step-by-step (**Tool i**) approach to organize your SPHM program implementation efforts, program steps are not always sequential and are often interdependent. When using a *continuous improvement approach* to program management you may need to develop, implement, evaluate, and enhance some solutions and processes concurrently.

It is recommended that you (together with your SPHM committee), review the entire toolkit before starting to plan your approach to implementing an SPHM program. This allows you to determine which sections of the toolkit are more relevant to your efforts, depending on what SPHM program elements may already exist and are effective at your facility.

Consider all phases of SPHM program planning and implementation collectively within the context of a systems approach.

Safe Patient Handling and Mobility – How to Use This Toolkit

The following is an outline of the Toolkit contents and steps to developing, implementing, and sustaining an SPHM program.

Section 1. Understanding SPHM.

This section offers an introduction to SPHM and describes:

- Safe Patient Handling and Mobility (SPHM) and its significance for healthcare workers, employers, and patients.
- The risks associated with manual patient handling and the supporting evidence and benefits of using SPHM to mitigate these risks.
- Relevant legislation, standards, and guidelines.
- Strategies for implementing and sustaining effective SPHM programs.

Section 2. Getting Started

Defines the need to develop a SPHM program or to enhance an existing program

Step 1. Review the best practices for preventing patient handling-related injuries and related regulations and standards and collect baseline incident/injury and cost data related to patient handling injuries.

Step 2. Analyze data collected to identify and prioritize units, departments, and employee groups, with higher risk of exposure to patient handling; and the nature, severity and cost of injuries associated with patient handling. Begin to identify hazards, overall risks & program elements that need to be addressed.

Building the SPHM Program Foundation & Management Structure

Step 3. Enlist support of senior leadership to develop a SPHM program plan that will support organizational goals related to delivery of safe, quality care to patients and providing a safe work environment for health care workers.

Step 4. Identify a program champion or executive sponsor, and a program coordinator, and form a multidisciplinary SPHM committee.

Step 5. Educate the committee about the scope and risk related to manual patient handling in health care, the components of successful SPHM programs, the proposed approach to addressing SPHM at your facility and function of the committee. Develop the program vision and committee mission statements, and a draft project charter.

Section 3 Hazard Identification & Assessment

Step 6. Determine the scope of the issue & program needs.

Multiple methods are detailed such as conducting a gap analysis, employee and manager surveys and site visits of priority units/departments where high-risk patient handling tasks are performed.

Step 7. Analyze and prioritize survey and site visit data.

A process to prioritize areas of concern/risk, program needs and gaps, and where SPHM program efforts are to be directed overall is defined.

Safe Patient Handling and Mobility – How to Use This Toolkit

Section 4 Hazard Control & Program Plan Development

Step 8. Develop solutions to address and control hazards.

Defines how to choose SPHM technology and program and process elements that will effectively address a facility or organization's specific SPHM needs.

Step 9. Create a communications plan, education and training plan, and SPHM policy

These program elements are essential to facilitate successful program implementation and active engagement of all stakeholders who are involved with or affected by it.

Step 10. Complete the draft SPHM program plan

This includes defining strategic and tactical elements to support the proposed approach to implementing SPHM program that meets established objectives and defining specific measurable goals for the program, return on investment strategies, and a detailed plan for program implementation.

Step 11. Obtain approval of the SPHM plan and policy from senior leadership

Step 12. Finalize the SPHM program plan and policy

Section 5. Hazard Control and Prevention - SPHM Solutions

Details SPHM technology solutions and SPHM patient mobility assessment protocols that can be used to mitigate risks associated with high-risk patient handling tasks and promote safe and progressive early mobility for patients.

Section 6. Education and Training

Describes how to develop and implement SPHM an Education and Training program.

Section 7. Program Implementation

Step 13. Implement the SPHM program

Details implementation strategies including approaches to pilot testing program activities; and selecting, purchasing, and installing SPHM technology. Incident reporting, response, and management program components are also discussed.

Section 8. Program Evaluating

Step 14. Evaluate the SPHM program

Effective evaluation of program implementation strategies, outcomes and processes using multiple approaches are discussed.

Section 9. Program Improvement & Sustainability

Step 15. Sustain the SPHM program

Strategies related to sustaining each core element of an SPHM program are reviewed.

Section 10. Resources

Extensive collection of articles and downloadable resources designed to support the development, implementation, and ongoing maintenance of Safe Patient Handling and Mobility (SPHM) programs across diverse healthcare environments.

Why SPHM Programs are Needed

Work-related musculoskeletal disorders (WMSDs) associated with manual transferring, repositioning, lifting, and mobilization of patients are a leading cause of injury and disability for health care workers in all areas of health care in the US.

Nursing aides, nurses, emergency medical workers, rehabilitation professionals such as physical therapists, radiology technicians, and home care and personal aides have the highest rates of injury associated with manual patient handling.

Unfortunately, specific injury and cost data related to overexertion related injuries such as WMSDs from lifting patients in Nevada healthcare facilities is not available. According to 2020 occupational injury data reported by the Nevada Department of Business & Industry Industrial Relations (DIR), *overexertion* accounted for the *highest rate* of injuries resulting in days away from work among healthcare practitioners, technical occupations, and healthcare support roles within Nevada's private sector. In 2020, healthcare support occupations had the *fourth highest* rate of sprains and strains resulting in days away from work among all occupations in private industry in Nevada.

WMSDs can affect the physical and psychological well-being of healthcare workers and may lead to the end of their professional careers. WMSDs can lead to increased absenteeism, burnout, turnover, lower efficiency, and higher workers' compensation costs for employers.

Patients may not receive essential care such as repositioning in bed and ambulation when HCWs must perform these tasks manually leading to a risk for pressure injuries and falls. Manual handling can also cause pain, skin tears, bruising, and compromise patient dignity.

The true costs of patient handling related injuries are likely much worse than currently realized due to high rates of underreporting of work-related injuries and illnesses by HCWs.

Over 35 years of research supports that:

- The cumulative exposure to biomechanical risk factors such as forceful exertion and the awkward and static postures required to manually handle non-mobile patients, plays the most significant role in development of low back pain and injury and
- Training HCWs to use 'proper' body mechanics and manual lifting techniques has failed to prevent and reduce WMSDs associated with patient handling tasks.

Evidence-based research supports that SPHM interventions, which replace manual patient handling with safer methods guided by ergonomic principles, can significantly reduce the incidence and severity of WMSDs. These interventions include the use of mechanical and non-mechanical lifts and other assistive technology and ergonomics work practices to reduce the biomechanical demands on caregivers.

Successful SPHM programs require a multifaceted participatory approach, including support structures and change management strategies to facilitate the use of patient handling equipment and foster a culture of safety.

The implementation of SPHM programs has shown to decrease WMSDs, reduce workers' compensation costs, and improve job satisfaction and retention among healthcare workers.

Why SPHM Programs are Needed

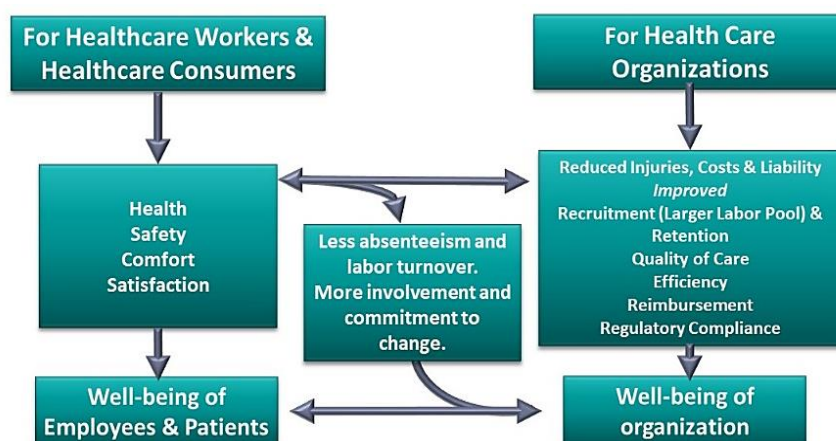
Additionally, SPHM programs benefit patients by improving mobility, comfort, and safety, and reducing the risk of health-facility acquired conditions such as pressure injuries and falls.

In summary, SPHM plays a critical role in safeguarding both healthcare workers and patients.

As the patient population ages and develops complex conditions affecting mobility, protecting the health and safety of HCWs is essential for safe care. Rising rates of obesity, diabetes, and related illnesses increase injury risks for both staff and patients.

The integration of SPHM programs and technologies within healthcare systems enables organizations to meet this increasing need and to foster safer working conditions, enhance patient outcomes, and realize substantial economic advantages.

Goals and Benefits of SPHM Programs



Source: Enos, 2012

Refer to Section 1 for more information about the benefits and elements of SPHM programs.

References

Enos, L. (2012). Evaluating a safe patient handling program: Beyond injury rates. Proceedings Safe Patient Handling and Mobility Conference 2012. VISON 8 Patient Safety Center of Inquiry and the Tampa VA Research and Education Foundation.

State of Nevada Department of Business & Industry, Industrial Relations. (2020).

Table 16. Incidence rates 1 for nonfatal occupational injuries and illnesses involving days away from work 2 per 10,000 full-time workers by selected worker characteristics, major occupational group, and selected natures of injury or illness, private industry.

Table 18. Incidence rates for nonfatal occupational injuries and illnesses involving days away from work per 10,000 full-time workers by selected worker characteristics, major occupational group, and selected events or exposures leading to injury or illness, private industry. Retrieved from https://dir.nv.gov/BLS/Nonfatal_Occupational_Injury_Data/

Table i. Why SPHM Programs are Needed.

Common Terms Used in This Toolkit

For the purposes of this toolkit the following terms and definitions apply.

Caregiver is any person of varying clinical disciplines and educational/licensure levels, involved in the delivery of care to a patient that includes the tasks of moving, handling, and mobilization, across the continuum of care. In a home care setting caregivers may include family members.

Employees and **Staff** are terms that may be used interchangeably. An “**employee**” is defined as an individual who has a contract with an organization and is considered a member of its permanent workforce. The term “**staff**” refers to all individuals engaged in work for an organization, such as employees, contractors, and temporary workers.

Ergonomics is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system (IEA, ND). Ergonomics when applied in the occupational setting such as health care, is about designing work/management systems, physical environment, workspaces and equipment, and work processes to fit the physical and cognitive capabilities of workers with the goal of preventing or reducing worker injuries such as musculoskeletal disorders (WMSDs), worker error and improving work quality and operations efficiency.

High-risk patient handling tasks are tasks that can result in work-related musculoskeletal disorders (WMSDs) in caregivers. These tasks are considered as high-risk due to the prevalence and magnitude of postural stressors, such as awkward and static positions; biomechanical loading or physical strain on the spine and other musculoskeletal structures resulting from the exertion of high forces during activities like lifting, carrying, pushing, pulling, or gripping; frequency of repetitive motions particularly when combined with postural stress or forceful exertion; and prolonged exposure to these stressors or risk factors.

Musculoskeletal disorders (MSDs) are injuries or disorders of the musculoskeletal systems including muscles, nerves, tendons, ligaments, joints, cartilage, connective tissue, and spinal discs that can occur in the upper and lower limbs, neck, and back. Examples of MSDs include strains and sprains, tendonitis, bursitis, carpal tunnel syndrome, and spinal disc herniation.

Patient applies to all individuals receiving care in hospitals, outpatient, long term care, and community-based settings.

Patient of size (also known as a bariatric patient or individual of size) refers to a person whose height, weight, and body shape may require increased space and specialized SPHM technology for care and mobilization. For this toolkit this includes those individuals who have a body weight of 300 pounds, or greater body mass index (BMI) of 30.0 or higher (Matz et al., 2019).

Safe Patient Handling and Mobility (SPHM) involves applying ergonomic principles to minimize the risk of injury caregivers and patients during the physical lifting, transferring, repositioning and mobilization of patients, and to enhance the health outcomes of patients, and the financial wellbeing of healthcare organizations (ANA, 2021).

SPHM technology refers to the equipment, devices, and accessories that are used to perform high-risk patient handling and mobility tasks with the goal of minimizing the risk of injury to the patient and the caregiver. Examples include but are not limited to, powered overhead or ceiling lifts, mobile floor-based or full-body sling lifts, sit-to-stand lifts and aids, together with sling accessories, and friction reducing devices.

Safe Patient Handling and Mobility – How to Use This Toolkit

*High-risk patient handling tasks, WMSDs, safe patient handling and mobility and ergonomics are further defined in **Section 1**.*

References:

American Nurses Association. (2021). Safe patient handling and mobility: Interprofessional national standards across the Care Continuum (2nd ed.). Silver Springs, MD: American Nurses Association. <https://www.nursingworld.org/nurses-books/safe-patient-handling-and-mobility-2nd-edition2/>

International Association of Ergonomics. (n.d.). What is ergonomics (HFE) <https://iea.cc/about/what-is-ergonomics/>

Matz M, Celona J, Martin M, McCoskey K, Nelson GG. (2019). Patient handling and mobility assessments (2nd ed.). The Facility Guidelines Institute. https://www.fgiguideines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf

Understanding Safe Patient Handling and Mobility (SPHM)

Contents

Understanding Safe Patient Handling and Mobility (SPHM)	1
What is Safe Patient Handling and Mobility (SPHM)?	1
<i>Table 1.1 What are Musculoskeletal Disorders (MSDs)?</i>	3
Why Safe Patient Handling and Mobility Is So Important	4
Injury Rates Associated with Manual Patient Handling	4
<i>Figure 1.1 Private Industries with highest numbers (in thousands) of nonfatal occupational injuries and illnesses in 2022 and 2023 (BLS, 2024)</i>	4
<i>Figure 1.2 The Top 10 Occupations with the highest number of nonfatal occupational strain, sprain, and tear Injuries involving restricted activity, or job transfer (DART) in private industry annualized for 2021-2022 (BLS, 2023a)</i>	5
<i>Figure 1.3 Top 20 annualized incidence rates for nonfatal occupational sprains, strains, and tear injuries related to overexertion involving days away from work, restricted activity, or job transfer (DART) per 10,000 full-time workers for healthcare occupations whose work involves direct patient care patient handling and mobility, private industry, 2021-2022 (BLS, 2023b)</i>	6
<i>Figure 1.4 Top 20 annualized incidence rates for nonfatal occupational injuries and illnesses involving days away from work, restricted activity, or job transfer (DART) due to lifting and lowering² events per 10,000 full-time workers for healthcare occupations whose work involves direct patient care patient handling and mobility, by occupation private industry, 2021-2022 (BLS, 2023c).</i>	7
The Cost of WMSDs Related to Manual Patient Handling	7
Health care workers.....	7
Health care employers.....	8
Patients	11
<i>Figure 1.5 The Cost of Manual Patient Handling.</i>	11
Society.....	12
<i>Table 1.2 SPHM & Missed Nursing Care.</i>	13
Why is Manual Patient Handling So Hazardous?.....	14
Physical Risk Factors	14
<i>Figure 1.6 Primary Risk Factors that Can Contribute to the Development of WMSDs Associated with Manual Patient Handling</i>	14
<i>Figure 1.7 The Direction of Forces on the Spine when Manually Lifting Patients</i>	16
<i>Figure 1.8 Decreasing Tolerance to Cumulative Loading of the Spine .</i>	17
<i>Figure 1.9 Various Painful Disc Disorders that can Result from Years of Overexertion of the Spine.</i>	18
Other Risk Factors that contribute to MSDs in HCWs	18
Psychosocial Risk Factors.....	19
Organizational Risk Factors	19
<i>Figure 1.10 The Overall Interrelationship Between Workplace and Individual Factors Affecting MSD Risk.</i>	20
Individual Factors.....	20

Safe Patient Handling and Mobility – Section 1

Table 1.4 Factors that Influence the Frequency, Magnitude and Duration of Exposure to Risk Factors for WMSDs Associated with Manual Patient Handling Tasks.	21
Figure 1.11 Progression of Disability and Importance of Early Reporting of WMSDs	22
Are Traditional Methods of Addressing Patient Handling Tasks Effective?	23
How Much Patient Weight Can a HCW Lift Manually?	24
So, Is There a Safe Lift Limit for Manually Lifting Patients?	25
Other recommended safe weight limits for specific patient handling tasks.....	26
SPHM and patients of size	27
Legislation, Standards and Guidelines Related to SPHM	29
Federal Regulations	29
State Standards and Guidelines.....	29
Standards and Guidance from Professional Organizations	30
Design Standards and Guidelines related to SPHM	31
CMS Recognized Accrediting Organizations	32
Hazard Prevention and Control - Using SPHM to Prevent Patient Handling Injuries.....	34
Effective SPHM Programs – Evidence and Outcomes for Health Care Workers, Patients and Organizations	34
Table 1.5 Elements of Successful SPHM Programs.	36
Benefits of SPHM Programs – The Evidence Base	37
Health care workers.....	37
Patients	37
Health care organizations.....	38
Figure 1.12 A Summary of the Benefits and Value of SPHM Programs for Health Care Organizations, HCWs and Patients.	39
An Approach to Developing a Successful SPHM Program	39
Figure 1.13 Effective, Sustainable SPHM Programs – A Systems View	41
Figure 1.14 The Plan Do Check Act (AKA The Shewhart Cycle) Approach as Applied to SPHM Programs	41
Figure 1.15 Integrating SPHM into a Health Care Organization's Culture	42
Hierarchy of SPHM Controls	43
Figure 1.16 The Hierarchy of Hazard Controls	43
SPHM Controls	44
Figure 1.17 Examples of Engineering Controls i.e., SPHM Technology.	45
Barriers to Successful Implementation and Sustainability of SPHM Programs.....	47
Table 1.6 Internal Barriers or Factors that can Prevent Successful Implementation and/or Sustainability of SPHM Programs (not all inclusive).	48
Culture of Worker and Patient Safety and the Role of SPHM	49
Appendix A. A Brief History of SPHM in the US	52
Appendix B. SPHM Toolkit Crosswalk with the ANA SPHM Standards	55
Appendix C. Development of SPHM Technology	58
References.....	61

Understanding Safe Patient Handling and Mobility (SPHM)

What is Safe Patient Handling and Mobility (SPHM)?

The principles of SPHM are founded in the science of Ergonomics.

The term ergonomics is derived from the Greek word *ergos* meaning "work" and *nomos* meaning "natural laws of" or "study of."

A globally accepted definition of ergonomics (also known as human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data, and methods to design in order to optimize human well-being and overall system performance (International Association of Ergonomics, ND).

Tools that Support Content in this Section

1a. An Introduction to SPHM in Pictures

Ergonomics when applied in the occupational setting is about designing work/management systems, physical environment, workspaces and equipment, and work processes to fit the physical and cognitive capabilities of workers with the goal of preventing worker injuries such as musculoskeletal disorders, worker error and improving work quality and operations efficiency. Work-related musculoskeletal disorders (WMSDs) are described in **Table 1.1**.

More simply put, ergonomics is about designing work to 'fit' the person rather than expecting the person to try and adapt or 'fit' to poorly designed work.

Musculoskeletal disorders (WMSDs) caused by overexertion involve injuries related to lifting, pushing, holding, carrying, or throwing objects, and are a leading cause of disabling injury to *all* US workers. These injuries account for 21.9% of the overall national burden and cost US industry in including healthcare 12.84 billion dollars in 2020 (Liberty Mutual 2023).

Unfortunately, injuries caused by overexertion are also the leading and costliest cause of disabling injuries in the US healthcare industry.

In fact, health care workers (HCWs) suffer a higher rate of WMSDs involving days away from work than workers in many other industries including the manufacturing, construction, and agricultural sectors (Davis & Kotowski, 2015; Gomaa et al., 2015; Przybysz & Levin, 2017; Van Hoof et al., 2018).

Over the past four years, overexertion injuries with more than 5 days away from work accounted for approximately 30% of workers compensation costs and cost the healthcare industry between 1.54 and 2.06 billion dollars (Liberty Mutual, 2020-2023).



Quick Tip

Use the information provided in this section when educating senior leadership, the SPHM committee, and other employees about the scope and impact of patient handling injuries in health care.

Safe Patient Handling and Mobility – Section 1

The single greatest risk factor for overexertion injuries in HCWs is the *manual lifting, moving, and repositioning of patients, residents, or clients*, i.e., manual patient handling (NIOSH, 2023).

Manual patient handling can be defined as the transporting or supporting of a patient by hand or bodily force, including pushing, pulling, carrying, holding, and supporting of the patient or a body part (Nelson et al., 2009).

SPHM is the application of ergonomics to reduce the risk of injury to HCWs and patients (residents, clients, health care consumers) during handling and mobility tasks and to enhance the health outcomes of patients, and the financial wellbeing of health care organizations (ANA, 2021).

Evidence-based research has shown that SPHM interventions can significantly reduce overexertion injuries by replacing manual patient handling with safer methods guided by the principles of “Ergonomics” (NIOSH, 2023).

This is achieved by using a multifaceted programmatic approach that includes the use of mechanical and non-mechanical devices and ergonomics work practices to reduce the biomechanical demands on caregivers when performing patient handling and mobility tasks i.e., to design work tasks within their physical capabilities. To meet SPHM goals, these programs must include support structures and change management strategies to facilitate use of patient handling equipment and foster a culture of worker and patient safety (Matz et al., 2019).

SPHM programs and solutions are discussed later in this section.

What Does the Term SPHM Mean?

The term ‘safe patient handling and movement’ was ‘coined’ in the US, when formal efforts to prevent injuries to HCWs associated with manual lifting, repositioning, and transferring of patients began in the late 1980s. ‘Safe’ means to perform these tasks without injury to HCWs and patients. ‘Handling’ refers to lifting, lowering, pushing, pulling, carrying, or holding (e.g., part of the body) a patient by another person either using human effort or with mechanical assistance e.g., a powered floor lift.

The 2013 publication of the American Nurses Association’s (ANA) Safe Patient Handling and Mobility: Interprofessional National Standards Across the Care Continuum, drove the initiative to replace the term ‘movement’ in SPHM with ‘mobility’.

Movement is a passive concept that describes the physical effort exerted on a patient’s behalf. The term mobility aligns with the current focus of using SPHM technology to actively engage the patient in mobilization related tasks with the goal of improving clinical outcomes through early and safe mobilization in the acute care setting and to assist with rehabilitation restoration and maintenance of independence in long term care (ANA, 2013; Waltrip, 2019).

In other countries such as the UK, and New Zealand, the term ‘moving and handling of people’ is more commonly used.

Appendix A describes a brief history of SPHM in the US.

What are Musculoskeletal Disorders (MSDs)?

Musculoskeletal disorders (MSD) are injuries or disorders of the musculoskeletal systems including muscles, nerves, tendons, ligaments, joints, cartilage, connective tissue, and spinal discs that can occur in the upper and lower limbs, neck, and back.

Examples of MSDs include strains and sprains, tendonitis, bursitis, carpal tunnel syndrome, and spinal disc herniation. Back injuries are the most common type of work-related MSD (WMSD) associated with manual patient handling (CDC, 2020; NIOSH 2023).



The term MSD can also refer to reports of pain or discomfort as well as injuries that are formally diagnosed by licensed health care providers.

MSDs are caused by sudden exertion or prolonged exposure to one or more physical risk factors such as overexertion, awkward postures, repetitive motion, and vibration (ANA, 2021)

MSDs caused by prolonged exposure to one or more physical risk factors are also called cumulative trauma, repetitive motion, or repetitive strain injuries.

Work-related musculoskeletal disorders (WMSDs) are conditions in which the work environment and performance of work contribute significantly to the condition; and/or the condition is made worse or persists longer due to work conditions (CDC, 2020).

There are other nonphysical risk factors that also contribute to the development of WMSDs (**Refer to page 1-18**). To learn more about Ergonomics and MSDs, review the resources below and references at the end of this Section.

The International Ergonomics Association (IEA)

What is Ergonomics - <https://iea.cc/about/what-is-ergonomics/>

Occupational Safety and Health Administration (OSHA)

- Ergonomics - <https://www.osha.gov/ergonomics>
- [Hospital-wide Hazards](#) Work-related Musculoskeletal Disorders
- <https://www.osha.gov/etools/hospitals/hospital-wide-hazards/work-related-musculoskeletal-disorders>

National Institute for Occupational Safety and Health

- Ergonomics and Musculoskeletal Disorders <https://www.cdc.gov/niosh/topics/ergonomics/default.html>
- Musculoskeletal Health Program <https://www.cdc.gov/niosh/programs/msd/default.html>

National Institutes of Health (NIH) National Library of Medicine

- Selected Health Conditions and Likelihood of Improvement with Treatment 2020. Chapter 5 - Musculoskeletal Disorders <https://www.ncbi.nlm.nih.gov/books/NBK559512/>

Canadian Center for Occupational Health and Safety

- Musculoskeletal Disorders <https://www.ccohs.ca/topics/hazards/ergonomic/wsmd/>

Table 1.1 What are Musculoskeletal Disorders (MSDs)?

Why Safe Patient Handling and Mobility Is So Important

Injury Rates Associated with Manual Patient Handling

In 2022 and 2023, Healthcare and Social Assistance had the highest number of nonfatal occupational injuries and illnesses (**Figure 1.1**) of all private industries (BLS, 2024).

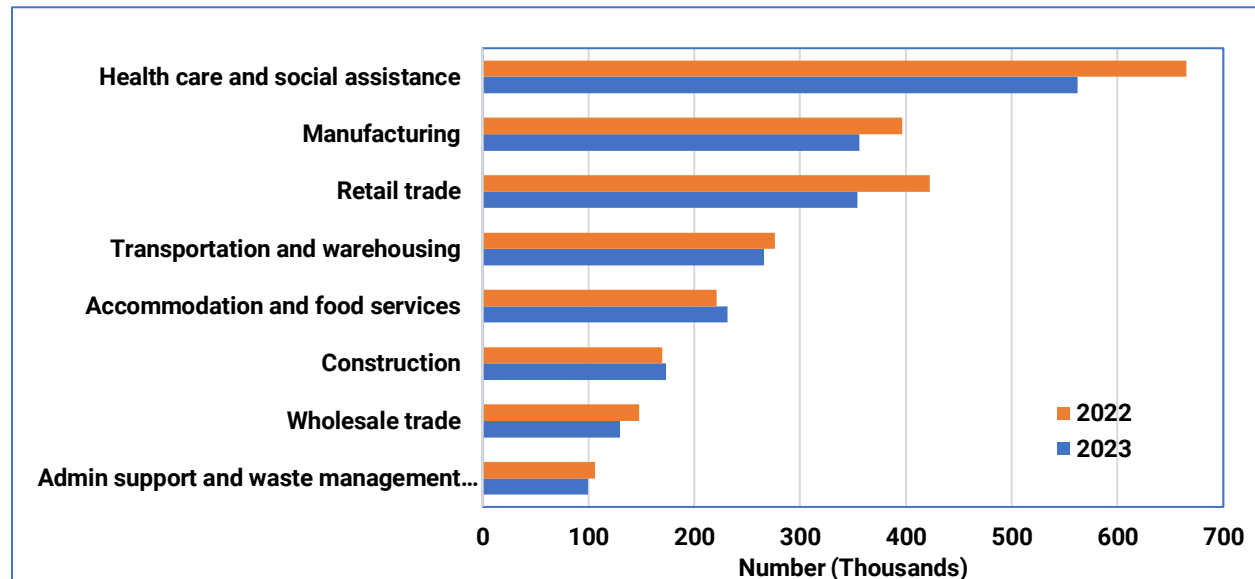


Figure 1.1 Private Industries with highest numbers (in thousands) of nonfatal occupational injuries and illnesses in 2022 and 2023 (BLS, 2024).¹

Within Healthcare and Social Assistance, the 2022 injury and illness rate and the DART rate for hospitals was over *double* the rate of private industry as a whole and higher than the rates in construction and manufacturing (BLS, 2023a). The occupational injuries and illnesses DART rate for nursing and residential care facilities was over *double* that of hospitals (BLS, 2023a).

As in previous years, in 2021-2022, nursing aides and registered nurses were in the top 10 occupations with the highest number of strain and sprain injuries involving restricted activity, or job transfer (**Figure 1.2**). Injury rates in hospitals and nursing and residential care facilities have followed this trend for over a decade.

As discussed earlier, a significant number of injuries occurring in healthcare are work-related musculoskeletal disorders (WMSDs).

Back and shoulder injuries persist as the most frequent and costly WMSDs for nurses, aides, and allied health professionals such as physical and occupational therapists (Von der Lancken & Levenhagen, 2014).

There is evidence to indicate that the annual prevalence of low back pain in nurses has a mean of 50%, and the lifetime prevalence ranges from 35% to 90%. Recurrence rates of low back pain in nurses exceed 70% (Richardson et al., 2018; Tariq et al., 2018; Van Hoof et al., 2018).

Safe Patient Handling and Mobility – Section 1



Figure 1.2 The Top 10 Occupations with the highest number of nonfatal occupational strain, sprain, and tear Injuries involving restricted activity, or job transfer (DART) in private industry annualized for 2021-2022 (BLS, 2023a).

In the 2018–2019 Healthy Nurse Healthy Nation® (HNNH) survey conducted by the American Nurses Association (ANA), 58% of nurse respondents indicated they had experienced musculoskeletal pain at work during the past year (ANA, 2019). In the 2020–2021 HNNH survey, over 30% of nurse respondents considered that lifting and repositioning heavy objects, including patients, created a significant level of risk for occupational injuries (ANA, 2021). This reflects data reported in surveys conducted by ANA in 2001 and 2011 where nurses listed disabling musculoskeletal injury as a top health concern (Loeppke, 2017).

The risk of and reported rates of WMSDs to nurses are higher in some specialty care areas. For example, Clairi et al., reported that perioperative nurses suffer 62% prevalence rates of lower back WMSDs (Clairi et al., 2021).

Nursing aides (NAs) are reported to experience twice the injury rate of nurses related to patient handling (Graham & Dougherty, 2012; Gomaa et al., 2015). Over 50 percent of injuries and illnesses reported in 2020 among nursing assistants were musculoskeletal disorders (OSHA, ND). NAs incur WMSDs at more than *five times* the US national average and account for 8% of all work-related back injuries in the US (Kayser et al., 2020).

Allied health professionals such as physical therapists (PTs) and occupational therapists (OTs), emergency medical technicians and paramedics, radiology technicians, and home care and personal aides, also experience high rates of WMSDs associated with performing manual patient lifting, transferring, and mobilization tasks (AIHA, 2021; Darragh et al., 2012; Davis et al., 2021; Graham & Dougherty, 2012; Dropkin et al., 2015; Evans et al., 2019; Haines et al., 2021; Hanania et al., 2020; Harwood et al., 2016; McLean, 2018; Mc Grath et al., 2015; Quinn et al., 2016; Vieira et al., 2016).

Evidence suggests that PTs and OTs experience an annual incidence of WMSDs of 20.7%, and an annual prevalence for WMSDs of 27% or greater (Harwood et al., 2016; Morabito et al., 2021). Studies indicate that 46-91% of PTs experience an MSD at some point in their career (Chen et al., 2022; Cromie et al., 2000).

Activities such as lifting, handling, and transferring patients when performing rehabilitative interventions

Safe Patient Handling and Mobility – Section 1

are believed to contribute to increased risk of WMSDs in PTs and OTs (Campo et al., 2008; Darragh et al., 2012; Harwood et al., 2016; Mc Grath et al., 2015).

Radiology technicians also suffer from significant rates of WMSDs associated with tasks such as manually transferring patients on a spine board to and from a radiographic table, manually lifting patients to and from a wheelchair, and repositioning patients (Evans et al., 2019; Hanania et al., 2020).

Interestingly, health care *students* performing patient care tasks during clinical rotation also experience WMSDs due to manual patient handling (Almhdawi et al., 2017; Backåberg et al., 2014; Boucaut & Knobben, 2020; Morabito et al., 2021; Solomon et al., 2017).

Figures 1.3 and 1.4 show the incidence rates for nonfatal occupational injuries involving days away from work, restricted activity, or job transfer (DART) that resulted in strains, sprains or tears and injuries that occurred as a result of overexertion during tasks requiring lifting and lowering. The data represents healthcare occupations whose work involves direct patient care patient handling and mobility, private industry.

WMSDs to HCWs during the Covid – 19 Pandemic

During the pandemic, U.S. health care workers experienced a staggering 249 percent increase in injury and illness rates in 2020 as compared to 2019 (OSHA, 2022).

Although these rates reflect the significant increase in reported illness related to occupational exposure to the coronavirus (SARS-CoV-2), injuries related to workplace violence and patient handling also increased significantly. Incidence rates for sprains, strains and tears involving days away from work per 10,000 full-time workers increased 14% in hospitals and 19% in nursing and residential care facilities, mostly in nurses and nursing assistants (BLS, 2021a; BLS, 2021c)

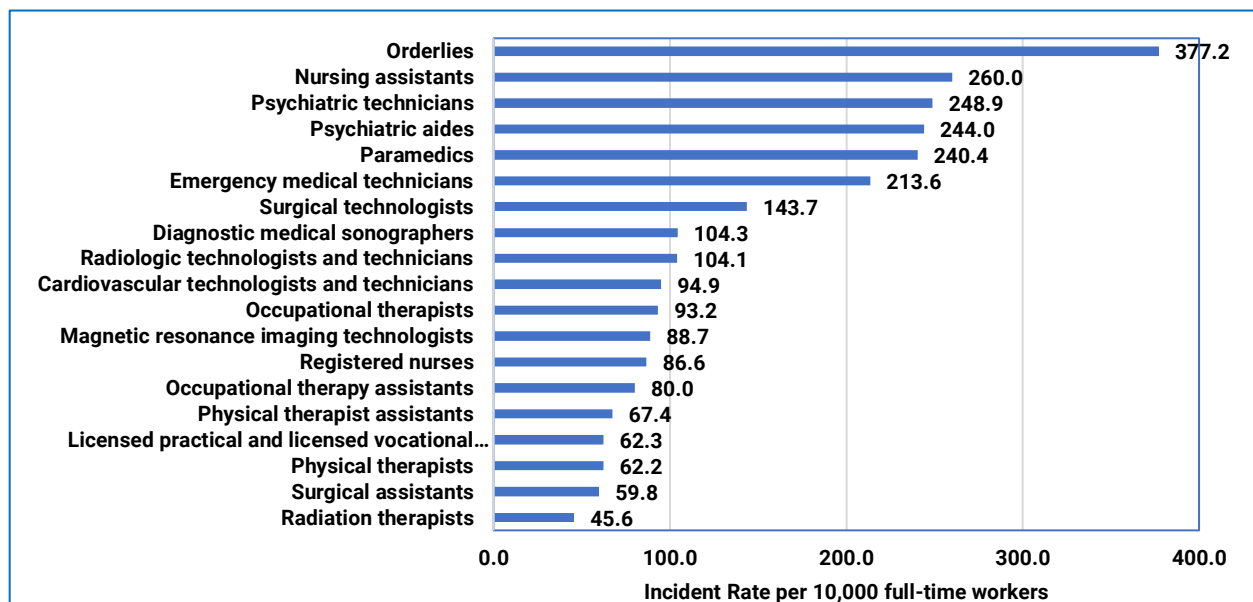


Figure 1.3 Top 20 annualized incidence rates for nonfatal occupational sprains, strains, and tear injuries related to overexertion involving days away from work, restricted activity, or job transfer (DART) per 10,000 full-time workers for healthcare occupations whose work involves direct patient care patient handling and mobility, private industry, 2021-2022 (BLS, 2023b)¹

Safe Patient Handling and Mobility – Section 1

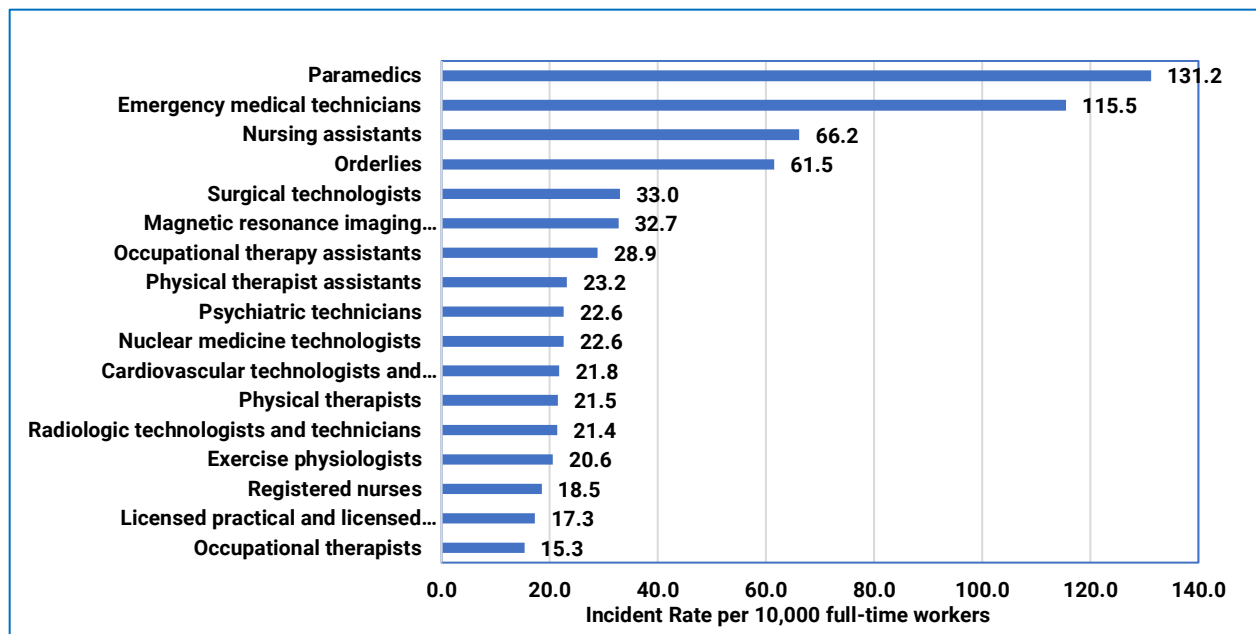


Figure 1.4 Top 20 annualized incidence rates for nonfatal occupational injuries and illnesses involving days away from work, restricted activity, or job transfer (DART) due to lifting and lowering² events per 10,000 full-time workers for healthcare occupations whose work involves direct patient care patient handling and mobility, by occupation private industry, 2021-2022 (BLS, 2023c).

1. The incidence rates represent the number of injuries and illnesses per 100 full-time workers and were calculated as: $(N/EH) \times 200,000$, where N = number of injuries and illnesses EH = total hours worked by all employees during the calendar year 200,000 = base for 100 equivalent full-time workers (working 40 hours per week, 50 weeks per year)
2. Given the primary function of these health care occupations is to provide direct patient care, it is likely that these lifting- and lowering-related injuries are mostly associated with tasks involving patient handling.

Note there is no published federal occupational injury data that defines the current injury rates or types of injuries that occur because of patient handling and lifting tasks

The Cost of WMSDs Related to Manual Patient Handling

The economic, physical, psychological, and social costs of WMSDs for HCWs, health care organizations, and their patients are staggering.

Health care workers

WMSDs have a significant physical and psychological impact on the quality of life of injured HCWs. Examples include reduction in usual leisure or recreational abilities, short-and long-term ability to perform activities of daily living, frustration and anger related to the inability to practice their profession, and

Safe Patient Handling and Mobility – Section 1

anxiety regarding future employment prospects (Chu et al., 2019; Evans et al., 2019; Mc Grath et al., 2015).

WMSDs are associated with higher levels of anxiety, sleeping problems, lower levels of mental well-being and overall fatigue of workers. (de Kok et al., 2019). The comorbidity of MSDs and depression is reported to be prevalent among hospital nurses and significantly associated with working night shift or longer shifts and work–family conflict (Zhang et al., 2020).

There is early research that has found an *increase* in overall mortality and deaths from cancer, heart disease, intentional self-harm, and opioid overdoses associated with disability from work-related low back strains (Martin et al., 2020).

Health care employers

WMSDs are associated with high costs to employers such as, absenteeism, burnout, higher employee turnover, reduced workforce efficiency, and the direct costs of increased health care, disability, and workers' compensation costs. The direct and indirect (hidden) costs of WMSDs are typically more severe than the average nonfatal occupational injury or illness (CDC, 2020; Tariq et al., 2018).

In 2017, costs of overexertion-related injuries due to manual patient handling were \$1.66 billion and accounted for 30.01% of the direct costs of all workers' compensation claims with more than five days away from work in the US health care industry (Liberty Mutual, 2020).

In the 2018 global insurance brokerage Aon reviewed over 230,000 closed workers compensation claims between 2012 to 2017 and concluded that patient handling claims continue to be the costliest claim type by severity. The average total cost per patient handling claim was \$14,100 and for claims where payments are made, patient handling claims were amongst the most severe worker compensation claims, averaging \$24,100 per claim for indemnity and medical costs (Jones et al., 2018).

Repositioning, managing uncooperative/aggressive patients, and transferring patients to/from a seated position the most frequently performed tasks performed that resulted in a claim with an average total cost of \$20,600 to \$25,400 per claim. The patient handling related events with the highest average cost of \$27,700 was injuries resulting from preventing a patient from falling (ANA, 2021).

In 2020-2021 the average total incurred cost of a strain/sprain injury was \$34,293 (medical and indemnity). The average cost of a lower back injury due to any cause was \$39,328 and a shoulder injury \$49,838. (NSC, 2023).

Indirect costs related to WMSDs, such as the costs related to replacing an injured worker either temporarily or permanently, are estimated to be 2.5-4 times the direct cost of injury, depending on the

The Impact of Covid-19 Pandemic on HCW Mental Health

In October 2023, the CDC reported that HCWs face burnout, harassment, and poor mental health at rates that have increased since the pandemic.

46% of HCWs reported often feeling burned out in 2022, up from 32% in 2018.

More than double the number of HCWs reported harassment at work in 2022 than in 2018.

44% of HCWs intended to look for a new job in 2022, up from 33% in 2018 (CDC, 2023).

Safe Patient Handling and Mobility – Section 1

severity (OSHA, 2013). The cost of replacing a single nurse can range from \$11,000 to \$103,000 (AOHP 2020; OSHA 2013; OSHA, 2013; Richardson et al., 2019).

Evidence shows that between 12%-25% of nurses and rehabilitation professionals with WMSDs request transfer away from providing bedside or client care or choose to leave the profession because of an injury or fear of an injury (Aslam et al., 2015; CDC, 2020; Grimaud, 2012; Tariq et al., 2018; Von der Lancken & Levenhagen, 2014).

Wiggerman et al., (2024), found in a recent survey of 973 HCWs, that 59.6% reported past work-related MSDs or pain. Of the HCWs who reported pain or injury, 33.3% changed roles, and only 30.9% reported workers' compensation claims. Additionally, 79.7% worked through pain or injury, which could further impair recovery and reduce job satisfaction (Wiggerman et al., 2024).

A 2024 report by NSI Nursing Solutions found that 23.8% of newly hired RNs left their positions within the first year, and first-year turnover accounted for 34.0% of all RN separations (NSI Nursing Solutions, Inc., 2024).

Additionally, data reported by Nurse.org in 2023 highlights that approximately 50% of new nurses leave the profession within their first two years, especially those who entered the workforce during the COVID-19 pandemic. Factors cited include high stress, poor support systems, and challenging work environments (Weber, 2023).

In a 2023 report from the National Council of State Boards of Nursing (NCSBN), 100,000 nurses left the workforce during the COVID-19 pandemic, and almost one-fifth of registered nurses in the US intend to leave the workforce by 2027 (NCSBN, 2023).

These figures suggest a significant increase in early-career nurse turnover compared to the 17.5% first-year and 33.5% two-year turnover rates reported in Kovner et al. (2014).

Historically, burnout has been a leading cause of the high turnover rates in nursing. However, the increased workloads experienced during the pandemic have resulted in extraordinary levels of burnout in nursing and other patient care related professions (ANA, 202; Martin et al., 2023; Rotenstein et al., 2023).

Organizational and psychosocial factors such as understaffing, high workload, and turnover, fatigue and burnout are associated with an increase in the incidence of WMSDs among nurses and nurse assistants (Bernal 2015; Han et al., 2014; Oakman & Macdonald, 2019; OSHA 2013; Vinstrup ,2020; Wåhlin et al., 2021).

The consequence of high physical and psychological demands in healthcare adversely impacts patient safety, health care organization's ability to recruit and retain HCWs and the overall future of US nursing health care workforce.

Decreasing HCW burnout, fatigue, and turnover related to high physical workloads associated with patient care tasks is more important than ever.

Despite these alarming statistics, injury rates and reported workers' compensation costs represent a *fraction* of the full cost of WMSDs associated with manual patient handling. Research indicates that as many as 50% of WMSDs go unreported by HCWs (Anderson & Oakman 2016; Capponecchia et al., 2020; Galizzi et al., 2010; Menzel, 2008). For example, one study found less than 10% of nursing home workers with prevalent lower back pain submitted a workers' compensation claim (Qin et al., 2014).

Underreporting of WMSDs and Patient Handling Injuries in Health Care

Due to the extent of underreporting of WMSDs, the magnitude of patient handling related injuries to HCWs and consequences to patient care is unknown.

Nurses frequently work while injured, which raises their risk of more serious injuries and increases the chance they may need to take leave or retire due to those injuries (Matz et al.).

The rationale for underreporting of WMSDs by HCWs is not well understood (Kyung et al., 2023).

A few studies have identified common themes for underreporting occupational injuries and illness in general. These include perception of how severe the injury is e.g., if medical treatment required; uncertainty if the injury is work related; fear or concern; the reporting process takes too long and/or is too complex; lack of knowledge about how to report injuries and distrust of reporting consequences (Hansell et al, 2018; Kyung et al., 2023; Quinn et al, 2016).

A recent systematic review of research found that low wage earners, racial/ethnic minority workers, and workers who perceive a poor psychosocial work environment encounter more barriers to reporting a work-related injury or illness (Kyung et al., 2023).

A 2006 study of Veteran Health Administration workers found that peer pressure not to report and frustration with workers' compensation procedures contributed to underreporting of WMSDs. The findings also indicated that older HCWs and those with longer service together with those working in the evening and night shifts, were less likely to report (Siddharthan et al., 2006).

Overall underreporting of HCW and patient safety related incidents and events occurs in work environments that do not support reporting e.g., those with poor safety culture (Loeppke, 2017).

In addition to underreporting of WMSDs related to patient handling, inconsistencies in data collection and standardized coding of incidents related to patient handling contributes to a lack of knowledge about the frequency and severity of WMSDs in health care.

Without accurate incident data, development, and implementation of effective SPHM programs can be challenging.

SPHM program activities that can improve reporting and data collection are discussed in **Sections 2 and 8**.

Safe Patient Handling and Mobility – Section 1

Patients

Not surprisingly, health care worker fatigue and burnout are negatively associated with poorer patient outcomes (Cho & Steege, 2021; Yellowlees & Rea, 2022).

However, WMSDs can have an indirect negative impact on the quality of care provided to patients. For example, there is some evidence to support the relationship between nurse injuries and physical discomfort and the impact on patient care (Kayser et al., 2020). In a 2014 survey, 22% of nurses reported being less friendly or engaging with their patients due to physical discomfort, and 22% also modified or limited their activity/movement on the job (Schmidt, 2014).

Overexertion and fatigue have been identified as contributing factors to medical errors in healthcare (Kiymaz, & Koc, 2018; Melnyk, et al., 2018). Overexertion and fatigue associated with repetitive manual patient handling may have an indirect effect on patient safety and contribute to burnout, especially in nurses.

Ambulation and repositioning of patients are two of the most frequently *missed nursing care* tasks in hospitals throughout the world (**Table 1.2**). The physical challenges associated with manually repositioning and assisting patients to ambulate may partially explain why these activities are among the nursing tasks most frequently missed (Kalisch et al., 2011). The 2018 Aon Barometer survey of health care systems found that patients with orders to be turned every two hours, were only turned 27% of the time (Jones et al., 2018).

Barriers to ambulation of patients include the nurse's perception of risk to the patients, e.g., risk of patient fall, or risk of injury to themselves if they get the patient up to walk (Doherty-King et al., 2014).

Missed nursing care is associated with nurse reports of patient falls, a leading patient safety indicator with high associated morbidity, mortality, and cost (Hessels et al., 2019).

Patients who are more physically challenging to mobilize, e.g., are immobile with high body weight and mass, and/or who are confused and agitated, may not be moved as frequently as needed if manual handling is required.

Lastly, manual patient handling can be painful, increase the risk of skin tears and bruising, and be undignified for the patient (Nelson et al., 2008).

Figure 1.5 summarizes the costs of manual patient handling.

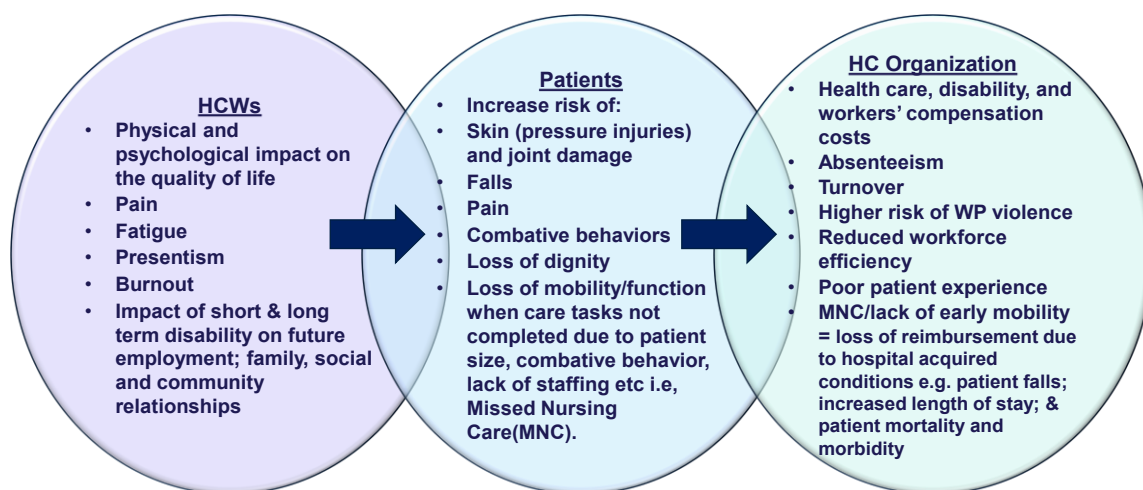


Figure 1.5 The Cost of Manual Patient Handling.

Safe Patient Handling and Mobility – Section 1

Society

All of society incurs costs when hospital workers are injured or ill. When injuries lead to long-term disabilities and chronic pain, the injured worker's family, social circle, and society bear many of the expenses resulting from long-term healthcare needs and difficulty working. Even when injured workers can still find employment, disabilities can permanently reduce their income.

The reaction of the injured worker's close social circle to their disability can affect how the individual manages their condition. For example, chronic pain patients may face additional challenges if their pain is not recognized or validated by those around them due to its invisible nature (Lee et al., 2022).

As hospitals bear the cost of workplace injuries, they may pass these expenses along to patients, insurance companies, or tax-funded government services through higher rates. They may also pay part of the cost from earnings that could otherwise be reinvested to improve quality of care. When an experienced, skilled worker is injured and forced to leave the field, this requires additional investment by society to educate replacement workers (OSHA, 2013).

SPHM & Missed Nursing Care

Missed Nursing Care (MNC) is defined as any aspect of required patient care that is omitted (either in part or in whole) or delayed by nursing staff that is, nurses and nursing aides (Kalisch, 2009). Missed care is also termed care left undone, unfinished care, and implicitly rationed care (Ball & Griffiths, 2018).

Missed care constitutes a form of healthcare underuse, which, according to renowned expert in healthcare systems safety, James Reason, is the most prevalent cause of quality issues in healthcare, surpassing both overuse and misuse combined (Ball & Griffiths, 2018). MNC is a global phenomenon in nursing.

Commonly missed patient care tasks missed include:

- Ambulation
- Turning
- Patient surveillance
- Delayed or omitted medications/treatments
- Delayed or missed feedings
- Patient education
- Discharge planning
- Emotional support
- Hygiene
- Input and output documentation

(Hessels, et al., 2019, Kalisch et. al., 2012; AHRQ, 2024)

Missed nursing care can lead to deconditioning, pressure injuries (PIs), falls, and longer hospital stays due to patient immobility when repositioning and ambulation are neglected.

Other consequences can include delayed or omitted medications or treatments; complications such as atelectasis, ventilator-associated pneumonia, or other nosocomial infections; increased length of stay; and decreased patient satisfaction (AHRQ, 2024).

Thus, missed care activities are linked to reportable hospital-acquired non-compensable conditions such as pressure ulcers and falls and associated costs (Hessels, et al., 2019).

SPHM & Missed Nursing Care continued

Ball et al., found an association between nurse staffing and missed care and a subsequent association between missed care and mortality (Ball, et al., 2018).

Unfinished care is also linked to increased nursing turnover, decreased work and occupational satisfaction, and increased intent to leave (Jones, 2015; Ogboenyi, 2019).

Studies show that MNC also occurs more frequently in units or work areas where nurses are exposed to patient and/or co-worker violence (Kim, et al., 2021; Najafi et al., 2018; Pompeii et al., 2015).

Causes of MNC are multifaceted and include lack of staff and supplies, poor use of existing staff resources, the time required to perform a nursing intervention, poor teamwork or communication problems, ineffective delegation, habit and denial (AHRQ, 2024; Bragadottir, et al., 2016; Griffiths et al., 2018; Kalisch et. al. 2014).

Unfortunately, the experience of working under time and resource pressure can unconsciously reinforce the acceptability of delaying or omitting care, leading to missed care becoming routine (AHRQ, 2024).

How is MNC related to SPHM programs?

SPHM plays a vital role in facilitating early, safe, and progressive mobility in the acute care setting with the goal of reducing patient risk of PIs, falls and length of stay etc. Thus, SPHM may also help to reduce the occurrence of 2 of the most frequently missed tasks, repositioning in bed and ambulation. The use of SPHM technology to mobilize patients has also been shown to reduce the risk of violence related injuries to staff (Collins et al., 2006; Kurowski & Ghaziri, 2019; Pihl-Thingvad et al., 2018; Risør et al., 2017).

Anecdotally, through questioning hundreds of nurses and nursing aides during SPHM training classes and direct observation over the past decade, this author concludes that patients who require additional staff to *manually* reposition and mobilize them are less likely to be moved especially towards the end of 12 hour shifts, primarily due to staff fatigue, the time needed to find help, and insufficient staffing. Missed care occurred more frequently with patients who are combative or not cooperative, and/or patients of size and/or have complex/special clinical needs.

Monitoring MNC may be a sensitive early warning system for hospitals to detect problems before hospital-acquired conditions such as falls, and PIs occur.

Evaluating MNC when measuring the impact of SPHM programs is discussed in **Section 4**.

Interested in learning more about Missed Nursing Care? Refer to the resources and references provided in **Section 10**.

Table 1.2 SPHM & Missed Nursing Care.

Why is Manual Patient Handling So Hazardous?

Physical Risk Factors

Manual patient handling tasks require HCWs to exert excessive force when lifting, pushing, and pulling, and work in extreme awkward postures such as lateral and/or forward bending, twisting of the trunk, and reaching above shoulder or head height. HCWs also maintain awkward body postures without movement for a period of time i.e., a static posture (**Figure 1.6 and Table 1.3**).

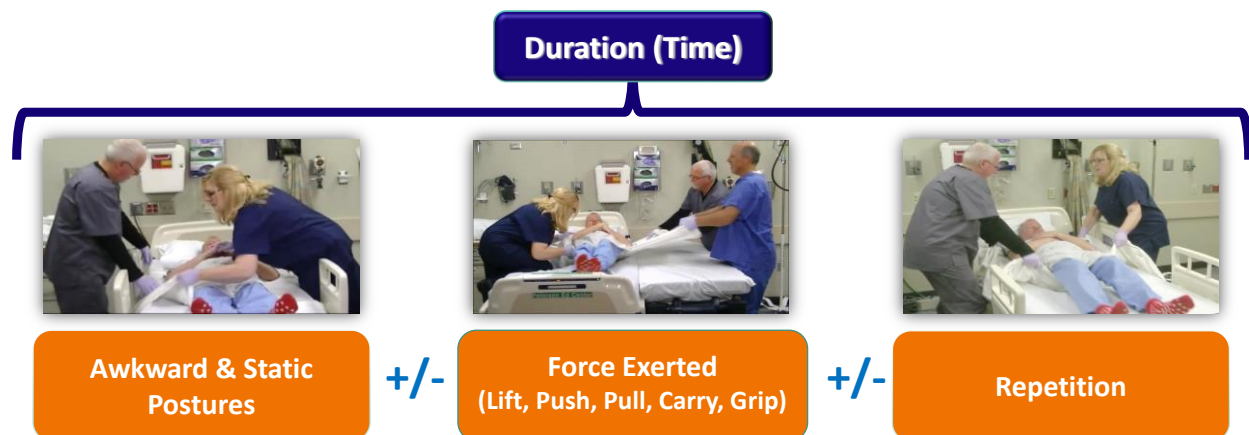


Figure 1.6 Primary Risk Factors that Can Contribute to the Development of WMSDs Associated with Manual Patient Handling. Source: L. Enos, HumanFit, LLC. Reproduced with permission.

Gallagher & Marras state that “forces acting on the spine as a result of exposure to patient handling activities can be broadly categorized as compressive forces (the forces acting down the long axis of the spine), shear forces (forces acting at 90° from the compressive forces defined above, in both lateral and anterior–posterior [A–P] directions), and torsional forces (rotation forces acting around the long axis of the spine)” (Gallagher & Marras, 2012). (**Figure 1.7**)

The National Institute for Occupational Safety and Health (NIOSH) suggests if a spinal compressive load at the L5/S1 level exceeds approximately 3400 N (Newtons) or 764.35 lbf, workers are at an increased risk of low back injury (Waters et al., 1993). Shear force limits are recommended not to exceed 1000 N or 224.80 lbf for occasional exposure to shear (under 100 loadings/day), and 700 N or 157.36 lbf, for frequent exposure to shear (100–1000 loadings per day) (Gallagher & Marras, 2012).

Studies have shown that tasks such as manually repositioning a patient in bed and transferring a patient between bed, chair, and commode create high compressive and shearing forces, or spinal loading, which exceeds recommended spinal loads thus, significantly increase the risk of low back injuries (Marras, 2008; Theilmeyer et al., 2010; Gallagher & Marras, 2012; Wiggermann et al., 2021).

Even patient care activities involving activities of daily living (ADLs) i.e., bathing, feeding, and dressing, have been found to produce large cumulative spine loads (Hodder et al., 2010).

Many patient handling transfers performed by one HCW have been shown to consistently exceed the loading tolerance of the spine.

Safe Patient Handling and Mobility – Section 1

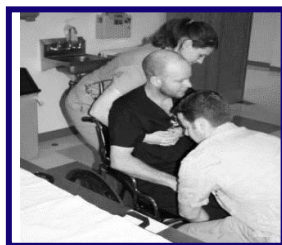
- **Repositioning in bed, on a stretcher or exam/ procedure table**

e.g., turning and boosting a patient; raising a patient from lying to sitting in bed or at edge of bed; positioning or removing a bedpan



- **Seated transfers**

e.g., to/from bed to chair, commode, wheelchair; chair to chair; wheelchair to exam table or vehicle



- **Supine transfers**

e.g., to/from bed, stretcher, or procedure table



- **Lifting and holding of extremities**

e.g., during wound care



- **Stabilizing patients in upright or lateral positions**

- **Repositioning in wheelchair, chair**

- **Positioning an individual of size to access the abdominal or perineal area**

- **Tasks performed with a confused or combative patient**

e.g., restraining, escorting, toileting, dressing, bathing etc

- **Performing cardiopulmonary resuscitation (CPR)**



- **Standing transfers**

e.g., to/from bed to commode/ chair/exam table

- **Ambulation**

- **Preventing falls/Lifting a patient from the floor**

- **Toileting**

- **Showering and bathing**

(in bed, shower chair, or trolley)

- **Repositioning patients to/from a prone position**

- **Transporting a patient in a bed, stretcher, or wheelchair**

- **Weighing a patient**

- **Changing an absorbent pad**

- **Making an occupied bed**

- **Feeding a bedridden patient**

- **Dressing or undressing a patient**

- **Applying anti-embolism stockings**

- **Tasks of rehabilitation**

e.g., training patients in self-transfer, assisted standing, sitting, kneeling, stairs, repositioning patients on mats



Table 1.3 High Risk Manual Patient Handling Tasks - as Supported by Research (Callison and Nussbaum, 2012; Hignett & Crumpton, 2002; Jäger et al., 2013; Jang et al., 2007; Matz et al., 2019; Marras et al., 1999; Nelson et al., 2003; Nelson & Baptiste, 2004; Nelson, 2006; Pompeii et al., 2009; Waters et al., 2007; Zhuang et al., 1999). Source: L. Enos, HumanFit, LLC. Reproduced with permission.

Safe Patient Handling and Mobility – Section 1

However, research shows that when two or more HCWs manually lift a patient together, the lift is uneven because of the differences in height and strength between HCWs performing the task. This uncoordinated movement and resultant postures create higher shear forces in the lower spine (Marras et al., 1999).

So, having more HCWs manually lift a patient does not necessarily reduce the risk of WMSDs.

Tasks involving *pushing and pulling* often involve high shear forces in addition to compressive force. The level of risk is dependent on the weight of the patient and the coefficient of friction between the sliding surfaces. HCWs may have to use rapid jerking motions to overcome friction in order to initiate patient movement (Waters et al., 2007; Wiggerman et al., 2021), e.g., pulling a patient up in bed or transferring a patient between two surfaces in a spine position from bed to stretcher.

Biomechanical tolerance to shear force is much lower than tolerance to compressive force, thus creating a higher risk for back injury (McGill, 1996; Marras et al., 1999; Hoozemans et al., 2008).

Sudden, unexpected, forceful exertion, e.g., when patients move unpredictably during a handling task, further increases the loading on the spine (Shahvarpour et al., 2015).

Several other factors can increase the level of exertion and ensuing loading on the spine and support structures when performing manual patient handling tasks that can significantly increase the risk of WMSDs.

These include the degree of flexion and/or rotation of the HCW's spine, the distance of the HCW from the patient; applied hand force; the size, shape, and weight of the patient; the patient's physical ability to assist during a patient handling task; cognitive ability to follow instructions; restricted physical workspace; the transfer distance; and/or there are not enough staff to assist (Choi & Brings, 2016; Frey & Hignett, 2015; Galinsky et al., 2021; Matz et al., 2019; Village et al., 2005).

Table 1.4 summarizes the factors that influence the frequency, magnitude, and duration of exposure to risk factors for WMSDs associated with manual patient handling tasks.

Sudden unexpected movements and resultant muscular contractions can cause high muscular forces within the erector spinae of approximately 145-187% of one's Maximum Voluntary Contraction (MVC) leading to fatigue and possible failure of the muscles surrounding the lumbar spine (Anderson et al., 2001; McGill, 2022; Pedersen et al., 2007; Sharvarpour et al., 2015; Zhou, 2014).

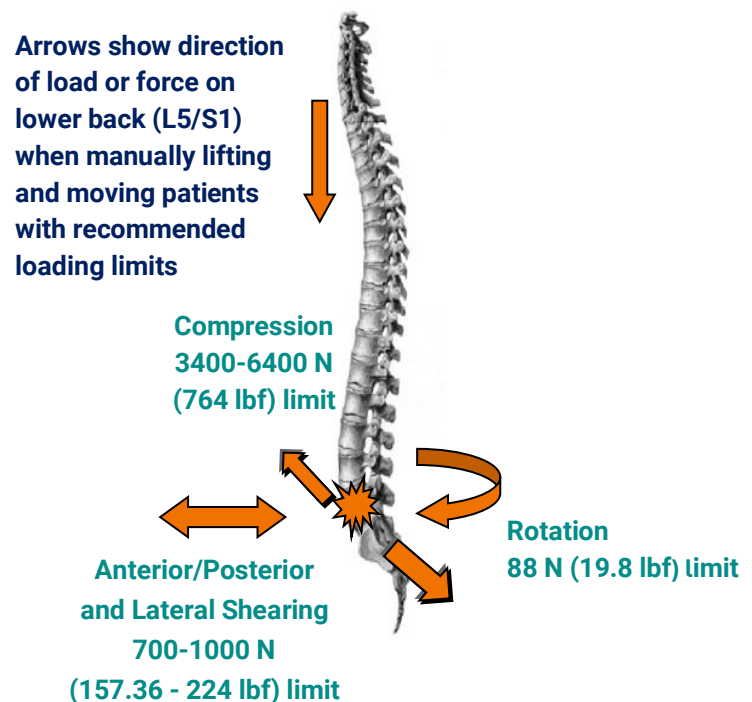


Figure 1.7 The Direction of Forces on the Spine when Manually Lifting Patients.

Safe Patient Handling and Mobility – Section 1

This can occur when a patient goes limp during a transfer causing the HCW to lose balance and move suddenly, or when a cognitively impaired patient is unpredictable and may suddenly become combative, and resist efforts to move them.

Back injuries may be caused by lifting and handling a load that exceeds spinal load tolerance with a few repetitions or repeatedly handling a small load over a long period (Casiano et al., 2023).

Risk of WMSDs increases with repeated exposure to these physical risk factors and associated spinal loading during a work shift and for extended duration, e.g., shift after shift. Over time the tolerance limit of the spine and surrounding soft tissues decreases, especially if there is *insufficient recovery or rest time* from exposure to physical risk factors (Marras et al., 2014). (**Figure 1.8**)

As muscles that support the spine become fatigued, they cannot provide optimal support of the spine which can become unstable and susceptible to injury at compressive loads as low as 88 N or 19.8 lbf (Marras et al. 2014).

This cumulative exposure to manual patient handling tasks not only leads to micro-injuries in the form of micro-tears to muscles, tendons, and ligaments, but to cumulative microfractures of the lower vertebrae which can lead to lumbar disc damage and permanent disabling injury (Davis & Jorgensen, 2005; Tariq, 1997; Waters, 2007). (**Figure 1.9**)

HCWs often work long and unpredictable hours with few work breaks and insufficient staffing levels. These work organization-related factors can lead to increased exposure to physical risk factors, subsequently raising the chances of lower back injuries (Choi & Brings, 2016; Dennerlien et al., 2017; Ribeiro et al., 2017; Richardson et al., 2019).

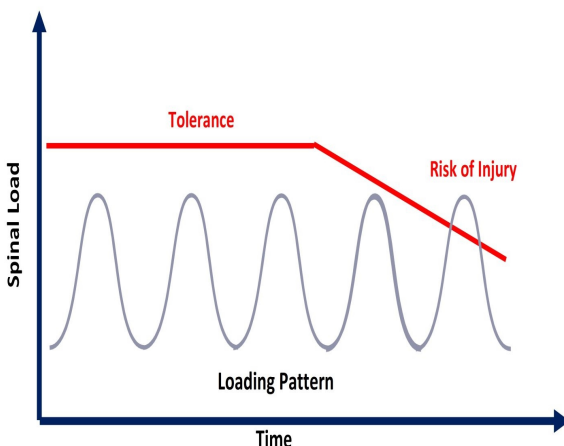


Figure 1.8 Decreasing Tolerance to Cumulative Loading of the Spine (Marras 2008).

Physical risk factors that contribute to the development of WMSDs – force, repetition, awkward postures, and duration – also occur in non-patient handling tasks performed by HCWs. These include carrying linen bags, moving and handling medical equipment, and pushing patients in wheelchairs or on stretchers.

Damage to the spine and intervertebral discs can accumulate over time without HCWs noticing until one event, like bending to pick up a light object, causes low back pain from final overloading (NPR, 2015).

Once a low back injury has occurred, there is a greater risk of reinjury as load tolerance of the spine and supporting structures decline (Marras et al., 2014; Tariq, 1997;).

Causative factors of low back injuries associated with manual patient handling are well studied. However,

there is limited research to indicate the relationship between manual patient handling and injuries to other body regions such as the middle and upper back, shoulders, neck, and upper extremities.

Belbecka et al., found that out of five commonly performed manual patient handling tasks, stand pivot transfers from bed to chair sit-to-chair and turning a patient in bed toward the HCW, were the most demanding tasks for the shoulder (Belbecka et al., 2014).

Safe Patient Handling and Mobility – Section 1

Wiggerman et al., found that overall risk of upper extremities may increase when boosting a patient using a drawsheet. Boosting a patient weighing 170 lbs and over was found to produce high hand forces that exceeded recommended limits. It was surmised that this in turn may lead to abnormal muscle recruitment and adjacent joint movement thus increasing the risk of injury in the shoulder complex (Wiggerman et al., 2021).

Spinal Damage - A Result of Cumulative Exposure to Manual Patient Handling

Damage to the spinal discs as result of the forces described above can vary. Spinal discs may degenerate over time due to damage to vertebral endplates. The resulting scar tissue prevents blood supply with essential nutrients from flowing into the discs. Without the diffusion mechanism to receive nutrients, discs can degenerate until nerve impingement results in pain and potential disability (Marras, 2008).

Early disc degeneration can contribute to bulging or herniation of spinal discs. Because discs have no nerve supply to warn of damage and the damage progresses over time, HCWs are often unaware of the injury until symptoms such as pain occur (Nedresky et al, 2023).

Muscles supporting the spine can become fatigued when exertion occurs often or over an extended period without adequate time for recovery and are no longer able to produce energy for contraction. Muscle fibers can also be damaged from excessive loading or repetitive actions without sufficient recovery periods (Dydyk et al., 2023).

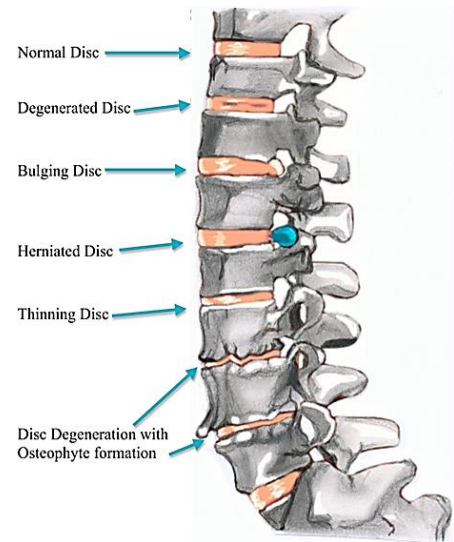


Figure 1.9 Various Painful Disc Disorders that can Result from Years of Overexertion of the Spine. Source: New York State Dept of Health, 2016.

Other Risk Factors that contribute to MSDs in HCWs

Recent research supports that causation of WMSDs and especially low back pain in HCWs are multifactorial and interact with one another i.e., physical workload, organizational psychosocial and individual factors (Wählin et al., 2021).

Therefore, for SPHM programs to successfully achieve and sustain desired goals, it is not only necessary to address the physical risk factors for WMSDs associated with patient handling tasks but to also consider other risk factors for WMSDs and how they can interact when designing, implementing and sustaining an SPHM program. **SPHM programs are discussed later in this section.**

Oakman & Macdonald, 2019 suggest that ‘a broad, systems-based framework and more holistic assessment of risk from all relevant hazards together rather than in isolation from each other’ (Oakman & Macdonald, 2019). (**Figure 1.10**)

Psychosocial Risk Factors

Psychosocial risk factors such as low social support from supervisors and/or colleagues, poor collaboration/lack of teamwork, negatively appraised leadership styles, reduced job control, time pressure, excessive workloads, hostile work environment (e.g., where bullying is allowed), and lack of clarity over role, have also been associated with an increased likelihood of WMSDs in HCWs. (Andersen et al., 2019; Bernal 2015; Graveling et al., 202; Han et al., 2014; Kim et al., 2014; Oakman & Macdonald, 2019; Sabbath, et al., 2014; Vignoli, et al., 2015; Wählin et al., 2021; Zare et al., 2021;).

The specific relationship between psychosocial risk factors, how they interact with physical risk factors and the degree to which they increase the risk of WMSDs is not well understood. There are various theories about how psychosocial factors contribute to the development of MSDs. These are based on physiological changes that occur when the body is exposed to psychological stressors.

Time pressure to meet work demands could increase the number of repetitive movements and facilitate awkward postures increasing biomechanical load which could lead to muscular strain (Ando et al., 2000).

Afsharian et al., surmised that “biochemical stress responses involving muscle tension, reduced blood supply, and less opportunity for muscle repair, and muscle fiber weakness increasing susceptibility to injuries” (Afsharian et al., 2023).

Perceived stress can contribute to reduced tolerance of pain and psychosocial factors can also influence the return to work of HCWs who have a WMSD (Graveling et al., 2021).

Organizational Risk Factors

The intensified workload, exposure to trauma, and relentless understaffing during the COVID-19 pandemic have resulted in increased physical and mental burnout in HCWs that is resulting in higher rates turnover and intent to leave healthcare. Given what is known about the impact of fatigue and psychosocial risk factors and WMSDs, it is very likely the current epidemic of burnout in HCWs compounds the risk of WMSDs.

In the ‘post-covid’ healthcare environment there is high use and turnover of traveling nurses and other allied professionals together with the increasing use of technicians or other non-nursing personnel to perform patient care tasks within a health care system. This new ‘norm’ in the US healthcare system is not likely to change in the near future.



Want To Learn More?

Psychosocial Factors and How They Contribute to WMSDs

- Bezzina, A., Austin, E., Nguyen, H., & James, C. (2023). Workplace psychosocial factors and their Association with Musculoskeletal disorders: a systematic review of Longitudinal studies. *Workplace health & safety*, 71(12), 578-588. <https://pubmed.ncbi.nlm.nih.gov/37698343/>
- Graveling R, Smith A & Hanson M 2021 musculoskeletal disorders: association with psychosocial risk factors at work. A literature review. European Agency of Health and Safety at Work https://osha.europa.eu/sites/default/files/2021-11/MSDs_association_pshychosocial_risks_factors_at_work_report.pdf%20
- Psychosocial factors in the prevention of work-related musculoskeletal disorders (MSDs) European Agency of Health and Safety at Work 2021 <https://osha.europa.eu/sites/default/files/psychosocial-risks-infosheet-en.pdf>
- Musculoskeletal Disorders - Psychosocial Factors, The Canadian Center for Occupational Health and Safety <https://www.ccohs.ca/oshanswers/psychosocial/musculoskeletal.html>

Safe Patient Handling and Mobility – Section 1

Research conducted in long-term care indicates that HCW turnover, the knowledge gaps of agency or temporary and new hire staff, in addition to the extra time needed to complete shift handover with these staff groups, can hinder safety interventions such as SPHM. (Kurowski et al., 2012).

These factors may lead to less frequent use of SPHM technology because staff may lack sufficient skills or time during a shift to use the equipment appropriately (Kurowski et al., 2012) and must be considered when developing and attempting to sustain SPHM programs.

Overall, research shows that the cumulative physical demands of manual handling and lifting of patients who cannot move independently play the *most significant* role in development of low back pain and injury (Bernal et al. 2015; Gomaa et al., 2014; Han et al., 2014; Richardson et al., 2019).

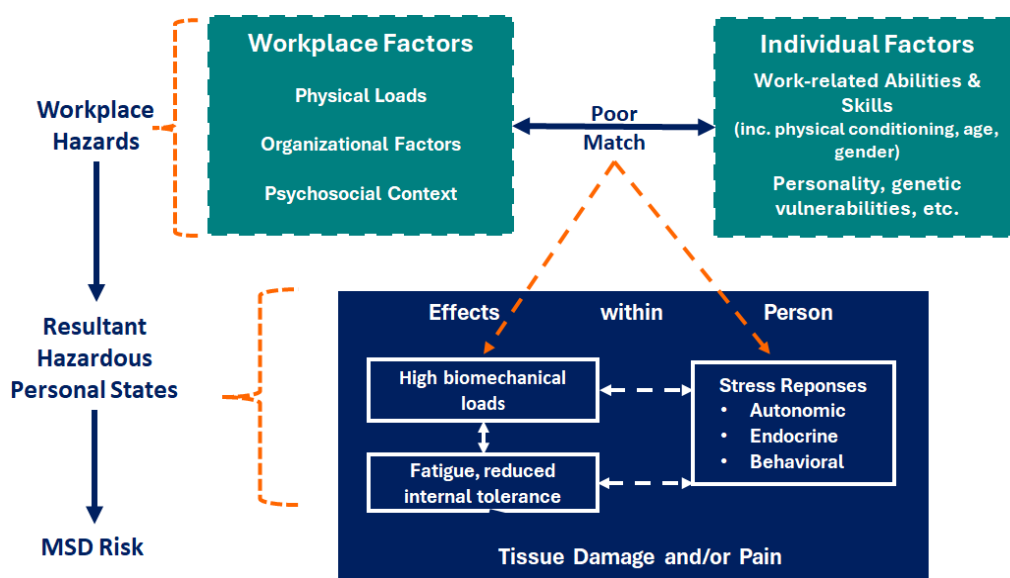


Figure 1.10 The Overall Interrelationship Between Workplace and Individual Factors Affecting MSD Risk.

Source: Oakman, J., Macdonald, W. The APHIRM toolkit: an evidence-based system for workplace MSD risk management. *BMC Musculoskelet Disord* 20, 504 (2019).

<https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-019-2828-1>

Individual Factors

In addition, there are some individual factors, as well as exposure to non-work-related physical risk factors, which may also contribute to WMSDs and can hinder the healing process after WMSDs occur (Marras et al., 2014; Marras et al., 2000). For example, the tolerance of the spine and supporting structures to withstand compressive force declines significantly with age. Starting at the age of 40 muscle mass and muscle endurance together with intervertebral disc strength begins to decline leading to less strength and mobility (Rogers, 2013). Lower compressive limits for men and women of age 60 years or more are recommended (Jäger, 2018).

Jäger also suggests that a lower safety margin is also considered for young adults of 20- 25 years of age as skeletal strength may not be fully developed. This point is interesting given the younger age of many health care students and new graduates.

Safe Patient Handling and Mobility – Section 1

Recommended spinal loading limits may also vary across individuals of different ethnicities and sexes (Hung et al., 2020).

Insufficient or poor sleep due to fatigue is a risk factor for low back pain (Vinstrup, 2020).

Physical Demands of the Task	Physical Environment	Patient	Caregiver	Psychosocial	Work Organization
- Physical effort (force) required to lift, push, pull, supporting/holding or gripping a load - Uneven application of force e.g., between 2 HCWs - Postures (non-neutral - dynamic or static) - Cumulative workload i.e., repetitive exposure to physical risk factors within a shift and shift after shift	- Bed or worksurface height - Transfer distance - Limited/cluttered workspace - Furniture & equipment lack adjustability/not easily moved - Coefficient of friction between the sliding surfaces e.g., floors - Thresholds/change in floor level/ramps - Narrow doorways	- Weight - Shape/Size - Physical functioning/ability to assist - Fall risk - Cognitive impairment (unpredictable, combative, ability to follow instructions/level of cooperation) - Fearful - Culture/language comprehension - Fatigue - Diagnosis - Medical devices attached to patient	- The anthropometry of the care staff - Stance width and foot posture - Knowledge & experience related to SPHM technology/work practices etc. - Previous low back injury/MSDs - Physical conditioning - Exposure to risk factors for MSDs elsewhere e.g., at other employment/leisure - Age - Personality - Genetics	- Low job control - Reduced decision-making autonomy - Negative leadership styles - Emotional demands - Low social support by peers/supervisors - Job dissatisfaction - Bullying/hostile work environment - Poor/inadequate sleep/cognitive fatigue	- Staffing & # of HCWs performing the task - Irregular & long shifts - Task pacing and variety - Lack of scheduled breaks - Exposure to manual materials handling tasks - Frequency and type of patient handling task performed

Table 1.4 Factors that Influence the Frequency, Magnitude and Duration of Exposure to Risk Factors for WMSDs Associated with Manual Patient Handling Tasks.

The Importance of Early Reporting of WMSDs

As previously discussed, WMSDs often develop gradually as a result of microtrauma brought about by repeated exposure to biomechanical risk factors with insufficient rest and recovery for the musculoskeletal system (OSHA 2021).

Symptoms of WMSDs such as fatigue, weakness, and dull pain are often not experienced until cellular damage to the musculoskeletal system from microtrauma has been occurring for some time. Because of the slow and progressive onset of this internal injury the condition is often ignored until symptoms become acute, often resulting in disabling injury. The slow onset of symptoms makes it more challenging for a HCW to recall a specific event that caused an injury. Thus, it is critical that HCWs report patient handling related incidents (even if there is no apparent injury) and injuries *immediately* so that treatment can be sought to improve the chances of recovery and prevent disability. (**Figure 1.11**)

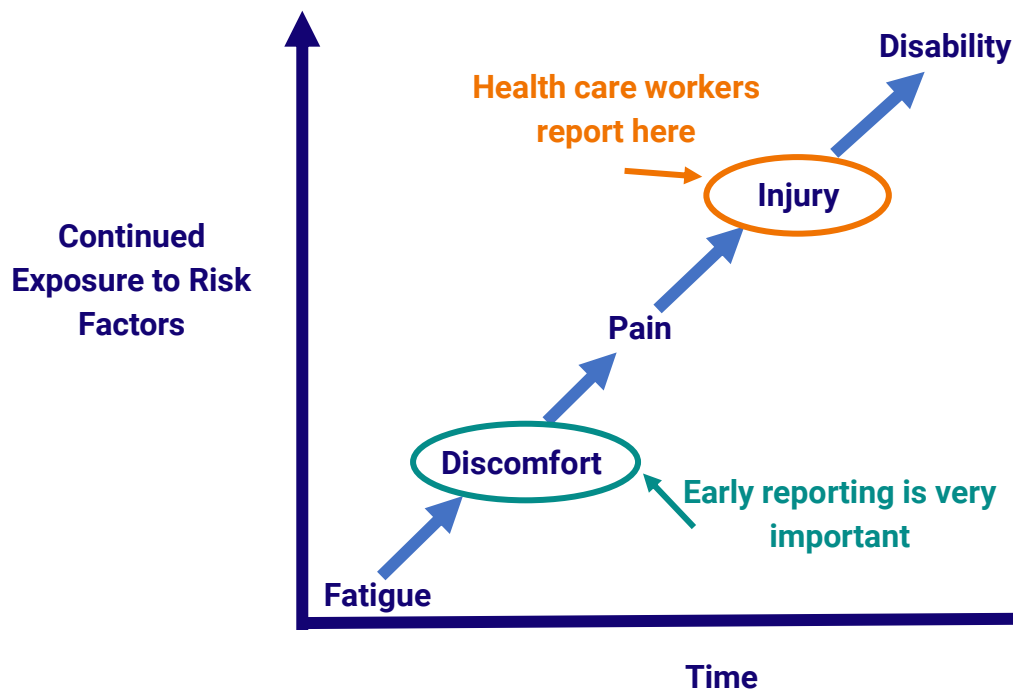


Figure 1.11 Progression of Disability and Importance of Early Reporting of WMSDs.

Are Traditional Methods of Addressing Patient Handling Tasks Effective?

More than 35 years of research have consistently shown that training HCWs to use 'proper' body mechanics and manual lifting techniques has failed to prevent and reduce WMSDs associated with patient handling tasks (Lavender et al., 2007; Matz et al., 2019; Martimo, et al., 2008; Warming et al., 2008).

As previously discussed, having multiple HCWs perform a manual patient handling tasks does not always reduce spinal loading enough to reduce injury risk and does not consider the impact of cumulative loading over time.

A study by Andersen et al. on over 5000 Danish HCWs found that performing just *1-2 manual patient lifts or transfers* daily increased the risk of back injury by 66%, even after adjusting for lifestyle and work-related factors.

The risk increased when 3–10 patient lifts were performed per day and remained about the same when more than 10 lifts were performed per day. The researchers concluded that these results suggest that *any* frequency of daily transfers is a risk factor for back injury (Andersen et al., 2014).

Waters proposed that the maximum weight limit for manual patient handling is 35 lbs based on the use of the Revised NIOSH Lifting Equation (RNLE) but only if the task is *not* performed under unpredictable conditions (e.g., unexpectedly heavy loads, slips, patient combativeness, or unexpected movements) (Waters, 2007; Rogers et al., 2013). *Refer to 'How Much Patient Weight Can a HCW Lift Manually?.'*

Another traditional solution that is thought to reduce the risk of back injury when standing and transferring patients is the use of gait belts. These are a straight belt made of fabric or plastic with no handles which is placed around the patient's abdomen. Gait belts are also often promoted as a tool to control a patient's descent to the ground during a fall. However, gait belts have not been shown to reduce loads on the spine sufficiently to decrease the risk of HCW injury when performing these tasks (Marras et al., 1999; Zhuang et al., 1999; Tang et al., 2018; Rockefeller & Proctor, 2011; Miller et al., 2017).

Thus, gait belts should not be used as devices to lift patients or be relied on to reduce injury risk to HCWs when trying to control a patient descent during a fall especially with patients of size. Gait belts are intended for guidance, feedback, and steadying assist when standing and ambulating patients who can bear their own weight and have some degree of locomotion.

The excessive biomechanical and postural stress required to repeatedly lift and move patients manually creates a significantly elevated risk of injury for HCWs. The loads are too great for body mechanics to make a difference (Hu et al., 2013; Marras, 2015; Marras, 2008).

Thus, there is no safe method to manually handle patients or manually assist with patient mobilization who cannot mobilize independently or with minimal supervision or coaching.

Research supports that the most effective approach to minimize the large external loads on the spine that occur during patient handling tasks is to use mechanical lifting devices as part of a multifaceted safe patient handling and mobility program (Richarz et al., 2023).

Safe Patient Handling and Mobility – Section 1

How Much Patient Weight Can a HCW Lift Manually?

One way to illustrate how much force a HCW will exert during a shift when manually handling patients is to examine patient handling tasks completed by nurses and aides in terms of patient weight handled. In the acute care setting, repositioning a patient in bed is one of the most frequently performed tasks that is also a leading cause of low back injuries. (Callison & Nussbaum, 2012; Kotowski et al., 2013; McCoskey, 2007; Pompeii, 2009; Wiggermann et al., 2021).

In 2018, the global risk consulting company AON reported that *nearly twice* as many HCWs are injured when repositioning patients up in bed (boosting), laterally repositioning, and turning as compared to transferring patients between beds or chairs (Jones et al., 2018).



Poole Wilson et al. observed nurses in three ICUs repositioning patients an average of 35 times during a 12-hour shift. Repositioning tasks were defined as boosting and turning in bed, repositioning extremities, and repositioning a patient laterally.

The average number for each task per 12-hour shift was seven times of turning patient on side, eight times of repositioning patient up in bed, 19 times of repositioning extremities, and one time of repositioning patient laterally (Poole et al., 2015).

The force required to logroll (i.e., the HCW reaches over a patient and turns the patient toward them) a patient who cannot assist to turn in bed is estimated to be approximately 32% of the patient's weight (Gonzalez et al., 2009).

The average weight of US adult men and women combined is 180 lbs. (Fryar et al., 2021).

Based on the above data, an HCW who turns patients with an average weight of 180 lbs. for a total of seven times in a shift would 'handle' about 400 lbs. of patient weight.

There is evidence to support the forces required to *boost* a patient in bed using a cotton sheet or drawsheet are *greater* than those required for turning the patient and *far exceed* the safe force limits for the spine (Wiggermann et al., 2021; Bartnik & Rice, 2013; Larson et al., 2018). However, there is no data on the force exerted as percent of patient weight when pulling or dragging the patient.



Safe Patient Handling and Mobility – Section 1



The leg of a patient with an average weight of 180 lbs. weighs approximately 31.5 lbs. (Krishnan et al., 2016; Plagenhoef et al., 1983). Thus, repositioning extremities alone could add up to handling several hundred pounds in a 12-hour shift! Given the many other manual patient handling and *materials* handling tasks that a nurse or aide may perform in a shift, it is not hard to extrapolate that they could handle the equivalent of hundreds of pounds of patient weight.

So, Is There a Safe Lift Limit for Manually Lifting Patients?

To keep force exerted below the recommended spinal loads (refer to *Physical Risk Factors* above), research demonstrates that the maximum weight a caregiver should manually lift is 35 lbs., but *only* if the task is performed under ideal conditions which include the following:

- The patient can follow directions and is not combative or unlikely to move suddenly during the task
- The patient is kept close to the HCW's body
- The lift is smooth and slow i.e., there are no unexpected or sudden movements
- The HCW does not have to twist
- The HCW does not have to reach with extended arms
- The shift worked is no longer than eight hours



What weighs 400 lbs.?
An adult male silverback gorilla!

(Waters, 2007)

In reality, few patient lifting tasks would meet these safety criteria, and few patients weigh less than 35 lbs.!

35 lbs. is approximately the weight of a typical computer task chair!

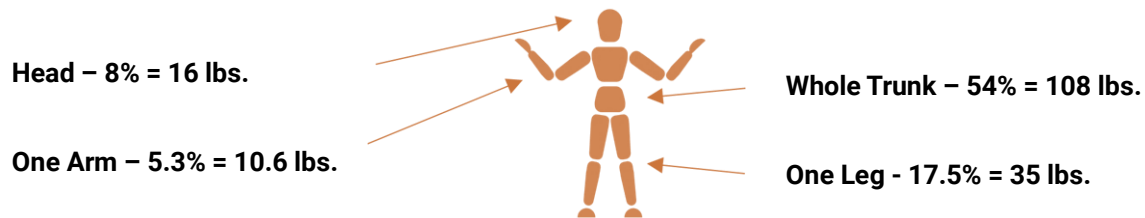


Waters (2007) provided examples of how easily the 35 lbs. weight limit is exceeded when manually handling a patient:

- If 2 HCWs are helping a patient who weighs 180 lbs. to stand from a chair and the patient can only partially assist by supporting about half of his/her own body weight, the HCWs would have to support 90 lbs. of weight. That is 45 lbs. each which exceeds the recommended 35-lb. limit.
- Even if 4 HCWs lifted or moved a patient who is unable to assist and/or bare their own body weight when standing, each HCW would support 50 lbs. which again exceeds the recommended 35-lb. limit (Waters, 2007).

Safe Patient Handling and Mobility – Section 1

The approximate weight of each body segment weigh on a patient who weighs 200 lbs. illustrated below (Krishnan et al., 2016; Plagenhoef et al., 1983; Chaffin 2006).



Other recommended safe weight limits for specific patient handling tasks

- For **log-rolling or turning a patient** is 78 lbs. (35 kgs.) by 1 person and 156 lbs. (70 kgs.) by 2 persons (Waters, 2009)
- Patient handling tasks that require **static loading** of the spine and musculoskeletal system include holding a limb, supporting a patient on their side, or bending and reaching over a bed during hygiene procedures or treatment of wounds. These tasks require HCWs to use a significant amount of muscle power as they hold their body weight in one position for a period of time. Consequently, blood supply to muscles is reduced which leads to rapid muscle fatigue (Knibbe and Knibbe, 2012).

Biomechanical guidelines that recommend safe limits for tasks requiring static postures with the goal of minimizing muscle fatigue e.g.,

- Not working for longer than 1 minute at more than 30 degrees in a bent forward position (Knibbe and Knibbe, 2012; Knibbe et al., 2003; ISO/TR 12296:2012).
- Not holding a patient's body part such as a leg weighing more than 7 lbs. with both hands for longer than 2 minute or more than 8 lbs. with both hands for longer than 1 minute (AORN 2021).
- There are ergonomics guidelines that define **acceptable forces for tasks involving pushing and pulling** e.g., transferring a patient in a spine position from a bed to stretcher. For tasks involving pulling forces pulling forces should not exceed 245 N at a frequency of 30 minutes for female workers (Snook, & Ciriello, 1991; Zhou & Wiggerman, 2019).

Calculating the 35 lbs. Lifting Limit

The Revised NIOSH Lifting Equation (1991) which is based on information derived from biomechanics (maintain L5/S1 compression forces below 3400 N), psychophysics (loads are acceptable to 75% of females and about 99% of males), and physiology (energy expenditure is limited to values ranging from 2.2 to 4.7 kcal/min depending on the duration and vertical distance of the lifts), was used to evaluate a safe weight limit for manual patient handling (Waters et al., 1993; Waters 2007). However, it can only be applied to a limited range of manual patient handling tasks (Waters, 2007).

Safe Patient Handling and Mobility – Section 1

SPHM and patients of size

The term 'individual or patient of size' is a more recently accepted term for obese persons and preferred over "bariatric patient" within this toolkit. Individual of size (IOS) takes into account a patient's body weight, height, and weight distribution (FGI, 2018).

An individual of size is defined as a person overweight by more than 100 lbs., with body weight greater than 300 lbs. or a body mass index (BMI) greater than 40. For safe patient handling purposes, a BMI of 30 is considered the threshold (Matz et al., 2019).

The risk of injury to HCWs significantly increases when manually lifting and mobilizing an individual/patient of size who is unable to move independently and safely. MSD risk factors such as force exerted and reach distance when performing care tasks are greater due to the patient's weight and body habitus (Choi & Brings, 2016; Cimolin et al., 2016; Davis et al., 2015; Galinsky et al., 2021; McClean et al., 2021; Réminiac et al., 2014).

From this author's experience when analyzing OSHA 300 logs and worker compensation data from several hospitals, it is observed that patients of size represent a smaller fraction of a typical hospital patient population but account for a considerable number of WMSDs to HCWs especially nurses and aides. There is little published data to reflect this finding.

The lack of rest and recovery time for the musculoskeletal system between exposure to patient handling tasks with an IOS is also a factor. Individuals of size who cannot mobilize independently, may require more HCWs to move them manually. This often means that within a shift, the same group of HCWs will perform patient handling and care tasks for an IOS, thus increasing their exposure to cumulative spinal loading.

It is important to note that one study conducted prior to the Covid-19 pandemic found that a significant number (65%) of patients admitted to the hospital for general medical conditions were overweight (34%) and obese (31%) (Hossain et al., 2018). This number has likely increased because obesity may triple the risk of hospitalization due to a COVID-19 infection (CDC, 2023).

Therefore, it is *critical* that SPHM technology is used to make care tasks safer for both HCWs and individuals/patients of size. The capacity of SPHM technology to safely lift and promote mobility for this patient population must be considered when developing a SPHM program.

SPHM technology that can be used to lift and mobilize individuals/patients of size is discussed **in Section 5**. Research and resources related to the care of these patients can be found in **Section 10**.

Obesity in the US

The national health and nutrition examination survey reported that based on data from 2017 to March 2020 the US obesity prevalence for adults aged 20 years and older was 41.9% and prevalence rate for severe obesity was 9.2%. Among children and adolescents aged 2–19 years, the prevalence of obesity was 19.7% (Stierman et al., 2021).

From 1999 –2000 through 2017–March 2020, US obesity prevalence increased from 30.5% to 41.9%. During the same time, the prevalence of severe obesity increased from 4.7% to 9.2% (Stierman et al., 2021).

Unfortunately, obesity is not just a serious health issue in the US, worldwide obesity has nearly tripled since 1975 and continues to increase (WHO, 2024).

Obesity can be defined as “abnormal or excessive fat accumulation that presents a risk to health” (WHO, 2024). Obesity is a complex disease with many causes and factors. Once established, obesity becomes a life-long chronic disease. Obesity-related conditions include heart disease, stroke, type 2 diabetes and certain types of cancer, Sleep apnea and respiratory problems, Alzheimer’s disease, depression and more. Often more than one condition (co-morbidity) is present in individuals with chronic obesity (NHLBI, 2018).

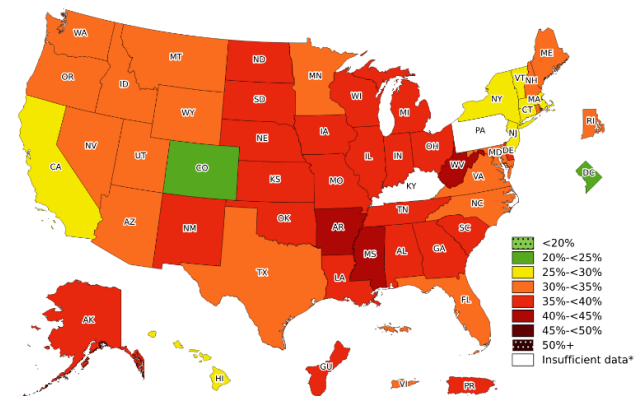
Obesity is associated with increased morbidity, increased mortality, and, subsequently, increased admittance to health care facilities (CDC 2023, Hallmark et al., 2016). The estimated annual medical cost of obesity in the United States was nearly \$173 billion in 2019 dollars (CDC, 2023).

Patients with a high BMI or of greater body weight are often referred to as ‘Bariatric patients.’ Wikipedia defines Bariatrics as the “branch of medicine that deals with the causes, prevention, and treatment of obesity (Wikipedia, ND).

The term bariatrics was coined around 1965, from the Greek root bar- (“weight” as in barometer), suffix -iatr (“treatment,” as in pediatrics), and suffix -ic (“pertaining to”). The field encompasses dieting, exercise and behavioral therapy approaches to weight loss, as well as pharmacotherapy and surgery. The term is also used in the medical field to refer to people of larger sizes without regard to their participation in any treatment specific to weight loss (Wikipedia, ND).

Body mass index (BMI) is a screening method for weight and is calculated by using a person’s weight in kilograms divided their height in meters squared, i.e., kg/m²

A BMI over 30 kg/m² is considered obese and a BMI of 40 or higher is sometimes categorized as “severe” or morbid obesity (CDC, 2023). For more information about Obesity, visit the CDC Overweight webpage at <https://www.cdc.gov/obesity/index.html>



Prevalence of Obesity Based on Self-Reported Weight and Height by State and Territory, [Behavioral Risk Factor Surveillance System](#) 2023. Source: CDC, 2024.

Legislation, Standards and Guidelines Related to SPHM

Federal Regulations

Legislative efforts to prevent WMSDs in the US began in the 1990s with the issuance of an OSHA Ergonomics Program Standard on Nov. 4, 2000. President George W. Bush and Congress repealed this standard in 2001, citing economic concerns for employers and conflicts with state workers' compensation laws (Ho, 2017).

OSHA then proceeded to address ergonomics concerns with issuance of guidelines for various industries that contain recommendations, best practices and lessons learned to prevent and control WMSDs. OSHA published the first guideline for prevention of musculoskeletal disorders in nursing homes in 2003 (*Revised March 2009*) in recognition of the need to address the high rates of WMSDs in healthcare (OSHA, 2009).

Four attempts were made in 2006, 2009, 2013 and in 2015 to pass the *Nurse and Health Care Worker Protection Act* in Congress. The goal of these bills was to require the Department of Labor to establish a standard on safe patient handling to prevent WMSDs in HCWs. However, all 4 bills failed to move out of committees.

In the United States, the Occupational Safety and Health Administration (OSHA), and the National Institute for Occupational Safety and Health (NIOSH), continue to develop guidelines to address SPHM in health care settings.

State Standards and Guidelines

In lieu of a federal standard, 10 states (CA, IL, MD, MO, MN, NJ, NY, RI, TX, and WA) have passed SPHM legislation between 2006 and 2014 in an effort to prevent patient handling injuries among HCWs. Hawaii and Ohio passed resolutions to support SPHM and in OHIO grants were provided to implement SPHM programs in long term care. However, the SPHM law in Missouri was rescinded in 2019 and Ohio's resolution grant program was repealed in 2015.

Although the nine states with existing regulations require a comprehensive SPHM program to be implemented and maintained, the scope of state laws varies.

However, there are few peer-reviewed studies that have evaluated the impact of these plans. In 2012, California passed a law that requires acute care hospitals to have a comprehensive plan to prevent patient handling injuries among employees.

Lee et al., conducted two serial cross-sectional studies in 2013 and 2016 involving statewide random samples of California registered nurses. Results showed that hospital SPHM policies and programs showed clear improvements, and a significant reduction in major musculoskeletal symptoms among workers was noted (Lee et al., 2019).

In another study, the impact of the California SPHM law on workers' compensation claims for MSDs in hospital workers was evaluated. From 2011 to 2016, the claim rate for MSDs attributed to patient handling showed a significant reduction in hospital workers, suggesting that SPH legislation played a crucial role in reducing the risk of injury among HCWs (Lee et al., 2022).

Safe Patient Handling and Mobility – Section 1

There is further evidence to support that in states with SPHM legislation patients are more likely to be mobilized with SPHM technology, and there is a decrease in WMSDs associated with patient handling (Kayser et al., 2020; Lapane et al., 2016; Lee et al., 2021; Rosebush et al., 2022; Silverstein & Schurke, 2011; Weinmeyer, 2016).

Standards and Guidance from Professional Organizations

The American Nurses Association (ANA)

In 2013, the American Nurses Association (ANA) published the *Safe Patient Handling and Mobility: Interprofessional National Standards*. The second edition of this standard was published in 2021, and details eight evidence-based standards required to implement and maintain a successful SPHM program (ANA, 2021).

1. Establish a culture of safety.
2. Implement and sustain an SPHM program.
3. Incorporate ergonomic design principles to provide a safe environment of care.
4. Select, install, and maintain safe patient handling technology.
5. Establish a system for education, training, and maintaining competence.
6. Integrate patient centered SPHM assessment, plan of care, and use of technology.
7. Include SPHM in reasonable accommodation and post-injury return to work.
8. Establish a comprehensive evaluation system.

The goal of the standards to “infuse a stronger culture of safety in health care work environments and provide a universal foundation for policies, practices, regulations and legislation to protect patients and health care workers from injury” (Powell-Cope & Rugs, 2015).

This groundbreaking document was developed by a multidisciplinary group of SPHM experts and, in lieu of federal SPHM regulation, is considered by many SPHM professionals and safety organizations as the evidence-based ‘gold standard’ for SPHM programs in the US (ANA, 2013; Hallmark et al., 2015).

Appendix B provides a crosswalk to show the mapping of elements of the ANA SPHM standards to the SPHM program elements detailed in this toolkit.



Multifaceted Evidence-Based SPHM Programs Show Cost-Savings

In a meta review of workers’ compensation claim data from 2016 and 2018, Aon, a global insurance brokerage firm, showed that health care systems using ANA SPHM standards significantly reduced the average total cost of claims.

In 2016, Aon reported a 23% reduction (\$6,000 vs \$7,800) for systems using the standards. Data included \$2.4 billion in incurred losses across 50 states from 2005 to 2016 (Jones et al., 2016).

In 2018, Aon's analysis confirmed greater savings with a 36% reduction in cost per claim (\$5,900 vs \$9,200) in a larger dataset of \$3.0 billion incurred losses. These findings suggest that ANA standards positively impact safety culture and effectively mitigate costs (ANA, 2021).

Safe Patient Handling and Mobility – Section 1

Professional Associations

Several other professional associations have developed Safe Patient Handling and Mobility (SPHM) standards and guidelines for health care disciplines including the:

- American Physical Therapy Association (APTA)
- American Occupational Therapy Association (AOTA)
- Association of periOperative Nurses (AORN)
- The National Association of Orthopedic Nurses (NAON)
- Association of Occupational Health Professionals in Healthcare (AOHP)

*More information about SPHM standards and guidelines from these associations can be found in **Section 10**.*

Design Standards and Guidelines related to SPHM

In recent years, federal entities and national design organizations have set standards requiring that healthcare facilities undergoing construction and renovation adhere to specific guidelines and standards to better protect HCWs and patients. These include:

The Facility Guidelines Institute (FGI)

The Facility Guidelines Institute (FGI) publishes 3 guidelines for design and construction of healthcare facilities in the US i.e., the ***Guidelines for Design and Construction of Hospitals; for Residential Health, Care and Support Facilities; and for Outpatient Facilities***.

<https://www.fgiguideelines.org/guidelines/editions/>

The guidelines require healthcare facilities to incorporate SPHM principles when designing new buildings, additions, and renovations of patient care and treatment areas with the goal of optimizing patient care and HCW safety. To date, 43 states have adopted these guidelines for use in their regulation of the licensing or construction of healthcare and residential care facilities. To provide architects, planners, state regulators, and healthcare organizations guidance on the rationale for, and relationship of, the physical environment with SPHM technology and practices, the FGI wrote the Patient Handling and Mobility Assessments (PHAMA) white paper in 2010. This paper was updated in 2019 and is available at no charge. It not only provides invaluable information about building design and SPHM technology but is a primer for development for SPHM programs. ***Patient Handling and Mobility Assessments: A White Paper (2nd ed. 2019) (PHAMA)***. <https://www.fgiguideelines.org/resource/patient-handling-and-mobility-assessments-2nd-ed/>

*SPHM and Health Care Design and Construction Guidelines are discussed further in **Section 9, Table 9.5**.*

Americans With Disabilities (ADA)

Americans With Disabilities (ADA) Access to Medical Care for Individuals with Mobility Disabilities—Use of SPH Equipment in Clinics. Department of Health and Human Services Office for Civil Rights (HHS OCR), 2010. <https://www.ada.gov/resources/medical-care-mobility/>

Safe Patient Handling and Mobility – Section 1

The *Americans with Disabilities Act of 1990 (ADA)* is a federal civil rights law that prohibits discrimination against individuals with disabilities in everyday activities, including medical services.

Title II and Title III of the Americans with Disabilities Act (ADA) of the ADA requires that medical care provided in clinics (including those owned by hospitals), offices, and similar locations are accessible to patients with mobility disabilities (DOJ, 2020). This includes the use of SPHM technology such as powered floor or overhead/ceiling lifts to facilitate patient accessibility to and from exam surfaces. The Americans with Disabilities (ADA) *Access to Medical Care for Individuals with Mobility Disabilities* technical assistance guide details design requirements and use of SPHM technology in medical settings such as clinics with respect to people with mobility disabilities, which include, for example, those who use wheelchairs, scooters, walkers, crutches, or no mobility devices at all.



Did you Know?

In January 2023, the Justice Department filed a proposed consent decree with a large chain of eye care providers to resolve its lawsuit alleging that the eye care practices violated the Americans with Disabilities Act. The eye care providers must train staff on the new policy requirements and on safe transfer techniques (including use of SPHM lift technology) and pay \$950,000 to patients and prospective patients who were harmed by its policies and a civil penalty of \$50,000 (DOJ, 2023).

International Organization for Standardization (ISO) Standard 10535:2021 Assistive products – Hoists for the transfer of persons – Requirements and test methods

This ISO 10535 details the design and testing requirements manufacturers of patient lifts and slings should meet before their products are made available for use in any healthcare or home/community environment. In the US, ISO 10535 is recognized as a consensus standard by the Food and Drug Administration (FDA) as applied to patient lifts and slings, thus, manufacturers of such devices should at a minimum, meet ISO 10535 design and testing criteria. **Section 5** of this toolkit outlines the ISO 10535:2021 requirements for the design and manufacture of SPHM technology.

ISO Standard 10535:2021 Assistive products – Hoists for the transfer of persons – Requirements and test methods. <https://www.iso.org/standard/72711.html>

CMS Recognized Accrediting Organizations

Accrediting organizations such as Det Norske Veritas (DNV), the Commission on Accreditation of Rehabilitation Facilities (CARF International) and the Joint Commission (TJC) have no specific standards related to SPHM programs.

However, the Joint Commission, through its Environment of Care standard: EC.02.06.05 #1, does require facilities that are building new structures or undergoing major renovations to use the FGI *Guidelines*, or the state construction guidelines, which are often FGI *Guidelines*. Since the FGI *Guidelines* include the PHAMA, construction should follow the PHAMA guidelines (Matz et al., 2019).

Safe Patient Handling and Mobility – Section 1

As stated in The Joint Commission EC News, August 2017 in an interview with Gary Orr, a health scientist and ergonomist at OSHA, “The Joint Commission promotes a culture of safety in its requirements. Its hazard assessment provision requires hospitals to identify areas of risk and develop a plan to mitigate the risk. In addition, several Environment of Care standards espouse best practices that foster a safer SPHM environment.” Joint Commission surveyors also look at the OSHA log and see injuries associated with patient handling as a risk,” Orr notes. “Implementation of an effective SPHM program is a good way to address that risk.” (TJC, 2017).

In 2012, TJC published “Improving Patient and Worker Safety: Opportunities for Synergy, Collaboration, and Innovation” which informs healthcare organizations about the risks of manual patient handling to HCWs and patients and how SPHM programs decrease these risks and facilitate safer patient care. This publication can be accessed at <https://www.patientcarelink.org/the-joint-commission-improving-patient-worker-safety-opportunities-for-synergy-collaboration-innovation/>

Information about the use of the CMS Durable Medical Equipment program to access SPHM technology such as floor-based patient lifts in community-based healthcare systems is discussed in **Section 5**.

CMS Age Friendly Measure 2025 and Relationship to SPHM

Effective January 1, 2025, the Centers for Medicare & Medicaid Services (CMS) implemented a new age-friendly hospital structural measure in the CMS 2025 Inpatient Prospective Payment System (IPPS).

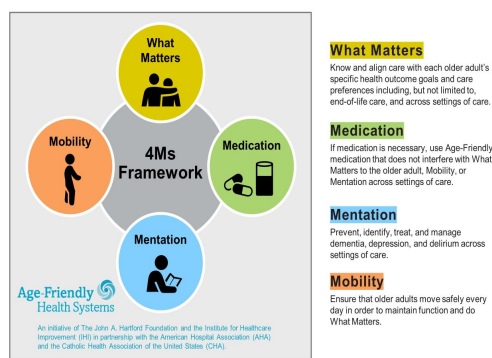
Hospitals that participate in the CMS Hospital Inpatient Quality Reporting Program (IQR) must report on their compliance with the measure. Hospitals that choose not to participate in the IQR program face a significant reduction in their annual Medicare payment update (The John A Hartford Foundation, 2024).

This measure focuses on five key domains to assess a hospital's commitment to delivering high-quality care for patients aged 65 and older. These domains are patient goals, medication management, frailty screening, social vulnerability, and leadership commitment.

Domain 3: Frailty Screening and Intervention, aims to screen patients for geriatric issues related to frailty including cognitive impairment/delirium, physical function/mobility, and malnutrition for the purpose of early detection and intervention where appropriate.

SPHM plays a key role in meeting the requirements of Domain 3 as related to physical function/mobility. Evidence supports the use of SPHM technology to facilitate early, safe, and progressive patient mobility and rehabilitation outcomes. The role of SPHM in early mobility programs is discussed in **Section 5**.

A recent study by Wiggerman et al., 2024, highlights the important role of SPHM in early mobility programs. A survey of 973 HCWs 82% of whom were nurses, indicated that in early mobility programs where SPHM technology was not utilized, there was an increase in reports of pain or



CMS Age Friendly Measure 2025 and Relationship to SPHM

injury. This highlights the unfortunate possible tradeoff between patient mobility and HCW safety which could be avoided by implementing a multifaceted SPHM program (Wiggerman et al., 2024).

The Age Friendly Hospital Measure is based in part on the 4Ms Framework for age-friendly care (What Matters, Medication, Mentation and Mobility) and standards of surgical and emergency department care developed as part of JAHF-funded initiatives (The John A Hartford Foundation).

For more information:

- Medicare and Medicaid Programs and the Children's Health Insurance Program; Hospital Inpatient Prospective Payment Systems for Acute Care Hospitals and the Long-Term Care Hospital Prospective Payment System and Policy Changes and Fiscal Year 2025 Rates; Quality Programs Requirements; and Other Policy Changes. A Rule by the Centers for Medicare & Medicaid Services on 08/28/2024.
<https://www.federalregister.gov/documents/2024/08/28/2024-17021/medicare-and-medicaid-programs-and-the-childrens-health-insurance-program-hospital-inpatient>
- Overview of Age-Friendly Hospital Measure. The John A Hartford Foundation.
<https://www.johnahartford.org/images/uploads/resources/Age-Friendly-Hospital-Measure-Domains-2024-Final-Rule-p-1428.pdf>
- Age-Friendly Health Systems. Institute for Healthcare Improvement (IHI)
<https://www.ihl.org/partner/initiatives/age-friendly-health-systems>

Hazard Prevention and Control - Using SPHM to Prevent Patient Handling Injuries

Effective SPHM Programs – Evidence and Outcomes for Health Care Workers, Patients and Organizations

Evidence shows that multifaceted participatory safe patient handling and mobility programs (SPHM) can be effective in reducing HCW injuries associated with patient handling and can also be beneficial for patients (Dennerlein et al., 2017; Halim, 2023; Hodgson et al., 2013; Humrickhouse & Knibbe, 2016; Jones & Eaferton, 2020; Lee & Rempel, 2020; Mayeda-Letourneau, 2014; Miller et al., 2022; Nelson et al., 2006; Powell-Cope et al., 2014; Przybysz, 2017; Richarz et al., 2023; Rogers, 2013; Sorensen et al., 2016; Thomas & Thomas, 2014; Siddharthan et al., 2005; Stevens et al., 2013; Wählin et al., 2022; White-Heisel et al., 2017). (**Table 1.5**)

At the core of these programs is the use of SPHM technology such as powered mobile mechanical patient lifts, ceiling-mounted or overhead lifts, and friction-reducing devices/lateral transfer aids, to safely move patients when performing patient handling tasks that expose HCWs to the risk factors for WMSDs as described previously.

The use of SPHM technology has been shown to reduce the biomechanical risk factors associated with manual patient handling to varying degrees. Powered motorized equipment such as ceiling lifts have

Safe Patient Handling and Mobility – Section 1

been shown to reduce biomechanical demands to safer levels. (Abdul et al., 2022; Bartnik et al., 2013; Dutta et al., 2012; Hwang et al., 2018; Jager et al., 2013; Koppelaar et al., 2012; Larson et al., 2018; Marras et al., 1999; Muona et al., 20; Riccoboni, et al., 2021; Richarz et al., 2022; Santaguida et al., 2002; Sivakanthan et al., 2021; Silvia et al., 2002; Vinstrup et al., 2020; Weiner et al., 2017; Wiggermann et al., 2021; Zuang et al., 1999).

However, there is less evidence to support that the use of small non-powered (non-technical) aids such as sliding sheets reduce these demands sufficiently (Freiberg, et al., 2016; Hegewald et al., 2018, Vinstrup et al., 2020).

SPHM technology is described in **Section 5. Appendix C** describes the development of SPHM technology over the past few decades.

Elements of Successful SPHM Programs

Research supports that SPHM programs should be designed and implemented using a system-oriented approach and include the following elements: (Adamczyk, 2018; ANA, 2021; Dennerlein et al., 2017; Hegewald et al., 2018; Huffman et al., 2014; Hurtado et al., 2018; King Jensen, 2023; Kurowski et al., 2017; McMillan et al., 2018; Olinski & Norton, 2017; Przybysz, 2017; Rugs et al., 2013; Stevens et al., 2013; Teeple et al., 2017; Totzkay, 2018; Wiggerman et al., 2024).

- Management leadership (senior and supervisory) and a safety climate that supports the use and supply of SPHM technology, program sustainability, and facilitates culture or behavioral change to promote SPHM.
- Active ongoing involvement of HCWs to facilitate and support all facets of an SPHM program.
- SPHM policies that promote minimal manual lifting and handling of patients who cannot move independently and SPHM protocols for specific patient populations e.g., bariatrics, orthopedics.
- The use of SPHM technology to safely lift, move, reposition, and transport patients, and to reduce or eliminate the risk factors for WMSDs.
- Sufficient quantity of SPHM technology that is readily accessible and is compatible with the physical, cognitive, and clinical needs of the patient; the patient handling or mobility task to be performed; the workspace the task is to be performed in; and the knowledge and skills of the caregiver.
- Defined processes for storage, cleaning, maintaining, and inspecting SPHM technology and slings with replacement plans based on lifespan of lifts, batteries, slings, etc.
- Patient-centered SPHM assessment protocols decision-making algorithms for selecting appropriate SPHM.
- Ongoing competency-based hands-on SPHM education and training.
- Facility champions (program coordinators).
- Well trained unit-based peer leaders or SPHM coaches to reinforce safe use of SPHM technology and work practices thus facilitating program effectiveness.

Elements of Successful SPHM Programs

- A well-defined and administered process for the reporting, recording, and responding to patient handling occupational injuries (incidents).
- Reporting processes and culture that facilitate early reporting of injuries and effective return to work and after injury care to minimize disability.
- Patient handling tasks and practices included during rounding and related periodic worker and patient safety and risk assessments.
- Proactive design i.e., including SPHM in design and new construction and remodeling of health care facilities.
- Periodic (at least annually) evaluation of program performance.

Tool i summarizes the steps to take when designing, implementing, and evaluating a SPHM program that includes these elements.

Table 1.5 *Elements of Successful SPHM Programs.*

The use of *SPHM technology and/or training alone* has been shown to be ineffective in reducing HCW injuries (Fragala & Bailey, 2003; Hignett 2003; Kanaskie & Synder, 2018; Martimo et al., 2008; Richardson et al., 2018).

Research supports that the use of SPHM technology reduces the forces exerted on the spinal and supporting structures when manually lifting and moving patients. However, to successfully reduce the risk of WMSDs from the effect of cumulative exposure to forceful exertion, SPHM technology must be used consistently by HCWs.

Additionally, awkward postures (static and dynamic) used by HCWs when performing patient handling and care tasks are still observed even when using SPHM technology e.g., bending over a bed that is not raised to place a sling or friction reducing sheet. Reducing exposure to poor postures requires that HCWs adopt ergonomics best practices when performing their work, which requires a change in behavior or how they perform their work.

As previously discussed, the effectiveness of SPHM technology to reduce MSDS risk is also dependent on the influence of other work environment and organizational variables (Wahlen et al., 2022; Wiggerman et al., 2021).

Therefore, for SPHM programs to be successful and sustainable (i.e., for HCWs to consistently use SPHM technology and ergonomics practices), research demonstrates that the many variables that contribute to WMSDs associated with manual patient handling have to be addressed, i.e., the biomechanical, psychosocial, work organization, environmental, patient and caregiver related factors.

The extent to which psychosocial and organizational factors play a role in MSDs development and are interdependent with each other and with physical factors is not fully understood. Thus, there is limited guidance about interventions that address these factors or how to measure them within a SPHM program. However, it is likely that a well-designed SPHM program that is continuously and visibly supported by leadership and actively fosters employee involvement, could positively impact the effects of psychosocial and organizational risk factors on HCW injury and patient safety. Incorporating the program

Safe Patient Handling and Mobility – Section 1

elements listed above sends a message that the organization is committed to actively supporting HCW safety (Caponata et al., 2020; Lee & Lee, 2021; Mayeda-Letourneau, 2014).

Benefits of SPHM Programs – The Evidence Base

Health care workers

The following is a summary of the outcomes reported as a result of implementation of comprehensive SPHM programs in the US over the past 15 years: (BLS, 2018; Celona, 2014; Collins 2020; Dennerlein et al., 2017; Garg & Kapellusch, 2012; Huffman et al., 2014; Kennedy & Kopp, 2015; Kurowski et al., 2017; Matz et al., 2019; Mayeda-Letourneau, 2014; Olinski & Norton, 2017; OSHA 2013; Powell-Cope et al., 2014; Restrepo, 2013; Rugs et al., 2013; Stevens et al., 2013; Theis & Finkelstein, 2014; Thomas & Thomas, 2014; Walker, et al., 2017).

- 30%-95% decrease in the number and rates of WMSDs.
- 66%-100% decrease in severity or lost and restricted workday injury rates related to WMSDs.
- 30%-95% decrease in workers' compensation costs of WMSDs.

Increases in HCW *job satisfaction* and significant reductions in HCW *turnover* are also reported.

Initial investment for purchase of technology and implementing an SPHM program is reported to be recovered between 15 months to four years (Aslam et al., 2015; Hallmark et al., 2015; HFES, 2023).

Violence by patients against HCWs has increased significantly over the past decade with serious and sometimes deadly consequences for workers (Kurowski & Ghaziri, 2019). Use of SPHM technology such as ceiling and floor-based lifts reduces the time spent in close physical contact during a patient lift or transfer task that may agitate patients who are cognitively impaired. Consistent use of SPHM technology appears to reduce the risk of patient-initiated violence when patient care tasks are performed (Collins et al., 2006; Kurowski & Ghaziri, 2019; Pihl-Thingvad et al., 2018; Risør et al., 2017).

There is anecdotal evidence that the decrease in close physical contact with patients when using SPHM technology may also decrease the risk of *body fluid exposure*.

SPHM equipment can reduce the number of staff needed to reposition patients compared to manual repositioning, thereby also reducing the usage of personal protective equipment (PPE) and exposure to infectious disease (HFES, 2023).

Patients

It is more challenging to measure the relationship between SPHM and patient outcomes; however, there is a growing body of evidence to support that SPHM programs are beneficial to patients.

In a meta-analysis of studies that examined the association between HCW health and safety and patient outcomes, Gibson et al., reported several key findings to support the positive impact of SPHM programs that include the use of SPHM technology and policies on HCW musculoskeletal health and on patient outcomes. These include:

- Reduced risk of health-facility acquired pressure injury by up to 17%.
- Improved patient mobility by 12%.
- Improved patient comfort and safety (Garg & Kapellusch, 2012; Gibson, 2017;)

Safe Patient Handling and Mobility – Section 1

A 43%-50% decrease in pressure injuries and significant reduction in patient falls related to lift and transfer activities have been reported by some hospitals and long-term care facilities when implementing an SPHM program (Gucer et al., 2013; Kennedy, et al, 2015; Kurowski & Ghaziri, 2019; The Joint Commission, 2012; Spritzer, et al, 2015; Walden et al., 2013; Yoder et al., 2014).

There is an increasing emphasis on early mobility programs in health care because of the critical role they play in improving patient outcomes and reducing length of stay and total cost of care (HFES, 2023). Although there is need for more research to demonstrate the impact of specific SPHM related interventions on early mobility, it appears that the use of SPHM technology plays a key role in facilitating early and safe mobilization of patients (Bassett et al., 2012; Dang et al., 2022; Dickinson et al 2018; Gibson, 2017; Kayser et al., 2020; Wyatt et al., 2020). The role of SPHM in early mobility programs is discussed in **Section 5**.

There is evidence that the use of SPHM technology increases participation of patients in their therapeutic activities and does not have a negative impact on functional independence measure (FIM) mobility scores (Arnold et al., 2011; Campo et al., 2013; Darragh et al., 2013; Darragh et al., 2012; Mcilvane et al., 2011; Rockefeller, 2008).

Case studies in long-term care have reported that residents experience an increase in physical functioning and activity level, lower levels of depression, improved urinary continence, lower fall risk, and higher levels of alertness during the day after SPHM programs were implemented (White-Heisel et al., 2017).

Health care organizations

The benefits of fewer health care worker injuries, improved job satisfaction, and decreased employers' overall work injury costs have potentially positive long-term implications for RN retention, satisfaction, and recruitment.

Fewer patient falls, skin tears, pressure ulcers, and improved mobility and function lead to significant savings for hospitals and improve patient experience and satisfaction. This can lead to higher Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores or ratings, and in turn higher value-based incentives payments from the Centers for Medicare and Medicaid Services (CMS) (OSHA ,2013; CMS, 2023)

SPHM plays an integral role in the safety and health of HCWs, health care consumers and in the wellbeing of healthcare organizations. Well-designed SPHM programs not only reduce the incidence and severity and costs of health care worker injuries associated with manual handling and lifting of patients but reduce HCW turnover and facilitate improved patient outcomes (ANA, 2021).

Figure 1.12 summarizes the overall benefits of SPHM programs for HCWs, patients and healthcare organizations.

Safe Patient Handling and Mobility – Section 1

The prerequisite for these benefits to occur is a culture of patient and health care worker safety & implementation of a multifaceted evidence based and sustainable SPHM

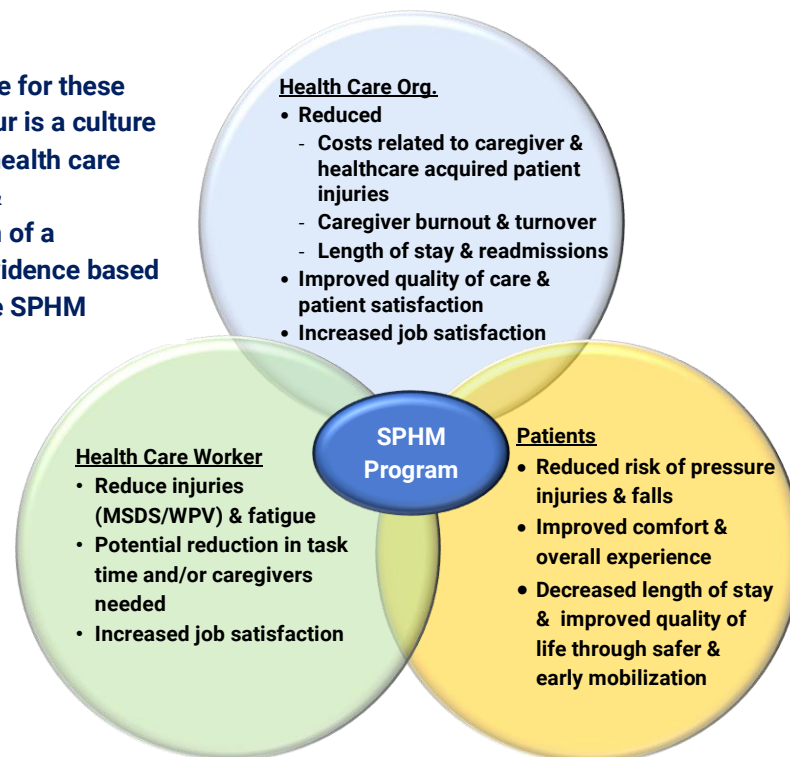


Figure 1.12 A Summary of the Benefits and Value of SPHM Programs for Healthcare Organizations, HCWs and Patients.

An Approach to Developing a Successful SPHM Program

The OSHA approach to management of effective occupational ergonomics, safety and health programs provides a sound framework for development of a multifaceted SPHM program that incorporates the evidence-based program components described earlier (OSHA, 2016).

The recommended OSHA program elements (listed below) are incorporated into this toolkit; however, additional elements have been added to further ensure program success and sustainably. These elements draw from the ANA SPHM standards and high reliability principles such as those detailed by the Joint Commission (TJC, 2024), Team Stepps® from the Agency for Healthcare Research and Quality (AHRQ, 2023), as well as published research, case studies, and the author's decades of experience implementing SPHM, safety, and ergonomics programs in healthcare and industry.

The following are the program components that foster a proactive and collaborative approach to preventing HCW and patient injury from manual patient handling and facilitating sustainable change.

- Management Leadership*
- Employee Participation & Engagement*
- SPHM Policy
- Program Management Organization

Safe Patient Handling and Mobility – Section 1

- Communications Structure
- Hazard Identification and Assessment*
- Hazard Control and Prevention*
- Education and Training*
- Medical Management of early symptoms of WMSDs and injuries reported by HCWs*
- Program Evaluation and Improvement*

*OSHA program components

Appendix B lists a brief description of each of the SPHM program components noted above together with the corresponding Toolkit Sections and mapping to the ANA SPHM Program Standards.

Studies show that occupational injury prevention programs are more effective and sustainable when they are multifaceted in nature, incorporated into an organization's culture and overall safety and health program, and assist to meet service delivery goals (**Figure 1.13**).

Continuous quality improvement principles (**Figure 1.14**) are used to plan, implement, evaluate, and sustain (i.e., ongoing program improvement) a multifaceted SPHM program that promotes and supports a culture of HCW and patient safety.

Implementing and sustaining a SPHM program is a journey. As program success is demonstrated to management and HCWs, SPHM becomes part of the organization's culture of safety. Over time, as the program matures and becomes integrated within the organization's practices, SPHM is considered a standard of care. Program measurements shift from reactive or lagging indicators i.e., moving from implementing hazard controls after injuries occur and using injury numbers and rates to gauge success—to proactive measures aimed at addressing risks for WMSDs *before* they arise (**Figure 1.15**).



Want to Learn More About How These Program Components Contribute to the Success of Safety Programs?

Useful Resources

- **Caring for Our Caregivers. Facts About Hospital Worker Safety.** OSHA
https://www.osha.gov/sites/default/files/1.2_Factbook_508.pdf
- **Worker Safety in Hospitals Caring for our Caregivers Safety and Health Management Systems** OSHA
<https://www.osha.gov/hospitals/mgmt-tools-resources>
- **Recommended Practices for Safety and Health Programs** OSHA
<https://www.osha.gov/sites/default/files/publications/OSHA3885.pdf>
- **Burgess-Limerick, R. (2018). Participatory ergonomics: Evidence and implementation lessons.** *Applied ergonomics*, 68, 289-293.
<https://www.sciencedirect.com/science/article/pii/S0003687017302740>
- **Implementing an Integrated Approach. Weaving Worker Health, Safety, and Well-being into the Fabric of Your Organization (2017).** Harvard T.H. Chan School of Public Health Center for Work, Health, and Well-being
https://centerforworkhealth.sph.harvard.edu/sites/default/files/10.12.17_Guidelines_Screen_post.pdf
- **McGonagle, A. K., Essenmacher, L., Hamblin, L., Luborsky, M., Upfal, M., & Arnetz, J. (2016). Management commitment to safety, teamwork, and hospital worker injuries.** *Journal of hospital administration*, 5(6), 46.
<https://pmc.ncbi.nlm.nih.gov/articles/PMC5113017/pdf/nihms822672.pdf>

Safe Patient Handling and Mobility – Section 1

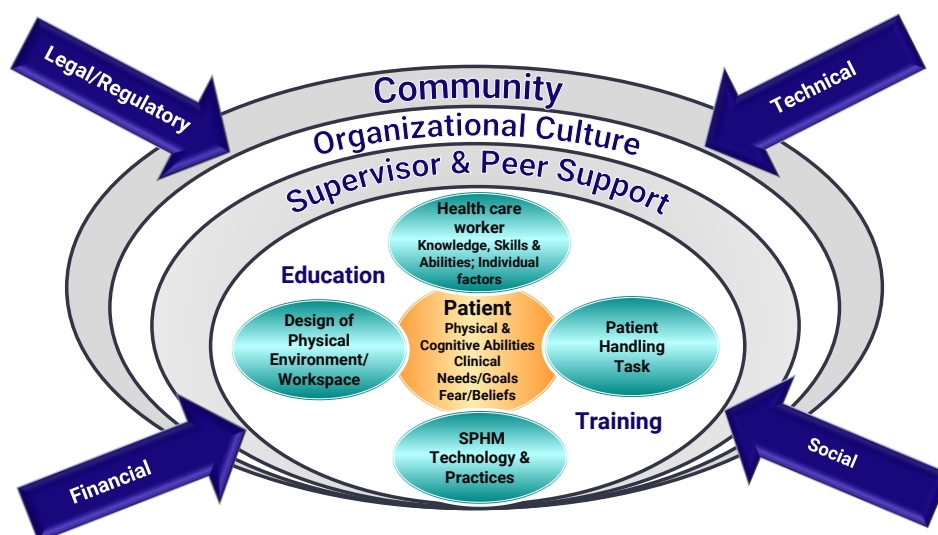


Figure 1.13 Effective, Sustainable SPHM Programs – A Systems View

Source: Enos 2014 (adapted from Corlett, 1995, Carayon, 2012, Holden et al., 2013).

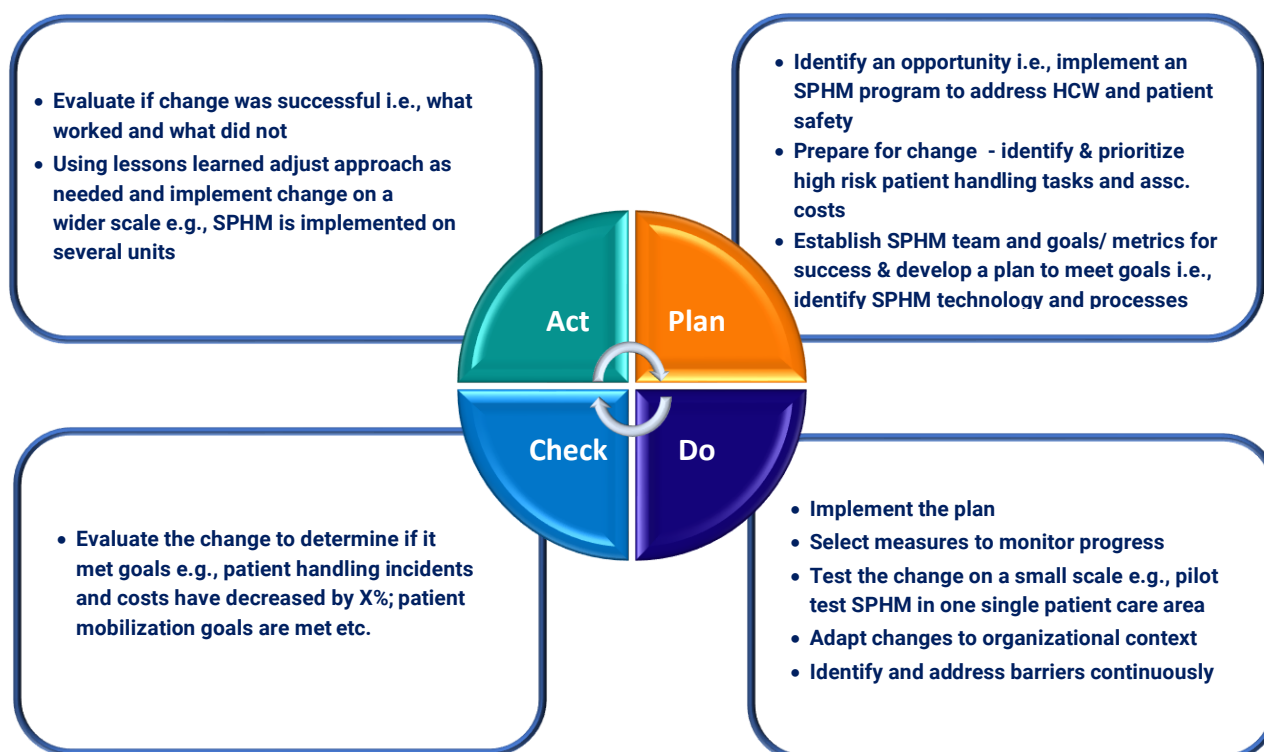


Figure 1.14 The Plan Do Check Act (AKA The Shewhart Cycle) Approach as Applied to SPHM Programs.

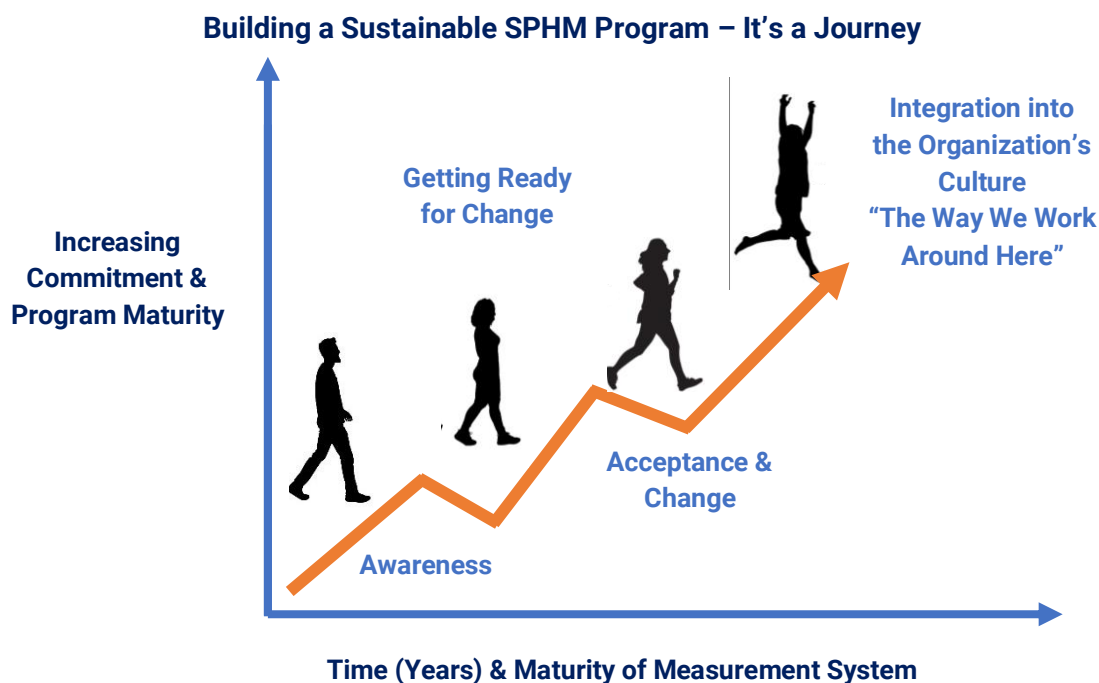


Figure 1.15 Integrating SPHM into a Health Care Organization's Culture.



Continuous Program Improvement

Useful Resources

- Quality Improvement Essentials Toolkit. IHI
<https://www.ihl.org/resources/tools/quality-improvement-essentials-toolkit>
- Deming's 14 Points. University of Tennessee Health Science Center
<https://www.uthsc.edu/its/business-productivity-solutions/lean-uthsc/deming.php>
- Endalamaw, A., Khatri, R.B., Mengistu, T.S. et al. A scoping review of continuous quality improvement in healthcare system: conceptualization, models and tools, barriers and facilitators, and impact. BMC Health Serv Res 24, 487 (2024).
<https://doi.org/10.1186/s12913-024-10828-0>
- O'Donnell B, Gupta V. Continuous Quality Improvement. [Updated 2023 Apr 3]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK559239/>

Hierarchy of SPHM Controls

The recommended approach to preventing and controlling hazards in occupational safety, health and ergonomics programs is to follow a *Hierarchy of Controls*. This includes hazard elimination/ engineering controls, administrative and work practice controls, and use of personal protective equipment (PPE). (NIOSH, 2023).

Controls to mitigate risk are categorized in order of effectiveness with elimination of the hazard being the most effective to personal protective equipment being the least effective form of control (**Figure 1.16**).

Elimination or substitution focus on making a job task inherently safe by removing a hazard completely through a redesign process or replacing the hazard with an alternative process or equipment that does not produce a hazard.

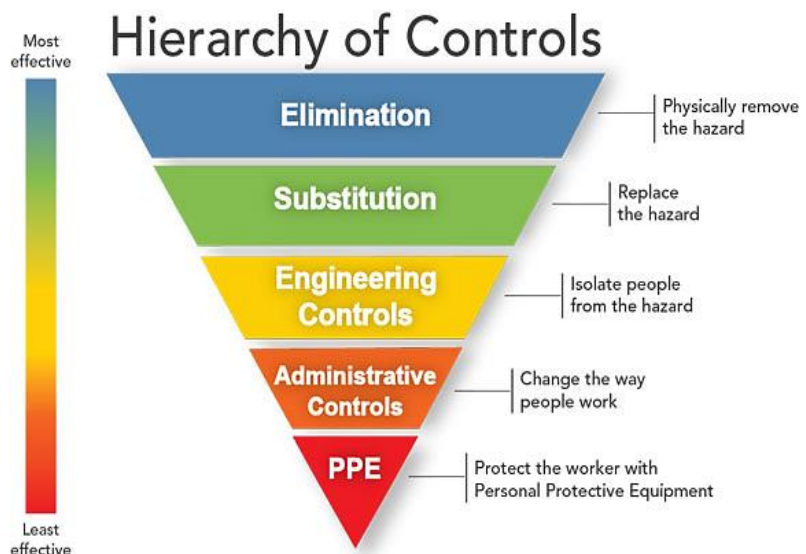
Ideally a hazard should be prevented before it occurs in the workplace and then must be addressed i.e., ensuring a hazard is not created when designing workspaces, products, equipment etc (Lyon and Popoff, 2023).

This model primarily focuses on physical hazards that occur in the workplace. It is important to note that this approach to controlling hazards should be considered in the context of the organizational culture or culture of safety within a health care organization or facility. Thus, psychosocial factors such as those that contribute to WMSDs, must also be addressed together with physical hazards (Kay and Peter, 2023).

The focus of the Hierarchy of Controls model is on what the employer should do to address occupational hazards. However, *employees* also have a responsibility per the OSHA General Duty Clause (OSHA Act 1970). That is to:

- Follow occupational safety and health rules that apply to their job
- Report any safety or health hazards to their employer
- Wear any personal protective equipment (PPE) that the employer requires
- Immediately report any workplace injury or illness
- Keep safety devices and warning signs in place, and use appropriate safeguards and equipment when exposed to hazards

It is the employer's responsibility to communicate and provide training to employees so they can meet these safety obligations in addition to providing a user-friendly non-punitive reporting system.



Source: NIOSH, 2023

Figure 1.16 The Hierarchy of Hazard Controls.

Safe Patient Handling and Mobility – Section 1

SPHM Controls

Elimination and substitution are difficult when trying to prevent patient handling injuries.

Eliminating care tasks that are essential for good patient care but that pose a high risk for HCW injury, is usually not possible. However, it is still useful to discuss the potential to eliminate or substitute any tasks.

An example of *Elimination* of a high-risk task would be to eliminate bed to chair transfers by using a bed which converts into a chair configuration.

An example of *Substitution* would be replacing one type of SPHM technology with another that is more effective at reducing the level injury risk to a HCW. For instance, a mechanical overhead or ceiling lift can facilitate boosting and turning patients—along with a variety of other handling tasks—while eliminating most of the exertion required. In contrast, a friction-reducing or slippery sheet only partially reduces the force needed and is limited in its application to certain patient handling tasks.

Mechanical overhead/ceiling lifts can be substituted for powered floor lifts because they require less force to operate thus reducing injury risk (De Vito et al., 2011; Dutta et al., 2012; Lee & Rempel, 2020; Marras et al., 2009; Rice et al., 2009; Santaguida et al., 2005; Waters et al., 2012). They may also complete a wider range of patient handling tasks than a floor lift.

Incorporating SPHM and ergonomics principles into the design and construction of new building and remodeling projects in healthcare is a proactive approach to preventing hazards and is discussed in **Section 9**.

While it can be difficult to eliminate or substitute hazards that cause WMSDs related to patient handling, engineering and administrative controls can be used effectively to reduce hazards when implemented in a comprehensive SPHM program that is supported by a culture of safety.

Examples of Controls in an SPHM Program

Engineering controls (Figure 1.17) are designed to isolate the worker from a hazard and reduce the risk of HCW injury to as low as reasonably possible. In the case of patient handling, engineering controls that can reduce the amount of force exerted by a HCW when lifting a patient include use of SPHM technology such as:

- Powered lift and transfer equipment e.g., ceiling/overhead and floor-based lifts; and sit to stand lifts; and air assist friction reducing mats
- Electric profiling beds and ergonomics hygiene equipment
- Non-powered equipment e.g., stand-assist aids and friction reducing slippery sheets

Of course, even if engineering controls (SPHM technology) are provided, HCWs must opt to use them to mitigate the risk; the option of moving a patient manually still exists. Thus, ensuring that HCWs use engineering controls requires a well-designed SPHM program with accessible technology, training on safe use, and a workplace culture that encourages technology utilization. Barriers to SPHM programs are discussed on **page 1-47**.

Section 5 provides an overview of different types of SPHM technology and their effectiveness in reducing WMSD injury risk. **Tool 1a** summarizes the risk factors for patient handling-related WMSD and visually compares manual patient handling methods with safer SPHM technology.

Safe Patient Handling and Mobility – Section 1



Powered ceiling or overhead lift



Powered floor lift



Powered stand assist lift



Air assist mat transfer mat



Friction reducing device or slippery sheet



Non-powered stand assist device

Figure 1.17 Examples of Engineering Controls i.e., SPHM Technology.

Administrative controls do not eliminate or change a hazard, but they can, if well designed, reduce the duration, frequency, or intensity of exposure to hazards through changes in work practices. These include:

- Patient assessment and communication protocols that provide decision making guidance related to the safest way to lift and mobilize a patient (**Refer to Section 5**)
- Use of ergonomics work practices to minimize HCW exposure to awkward postures (**Refer to Section 5**)
- Changes in work methods or workflow to reduce risk of HCW exposure to risk factors e.g., having enough staff when moving and lifting patients of size with SPHM technology; planning patient assignments so that a nurse or aide doesn't care for the same dependent patient(s) for multiple consecutive shifts.
- Peer coaches/champions to support change in HCW behaviors so that they use SPHM technology and ergonomics work practices appropriately (**Refer to Section 4**)
- Written SPHM policy and procedures (**Refer to Section 4**)
- Injury reporting (non-punitive) and response including investigation protocols and corrective action to prevent reoccurrence of a similar incident (**Refer to Section 7**)

Safe Patient Handling and Mobility – Section 1

- Education and training programs that are customized to all HCWs job responsibilities and role within the SPHM program and ensure competency-based skills are learned to facilitate safe use of SPHM technology and best work practices (**Refer to Section 6**)
- Return to work programs for injured HCWs to facilitate retention of employees (**Refer to Section 7**).

Personal Protective Equipment (PPE)

If engineering and administrative strategies are not possible then PPE, the last line of defense, must be used to offer protection from hazards. PPE are items worn by workers to help reduce exposure to a hazard and thereby reduce the risk to the worker. Examples of PPE include face masks or respirators, eye protection, gloves, and gowns, ear plugs/muffs, radiology lead aprons, etc.

There is no evidence that any type of PPE such as 'back belts,' reduces the risk of injury to HCWs who are required to manually handle or mobilize patients (Rogers, 2020). However, in the not-too-distant future, *occupational exoskeleton technology* may be used as a PPE for some health care occupations to mitigate risk of injury especially in environments where the use of currently available SPHM technology is challenging or not feasible e.g., EMS and Home Care.

Administrative controls and PPE programs may be 'less expensive' to implement than engineering controls (i.e., purchasing SPHM technology) but over the long term, can be costly to sustain and require constant monitoring or 'supervision' to ensure HCWs are trained and desired work practices and processes are followed correctly and consistently. SPHM programs require HCWs to *change* the way they deliver care. Leadership commitment of an SPHM program and supervisory support of SPHM technology use at the unit or department level together with peer support e.g., SPHM coaches/champions, are key program components to facilitate change. The principles of selecting the best SPHM controls to mitigate hazards for WMSDs are discussed in **Section 4**.

Exoskeleton Technology

Research on exoskeletal technology in health care is growing, including its use in patient handling.

Currently exoskeletal technology is mostly used in the military and manufacturing environments to enhance the physical capabilities of soldiers and workers to perform physically demanding tasks such as manual material handling and reduce the risk of WMSDs. Exoskeletons are also used as haptic devices for training and rehabilitation (Flor-Unda et al., 2023).

Exoskeleton technology may be especially helpful in protecting HCWs in environments where SPHM technology cannot be used due to the design of the physical work environment such as emergency medical services and home care.

However, limitations of exoskeleton use must be addressed if they are to be considered as another tool to reduce patient handling related injuries to HCWs.

Currently these devices need to be custom fit for each individual worker which may hinder adoption. Devices must be lightweight, and suitable for various tasks performed by HCWs such as lifting or carrying and be easy to disinfect.

Research is limited as to whether these devices affect healing in workers recovering from WMSDs or the impact of long-term exoskeleton use near supported joints.

Health care consumer safety and experience must also be evaluated when considering the use of exoskeleton technology by HCWs (AIHA, 2023; Flor-Unda et al., 2023; Rayssiguie & Erden, 2022; Robertson et al., 2020; Turja et al., 2020; Zheng, 2020).

Barriers to Successful Implementation and Sustainability of SPHM Programs

Internal barriers or factors that hinder implementation and sustainability of successful SPHM programs in acute and long-term care are well defined.

Schoenfisch et al., defined these internal barriers as “a complex mix of patient, worker, technology, and situational/organizational factors, some of which are interdependent and dynamic in nature” (Schoenfisch et al., 2019).

A list of primary internal barriers to implementing and sustaining SPHM programs is provided in **Table 1.6**.

Understanding these potential barriers allows you to identify those that exist in your organization and address them as you develop and implement your SPHM program.

Addressing internal barriers relies on integrating the previously mentioned components of SPHM programs into a framework that receives ongoing visible support from leadership and actively fosters employee participation program within an organization culture that embraces HCW and patient safety as interrelated and of equal significance. Refer to the *Culture of Worker and Patient Safety and the role of SPHM* on **page 1-49**.

Implementing successful SPHM programs requires that the organization and its HCWs change the way patient care is delivered, i.e., using SPHM technology and ergonomics best practices that facilitate safer patient mobility instead of manual handling. Thus, a change-management strategy is also an essential component of planning, implementing, and sustaining an effective SPHM program.

The approach to SPHM program development described in this toolkit is designed to manage the required change, promote a culture of HCW and patient safety, and achieve acceptance of SPHM program and desired program outcomes.

Assessing organizational culture and readiness for change related to SPHM programs is discussed in Sections 3. Change management is discussed in Section 7 and other related resources are provided in Section 10 of this toolkit.



Manual Patient Handling – It’s Just Part of the Job!

To ensure successful SPHM technology programs, nursing culture must address the belief that nurses should sacrifice themselves for patient handling and are at fault if an injury occurs.

Florence Nightingale viewed musculoskeletal injuries to nurses as accepted part of the job that were attributed to lack of strength and poor lifting techniques.

Isabel Hampton reinforced this notion in 1898, stating that “Occasionally the complaint is made that a nurse injured her back or strained herself in some way while moving a patient. This will generally occur because she has failed to perform the lifting properly.” (Hampton, 1898).

In a recent study by Wiggerman et al., the majority of nurses surveyed reported they would manually reposition or transfer a patient weighing up to 200 lbs. Further, 30% of nurses would manually reposition, and 22% would manually laterally transfer a patient up to 300 lbs.

This reinforces the notion that nurses do not prioritize their safety together with the safety of their patients. As previously discussed, lifting more than 35 lbs. of patient weight manually exceeds established physical exposure guidelines for injury risk (Wiggerman et al., 2024).

Safe Patient Handling and Mobility – Section 1

SPHM Technology; Physical Environment	Organizational	Health Care Worker (HCW)	Patient
- SPHM technology (e.g., powered lifts and slings, friction reducing devices, other assistive aids) not: - Easily/quickly accessible - Available - insufficient quantity purchased and/or internal supply chain shortages - Suitable for patient handling task/to suit patient - User-friendly for intuitive and safe use - Well maintained - Lack of ceiling or overhead lifts - Physical workspace. - SPHM technology such as floor-based lifts, does not 'fit' under beds/stretchers/around the base of chairs/ through doorways/in a small workspace e.g., bathrooms.	- Poor safety culture. - Culture that prioritizes patient safety over HCW safety - Lack of engagement /support by leadership e.g., nursing - Lack of supervisory and/or peer support at unit/dept. level to prioritize patient and HCW safety - High workload e.g., high ratio of patients to a single nurse - Understaffing - Competing demands - Lateral violence or bullying - Lack of or poorly supported SPHM policy - Lack of knowledge & skills about use of SPHM technology and protocols such as patient mobility assessments - Challenges to maintain SPHM training and practices due to high staff turnover, agency, and part-time workers. - HCWs not relieved to attend training - Perception that equipment costs too much - Lack of funding for sufficient equipment, training, or SPHM program coordinator hours - Incorrect classification of MSD injuries related to patient handling	- Place patient needs/safety first above own safety (note – prior injury not a motivator to use SPHM technology) - Belief that good body mechanics and having enough staff to perform patient handling tasks is enough - Lack of coordination of care e.g., between nursing and therapy staff about use of SPHM technology to assist in patient mobilization/Therapy staff believes that SPHM technology will hinder rehab outcomes. - Perception that the task is not dangerous e.g., technology is only needed to lift patients of size - Social pressure by co-worker (s) to perform manual lifting - Perception that using SPHM technology takes too much time - Historical knowledge of patient's ability to mobilize - Perception patient is physically capable of performing the task - Stature e.g., taller HCWs experience more back pain	- Patient ability to physically assist and cooperate/follow instructions - Patient is aggressive/combative - Clinician conditions that preclude use of some types of SPHM technology - Emergency situations - Patient (and family) preference and/or fears about using SPHM technology/past experience - Patient motivation to be out of bed or to ambulate - A patient's urgency to use the bathroom

Table 1.6 Internal Barriers or Factors that can Prevent Successful Implementation and/or Sustainability of SPHM Programs (not all inclusive).

Safe Patient Handling and Mobility – Section 1

Source: (Boynton 2023; Capponechhia et al., 2020; Dennerlein et al., 2017; Harwood et al., 2016; Kanaskie & Snyder, 2018; Kayser et al., 2020; Kim et al., 2014; Kneafsey et al., 2014; Koppelaar et al., 2011; Kucera et al., 2019; Kurowski, et al., 2012; Kurowski et al., 2017; Kurowski et al., 2019; Lee & Lee, 2017; Lee & Lee, 2021; Lee, & Rempel, 2020; Mayeda-Letourneau, 2014; Noble & Sweeney, 2017; Olinksi & Norton, 2017; Park et al., 2018; Przybysz & Levin, 2017; Sampath et al 2019; Scheonfisch et al., 2011; Scheonfisch et al., 2019; Teeple et al, 2017; Vinstrup et al., 2020; Waltrip, 2019; Wiggerman et al., 2024).

Culture of Worker and Patient Safety and the Role of SPHM

The relationship between the well-being of HCWs and patient safety is globally recognized. Loeppke et al., stated “Without a safe and healthy work environment for the millions of individuals who provide care for and support the needs of patients, the core goal of ensuring patient safety is placed at risk. Healthy and safe HCWs are more likely to provide care that leads to optimized patient health and safety” (Loeppke et al., 2017).

The COVID-19 pandemic has further highlighted the urgent need to address the physical and psychological well-being of HCWs if organizations across the health care continuum are to retain and recruit sufficient numbers of HCWs to provide quality care and achieve patient safety goals (ANA, 2021; Emory et al., 2021; IHI, 2022).

However, the incorporation of HCW wellbeing as a driver that improves patient outcomes is still a relatively new concept in the US health care system. For SPHM to be implemented in health care environments across the continuum, it is *essential* that health care leaders, HCWs, and patients understand the value of SPHM to benefit both HCW and patient safety and to help retain the nursing and allied professional workforce.

The Joint Commission’s publication *Improving patient and worker safety: opportunities for synergy, collaboration, and innovation* states that, “Few activities in health care link patient and worker safety more directly than lifting, transferring, repositioning, and ambulating patients.” (The Joint Commission, 2012).

In the 2020 Institute for Healthcare Improvement’s (IHI) *Safer Together: A National Action Plan to Advance Patient Safety*, Workforce safety is one of the four foundational areas for advancing safe and highly reliable care. <https://www.ihi.org/partner/initiatives/national-steering-committee-patient-safety/national-action-plan-advance-patient-safety>

In their 2022 *Implementation Resource Guide A National Action Plan to Advance Patient Safety*, IHI includes SPHM as one of the priority programs that should be implemented to address the physical and psychological safety of HCWs and foster a healthy work environment <https://www.ihi.org/national-action-plan-advance-patient-safety>

Incorporating SPHM into a safe, early, and progressive patient mobility and falls prevention program is an example of how SPHM can assist to benefit both HCW and patient safety.

As previously discussed, early mobility is associated with improved patient outcomes, and there is a growing evidence base that demonstrates the critical role SPHM plays in facilitating early, safe, and continuous mobilization of patients.

In fact, SPHM programs may be more successful at reducing HCW and patient injuries when specifically designed to be part of an early mobility program. The role of SPHM in facilitating successful early mobility programs is discussed further in **Section 5**.

Safe Patient Handling and Mobility – Section 1

Although not directly researched, the application of SPHM in early mobility programs may also help to reduce the occurrence of two of the most frequently missed nursing care tasks, repositioning in bed and ambulation.

As discussed later in this toolkit, for a SPHM program to be sustainable, it *must* demonstrate its value to patient safety and health care organization goals.

Worker or patient safety programs are rarely sustainable when they are implemented using a siloed approach. Instead, a systems approach that includes collaboration across professions and departments is essential to establish SPHM as a standard of care that benefits workers, patients, and the organization.

Integrating SPHM programs with fall prevention and early mobility programs is one approach that can assist in meeting this goal (**Refer to Section 9**).

The Current State of SPHM in the US

More than four decades of global research and published injury data have indicated that manually lifting and assisting patients with limited mobility is a significant cause of work-related injuries to HCWs across various settings in the US.

Manual patient handling significantly contributes to patient immobility, resulting in both immediate and long-term harm, including functional decline for patients. These issues also lead to considerable expenses for healthcare organizations.

Well-designed multi-faceted SPHM programs, incorporating SPHM technology such as powered lifts and stand assist devices, have been proven to reduce the incidence, severity, and costs of work-related musculoskeletal disorders (WMSDs) associated with manual patient handling. Additionally, these programs help decrease HCW turnover and enhance patient outcomes through safe, early, and continuous mobility.

However, despite the development of standards for SPHM and legislation in some states and the collaborative efforts of numerous industry, government, and academic entities to promote and integrate SPHM into US health care facilities over the past 20 years, SPHM is still not ‘the norm’ or considered a standard of care in many health care organizations.

In fact, after a retrospective analysis of the 2018 International Pressure Ulcer Prevalence™ data from 642 hospitals, Kayser et al., (2020) reported that ‘US acute care facilities are largely not using lifts to safely mobilize patients’ (Kayser et al., 2020; Sampath et al., 2019)

There are many interdependent factors that contribute to the absence of SPHM programs in US health care facilities. These include:

- The negative impact of the pandemic on finances and staffing resources for most health care organizations in the US. This includes the effect of an unstable and transient workforce that is occurring in many job positions including management and nursing across many departments within health care facilities. These factors alone make the sustainability of any effective worker and patient safety program extremely challenging. Recent downsizing of federal occupational health and safety and health care research entities and the resources they offer to employers and the uncertainty about potential changes in CMS reimbursement rates may exacerbate these challenges.

Safe Patient Handling and Mobility – Section 1

The Current State of SPHM in the US

- Lack of national SPHM regulation, e.g., a federal standard enforced by OSHA and/or standards enforceable by accrediting bodies such as the Joint Commission, DNV and CARF. The lack of national SPHM regulation may have contributed to the patchwork approach to SPHM that is observed in health care organizations across the US.
- The lack of occupational health and safety education including SPHM, for health care students in the US. Physicians, nurses, nursing aides, allied health professionals such as physical therapists and others who will provide direct care for patients, receive education about to protect themselves against blood borne pathogens and infectious diseases during their training as students. However, education is sparse related to preventing physical and psychological injury or illness from risk factors such as, patient handling, workplace violence including bullying, stress, fatigue, and burnout.

Most health care education programs in the US do not teach SPHM as a core curriculum element. Many schools continue to rely on teaching outdated and disproven evidence that 'proper body mechanics can prevent injuries when manually handling patients (ASPHP, 2023).

Without exposure to SPHM techniques and training, students are at greater risk for injury during their clinical internships. Some are injured before they even graduate which increases their risk of reinjury when they enter the workforce thus jeopardizing the sustainability of the health care workforce. Insufficient SPHM training by schools also places a greater burden on healthcare organizations to provide additional training for their new HCWs.

Given the growing demand for HCWs in the US, equipping health care students with the knowledge and skills that demonstrate SPHM is an expected *standard of practice* for patient safety and their own safety, may also provide a competitive advantage to schools when attracting and retaining students (Powell-Cope et al., 2018).

Health care education programs *could and should* play a critical role in driving culture change to integrate worker and patient safety within health care organizations, equipping students with the knowledge and skills to ensure their health and safety and maximize the well-being of their patients (ASPHP, 2023).

For more information review the *SPHM Education in Health Care Student Curriculum – ASPHP White Paper* <https://asphp.org/wp-content/uploads/2023/09/SPHM-Curriculum-White-Paper.pdf>

Information provided in this section highlights the critical need for integration of SPHM into health care settings across the continuum to protect the health and safety of HCWs and patients. This need is more urgent than ever in the post pandemic world if health care organizations are to attract and retain HCWs and offer safe, quality patient care.

Applying a systematic approach together with the strategies outlined in this toolkit, you can build a comprehensive SPHM program tailored to meet your healthcare organization's needs. This will enhance employee safety, improve patient care, and ensure continued program effectiveness within constantly changing environment.

Appendix A

A Brief History of SPHM in the US

From the early beginnings of professional nursing in Florence Nightingale's time, musculoskeletal injuries, especially from lifting patients, were believed to be an accepted part of the job. For many decades causation of back injuries in nursing was claimed to be due to the female nurse's lack of strength and poor lifting technique.

"Body Mechanics in Nursing Arts" was published in 1941 following observations that nursing students were too tired for their physical education classes after their clinical time on the wards (Monaghan, 2011). Post-World War II, early ambulation for postoperative patients increased nursing workloads due to patient instability and loss of balance. The formal concept of "body mechanics" was introduced by a physician Dr. Jesse Wright, in an article in the *American Journal of Nursing* in 1945 (Powell-Cope et al., 2008).

The Vanderbilt University School of Nursing formally incorporated body mechanics into its curriculum in 1950 to help prevent muscle strain and fatigue associated with lifting and handling patients (Monaghan, 2011). It was thought that the risk of back injuries would be reduced if nurses shifted their weight in certain ways when repositioning patients (Powell-Cope et al., 2008).

For several decades after that nurses, aides and other HCWs were taught body mechanics techniques 'to use their own body efficiently to prevent unnecessary fatigue and strain.' However, there was no evidence to support that these techniques were effective to reduce injury risk or even safe for patients (Nelson, 2006).

In the 1960s, there was some recognition that the body mechanics principles being taught such, as bending the knees and keeping the back straight, was ineffective at addressing the multiple variables that can occur during patient handling e.g., patient weight and tendency to lose balance and fall, inability to assist and combativeness, and bed height.

It wasn't until the 1970s and 80s that back injuries were validated as a leading cause of occupational injuries in the nursing population in the US and Europe (Buckle, 1986; Cohen-Mansfield et al, 1996; Snook et al., 1978) and manual lifting and transferring of patients was recognized as the most common cause of back pain (Garg, 1999). There was a realization that nurses and nursing aides typically manually lift and move patients who weigh 80-220 lbs. or more, and the ability to lift this amount of weight is beyond physical capabilities of nursing work force (Garg, 1999). Research supported that body mechanics training was not effective in reducing the incidence of low back pain (Stubbs et al. 1983).

The application of ergonomics principles and use of SPHM technology to address injuries from manual patient handling began in the 1990s. During this period, another commonly adopted method to address manual patient handling injuries in the US, was employing lift teams to reduce the physical workload for nurses.

A lift team was originally defined as "two physically fit people, competent in lifting techniques, working together to accomplish high risk client transfers" (Charney, 2009). However, although this approach was somewhat successful, it often required HCWs/lift team members to manually lift patients. Refer to **Tool 4j** about the Pros and Cons of using Lift Teams in SPHM programs.

OSHA also played a role in moving SPHM forward in the 1990s when they cited Beverly Enterprises Inc. (the largest nursing home chain in the US at the time) under the General Duty Clause, in 1991. They

Safe Patient Handling and Mobility – Section 1

alleged that at five of the company's 800 nursing home facilities, manual resident handling exposed employees to the hazard of injuries to the back and upper extremities. In 2002, after Beverly had appealed the citation for a decade, an agreement was reached, and Beverly had to provide SPHM technology and training to mitigate hazards associated with resident handling and lifting (OSHA 2002).

The biomechanical risk factors that cause back pain and mechanism of injury associated with manual patient handling were not well understood until the late 1990s. Research demonstrated that the physical effort required to complete manual repositioning and transfers of patients exceeded compressive and shearing forces that can be tolerated safely by the lower lumbar spine. *Refer to “Why is Manual Patient Handling So Hazardous?” in this Section.*

As the relationship between biomechanical loading of the spine during manual lifting of patients became evident, powered lift equipment was recommended to reduce the risk of WMSDs for HCWs. However, as previously described research conducted in the past 15 years indicates that other variables also contribute to WMSDs associated with patient handling such as cumulative loading of the spine and supporting structures with insufficient rest and recovery, and psychosocial factors.

Several key activities that moved SPHM forward in the US from 2000 on include (Hallmark et al., 2015; ANA 2021):

- The ‘Patient Care Ergonomics Resource Guide: Safe Patient Handling and Movement’ was published by the Veterans Health Administration (VHA) in 2001. This ‘first of its kind’ guide has since been updated to incorporate new evidence based SPHM practices developed within the VHA US wide SPHM program.
- OSHA’s publication of the ‘Guidelines for Nursing Homes—Ergonomics for the Prevention of Musculoskeletal Disorders’ in 2003, which was updated in 2009.
- ANA’s “Handle with Care” Campaign was initiated in 2004. This campaign helped to promote the use of a multi-faceted SPHM approach addressing WMSDs in nurses.
- Texas became the to pass SPHM legislation in 2005. Nine other states passed SPHM legislation and two passed resolutions to provide healthcare organizations guidance about SPHM between 2006 and 2014.
- Dr. Audrey Nelson et al. published a landmark VHA study, “Development and evaluation of a multifaceted ergonomics program to prevent injuries associated with patient handling tasks,” about necessary components of effective SPHM programs in 2006.
- In 2007, research was published by Dr. Thomas Waters that detailed the amount of patient weight that could be lifted safely by a single caregiver under ideal conditions, “When is it safe to manually lift a patient?” (Waters, 2007).
- SPHM curriculum was developed and published by the Centers for Disease Control and Prevention in partnership with the NIOSH, the Veterans Health Administration, and the ANA in 2009. The curriculum was based on four years of research and testing conducted by the VHA.
- In 2010 the Facility Guidelines Institute (FGI) published the “Patient Handling and Movement Assessments (PHAMA): A White Paper” to educate design professionals about the importance of and how to integrate SPHM into design of healthcare facilities. This guide was updated in 2019 and incorporated design criteria for patients of size (bariatrics) and facilitating patient mobilization.

Safe Patient Handling and Mobility – Section 1

- “Beyond Getting Started: A Resource Guide for Implementing a Safe Patient Handling Program in the Acute Care Setting” was published in 2011 but the Association of Occupational Health Professionals (AOHP), in collaboration with OSHA. This guide was updated in 2020.
- In 2011 the Association of Safe Patient Handling Professionals (ASPHP) was formed. This non-profit membership organization initiated the SPHM Professional Certification program. This program is now managed by an independent credentialing organization, the *Certified Safe Patient Handling Professionals™ (CSPHP)*.
- In 2012, the International Organization for Standardization. Technical report (ISO TR) 12296:2012. *Ergonomics—Manual Handling of People in the Healthcare Sector* was published.
- In 2013, the American Nurses Association published the evidence-based “SPHM Interprofessional National Standards”. The second edition of the standards was published in 2021. In lieu of federal SPHM legislation, these standards are considered the ‘benchmark’ or ‘gold standard’ for SPHM in the US.
- In 2014, the International Organization for Standardization (ISO) standard 10535:2006. “Hoists for the transfer of disabled persons—requirements and test methods” is recognized as a consensus standard by the Food and Drug Administration (FDA). This standard was updated in 2021 i.e., ISO 10535:2021 “Assistive products—Hoists for the transfer of disabled persons—Requirements and test methods.”

Over the past decade, several other professional organizations have also worked to promote the importance of SPHM in an attempt to integrate SPHM as a standard of care throughout the healthcare continuum in the US. These efforts are described in ‘*Legislation, Standards and Guidelines Related to SPHM*’ on **page 1-29**.

Appendix B

SPHM Toolkit Crosswalk with the ANA SPHM Standards

The following table maps the elements of a comprehensive SPHM program described in this toolkit with the corresponding toolkit sections and the American Nurses Association (ANA) Safe Patient Handling and Mobility: Interprofessional National Standards Across the Care Continuum. 2nd edition, 2021.

SPHM program elements - OSHA NIOSH	Toolkit Section	ANA SPHM standard
1. Management Leadership - Create and sustain a culture of worker safety and health (physical and psychological) as a precondition to patient safety - Communicate ongoing commitment to a SPHM program - Define program goals and expectations - Ongoing allocation of resources to meet program goals including consistent investment in equipment, SPHM coaching, and training programs - Expect performance	Sections 2-4, 7-9	1. Establish a culture of safety
2. Worker* Participation & Engagement - Encourage employees to report safety and health concerns - Encourage workers to participate in the program i.e., in the assessment and implementation processes and the evaluation and selection of SPHM technology and processes - Involve workers in all aspects of the SPHM program - Give workers access to SPHM information - Remove barriers to participation <i>*The term Employee Involvement is also used in this toolkit</i>	Sections 2-4, 7-9	1. Establish a culture of safety
3. SPHM Program Management - Program champion - Program/project manager/coordinator - Committee/Team (multidisciplinary) - Program plan (interdisciplinary) with strategic and tactical elements	Sections 2 & 4	2. Implement and sustain a SPHM program

Safe Patient Handling and Mobility – Section 1

SPHM program elements - OSHA NIOSH	Toolkit Section	ANA SPHM standard
4. Communication/Social Marketing - Identifying all stakeholders who will be affected by the SPHM program - Develop, implement, and evaluate a communications plan for the SPHM	Section 4	2. Implement and sustain a SPHM program
5. Hazard Identification and Assessment - Collect existing information about hazards associated with patient handling tasks (injury data, worker/patient surveys, gap analysis) - Inspect the workplace - Assessment of patient handling tasks, work practices, physical work environment, and patient population - Conduct incident investigations ('after action' reviews), corrective action process - Identify hazards associated with emergency and non-routine situations - Characterize the nature of identified hazards, determine the controls to be implemented, and prioritize the hazards high-risk units/areas and tasks for control	Section 3	2. Implement and sustain a SPHM program
6. Hazard Prevention and Control - Identify control options (engineering & administrative controls) - Select controls that mitigate the greatest risk of HCW injury and improve patient outcomes i.e., SPHM technology and related management of, patient mobility assessment and communication protocols, unit based coaching programs, training, and other best work practices; written SPHM policy & procedures - Develop and update a hazard control plan - Select controls to protect workers during non-routine operations and emergencies - Implement selected controls in the workplace - Follow up to confirm that controls are effective - Prevention of patient-handling related risk through design - ensure SPHM is incorporated in remodel and new build projects; changes in patient care service line and processes etc.	Sections 4-5, 7-8	3. Incorporate ergonomic design principles to provide a safe environment of care 4. Select, install, and maintain SPHM technology 6. Integrate patient centered SPHM assessment, plan of care, and use of technology

Safe Patient Handling and Mobility – Section 1

SPHM program elements - OSHA NIOSH	Toolkit Section	ANA SPHM Standard
7. Education and Training • Provide program awareness training • Educate workers on their specific roles and responsibilities in the SPHM program • Train workers on assessment of hazards and controls i.e., selection and use of the appropriate SPHM technology and best work practices, and procedures for reporting injuries	Sections 4 & 6	5. Establish a system for education, training, and maintaining competence
8. Medical Management of WMSDs • Medical management of early symptoms and injuries reported by HCWs • Safe early return to work programs following occupational injury	Section 7	7. Include SPHM in reasonable accommodation and post-injury return to work
9. Ongoing Program Evaluation, Improvement & Sustainability • Monitor performance and progress- evaluate success of SPHM interventions and program processes • Verify the SPHM program is implemented and is operating e.g., through HCW/patient surveys and site assessments • Correct program deficiencies and identify opportunities to improve • Plan for ongoing program sustainability	Sections 8 & 9	2. Implement and sustain a SPHM program 8. Establish a comprehensive evaluation system

Appendix C

Development of SPHM Technology

Mechanical Patient Lifts

Patient lifts (also known as hoists) have their mechanical origins in industry and manufacturing. Although there were some efforts to develop mechanical devices to lift patients in the late 1800s (**Figures 1 & 2**), it was not until the 1950s that the first mobile patient lifts were invented and commercialized in the United Kingdom (UK) and United States (US).

In the US, Theodore Hoyer of Oshkosh, Wisconsin, a quadriplegic, invented the 'Hoyer lift' in 1949 with his cousin, Victor Hildemann. It was an "adjustable base invalid lift" so that Hoyer could enjoy independence and mobility throughout his busy workday (Medmart, 2021).

The first wall mounted lift was installed at Headington Hill Hospital in Oxford, UK in 1954. The lift was designed and manufactured by Dr. W. Ritchie Russell, a neurologist for the United Oxford Hospitals, and an engineer, John Payne (Joerns, 2021). They went on to design and commercialize the first "Oxford" mobile patient hoist in 1955.

The Oxford and Hoyer lifts were operated by hydraulic pump, but in 1982 'The Danish Hoist' a first all-electric floor hoist operated via electric linear actuator was introduced (Mechan & Wright, 2015). Government focus on lifting and mobility equipment and services in the social sector and healthcare in Denmark and Sweden assisted designers and manufacturers in these countries to not only improve the functionality of floor lifts, but to develop first standing raising aids or sit-to-stand floor lifts and ceiling/overhead lifts (Mechan & Wright, 2015). Power floor lifts, sit-to-stand devices, and ceiling lifts have been used in US healthcare for over 20 years.



Figure 1.
A nurse and an orderly move a patient from his bed to a bathtub with the aid of an "electric lift" in 1898.
Source: The National Library of Medicine



Figure 2.
Early version of a floor-based hoist. Date unknown.
Source: The Burns Archive



Figure 3.
Hoyer lift circa 1960
Source: Unknown



Figure 4.
Powered ceiling or overhead lift used to reposition a patient in bed



Figure 5.
Powered floor lift used to transfer a patient to/from in bed to chair



Figure 6.
Powered stand assist lift used to transfer a patient to/from in bed to chair

Repositioning Devices

The use of draw/lift sheets to reposition patients in bed first appears in the literature around the 1900s. The drawsheet is to this day often perceived to be a ‘time-saver’ when moving patients; it is always on the bed and ready for use, even though it requires 2 or more clinical staff for use (Mechan & Wright, 2015).

Since the 1980s a myriad of friction reducing devices (FRDs) made from a variety of materials such as plastic and nylon-based fabric have been made available for safer repositioning of patients. Over the past 20 years many published studies have shown that FRDs are significantly *more effective* in reducing injury risk to staff than a traditional cotton sheet. They also reduce the risk of injury to patients from friction and shear that occurs when patients are repositioned with drawsheets (Mechan & Wright, 2015).

The first powered air assist transfer devices were designed and manufactured in the US in the 1980s. There is some evidence that these devices have been shown to be more effective at reducing force used to reposition and transfer patients than non-rigid FRDs and rigid transfer devices such as slider boards (Hwang et al., 2018; Lloyd & Baptiste, 2006; Wiggermann et al., 2021).



Figure 7. *Drawsheet used to move patient in bed*



Figure 8. *Air assist mat used to transfer a patient from one surface to another*

Non-Powered Transfer Aids

John Thornton Posey started developing mobility ‘aiding devices’ in 1937 and likely introduced the first gait belt i.e., the Posey gait belt to aid mobility and ambulation activities (Vitality Medical, 2024).

These are typically a straight belt made of fabric or plastic with no handles which is placed around the patient’s abdomen. Gait belts are intended for guidance, feedback, and steadying assist when standing and ambulating patients who can bear their own weight and have some degree of locomotion. However,

Safe Patient Handling and Mobility – Section 1

they are often used as lifting aids when standing and transferring a patient, and as tools to control patient descent to the ground during a fall. Gait belts have *not* been shown to reduce loads on the spine sufficiently to decrease the risk of caregiver injury when performing these tasks (Marras et al., 1999; Miller et al., 2017; Rockefeller & Proctor, 2011; Tang et al., 2018; Zhuang et al., 1999).

Many of the non-powered transfer-assistive devices that are available from various SPHM technology companies today such as, transfer boards and stand assist devices, are based on the products developed in Sweden Björn Ross and his company Romedic from 1984 -2006.

Beds

As SPHM technology has evolved during the past 30 years, so has the design of the hospital bed. Beds now have multiple features that promote patient mobility and safety such as lateral rotation and ability to convert to chair position and/or verticalization to facilitate progressive mobility of a patient into a standing position.

SPHM technology is reviewed in detail in **Section 5**.

Safe Patient Handling and Mobility – Section 1

References

- Abdul Halim, N. S. S., Mohd Ripin, Z., & Ridzwan, M. I. Z. (2023). Efficacy of Interventions in Reducing the Risks of Work-Related Musculoskeletal Disorders Among Healthcare Workers: A Systematic Review and Meta-Analysis. *Workplace Health & Safety*, 21650799231185335.
- Abdul Halim, N. S. S., Ripin, Z. M., & Ridzwan, M. I. Z. (2022). Effects of patient transfer devices on the risk of work-related musculoskeletal disorders: a systematic review. *International Journal of Occupational Safety and Ergonomics*, 1-21.
- Adamczyk, M. A. (2018). Reducing intensive care unit staff musculoskeletal injuries with implementation of a safe patient handling and mobility program. *Critical care nursing quarterly*, 41(3), 264-271.
- Afsharian, A., Dollard, M. F., Glozier, N., Morris, R. W., Bailey, T. S., Nguyen, H., & Crispin, C. (2023). Work-related psychosocial and physical paths to future musculoskeletal disorders (MSDs). *Safety Science*, 164, 106177.
- Agency for Healthcare Research and Quality (2023), Team Stepps® 3.0. <https://www.ahrq.gov/teamstepps-program/index.html>
- Agency for Healthcare Research and Quality (2020). Section 4: Ways To Approach the Quality Improvement Process. Content last reviewed January 2020. <https://www.ahrq.gov/cahps/quality-improvement/improvement-guide/4-approach-qi-process/index.html>
- Agency for Healthcare Research and Quality (2019). Missed Nursing Care. A Primer. September 7, 2019. <https://psnet.ahrq.gov/primer/missed-nursing-care>
- Almhdawi KA, Mathiowetz V, Al-Hourani Z, Khader Y. Musculoskeletal pain symptoms among allied health professions' students: Prevalence rates and associated factors. *Journal of Back and Musculoskeletal Rehabilitation*. 2017; 30: 1291-1301. doi:10.3233/BMR-169669. IOS Press.
- American Industrial Hygiene Association. (2020). Exoskeletons [White Paper]. <https://www.aiha.org/education/white-papers/exoskeletons>
- American Industrial Hygiene Association. (2021). Home Health Care Aides: Occupational Health and Safety Challenges and Opportunities [White Paper]. <https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/White-Papers/Home-Health-Care-Aides-Occupational-Health-and-Safety-Challenges-and-Opportunities-White-Paper.pdf>
- American Nurses Association. (2013). Safe patient handling and mobility: Interprofessional national standards. American Nurses Association; Silver Springs, MD.
- American Nurses Association. (2021). Safe patient handling and mobility: Interprofessional national standards across the Care Continuum. 2nd edition American Nurses Association; Silver Springs, MD
- American Nurses Association. (2019). Healthy Nurse Healthy Nation Highlights 2018-2019. *American Journal of Nursing*. Sept. 2019; 3-11. <https://www.nursingworld.org/~4a6d20/globalassets/docs/ana/practice/hnhn18-19highlights.pdf>
- American Nurses Association. (2021). Healthy Nurse Healthy Nation Year 4 Highlights 2020-2021. *American Journal of Nursing*. October 2021; 29-39. <https://www.healthynursehealthynation.org/our-resources/annual-reports/>
- American Nurses Association. (2021). COVID-19 Impact Assessment Survey – The First Year. <https://www.nursingworld.org/practice-policy/work-environment/health-safety/disaster-preparedness/coronavirus/what-you-need-to-know/year-one-covid-19-impact-assessment-survey/>
- Andersen, L. L., Burdorf, A., Fallentin, N., Persson, R., Jakobsen, M. D., Mortensen, O. S., ... & Holtermann, A. (2014). Patient transfers and assistive devices: prospective cohort study on the risk for occupational back injury among healthcare workers. *Scandinavian journal of work, environment & health*, 74-81.
- Andersen, L. L., Vinstrup, J., Villadsen, E., Jay, K., & Jakobsen, M. D. (2019). Physical and psychosocial work environmental risk factors for back injury among healthcare workers: prospective cohort study. *International journal of environmental research and public health*, 16(22), 4528.
- Andersen, T. B., Schibye, B., & Skotte, J. (2001). Sudden movements of the spinal column during health-care work. *International Journal of Industrial Ergonomics*, 28(1), 47-53.

Safe Patient Handling and Mobility – Section 1

- Anderson S.P., Oakman J. (2016). Allied health professionals and work-related musculoskeletal disorders: a systematic review. *Safety and Health at Work*. 7(4), 259-267.
- Ando, S., Ono, Y., Shimaoka, M., Hiruta, S., Hattori, Y., Hori, F., & Takeuchi, Y. (2000). Associations of self estimated workloads with musculoskeletal symptoms among hospital nurses. *Occupational and environmental medicine*, 57(3), 211-211.
- Arnold M, Radawiec S, Campo M, Wright LR. Changes in functional independence measure ratings associated with a safe patient handling and movement program. *Rehabil Nurs*. 2011; 36(4): 138-144.
- Aslam I, Davis SA, Feldman SR, Martin WE. A Review of Patient Lifting Interventions to Reduce Health Care Worker Injuries. *Workplace Health Saf*. 2015; 63(6): 267-276.
- ASPHP. (2023). Safe Patient Handling and Mobility (SPHM) Education in Health Care Student Curriculum. A White Paper by The Association of Safe Patient Handling Professionals, Inc. Warrendale, PA. March 2023. www.ASPHP.org
- Association of Occupational Health Professionals in Healthcare (AOHP). Beyond Getting Started: A Resource Guide for Implementing a Safe Patient Handling Program in the Acute Care Setting. (4th ed., Rev. Spring 2020). <https://www.aohp.org/aohp/Portals/0/Documents/ToolsForYourWork/BGSpublication/20-06%20BGS%20Safe%20Patient%20Handling.pdf>
- Association of periOperative Registered Nurses. (2021). Guideline for Safe Patient Handling and Movement. *In Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc. <https://aornguidelines.org/guidelines/content?sectionid=192587418&view=book>
- Backåberg S, Rask M, Brunt D, Gummesson C. Impact of musculoskeletal symptoms on general physical activity during nursing education. *Nurse Educ Pract*. 2014; 14(4): 385-390.
- Ball, J., Griffiths, P., & Target, S. (2018). Missed nursing care: a key measure for patient safety. Agency for Healthcare Research and Quality, PSNet. <https://psnet.ahrq.gov/perspective/missed-nursing-care-key-measure-patient-safety>
- Bartnik LM, Rice MS. Comparison of caregiver forces required for sliding a patient up in bed using an array of slide sheets. *Workplace Health & Safety*. 2013; 61(9): 393-400.
- Bassett RD, Vollman KM, Brandwene L, Murray T. (2012). Integrating a multidisciplinary mobility programme into intensive care practice (IMMPTP): a multicentre collaborative. *Intensive Crit Care Nurs*. 28(2): 88-97.
- Belbeck, A., Cudlip, A. C., & Dickerson, C. R. (2014). Assessing the interplay between the shoulders and low back during manual patient handling techniques in a nursing setting. *International Journal of Occupational Safety and Ergonomics*, 20(1), 127-137.
- Bernal, D., Campos-Serna, J., Tobias, A., Vargas-Prada, S., Benavides, F. G., & Serra, C. (2015). Work-related psychosocial risk factors and musculoskeletal disorders in hospital nurses and nursing aides: a systematic review and meta-analysis. *International journal of nursing studies*, 52(2), 635-648.
- Bodenheimer T, Sinsky C. (2014). From triple to quadruple aim: care of the patient requires care of the provider. *The Annals of Family Medicine*. 12(6): 573-576.
- Boucalt R, Knobben L. Occupational health and safety incidents at a university school of nursing: A retrospective, descriptive appraisal. *Nurse Educ Pract*. 2020; 44: 102776.
- Boynton, T. (2023). Coding and applying injury claims data to implement and sustain effective safe patient handling and mobility solutions. *International Journal of Industrial Ergonomics*, 93, 103397.
- Bragadóttir, H., Kalisch, B. J., & Tryggvadóttir, G. B. (2017). Correlates and predictors of missed nursing care in hospitals. *Journal of clinical nursing*, 26(11-12), 1524-1534.
- Buckle P. Epidemiological aspects of back pain within the nursing profession. *Int J Nurs Stud*. 1987;4:319–24.
- Callison MC, Nussbaum MA. Identification of physically demanding patient-handling tasks in an acute care hospital. *International Journal of Industrial Ergonomics*. 2012; 42(3): 261-267.
- Campo M, Shiyko MP, Margulis H, Darragh AR. (2013). Effect of a safe patient handling program on rehabilitation outcomes. *Arch Phys Med Rehabil*. 94(1): 17-22.
- Campo, M., Weiser, S., Koenig, K. L., & Nordin, M. (2008). Work-related musculoskeletal disorders in physical therapists: A prospective cohort study with 1-year follow-up. *Physical Therapy*, 88(5), 608–620.

Safe Patient Handling and Mobility – Section 1

Capponecchia C, Coman R, Gopaldasani V, Mayland EC, Campbell L. (2020). Musculoskeletal disorders in aged care workers: A systematic review of contributing factors and interventions. *International Journal of Nursing Studies*. 110: 103715.

Carayon, P.Ed. (2012). *Handbook of human factors and ergonomics in health care and patient safety*. 2nd Edition CRC press.

Casiano VE, Sarwan G, Dydyk AM, et al. Back Pain. [Updated 2023 Dec 11]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. <https://www.ncbi.nlm.nih.gov/books/NBK538173/>

Celona, J. (2014). Elements of a successful safe patient handling and mobility program. *American Nurse Today*, 9(9): 4-6.

Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition, Physical Activity, and Obesity. (2023, September 21). Adult Obesity Prevalence Maps. <https://www.cdc.gov/obesity/data-and-statistics/adult-obesity-prevalence-maps.html>

Centers for Disease Control and Prevention (n.d). Overweight & Obesity. <https://www.cdc.gov/obesity/index.html>

Centers for Disease Control. (n. d). Ergonomics and Work-Related Musculoskeletal Disorders. Center for Disease Control and Prevention. Last updated February 12, 2020. <https://www.cdc.gov/workplacehealthpromotion/health-strategies/musculoskeletal-disorders/index.html>

Centers for Disease Control. (2023). Health Workers Face a Mental Health Crisis. Centers for Disease Control and Prevention (CDC) Vital Signs Updated October 24, 2023. <https://www.cdc.gov/vitalsigns/health-worker-mental-health/index.html><https://www.cdc.gov/vitalsigns/health-worker-mental-health/index.html>

Centers for Medicare & Medicaid Services. (2023, September 6). HCAHPS: Patients' perspectives of care survey. <https://www.cms.gov/medicare/quality/initiatives/hospital-quality-initiative/hcahps-patients-perspectives-care-survey>

Chaffin, D. B., Andersson, G. B., & Martin, B. J. (2006). *Occupational biomechanics*. John Wiley & Sons.

Charney, W. (Ed.). (2009). *Handbook of modern hospital safety*. CRC Press.

Chen, C. Y., Lu, S. R., Yang, S. Y., Liang, F. W., Wang, J. J., Ho, C. H., & Hsiao, P. C. (2022). Work-related musculoskeletal disorders among physical therapists in Taiwan. *Medicine*, 101(7).

Cho, H., & Steege, L. M. (2021). Nurse fatigue and nurse, patient safety, and organizational outcomes: A systematic review. *Western Journal of Nursing Research*, 43(12), 1157-1168.

Choi SD, Brings K. (2016). Work-related musculoskeletal risks associated with nurses and nursing assistants handling overweight and obese patients: A literature review. *Work*, 53(2): 439-448.

Chu PC, Chin WS, Guo YL, Shiao JS. (2019). Long-term effects of psychological symptoms after occupational injury on return to work: A 6-year follow-up. *International Journal of Environmental Research and Public Health*, 16(2): 235.

Cimolin, V., Cau, N., Tacchini, E., Galli, M., Rigoldi, C., Rinolfi, M., ... & Capodaglio, P. (2016). Spinal load in nurses during emergency lifting of obese patients: preliminary results. *La Medicina del lavoro*, 107(5), 356-363.

Clari, M., Godono, A., Garzaro, G., Voglino, G., Gualano, M. R., Migliaretti, G., ... & Dimonte, V. (2021). Prevalence of musculoskeletal disorders among perioperative nurses: a systematic review and META-analysis. *BMC musculoskeletal disorders*, 22, 1-12.

Cohen-Mansfield, J., Culpepper, W. J., & Carter, P. (1996). Nursing staff back injuries: prevalence and costs in long term care facilities. *AAOHN Journal*, 44(1), 9-17.

Collins JW, Nelson A, and Sublet V. (2006). Safe lifting and movement of nursing home residents. 2006; DHHS (NIOSH) Publication No. 2006-117. Cincinnati, OH: National Institute for Occupational Safety and Health. <http://www.cdc.gov/niosh/docs/2006-117/>

Collins, F. (2020). Implementing a Safe Patient Handling and Mobility Program to Prevent Staff Injury. <https://thescholarship.ecu.edu/handle/10342/8661>

Corlett, E. N., Wilson, J. R., & CORLETT, N. (Eds.). (1995). *Evaluation of human work*. CRC Press.

Cromie, J. E., Robertson, V. J., & Best, M. O. (2000). Work-related musculoskeletal disorders in physical therapists: prevalence, severity, risks, and responses. *Physical therapy*, 80(4), 336-351.

Safe Patient Handling and Mobility – Section 1

- Dang, T., Roberts, D., Murray, A., & Wiggermann, N. (2022). A return-on-investment model using clinical and economic data related to safe patient handling and mobility programs in the ICU. *International Journal of Industrial Ergonomics*, 92, 103372.
- Darragh, A. R., Campo, M., & King, P. (2012). Work-related activities associated with injury in occupational and physical therapists. *Work*, 42(3), 373-384.
- Darragh, A. R., Campo, M. A., Frost, L., Miller, M., Pentico, M., & Margulis, H. (2013). Safe-patient-handling equipment in therapy practice: Implications for rehabilitation. *American Journal of Occupational Therapy*, 67(1), 45–53. [URL]
- Davis, K. G., & Kotowski, S. E. (2015). Prevalence of musculoskeletal disorders for nurses in hospitals, long-term care facilities, and home health care: A comprehensive review. *Human Factors*, 57(5), 754–792.
- Davis, K. G., & Jorgensen, M. J. (2005). Biomechanical modeling for understanding of low back injuries: a systematic review. *Occupational Ergonomics*, 5(1), 57-76.
- Davis, K. G., Freeman, A. M., Ying, J., & Huth, J. R. (2021). Workers' compensation costs for healthcare caregivers: Home healthcare, long-term care, and hospital nurses and nursing aides. *American Journal of Industrial Medicine*, 64(5), 369-380.
- Daynard D, Yassi A, Cooper JE, Tate R, Norman R, Wells R. (2001). Biomechanical analysis of peak and cumulative spinal loads during simulated patient-handling activities: a substudy of a randomized controlled trial to prevent lift and transfer injury of health care workers. *Appl Ergon*, Jun;32(3):199–214.
- de Looze, M.P., Zinzen, E., Caboor, D., van Roy, P., Clarijs, J.P. (1998). Muscle strength, task performance and low back load in nurses. *Ergonomics*. 41, 1095-1104.
- De Vito, G., Meroni, R., Riva, M.A., Mauri, R., Giunco, F., Conti, S., Cesana, G.C. (2011). EMG and forces during manoeuvring of ceiling-based and floor-based patient transfer devices]. *G. Ital. Med. Lav. Ergon*. 33, 230–234.
- Dempsey, P.G., 1998. A critical review of biomechanical, epidemiological, physiological and psychophysical criteria for designing manual materials handling tasks. *Ergonomics*. 41, 73-88.
- Dennerlein, J. T., O'Day, E. T., Mulloy, D. F., Somerville, J., Stoddard, A. M., Kenwood, C., et al. (2017). Lifting and exertion injuries decrease after implementation of an integrated hospital-wide safe patient handling and mobilisation programme. *Occupational and Environmental Medicine*, 74(5), 336–343.
- Dickinson, S., Taylor, S., & Anton, P. (2018). Integrating a standardized mobility program and safe patient handling. *Critical Care Nursing Quarterly*, 41(3), 240–252.
- Doherty-King, B., Yoon, J. Y., Pecanac, K., Brown, R., & Mahoney, J. (2014). Frequency and duration of nursing care related to older patient mobility. *Journal of Nursing Scholarship*, 46(1), 20–27.
- Dropkin, J., Moline, J., Power, P. M., & Kim, H. (2015). A qualitative study of health problems, risk factors, and prevention among emergency medical service workers. *Work*, 52(4), 935–951.
- Dutta, T., Holliday, P. J., Gorski, S. M., Baharvandy, M. S., & Fernie, G. R. (2012). A biomechanical assessment of floor and overhead lifts using one or two caregivers for patient transfers. *Applied ergonomics*, 43(3), 521-531.
- Dydyk AM, Ngnitewe Massa R, Mesfin FB. Disc Herniation. [Updated 2023 Jan 16]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan. <https://www.ncbi.nlm.nih.gov/books/NBK441822/>
- Emory, J., Kippenbrock, T., & Buron, B. (2021). A national survey of the impact of COVID-19 on personal, academic, and work environments of nursing students. *Nursing Outlook*, 69(6), 1116–1125.
- Enos, L. (2012). Evaluating a safe patient handling program: Beyond injury rates. In *Proceedings Safe Patient Handling and Mobility Conference 2012*. VISN 8 Patient Safety Center of Inquiry and The Tampa VA Research and Education Foundation, Inc.
- Evans, K. D., Sommerich, C. M., Klatt, M. D., Griffin, H., & Pan, X. (2019). Self-reported symptoms of work-related musculoskeletal disorders among radiation therapists. *Radiation Therapist*, 28(2).
- Facility Guidelines Institute. (2018). Guidelines for design and construction of hospitals. Facility Guidelines Institute. <https://www.fgiguilines.org/guidelines/editions/>
- Flor-Unda, O., Casa, B., Fuentes, M., Solorzano, S., Narvaez-Espinoza, F., & Acosta-Vargas, P. (2023). Exoskeletons: Contribution to Occupational Health and Safety. *Bioengineering*, 10(9), 1039.

Safe Patient Handling and Mobility – Section 1

- Fragala, G., & Bailey, L. P. (2003). Addressing occupational strains and sprains: Musculoskeletal injuries in hospitals. *Aaohn Journal*, 51(6), 252-259.
- Fray, M., & Hignett, S. (2015, August). An evaluation of the biomechanical risks for a range of methods to raise a patient from supine lying to sitting in a hospital bed. In *Proceedings 19th Triennial Congress of the IEA* (Vol. 9, p. 14).
- Freiberg, A., Euler, U., Girbig, M., Nienhaus, A., Freitag, S., & Seidler, A. (2016). Does the use of small aids during patient handling activities lead to a decreased occurrence of musculoskeletal complaints and diseases? A systematic review. *International archives of occupational and environmental health*, 89, 547-559.
- Fryar CD, Carroll MD, Gu Q, Afful J, Ogden CL. (2021). Anthropometric reference data for children and adults: United States, 2015–2018. National Center for Health Statistics. *Vital Health Stat* 3(46).
https://www.cdc.gov/nchs/data/series/sr_03/sr03-046-508.pdf
- Gabele, D., Mendez, S., & Giuliano, K. K. (2023). Early and progressive mobility in a community hospital: A new interdisciplinary safe patient handling and mobility model. *Nursing Management*, 54(3), 22.
- Galinsky, T., Deter, L., Krieg, E., Feng, H. A., Battaglia, C., Bell, R., et al. (2021). Safe patient handling and mobility (SPHM) for increasingly bariatric patient populations: Factors related to caregivers' self-reported pain and injury. *Applied Ergonomics*, 91, 103300.
- Galizzi, M., Miesmaa, P., Punnett, L., & Slatin, C.; Phase in Healthcare Research Team. (2010). Injured workers' underreporting in the health care industry: An analysis using quantitative, qualitative, and observational data. *Industrial Relations: A Journal of Economy and Society*, 49(1), 22–43.
- Gallagher, S., & Marras, W. S. (2012). Tolerance of the lumbar spine to shear: A review and recommended exposure limits. *Clinical Biomechanics*, 27(10), 973–978.
- Gallagher S, Schall MC., Jr (2017). Musculoskeletal disorders as a fatigue failure process: evidence, implications and research needs. *Ergonomics*, 60(2):255–269.
- Gallagher, S, Sesek R, Sesek B, Nail, I, Pool N, Budnick, P. (2022) Fatigue Failure Ergonomics Assessment Tools Advance MSD Prevention Strategies. *Ergoweb*, February 2, 2022. <https://ergoweb.com/fatigue-failure-ergonomics-assessment-tools-advance-msd-prevention-strategies/>
- Gallagher, S. (2021). Determinants of the Fatigue Life of Musculoskeletal Tissues. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 65, No. 1, pp. 484-488). Sage CA: Los Angeles, CA: SAGE Publications.
- Garg A, Kapellusch JM. (2012) Long-term efficacy of an ergonomics program that includes patient-handling devices on reducing musculoskeletal injuries to nursing personnel. *Human Factors*, 54(4): 608-625.
- Garg, A. (1999). Long-term Effectiveness of 'Zero-Lift Program' in Seven Nursing Homes and One Hospital. U.S. Department of Health & Human Services Center for Disease Control and Prevention National Institute for Occupational Safety and Health Cincinnati, Ohio 45226 August 16, 1999.
- Gibson K, Costa B, Sampson A. (2017). Linking worker health and safety with patient outcomes. WorkSafe Victoria (WSV). The Institute of Safety, Compensation and Recovery Research (ISCRR).
http://www.iscrr.com.au/_data/assets/pdf_file/0006/1321719/Evidence-Review_Linking-worker-health-and-safety-with-patient-outcomes.pdf
- Gomaa, A. E., Tapp, L. C., Luckhaupt, S. E., et al. (2015). Occupational traumatic injuries among workers in health care facilities—United States, 2012–2014. *Morbidity and Mortality Weekly Report*, 64(15), 405.
- Gonzalez, C. M., Howe, C. M., Waters, T. R., & Nelson, A. (2009). Recommendations for turning patients with orthopaedic impairments. *Orthopaedic Nursing*, 28(2S), S9–S12.
- Graham, P., & Dougherty, J. P. (2012). Oh, their aching backs!: Occupational injuries in nursing assistants. *Orthopaedic Nursing*, 31(4), 218–223.
- Graveling R, Smith A and Hanson M. (2021). musculoskeletal disorders: association with psychosocial risk factors at work. A literature review. European Agency of Health and Safety at Work
https://osha.europa.eu/sites/default/files/2021-11/MSDs_association_pshychosocial_risks_factors_at_work_report.pdf

Safe Patient Handling and Mobility – Section 1

Griffiths, P., Recio-Saucedo, A., Dall'Ora, C., Briggs, J., Maruotti, A., Meredith, P., ... & Missed Care Study Group. (2018). The association between nurse staffing and omissions in nursing care: a systematic review. *Journal of advanced nursing*, 74(7), 1474-1487.

Grimaud, T. A. (2012). Safe patient handling and movement device training: A hands-on continuing education program for occupational therapy practitioners (White paper submitted in partial fulfillment of requirements for the degree of Doctor of Occupational Therapy). Boston University.

Gucer, P. W., Gaitens, J., Oliver, M., & McDiarmid, M. A. (2013). Sit-stand powered mechanical lifts in long-term care and resident quality indicators. *Journal of Occupational and Environmental Medicine*, 55(1), 36–44. [URL]

Haines, J., Arnold, M., & Cheng, C. (2021). Safe patient handling and mobility principles in doctor of physical therapy students: Intentions for future practice. *International Journal of Safe Patient Handling & Mobility*, 11(2), 61–75.

Hallmark, B., Mechan, P., & Shores, L. (2015). Ergonomics safe patient handling and mobility. *Nursing Clinics of North America*, 50(1), 153–166.

Hampton, I. A. (1898). *Nursing: Its principles and practice*. Cleveland: J.B Savage.

Han, K., Trinkoff, A. M., & Geiger-Brown, J. (2014). Factors associated with work-related fatigue and recovery in hospital nurses working 12-hour shifts. *Workplace Health & Safety*, 62(10), 409-414.

Hanania AN, Cook A, Threadgill MP, Conway SH, Ludwig M. (2020). Prevalence of musculoskeletal work-related injuries among radiation therapists. *Radiologic Technology*. 91(5): 414-421.

Handicare (n.d.). How it All Started. <https://www.handicare.com/en/product-cat/how-it-all-started-about-systemromedic>.

Hansell AK, Knaster ES, Phillips LE (2018). Injury among home workers in Washington State. *New Solutions*, 27(4); 543-558.

Harwood, K. J., Scalzitti, D. A., Campo, M., & Darragh, A. (2016). Systematic review of safe patient handling and mobility programs to improve patient outcomes in rehabilitation. *American Journal of Safe Patient Handling and Mobility*, 6(4), 141–150.

Hegewald, J., Berge, W., Heinrich, P., et al. (2018). Do technical aids for patient handling prevent musculoskeletal complaints in health care workers? A systematic review of intervention studies. *International Journal of Environmental Research and Public Health*, 15(3), 476.

Hessels, A. J., Paliwal, M., Weaver, S. H., Siddiqui, D., & Wurmser, T. A. (2019). Impact of Patient Safety Culture on Missed Nursing Care and Adverse Patient Events. *Journal of nursing care quality*, 34(4), 287-294.

National Institute for Occupational Safety and Health (2023, January 17). Hierarchy of Controls. <https://www.cdc.gov/niosh/topics/hierarchy/>

Hignett, S., Crumpton, E., et al. (2002). Evidence-based patient handling: Tasks, equipment, and interventions. Psychology Press.

Hignett, S. (2003). Intervention strategies to reduce musculoskeletal injuries associated with handling patients: A systematic review. *Occupational and Environmental Medicine*, 60, E6.

Ho, J. (2017, June 22). OSHA and ergonomics: The past, present and future. EHA Today. <https://www.ehstoday.com/standards/osha/article/21919092/osha-and-ergonomics-the-past-present-and-future>

Hodder, J. N., MacKinnon, S. N., Ralhan, A., & Keir, P. J. (2010). Effects of training and experience on patient transfer biomechanics. *Ergonomics*, 40(3), 282-288.

Hodder, J. N., Holmes, M. W., & Keir, P. J. (2010). Continuous assessment of work activities and posture in long-term care nurses. *Ergonomics*, 53(9), 1097-1107.

Hodgson MJ, Matz MW, Nelson, A. (2013). Patient handling in the Veterans Health Administration: Facilitating change in the health care industry. *Journal of Occupational and Environmental Medicine*, 55: 1230–1237.

Holden, R. J., Carayon, P., Gurses, A. P., Hoonakker, P., Hundt, A. S., Ozok, A. A., & Rivera-Rodriguez, A. JSEIPS 2.0: a human factors framework for studying and improving the work of healthcare professionals and patients. *Ergonomics*, 56(11), 1669-1686.

Hoozemans, M. J., Kingma, I., de Vries, W. H., & van Dieën, J. H. (2008). Effect of lifting height and load mass on low back loading. *Ergonomics*, 51(7), 1053-1063.

Safe Patient Handling and Mobility – Section 1

Hossain, M. A., Amin, A., Paul, A., Qaisar, H., Akula, M., Amirpour, A., ... & Asif, A. (2018). Recognizing obesity in adult hospitalized patients: a retrospective cohort study assessing rates of documentation and prevalence of obesity. *Journal of clinical medicine*, 7(8), 203.

Hu B, Shan X, Zhou J, Ning X. The effects of stance width and foot posture on lumbar muscle flexion-relaxation phenomenon. *Clinical Biomechanics*. 2013; 29(3): 311-316.

Huffman GM, Crumrine J, Thompson B, Mobley V, Roth K, Roberts C. (2014). On SHiPs and safety: A journey of safe patient handling in pediatrics. *Journal of Pediatric Nursing*, 29: 641–650.

Human Factors and Ergonomics Society. (2023). Prevention of Musculoskeletal Disorders in Healthcare Workers: Safe Patient Handling and Mobility Programs. Washington DC, 2023.

<https://www.hfes.org/Portals/0/Safe%20Patient%20Handling%20and%20Mobility.pdf>

Humrickhouse, R., & Knibbe, H. J. (2016). The importance of safe patient handling to create a culture of safety: an evidential review. *The Ergonomics Open Journal*, 9(1).

Hung, I. Y. J., Shih, T. T. F., Chen, B. B., Liou, S. H., Ho, I. K., & Guo, Y. L. (2020). The roles of lumbar load thresholds in cumulative lifting exposure to predict disk protrusion in an Asian population. *BMC Musculoskeletal Disorders*, 21(1), 1-13.

Hurtado, D. A., Heinonen, G. A., Dumet, L. M., & Greenspan, S. A. (2018). Early career nurses with fewer supportive peers for safe patient handling are likely to quit. *International Nursing Review*, 65(4), 596-600.

Hwang, J., Kuppam, V. A., Chodraju, S. S. R., Chen, J., & Kim, J. H. Evaluation of Different Patient Transfer Devices in Reducing Biomechanical Exposures among Professional Caregivers. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 62, No. 1, pp. 933-937). Sage CA: Los Angeles, CA: SAGE Publications.

Ibrahim, M. E., El-Zoghby, S. M., Zaghloul, N. M., Shehata, S. A., & Farghaly, R. M. (2024). Musculoskeletal pain among medical residents: role of workplace safety climate and sexual harassment. *BMC musculoskeletal disorders*, 25(1), 167.

International Association of Ergonomics (IEA). (n.d.) What is ergonomics (HFE). <https://iea.cc/about/what-is-ergonomics/>

International Organization for Standardization. (2012). ISO/TR 12296:2012 Ergonomics – Manual Handling of People in the Healthcare Sector. Geneva, Switzerland: Author. <https://www.iso.org/standard/51310.html>

Jäger M, Jordan C, Theilmeier A, Wortmann N, Kuhn S, Nienhaus A, et al. (2013). Lumbar-load analysis of manual patient-handling activities for biomechanical overload prevention among healthcare workers. *Annals of Occupational Hygiene*, 57(4): 528-544.

Jäger, M. (2018). Extended compilation of autopsy-material measurements on lumbar ultimate compressive strength for deriving reference values in ergonomic work design: The Revised Dortmund Recommendations. *EXCLI journal*, 17, 362.

Joint Commission. (2012). Improving patient and worker safety: opportunities for synergy, collaboration and innovation. Oakbrook Terrace, IL: The Joint Commission. 2012. <http://www.jointcommission.org/assets/1/18/TJC-ImprovingPatientAndWorkerSafety-Monograph.pdf>

Joint Commission (2017). OSHA & Worker Safety Handling with Care Practicing safe patient handling EC NEWS August 2017. https://lhatrustfunds.com/assets/uploads/documents/11-Pages_from_ECN_20_2017_08-2.pdf

The Joint Commission (2024). High Reliability. <https://www.jcrinc.com/what-we-offer/high-reliability/>

Jones V, Missar V, Bronson M, Grant J. Aon health care workers compensation barometer. Aon plc. 2016. <https://www.aon.com/risk-services/thought-leadership/report-2016-health-care-barometer.jsp>

Jones V, Missar V, Zmyslowski K, Cregg H, Zhang K. Aon health care workers compensation barometer (GDM08049). Aon plc. 2018. <https://www.aon.com/risk-services/thought-leadership/report-2018-health-care-barometer.jsp>

Jones, D & Eaferton, G. (2020). Reducing Preventable Injuries Through the Safe Patient Handling and Mobility Program Bundle. *Int J SPHM*, 1(4), 134-138.

Jones, T. L., Hamilton, P., & Murry, N. (2015). Unfinished nursing care, missed care, and implicitly rationed care: State of the science review. *International journal of nursing studies*, 52(6), 1121-1137.

Safe Patient Handling and Mobility – Section 1

- Kalisch B. J., Tschannen D, Lee H, Friese C.R. (2011). Hospital variation in missed nursing care. *Am J Med Qual*, 26(4): 291-299.
- Kalisch, B. J., & Xie, B. (2014). Errors of omission: missed nursing care. *Western journal of nursing research*, 36(7), 875- 890.
- Kalisch, B. J., Tschannen, D., & Lee, K. H. (2012). Missed nursing care, staffing, and patient falls. *Journal of nursing care quality*, 27(1), 6-12.
- Kalisch, B. J., Landstrom, G. L., & Hinshaw, A. S. (2009). Missed nursing care: a concept analysis. *Journal of advanced nursing*, 65(7), 1509-1517.
- Kanaskie, M. L., & Snyder, C. (2018). Nurses and nursing assistants decision-making regarding use of safe patient handling and mobility technology: A qualitative study. *Applied Nursing Research*, 39, 141-147.
- Kayser SA, Wiggermann NE, Kumpar D. (2020). Factors associated with safe patient handling practice in acute care and its relationship with patient mobilization: A cross-sectional study. *International Journal of Nursing Studies*, 104: 103508.
- Keir, P.J., MacDonell, C.W. (2004). Muscle activity during patient transfers: a preliminary study on the influence of lift assists and experience. *Ergonomics* 47, 296–306.
- Kennedy, B., & Kopp, T. (2015). Safe patient handling protects employees, too. *Nursing*, 45(8), 65–67.
- Kim, S. S., Okechukwu, C. A., Dennerlein, J. T., Boden, L. I., Hopcia, K., Hashimoto, D. M., et al. (2014). Association between perceived inadequate staffing and musculoskeletal pain among hospital patient care workers. *International Archives of Occupational and Environmental Health*, 87(3), 323-330.
- Kim, S., Mayer, C., & Jones, C. B. (2021). Relationships between nurses' experiences of workplace violence, emotional exhaustion and patient safety. *Journal of research in nursing*, 26(1-2), 35-46.
- King Jensen, M. (2023). Factors predicting sustainability using a multi site safe patient handling program. *Int J SPHM*, 13(1), 14-21.
- Kiyamaz, D.; Koc, Z. (2018). Identification of factors which affect the tendency towards and attitudes of emergency unit nurses to make medical errors. *J. Clin. Nurs*, 27, 1160–1169.
- Kneafsey, R., Clifford, C., & Greenfield, S. (2014). Perceptions of hospital manual handling policy and impact on nursing team involvement in promoting patients' mobility. *Journal of clinical nursing*, 24(1-2), 289-299.
- Knibbe, J. J., Knibbe, N. E., & Geuze, I. (2003). Work package Better, Sector funds Care and Welfare, Sector Hospitals, Utrecht (Dutch guidelines prevention of physical overload for General Hospitals).
- Knibbe, J. J., & Knibbe, N. E. (2012). Static load in the nursing profession; the silent killer? *Work*, 41(Suppl 1), 5637–5638.
- Kok, J. D., De Vroonhof, P., Snijders, J., Roullis, G., Clarke, M., Peereboom, K., & Isusi, I. (2019). Work-related MSDs: prevalence, costs and demographics in the EU (European Risk Observatory Executive summary). Publications Office of the European Union, 1-18.
https://osha.europa.eu/sites/default/files/Work_related_MSDs_prevalence_costs_and_demographics_in_EU_summary.pdf
- Koppelaar, E., Knibbe, J. J., Miedema, H. S., & Burdorf, A. (2011). Individual and organisational determinants of use of ergonomic devices in healthcare. *Occupational and Environmental Medicine*.
- Koppelaar, E., Knibbe, J.J., Miedema, H.S., Burdorf, A. (2012). The influence of ergonomic devices on mechanical load during patient handling activities in nursing homes. *Ann. Occup. Hyg.* 56, 708–718.
- Kotowski, S. E., Davis, K. G., Wiggermann, N., & Williamson, R. (2013). Quantification of patient migration in bed: Catalyst to improve hospital bed design to reduce shear and friction forces and nurses' injuries. *Human Factors*, 55(1), 36–47.
- Kovner, C. T., Brewer, C. S., Fatehi, F., & Jun, J. (2014). What does nurse turnover rate mean and what is the rate? *Policy, Politics, & Nursing Practice*, 15(3–4), 64–71.
- Krishnan, R. H., Devanandh, V., Brahma, A. K., & Pugazhenth, S. (2016). Estimation of mass moment of inertia of human body, when bending forward, for the design of a self-transfer robotic facility. *Journal of Engineering Science and Technology*, 11(2), 166–176.

Safe Patient Handling and Mobility – Section 1

- Kucera, K. L., Schoenfisch, A. L., McIlvaine, J., Becherer, L., James, T., Yeung, Y. L., ... & Lipscomb, H. J. (2019). Factors associated with lift equipment use during patient lifts and transfers by hospital nurses and nursing care assistants: A prospective observational cohort study. *International journal of nursing studies*, 91, 35-46.
- Kurowski A, Ghaziri M. (2019). The Role of Safe Patient Handling in Reducing Type II Workplace Violence in Healthcare Setting. *CPH News and Views*. June 1, 2019. Issue 61. <https://www.uml.edu/Research/CPH-NEW/News/emerging-topics/News-views-62.aspx>
- Kurowski A, Gore R, Roberts Y, Kincaid KR, Punnett L. (2017). Injury rates before and after the implementation of a safe resident handling program in the long-term care sector. *Saf Sci*. 92: 217-224.
- Kurowski, A., Gore, R., Buchholz, B., & Punnett, L. (2012). Differences among nursing homes in outcomes of a safe resident handling program. *Journal of Healthcare Risk Management*, 32(1), 35-51.
- Kyung, M., Lee, S. J., Dancu, C., & Hong, O. (2023). Underreporting of workers' injuries or illnesses and contributing factors: a systematic review. *BMC public health*, 23(1), 558.
- Lapane, K. L., Dubé, C. E., & Jesdale, B. M. (2016). Worker injuries in nursing homes: is safe patient handling legislation the solution?. *The journal of nursing home research sciences*, 2, 110.
- Larson RE, Murtagh EM, Rice MS. (2018). Forces involved when sliding a patient up in bed. *Work*59(3): 439-448.
- Lavender, S. A., Lorenz, E. P., & Andersson, G. B. (2007). Can a new behaviorally oriented training process to improve lifting technique prevent occupationally related back injuries due to lifting? *Spine*, 32, 487–494.
- Lee, J., Green, B. M., Palmarella, G., McNamara, K., & Wachholtz, A. (2022). Negative impact of chronic pain: The role of locus of control and perceived family validation of chronic pain. *Health Psychology Open*, 9(2), 20551029221125170.
- Lee, S. J., & Lee, J. H. (2017). Safe patient handling behaviors and lift use among hospital nurses: A cross-sectional study. *International journal of nursing studies*, 74, 53-60.
- Lee, S. J., & Rempel, D. (2020). Comparison of lift use, perceptions, and musculoskeletal symptom symptoms between ceiling lifts and floor-based lifts in patient handling. *Applied ergonomics*, 82, 102954
- Lee, S. J., Kang, K. J., & Lee, J. H. (2021). Safe patient handling legislation and changes in programs, practices, perceptions, and experience of musculoskeletal disorders by hospital characteristics: A repeated cross-sectional survey study. *International Journal of Nursing Studies*, 113, 103791
- Lee, S. J., Joung H.L., & Harrison R. (2019) Impact of California's safe patient handling legislation on musculoskeletal injury prevention among nurses. *American Journal of industrial medicine* 62 (1), 50-58.
- Lee, S. J., Lee, J. H., & Harrison, R. (2022). Safe patient handling legislation and musculoskeletal disorders among California healthcare workers: Analysis of workers' compensation data, 2007-2016. *American Journal of Industrial Medicine*, 65(7), 589-603.
- Liberty Mutual. (2020). Workplace Safety Index Healthcare and Social Assistance. N/D. Last reviewed May 2020. https://business.libertymutual.com/wp-content/uploads/2021/04/WSI_1003.pdf.
- Liberty Mutual. Workplace Safety Indexes 2019 - 2023: Healthcare and Social Assistance. Liberty Mutual. <https://business.libertymutual.com/>
- Liberty Mutual. (August 2023). Workplace Safety Indexes 2023: Healthcare and Social Assistance. <https://business.libertymutual.com/>
- Lloyd, J. D., & Baptiste, A. (2006). Friction-reducing devices for lateral patient transfers: A biomechanical evaluation. *Aaohn Journal*, 54(3), 113-119.
- Loeppke, R., Boldrighini, J., Bowe, J., Braun, B., Eggins, E., Eisenberg, B. S., ... & Yarbrough, M. (2017). Interaction of health care worker health and safety and patient health and safety in the US health care system: recommendations from the 2016 summit. *Journal of Occupational and Environmental Medicine*, 59(8), 803-813.
- Lyon, B. K., & Popov, G. (2023). Prevention Through Ergonomics: Integrating Human Factors Into a Prevention Through Design Approach. *Professional Safety*, 68(06), 24-33.
- Marras, W. S. (2008). *The working back: A systems view*. John Wiley & Sons.
- Marras, W. S., Davis, K. G., Heaney, C. A., Maronitis, A. B., & Allread, W. G. (2000). The influence of psychosocial stress, gender, and personality on mechanical loading of the lumbar spine. *Spine*, 25(23), 3045-3054.

Safe Patient Handling and Mobility – Section 1

- Marras, W. S., Davis, K. G., Kirking, B. C., & Bertsche, P. K. (1999). A comprehensive analysis of low-back disorder risk and spinal loading during the transferring and repositioning of patient using different techniques. *Ergonomics*, 42(7), 904-926.
- Marras, W. S., Ferguson, S. A., Lavender, S. A., Splittstoesser, R. E., & Yang, G. (2014). Cumulative spine loading and clinically meaningful declines in low-back function. *Human Factors and Ergonomics Society*, 56(1), 29-43. [URL]
- Marras, W. S., Knapik, G. G., & Ferguson, S. (2009). Lumbar spine forces during manoeuvring of ceiling-based and floor-based patient transfer devices. *Ergonomics*, 52, 384–397.
- Martimo, K. P., Verbeek, J., Karppinen, J., Furlan, A. D., Takala, E., Kuijer, P. P., et al. (2008). Effect of training and lifting equipment for preventing back pain in lifting and handling: Systematic review. *BMJ*, 336(7641), 429-431.
- Martin, B., Kaminski-Ozturk, N., O'Hara, C., & Smiley, R. (2023). Examining the impact of the COVID-19 pandemic on burnout and stress among US nurses. *Journal of Nursing Regulation*, 14(1), 4-12.
- Martin, C. J., Jin, C., Bertke, S. J., Yiin, J. H., & Pinkerton, L. E. (2020). Increased overall and cause-specific mortality associated with disability among workers' compensation claimants with low back injuries. *American journal of industrial medicine*, 63(3), 209-217.
- Matz M, Celona J, Martin M, McCoskey K, Nelson GG. (2019). Patient Handling and Mobility Assessments (2nd ed.). https://www.fgiguideelines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf
- Mayeda-Letourneau J. (2014). Safe patient handling and movement: a literature review. *Rehabil Nurs*. 39(3): 123-129.
- McClean, K., Cross, M., & Reed, S. (2021). Risks to healthcare organizations and staff who manage obese (Bariatric) patients and use of obesity data to mitigate risks: a Literature Review. *Journal of Multidisciplinary Healthcare*, 577-588.
- McCoskey KL. (2007). Ergonomics and Patient Handling. *AAOHN Journal*, 55(11): 454–62
- McGill, S. M. (1997). The biomechanics of low back injury: implications on current practice in industry and the clinic. *Journal of biomechanics*, 30(5), 465-475.
- McGill, S., (2002). Low back disorders: Evidence based prevention and rehabilitation. Human Kinetics, Windsor, Canada.
- McGrath, M., Taaffe, C., & Gallagher, A. (2015). An exploration of knowledge and practice of patient handling among undergraduate occupational therapy students. *Disability and Rehabilitation*, 37(25), 2375-2381.
- Mcilvane, J., et al. (2011). Integrating patient handling equipment into physical therapy activities in a rehabilitation setting: A case series. *American Journal of Safe Patient Handling and Movement*, 1(3), 16-22.
- McLean, H. (2018). Home care and home support worker safety: A scoping review. *Perspectives*, 40(1), 18-26.
- McMillan, J., Moo, A., Newnam, S., & de Silva, A. (2018). Improvements in patient handling for worker and patient safety. The Institute of Safety, Compensation and Recovery Research (ISCRR). WorkSafe Victoria (WSV). https://research.iscrr.com.au/_data/assets/pdf_file/0004/1321771/Environmental-Scan_Improvements-in-patient-handling-for-worker-and-patient-safety.pdf
- Mechan, P., & Wright, L. (2015). A history of safe patient handling and mobility technology. *American Journal of Safe Patient Handling and Movement*, 5(3), 87-103.
- Medmart. (Year unavailable). The man behind the Hoyer. https://medmartonline.com/blog/the-man-behind-the-hoyer-lift?srsId=AfmBOoq0K_B1b0SJ5p17tfGNVd7o3wMGO2_840Atm99vDO9tjZE0BL6T
- Melnik, B. M., Orsolini, L., Tan, A., Arslanian-Engoren, C., Melkus, G. D., Dunbar-Jacob, J., Rice, V. H., Millan, A., Dunbar, S. B., Braun, L. T., et al. (2018). A national study links nurses' physical and mental health to medical errors and perceived worksite wellness. *Journal of Occupational and Environmental Medicine/American College of Occupational and Environmental Medicine*, 60, 126–131.
- Menzel, N. N. (2008). Underreporting of musculoskeletal disorders among health care workers: Research needs. *AAOHN Journal*, 56(12), 487-494.

Safe Patient Handling and Mobility – Section 1

- Miller H, Rockefeller K, Townsend P. (2017). International round table discussion: Do gait belts have a role in safe patient handling programs? *Int. Journal SPHM*, 7(3): 116-121.
- Miller, L, Mahar, S, & Nicastro, B. (2022). Transforming Safety at the Bedside with Safe Patient Handling Practice. *Int J SPHM*, 12(1), 5-12.
- Miranda, H., Punnett, L., Gore, R., & Boyer, J. (2011). Violence at the workplace increases the risk of musculoskeletal pain among nursing home workers. *Occupational and environmental medicine*, 68(1), 52-57.
- Modes RJ, Lafci Fahrioglu S. Anatomy, Back. [Updated 2023 Feb 27]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan. <https://www.ncbi.nlm.nih.gov/books/NBK539746/>
- Monaghan H. (2011). Selecting effective training and education strategies as part of a safe patient handling and movement program. *Am. J. SPHM*, 1(4), 1-21.
- Morabito, J, Penkala, S, Coxon, K. (2021). Workplace musculoskeletal problems in occupational therapy students. *BMC Public Health*, 21(1): 1-12.
- Muona, A., Vartiainen, P., Karjalainen, P. A., & Räsänen, K. (2022). Forces required in repositioning a patient in bed using regular sheet and slide film. *International Journal of Industrial Ergonomics*, 90, 103302.
- Mustafa I. Al Qaraghli, A; De Jesus O.(2023). Lumbar Disc Herniation. In StatPearls [Internet]. StatPearls Publishing. Last Update: August 23, 2023. <https://www.ncbi.nlm.nih.gov/books/NBK560878/>
- Najafi, F., Fallahi-Khoshknab, M., Ahmadi, F., Dalvandi, A., & Rahgozar, M. (2018). Antecedents and consequences of workplace violence against nurses: A qualitative study. *Journal of clinical nursing*, 27(1-2), e116-e128.
- National Council of State Boards of Nursing. (April 13, 2023) NCSBN Research Projects Significant Nursing Workforce Shortages and Crisis. News Release. <https://www.ncsbn.org/news/ncsbn-research-projects-significant-nursing-workforce-shortages-and-crisis>
- National Heart, Lung and Blood Institute. (March 24, 2022). Overweight and Obesity. National Heart, Lung and Blood Institute. <https://www.nhlbi.nih.gov/health-topics/overweight-and-obesity>
- National Institute for Occupational Safety and Health (1997 updated July 2017). Elements of Ergonomics Programs. <https://www.cdc.gov/niosh/topics/ergonomics/ergoprimer/default.html>
- National Institute for Occupational Safety and Health. (May 9, 2024). Safe Patient Handling and Mobility (SPHM) <https://www.cdc.gov/niosh/healthcare/prevention/sphm.html>
- National Public Radio. (2015). Even 'Proper' Technique Exposes Nurses' Spines to Dangerous Forces. NPR.org. Published February 11, 2015. <https://www.npr.org/2015/02/11/383564180/even-proper-technique-exposes-nurses-spines-to-dangerous-forces>.
- National Safety Council (2023). Worker Injury Facts, NSC 2023. <https://injuryfacts.nsc.org/work/costs/work-injury-costs/>
- National Steering Committee for Patient Safety. (May 2022). Declaration to Advance Patient Safety. Boston, Massachusetts: Institute for Healthcare Improvement. www.ihl.org
- National Steering Committee for Patient Safety. Implementation Resource Guide: A National Action Plan to Advance Patient Safety. Boston, Massachusetts: Institute for Healthcare Improvement; 2020. www.ihl.org/SafetyActionPlan
- National Steering Committee for Patient Safety. (2020). Safer Together: A National Action Plan to Advance Patient Safety. Boston, Massachusetts: Institute for Healthcare Improvement. www.ihl.org
- Nedresky, D., Reddy, V., & Singh, G. (2023). Anatomy, back, nucleus pulposus. In *StatPearls [Internet]*. StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK535373/>
- Nelson, A. L. (2006). Safe patient handling and movement: A practical guide for health care professionals. Springer Publishing Company
- Nelson, A., & Baptiste, A. (2004). Evidence-based practices for safe patient handling and movement. *Online Journal of Issues in Nursing*, 9(3), Manuscript 3.
- Nelson, A., Collins, J., Siddharthan, K., Matz, M., & Waters, T. (2008). The link between safe patient handling and patient outcomes in long-term care. *Rehabilitation Nursing*, 33(1), 33–43.

Safe Patient Handling and Mobility – Section 1

- Nelson, A., Lloyd, J. D., Menzel, N., & Gross, C. (2003). Preventing nursing back injuries: Redesigning patient handling tasks. *AAOHN Journal*, 51(3), 126–134.
- Nelson, A., Matz, M., Chen, F., Siddharthan, K., Lloyd, J., & Fragala, G. (2006). Development and evaluation of a Rice multifaceted ergonomics program to prevent injuries associated with patient handling tasks. *International Journal of Nursing Studies*, 43(6), 717–733.
- Nelson, A. L., Motacki, K., & Menzel, N. (2009). *The illustrated guide to safe patient handling and movement*. Springer. New York toolkit New York State Dept of Health Safe Patient Handling Workgroup. Report to the Commissioner of Health, 2016. https://www.health.ny.gov/statistics/safe_patient_handling/
- Noble, N. L., & Sweeney, N. L. (2018). Barriers to the use of assistive devices in patient handling. *Workplace health & safety*, 66(1), 41-48.
- NSI Nursing Solutions, Inc. (2024). 2024 NSI National Health Care Retention & RN Staffing Report. <https://www.nsinursingsolutions.com>
- NSI Nursing Solutions, Inc. (2025). 2025 NSI National Health Care Retention & RN Staffing Report. https://www.nsinursingsolutions.com/documents/library/nsi_national_health_care_retention_report.pdf
- Oakman, J., Macdonald, W. (2019). The APHIRM toolkit: an evidence-based system for workplace MSD risk management. *BMC Musculoskelet Disord* 20, 504. <https://pmc.ncbi.nlm.nih.gov/articles/PMC6822468/>
- Occupational Safety and Health Administration (2016). Recommended Practices for Safety and Health Programs <https://www.osha.gov/sites/default/files/publications/OSHA3885.pdf>
- Occupational Safety and Health Administration (2002). OSHA vs. Beverly Enterprises Stipulation and Settlement Agreement. OSHA. <https://www.osha.gov/enforcement/cwsa/beverly-enterprises-inc-02262002>
- Occupational Safety and Health Administration. (n.d.). Safe patient handling programs. <https://www.osha.gov/hospitals/patient-handling>
- Occupational Safety and Health Administration. (2013). Safe patient handling programs: Learn from the leaders. https://www.osha.gov/sites/default/files/3.6_SPH_profiles_508.pdf
- Occupational Safety and Health Administration. (2013). Safe patient handling programs: Effectiveness and cost savings (OSHA 3729 – 09/2013). <https://www.osha.gov/sites/default/files/publications/OSHA3279.pdf>
- Occupational Safety and Health Administration. (2023). All About OSHA https://www.osha.gov/sites/default/files/publications/all_about_OSHA.pdf
- Occupational Safety and Health Administration. (2003, Revised March 2009). Guidelines for Nursing Homes: Ergonomics for the Prevention of Musculoskeletal Disorders. OSHA Publication 3182. https://www.osha.gov/sites/default/files/publications/final_nh_guidelines.pdf
- Occupational Safety and Health Administration. (n.d.). Worker Safety in your Hospital - Know the Facts. https://www.osha.gov/sites/default/files/1.1_Data_highlights_508.pdf
- Occupational Safety and Health Administration (n.d.). Technical Manual (OTM) Section VII: Chapter 1. Back Disorders and Injuries. <https://www.osha.gov/otm/section-7-ergonomics/chapter-1#:~:text=Back%20disorders%20can%20develop%20gradually,of%20a%20single%20traumatic%20event>
- Ogboenyi, A. A. (2019). Exploring the associations of burnout, missed nursing care, turnover status, and job satisfaction among neonatal intensive care nurses (Doctoral dissertation, University of Cincinnati;).
- Olinski, C., & Norton, C. E. (2017). Implementation of a safe patient handling program in a multihospital health system from inception to sustainability: successes over 8 years and ongoing challenges. *Workplace health & safety*, 65(11), 546-559.
- Occupational Safety and Health Administration US Dept. of Labor. (n.d.). OSH Act of 1970, Sec. 5 Duties. <https://www.osha.gov/laws-regs/oshact/section5-duties>
- Oxford Medical Healthcare Limited (n.d.). Oxford Hoist: A Rich History. <https://oxfordhealthcare.co.uk/oxford-hoist-a-rich-history/>
- Park, S., Lavender, S. A., Sommerich, C. M., & Patterson, E. S. (2018). Increasing the use of patient lifting devices in nursing homes: Identifying the barriers and facilitators affecting the different adoption stages for an ergonomics intervention. *International Journal of Safe Patient Handling & Mobility*, 8(1), 9–24.

Safe Patient Handling and Mobility – Section 1

- Pedersen, M. T., Essendrop, M., Skotte, J. H., Jørgensen, K., Schibye, B., & Fallentin, N. (2007). Back muscle response to sudden trunk loading can be modified by training among healthcare workers. *Spine*, 32(13), 1454-1460.
- Pihl-Thingvad, J., Brandt, L. P., & Andersen, L. L. (2018). Consistent use of assistive devices for patient transfer is associated with less patient-initiated violence: Cross-sectional study among healthcare workers at general hospitals. *Workplace Health & Safety*, 66(9), 453-461.
- Plagenhoef, S., Evans, F. G., & Abdelnour, T. (1983). Anatomical data for analyzing human motion. *Research Quarterly for Exercise and Sport*, 54(2), 169-178.
- Pompeii, L. A., Schoenfisch, A. L., Lipscomb, H. J., Dement, J. M., Smith, C. D., & Upadhyaya, M. (2009). Musculoskeletal injuries resulting from patient handling tasks among hospital workers. *American Journal of Industrial Medicine*, 52(7), 571-578.
- Pompeii, L. A., Schoenfisch, A. L., Lipscomb, H. J., Dement, J. M., Smith, C. D., & Upadhyaya, M. (2015). Physical assault, physical threat, and verbal abuse perpetrated against hospital workers by patients or visitors in six US hospitals. *American journal of industrial medicine*, 58(11), 1194-1204.
- Poole Wilson T, Davis KG, Kotowski SE, Daraiseh N. Quantification of patient and equipment handling for nurses through direct observation and subjective perceptions. *Advances in Nursing*. 2015.
- Powell-Cope, G., Rugs, D., Ialynytchev, A., Devine, D., McCoskey, K., Zhang, Y., & Deter, L. (2018). CE: Original research: Patient handling and mobility course content: A national survey of nursing programs. *AJN The American Journal of Nursing*, 118(11), 22-31.
- Powell-Cope, G., Toyinbo, P., Patel, N., Rugs, D., Elnitsky, C., Hahm, B., ... & Hodgson, M. (2014). Effects of a national safe patient handling program on nursing injury incidence rates. *JONA: The Journal of Nursing Administration*, 44(10), 525-534.
- Powell-Cope, G., & Rugs, D. (2015). What elements of the 2013 American Nurses Association safe patient handling and mobility standards are reflected in state legislation? *American Journal of Safe Patient Handling & Movement*, 5(1), 13–18.
- Powell-Cope, G., Hughes, N., Sedlak, C., Nelson, A., (August 18, 2008) "Faculty Perceptions of Implementing an Evidence-Based Safe Patient Handling Nursing Curriculum Module" *OJIN: The Online Journal of Issues in Nursing*. Vol. 13 No. 3.
- Przybysz L, Levin PF. (2017). Initial results of an evidence-based safe patient handling and mobility program to decrease hospital worker injuries. *Workplace Health & Safety*, 65(2): 83-88.
- Qin J, Kurowski A, Gore R, Punnett L. (2014). The impact of workplace factors on filing of workers' compensation claims among nursing home workers. *BMC Musculoskeletal Disorders*, 15(1): 22-29.
- Quinn, M. M., Markkanen, P. K., Galligan, C. J., Sama, S. R., Kriebel, D., Gore, R. J., ... & Davis, L. (2016). Occupational health of home care aides: results of the safe home care survey. *Occupational and Environmental Medicine*, 73(4), 237-245.
- Rayssiguie, E., & Erden, M. S. (2022). A Review of Exoskeletons Considering Nurses. *Sensors*, 22(18), 7035.
- Réminiac, F., Jouan, Y., Cazals, X., Bodin, J. F., Dequin, P. F., & Guillon, A. (2014). Risks associated with obese patient handling in emergency prehospital care. *Prehospital Emergency Care*, 18(4), 555-557.
- Restrepo TE, Schmid FA, Gucer PW, Shuford HL, Shyong CJ, McDiarmid MA. Safe lifting programs at long-term care facilities and their impact on workers' compensation costs. *Journal of Occupational and Environmental Medicine*. 2013; 55(1): 27-35.
- Ribeiro T, Serranheira F, Loureiro H. (2017). Work related musculoskeletal disorders in primary health care nurses. *Applied Nursing Research*. 33: 72-77.
- Riccoboni, J. B., Monnet, T., Eon, A., Lacouture, P., Gazeau, J. P., & Campone, M. (2021). Biomechanical comparison between manual and motorless device assisted patient handling: sitting to and from standing position. *Applied Ergonomics*, 90, 103284.
- Rice, M.S., Woolley, S.M., Waters, T.R. (2009). Comparison of required operating forces between floor-based and overhead-mounted patient lifting devices. *Ergonomics* 52, 112–120.
- Richardson A, Gurung G, Derrett S, Harcombe H. (2009). Perspectives on preventing musculoskeletal injuries in nurses: A qualitative study. *Nursing Open*, 6(3): 915-929.

Safe Patient Handling and Mobility – Section 1

- Richardson A, McNoe B, Derrett S, Harcombe H. (2018). Interventions to prevent and reduce the impact of musculoskeletal injuries among nurses: a systematic review. *International Journal of Nursing Studies*, 82: 58-67.
- Richarz, H. U., Tamayo, A., Rahmig, J., Siepmann, T., & Barlinn, J. (2023). The impact of mechanical devices for lifting and transferring of patients on low back pain and musculoskeletal injuries in health care personnel—A systematic review and meta-analysis. *Journal of Occupational Health*, 65(1), e12423.
- Risør BW, Casper SD, Andersen LL, Sørensen J. (2017). A multi-component patient-handling intervention improves attitudes and behaviors for safe patient handling and reduces aggression experienced by nursing staff: A controlled before-after study. *Appl Ergon*, 60: 74-82.
- Robertson, L.D., Syron, L., Flynn, M., Teske, T., Hsiao, H., Lu, J., & Lowe, B. (2020). Exoskeletons and occupational health equity. <https://blogs.cdc.gov/niosh-science-blog/2020/12/14/exoskeletons-health-equity/>
- Rockefeller K, Proctor B. (2011). Is there a role for gait belts in safe patient handling and movement programs? *American Journal SPHM*. 1(1): 30-35.
- Rockefeller K. (2008). Using technology to promote safe patient handling and rehabilitation. *Rehabil Nurs*. 33(1): 5-11.
- Rogers, B. (July 9, 2020). Safety Culture and Health Care NIOSH Science Blog. <https://blogs.cdc.gov/niosh-science-blog/2020/07/09/hc-safety-culture/>
- Rogers, B., Buckheit, K., & Ostendorf, J. (2013). Ergonomics and nursing in hospital environments. *Workplace health & safety*, 61(10), 429-439.
- Rosebush, C. E., Schofield, K. E., Ramirez, M., Zaidman, B., Erickson, D. J., Tschida, B., & McGovern, P. M. (2022). Differential effectiveness of the Minnesota Safe Patient Handling Act by health care setting: An exploratory study. *American Journal of Industrial Medicine*, 65(2), 105-116.
- Rotenstein, L. S., Brown, R., Sinsky, C., & Linzer, M. (2023). The Association of Work Overload with Burnout and Intent to Leave the Job Across the Healthcare Workforce During COVID-19. *Journal of General Internal Medicine*, 1-8.
- Rugs, D., Toyinbo, P., Patel, N., Powell-Cope, G., Hahm, B., Elnitsky, C., ... & Sutton, B. (2013). Processes and outcomes of the Veterans Health Administration safe patient handling program: study protocol. *JMIR Research Protocols*, 2(2), e2905.
- Sabbath, E. L., Hurtado, D. A., Okechukwu, C. A., Tamers, S. L., Nelson, C., Kim, S. S., ... & Sorenson, G. (2014). Occupational injury among hospital patient-care workers: what is the association with workplace verbal abuse? *American journal of industrial medicine*, 57(2), 222-232.
- Sampath SL, Wilson K, Davis K, Kotowski S (2019). Reality of Safe Patient Handling Policies and Programs in Hospitals Across the United States. *International Journal of Safe Patient Handling & Mobility* 9(2) 69-76.
- Santaguida, P. L., Pierrynowski, M., Goldsmith, C., & Fernie, G. (2005). Comparison of cumulative low back loads of caregivers when transferring patients using overhead and floor mechanical lifting devices. *Clinical Biomechanics*, 20(9), 906-916.
- Schmidt B. (2014). Survey: Work-related Injuries and Their Potential Impact on Quality Patient Care to be of Great Concern to Nursing Workforce. *Patient Safety and Quality Healthcare*. <https://www.psqh.com/news/survey-work-related-injuries-and-their-potential-impact-on-quality-patient-care-to-be-of-great-concern-to-nursing-workforce>
- Schoenfisch, A. L., Kucera, K. L., Lipscomb, H. J., McIlvaine, J., Becherer, L., James, T., & Avent, S. (2019). Use of assistive devices to lift, transfer, and reposition hospital patients. *Nursing Research*, 68(1), 3-12.
- Schoenfisch, A. L., Myers, D. J., Pompeii, L. A., & Lipscomb, H. J. (2011). Implementation and adoption of mechanical patient lift equipment in the hospital setting: the importance of organizational and cultural factors. *American journal of industrial medicine*, 54(12), 946-954.
- Shahvarpour A, Shirazi-Adl A, Mecheri H, Larivière C. (2014). Trunk response to sudden forward perturbation - Effects of preload and sudden load magnitudes, posture and abdominal muscle preactivation. *Journal of Electromyography and Kinesiology*, 24: 394-403.
- Siddharthan, K., Nelson, A., Tiesman, H., & Chen, F. (2005). Cost effectiveness of a multifaceted program for safe patient handling. *Advances in Patient Safety: From Research to Implementation (Volume 3: Implementation Issues)*.
- Siddharthan, K., Hodgson, M., Rosenberg, D., Haiduven, D., & Nelson, A. (2006). Under-reporting of work-related musculoskeletal disorders in the Veterans Administration. *International Journal of Health Care Quality Assurance*, 19(6), 463-476.

Safe Patient Handling and Mobility – Section 1

- Silverstein, B., & Schurke, J. (2011). Washington State Department of Labor and Industries' SHARP Program: Implementation of Safe Patient Handling in Washington State Hospitals. Olympia, WA: Safety and Health Assessment & Research for Prevention.
- Silvia CE, Boswick DS, Lillquist D, Wallace D, Perkins M. (2002). An ergonomic comparison between mechanical and manual patient transfer techniques. *Work*, 19:19-34.
- Sivakanthan, S., Blaauw, E., Greenhalgh, M., Koontz, A. M., Vegter, R., & Cooper, R. A. (2021). Person transfer assist systems: a literature review. *Disability and Rehabilitation: Assistive Technology*, 16(3), 270-279.
- Skotte, J. H., Essendrop, M., Hansen, A. F., & Schibye, B. (2002). A dynamic 3D biomechanical evaluation of the load on the low back during different patient-handling tasks. *Journal of biomechanics*, 35(10), 1357-1366.
- Snook S.H., Campanelli R.A., Heart J.W. (1978). A study of three preventative approaches to low back pain injury. *Journal Occupational Medicine*, (20)7 478-481.
- Snook, S. H., & Ciriello, V. M. (1991). The design of manual handling tasks: revised tables of maximum acceptable weights and forces. *Ergonomics*, 34(9), 1197-1213.
- Solomon, A., Wilson, S., Meyer, M., & Sharma, N. (2017). Prevalence of low back pain among nursing students compared to physical therapy and engineering students in the United States. *International Journal of Nursing Education*, 9(3), 115-121.
- Sorensen, G., Nagler, E. M., Hashimoto, D., et al. (2016). Implementing an integrated health protection/health promotion intervention in the hospital setting: Lessons learned from the Be Well, Work Well study. *Journal of Occupational and Environmental Medicine*, 58(2), 185-194.
- Splittstoesser, R. E., Marras, W. S., & Best, T. M. (2012). Immune responses to low back pain risk factors. *Work*, 41(Supplement 1), 6016-6023.
- Spritzer, S. D., Riordan, K. C., Berry, J., Corbett, B. M., Gerke, J. K., Hoerth, M. T., ... & Noe, K. H. (2015). Fall prevention and bathroom safety in the epilepsy monitoring unit. *Epilepsy & Behavior*, 48, 75-78.
- St Aubin, K., & Pater, R. (2023). The Hierarchy of Influences . *Professional Safety*, 68(3), 14-17.
- Stevens L, Rees S, Lamb KV, Dalsing D. (2013). Creating a culture of safety for safe patient handling. *Orthop Nurs*. 32(3): 155-166.
- Stierman, B., Afful, J., Carroll, M. D., Chen, T. C., Davy, O., Fink, S., ... & Akinbami, L. J. (2021). National health and nutrition examination survey 2017–March 2020 Prepandemic Data Files Development of Files and Prevalence Estimates for Selected Health Outcomes. National Center for Health Statistics (U.S.).
<https://stacks.cdc.gov/view/cdc/106273>
- Stubbs DA, Buckle PW, Hudson MP, Rivers PM. (1983). Back pain in the nursing profession. II. The effectiveness of training. *Ergonomics*. 26:767–79.
- Tang, R., Holland, M., Milbauer, M., Olson, E., Skora, J., Kapellusch, J. M., et al. (2018). Biomechanical evaluations of bed-to-wheelchair transfer: Gait belt versus walking belt. *Workplace Health & Safety*, 66(8), 384–392.
- Tariq, R. A., George, J. S., Ampat, G., & Toney-Butler, T. J. (2018, August 8). Back safety. *StatPearls*. Last updated March 29, 2022. <https://www.ncbi.nlm.nih.gov/books/NBK519066/>
- Teeple, E., Collins, J. E., Shrestha, S., Dennerlein, J. T., Losina, E., & Katz, J. N. (2017). Outcomes of safe patient handling and mobilization programs: A meta-analysis. *Work*, 58(2), 173–184. [URL]
- The Burns Archive. (n.d.). Retrieved from theburnsarchive.blogspot.com
- The John Hartford Foundation. (2024, August 1). CMS approves new 2025 age-friendly hospital measure. <https://www.johnhartford.org/resources/view/cms-passes-new-2025-age-friendly-hospital-measure>
- Theilmeyer, A., Jordan, C., Luttmann, A., & Jäger, M. (2010). Measurement of action forces and posture to determine the lumbar load of healthcare workers during care activities with patient transfers. *Annals of Occupational Hygiene*, 54(8), 923–933.
- Theis, J. L., & Finkelstein, M. J. (2014). Long-term effects of safe patient handling program on staff injuries. *Rehabilitation Nursing*, 39(1), 26–35.
- Thomas, D. R., & Thomas, Y. L. (2014). Interventions to reduce injuries when transferring patients: A critical appraisal of reviews and a realist synthesis. *International Journal of Nursing Studies*, 51(10), 1381–1394. [URL]

Safe Patient Handling and Mobility – Section 1

- Totzkay, D. L. (2018). Multifactorial strategies for sustaining safe patient handling and mobility. *Critical Care Nursing Quarterly*, 41(3), 340–344.
- Turja, T., Saurio, R., Katila, J., Hennala, L., Pekkarinen, S., & Melkas, H. (2020). Intention to use exoskeletons in geriatric care work: Need for ergonomic and social design. *Ergonomics in Design*, 1064804620961577.
- Turner R, Agarwal N, Agarwal S, Best L. (2021). Bringing Life to a Systemwide Early Mobility Clinical Practice: Part 1. *Int J SPHM*, 10(4): 126-133.
- Turner R, Agarwal N, Agarwal S, Best L, Noble J. (2022). Bringing Life to a Systemwide Early Mobility Clinical Practice: Part 2. *Int J SPHM*. 11(1): 190-198.
- Ulin, S. S., Chaffin, D. B., Patellos, C. L., Blitz, S. G., Emerick, C. A., Lundy, F., & Misher, L. (1997). A biomechanical analysis of methods used for transferring totally dependent patients. *Sci Nurs*, 14(1), 19-27.
- U.S. Bureau of Labor Statistics. (April 8, 2020). Fact Sheet: Workplace Violence in Healthcare, 2018. <https://www.bls.gov/iif/oshwc/cfoi/workplace-violence-healthcare-2018.htm>
- U.S. Bureau of Labor Statistics. (Nov 8, 2024), US Department of Labor Statistics. News Release: Employer-Reported Workplace Injuries and Illnesses, 2023. <https://www.bls.gov/news.release/pdf/osh.pdf>
- U.S. Bureau of Labor Statistics. (2023a), US Department of Labor Statistics. Table R9. Number of nonfatal occupational injuries and illnesses involving days away from work, restricted activity, or job transfer (DART), days away from work (DAFW), and days of restricted work activity, or job transfer (DJTR) by occupation and selected natures of injury or illness, private industry, 2021-2022. <https://www.bls.gov/iif/nonfatal-injuries-and-illnesses-tables.htm>
- U.S. Bureau of Labor Statistics. (2023b). Bureau of Labor Statistics (BLS), US Department of Labor Statistics, TABLE R98. Annualized incidence rates for nonfatal occupational injuries and illnesses involving days away from work, restricted activity, or job transfer (DART), days away from work (DAFW), and days of restricted work activity, or job transfer (DJTR) per 10,000 full-time workers by occupation and selected natures of injury or illness, private industry, 2021-2022. <https://www.bls.gov/iif/nonfatal-injuries-and-illnesses-tables.htm>
- U.S. Bureau of Labor Statistics. (2023c). Bureau of Labor Statistics (BLS), US Department of Labor Statistics, TABLE R100. Annualized incidence rates for nonfatal occupational injuries and illnesses involving days away from work, restricted activity, or job transfer (DART), days away from work (DAFW), and days of restricted work activity, or job transfer (DJTR) per 10,000 full-time workers by occupation and selected events or exposures leading to injury or illness, private industry, 2021-2022. <https://www.bls.gov/iif/nonfatal-injuries-and-illnesses-tables.htm>
- U.S. Bureau of Labor Statistics. (May 1, 2020). US Bureau of Labor Statistics. n.d. <https://www.bls.gov/iif/oshwc/case/msds.htm>
- U.S. Dept of Justice Civil Rights Division. Access to Medical Care for Individuals with Mobility Disabilities. Last updated: June 26, 2020. <https://www.ada.gov/resources/medical-care-mobility/>
- U.S. Dept of Justice Office of Public Affairs Press Release. Eye Surgery Practices Agree to Pay \$1 Million and End Discriminatory Policies Towards People with Disabilities. Tuesday, January 17, 2023. <https://www.justice.gov/opa/pr/eye-surgery-practices-agree-pay-1-million-and-end-discriminatory-policies-towards-people>
- Van Hoof W, O'Sullivan K, O'Keeffe M, Verschueren S, O'Sullivan P, Dankaerts W. The efficacy of interventions for low back pain in nurses: a systematic review. *International Journal of Nursing Studies*. 2018; 77: 222-231.
- Vieira, E. R., Svoboda, S., Belniak, A., Brunt, D., Rose-St Prix, C., Roberts, L., & da Costa, B. R. (2016). Work-related musculoskeletal disorders among physical therapists: an online survey. *Disability and rehabilitation*, 38(6), 552-557.
- Vignoli, M., Guglielmi, D., Balducci, C., & Bonfiglioli, R. (2015). Workplace bullying as a risk factor for musculoskeletal disorders: the mediating role of job-related psychological strain. *BioMed research international*, 2015(1), 712642.t3
- Village J, Frazer M, Cohen M, Leyland A, Park I, Yassi A. (2005). Electromyography as a measure of peak and cumulative workload in immediate care and its relationship to musculoskeletal injury: An exploratory ergonomic study. *Applied Ergonomics*, 36(5): 609-618.
- Vinstrup, J., Jakobsen, M. D., & Andersen, L. L. (2020). Poor sleep is a risk factor for low-back pain among healthcare workers: prospective cohort study. *International journal of environmental research and public health*, 17(3), 996.

Safe Patient Handling and Mobility – Section 1

Vinstrup, J., Jakobsen, M. D., Madeleine, P., & Andersen, L. L. (2020). Physical exposure during patient transfer and risk of back injury & low-back pain: prospective cohort study. *BMC Musculoskeletal Disorders*, 21(1), 1-8

Vitality Medical. (n.d.). Posey. <https://www.vitalitymedical.com/posey.html>

Von der Lancken S, Levenhagen K. (2014). Interprofessional teaching project with nursing and physical therapy students to promote caregiver and patient safety. *Journal of Nursing Education*, 53(12): 704-709.

Wählin, C., Stigmar, K., & Nilsing Strid, E. (2022). A systematic review of work interventions to promote safe patient handling and movement in the healthcare sector. *International Journal of Occupational Safety and Ergonomics*, 28(4), 2520-2532.

Walden, C. M., Bankard, S. B., Cayer, B., Floyd, W. B., Garrison, H. G., Hickey, T., ... & Pories, W. J. (2013). Mobilization of the obese patient and prevention of injury. *Annals of surgery*, 258(4), 646-651.

Walker, et al. (2017). Sharing the Lessons: The 10-Year Journey of a Safe Patient Movement Program, *Int J SPHM*. 7(1): 20-28.

Waltrip, K. (2019). A Survey of Healthcare Workers on Safe Patient Handling and Mobility Resource Availability, Utilization, and Adherence.

Warming, S., Ebbehøj, N. E., Wiese, N., Larsen, L. H., Duckert, J., & Tønnesen, H. (2008). Little effect of transfer technique instruction and physical fitness training in reducing low back pain among nurses: A cluster randomised intervention study. *Ergonomics*, 51, 1530–1548.

Waters T.R. (2007). When is it safe to manually lift a patient? *American Journal of Nursing*. 107(8): 53-58.

Waters T.R. (2009). Recommendations for turning patients with orthopaedic impairments. *Orthop Nurs* 28(2S):28032.

Waters, T. R., Nelson, A., & Proctor, C. (2007). Patient handling tasks with high risk for musculoskeletal disorders in critical care. *Critical care nursing clinics of North America*, 19(2), 131-143.

Waters, T. R., Putz-Anderson, V., Garg, A., & Fine, L. J. (1993). Revised NIOSH equation for the design and evaluation of manual lifting tasks. *Ergonomics*, 36(7), 749-776.

Waters, T.R., Dick, R., Lowe, B., Werren, D., Parsons, K. (2012). Ergonomic assessment of floor-based and overhead lifts. *Am. J. Safe Patient Handl. Mov.* 2 119-113.

Weber, A. (2023, July 10). Half of New Nurses Quit Within 2 Years – Here's Why. *Nurse.org*. <https://nurse.org/news/half-of-new-nurses-quit-within-2-years>

Weiner, C., Kalichman, L., Ribak, J., Alperovitch-Najenson, D. (2017). Repositioning a passive patient in bed: choosing an ergonomically advantageous assistive device. *Appl. Ergon.* 60, 22–29.

Weinmeyer, R. (2016). Safe patient handling laws and programs for health care workers. *AMA Journal of Ethics*, 18(4), 416-421.

White-Heisel R, Canfield JP, Young-Hughes S. (2017). Examining the Factor Structure and Reliability of the Safe Patient Handling Perception Scale: An Initial Validation Study. *Rehabil Nurs*. 42(3): 164-171.

Wiggermann, N., Francis, R., & Solomon, A. (2024). Individual and organizational factors associated with injury history and patient handling behaviors: Results from a nationwide survey of healthcare workers. *Applied Ergonomics*, 118, 104251.

Wiggermann, N., Zhou, J., & McGann, N. (2021). Effect of repositioning aids and patient weight on biomechanical stresses when repositioning patients in bed. *Human factors*, 63(4), 565-577.

Wikipedia, Bariatrics (ND).

<https://en.wikipedia.org/wiki/Bariatrics#:~:text=The%20term%20bariatrics%20was%20coined,well%20as%20pharmaco%20therapy%20and%20surgery.>

Wilson, J. R. (2005). Chapter 1: A framework and a context for ergonomics methodology. In J. R Wilson, & N. Corlett (Eds.), *Evaluation of human work* (2nd edition; pp. 11). CRC press.

World Health Organization (WHO) (2024). Obesity. https://www.who.int/health-topics/obesity#tab=tab_1

Wyatt S, Meacci K, Arnold M. Integrating Safe Patient Handling and Early Mobility: Combining Quality Initiatives. *J Nurs Care Qual*. 2020; 35(2): 130-134.

Safe Patient Handling and Mobility – Section 1

Yellowlees, P & Rea, M. (2022). Burnout A Primer. September 27, 2022. Agency for Healthcare Research and Quality: Rockville, MD, USA <https://psnet.ahrq.gov/primer/burnout>

Yoder et al. Outcomes of a safe patient handling program implementation. (2014). American Journal SPHM, 4(4):111-117.

Zare, A., Choobineh, A., Hassanipour, S., & Malakoutikhah, M. (2021). Investigation of psychosocial factors on upper limb musculoskeletal disorders and the prevalence of its musculoskeletal disorders among nurses: a systematic review and meta-analysis. International Archives of Occupational and Environmental Health, 94, 1113-1136. Workplace Bullying as a Risk

Zhang, Y., ElGhaziri, M., Nasuti, S., & Duffy, J. F. (2020). The comorbidity of musculoskeletal disorders and depression: associations with working conditions among hospital nurses. Workplace health & safety, 68(7), 346-354.

Zheng, L. (2020, November 4). Can exoskeletons reduce musculoskeletal disorders in healthcare workers? The Centers for Disease Control and Prevention, NIOSH Science Blog. <https://blogs.cdc.gov/niosh-science-blog/2020/11/04/exoskeletons-hc/>

Zhou, J., Wiggermann, N., 2019. November). Physical Stresses on Caregivers when Pulling Patients up in Bed: Effect of Repositioning Aids and Patient Weight. In: Proceedings of the Human Factors and Ergonomics Society Annual Meeting, vol. 63. SAGE Publications, Los Angeles, CA, pp. 1057–1061. No. 1.

Zhou, J. (2014). Trunk biomechanical responses during sudden loading (Graduate Theses, Dissertations, and Problem Reports No. 156). West Virginia University. <https://researchrepository.wvu.edu/etd/156>

Zhuang, Z., Stobbe, T. J., Hsiao, H., Collins, J. W., & Hobbs, G. R. (1999). Biomechanical evaluation of assistive devices for transferring residents. Applied Ergonomics, 30(4), 285–294.

Getting Started

Contents

Getting Started	1
Introduction	1
Define the Need to Develop a SPHM Program or to Enhance an Existing Program	2
Step 1	2
a. Review the best practices for preventing patient handling-related injuries and related regulations and standards.	2
b. Collect baseline incident/injury and cost data related to patient handling injuries	3
Table 2.1 Sources of Employee Injury Data.	3
Step 2. Analyze data collected to identify and prioritize units, departments, and employee groups, with higher risk of exposure to patient handling; and the nature, severity and cost of injuries associated with patient handling. Begin to identify hazards, overall risks & program elements that need to be addressed.	4
Figure 2.1 Full Costs of Patient Handling Related Injuries.	7
SPHM Program Foundation & Management	8
Step 3. Enlist support of senior leadership to develop a SPHM program plan	8
Preparing for the meeting.....	8
During the meeting	10
Table 2.2 What do Senior Leadership Want to Know?	17
Step 4. Identify a program champion or executive sponsor, and a program coordinator, and form a multidisciplinary SPHM committee.....	17
a. Identify a Program Champion or Executive Sponsor and a Program Coordinator	17
b. Form a Multidisciplinary SPHM Committee	17
Figure 2.2 The Stakeholders (i.e., Disciplines, Expertise, and Departments), that may be represented in a SPHM Committee at this stage of program planning.	18
SPHM Committee Reporting Structure.....	20
Figure 2.3a Example of Reporting Structure of the SPHM Committee in a Large Hospital System.	21
Figure 2.3b Example of Reporting Structure of the SPHM Committee in a Small Hospital or Health Care Facility.	21
SPHM Committee Roles and Responsibilities	21
Table 2.3 Examples of the Roles and Responsibilities of a SPHM Committee.	22
Meeting structure	23
Step 5. Educate the committee about the scope and risk related to manual patient handling in health care, the components of successful SPHM programs, the proposed approach to addressing SPHM at your facility and function of the committee. Develop the program vision and committee mission statements, and a draft project charter.	24
Create a Vision Statement for the SPHM Program.....	24
Create a SPHM Committee Mission Statement	25
Develop a draft Project Charter	25
Section Summary	27
References and Resources Used in this Section	28

Getting Started

Introduction

Getting Started

This section describes the steps and tools you can use to:

- Define the need for a SPHM program or to improve an existing SPHM initiative
- Solicit initial leadership support for development of a SPHM program plan and
- Develop the management structure for the proposed SPHM program

The steps and activities conducted when developing and implementing an SPHM program are often not sequential and may be interdependent. The steps described in this section may be performed in a different sequence, or in some cases concurrently.

*However, it is important to ensure that senior leadership supports development or enhancement of an SPHM program **before** time is spent to draft a program plan, and employees are engaged in program efforts, and too many resources are used.*

As discussed in **Section 1**, retaining ongoing support of comprehensive worker safety programs such as SPHM can be difficult due to competing business and service demands, changing health care reimbursement rules, and employee recruitment and retention challenges.

Health care organizations must be committed to providing ongoing financial and personnel resources, not only for acquiring and maintaining SPHM technology and implementing an SPHM training program, but also to support initiatives that promote the necessary changes to work culture, processes, and procedures.

These changes are essential to reduce the risk of injuries related to patient handling. Evidence indicates that successful and sustainable safety programs require consistent organizational commitment and financial backing.

Meeting with leadership before developing the program plan is part of evaluating organizational culture and readiness for change. This helps prioritize SPHM activities and address barriers to implementation and sustainability (**Discussed in Section 3**).

Securing leadership commitment early in the program planning process is essential for ensuring that the SPHM program aligns with the organization's capabilities, supports business objectives, and enhances safety and satisfaction for patients and employees. This approach increases the likelihood of sustained success.

Tools that Support Content in this Section

2a. Master tool for tracking and analyzing incident and injury data.

2b. Injury data summary report

2c. Calculating direct and indirect injury costs

2d. Coding and analyzing injury data and costs

2e. SPHM Program manager/coordinator job description

2f. SPHM stakeholders and their role

2g. Tips for effective committees

2h. Sample project charter

Safe Patient Handling and Mobility – Section 2

When starting an SPHM program, it is recommended that a small group of key stakeholders conduct the planning activities described in Steps 1, 2, and 3, such as managers and employees who are responsible for employee and patient safety. This includes employee health and safety, patient quality and risk management, and rehabilitation professionals who have an interest in SPHM.

For existing SPHM programs, the SPHM program lead and committee or team (as applicable) should evaluate the program status and meet with leadership to solicit future program support.

Define the Need to Develop a SPHM Program or to Enhance an Existing Program

Step 1

a. Review the best practices for preventing patient handling-related injuries and related regulations and standards.

The first step in defining the need for or enhancing a SPHM program, is to understand why and how manual patient handling must be addressed, and to identify the scope of patient handling injuries to employees and patients at your facility or within your organization.

Section 1 of this toolkit '*Understanding Safe Patient Handling and Mobility*' provides evidence-based information and reference material about the scope of manual patient handling in health care, and why and how it should be addressed using a comprehensive SPHM program approach. You can use this information to become familiar with the topic and to educate your SPHM committee, management, and employees about SPHM.

Section 6 Education and Training and **Tool 6a** contains links to other training resources that provide background information about SPHM such as, the U Mass – Lowell online training '*Ergonomics in Healthcare: A Continuing Education Program for Nurses, Nursing Assistants and Healthcare Managers*'. This free course can be accessed at www.uml.edu/Research/CPH-NEW/nurse-education/ergonomics/

Review this toolkit and resources provided in its entirety to gain an understanding of best practices for assessing risk and prevention of patient handling related injuries to caregivers and patients. Resources detailing SPHM program success stories are listed in **Section 10**.

Make sure you understand your organization's responsibilities related to any applicable state laws for SPHM.

In addition, it is important to understand other applicable legislation such as the OSHA General Duty Clause, and best practice standards and guidelines such as the American Nurses Association (ANA) Safe Patient Handling and Mobility: Interprofessional National Standards Across the Care Continuum, so that you can educate senior leadership and the SPHM committee about regulatory responsibilities.

Review any collective bargaining agreement(s) in your workplace for provisions related to employee safety and health programs including SPHM.

Safe Patient Handling and Mobility – Section 2

Refer to the toolkit **Introduction** and **Section 1** for more information about relevant regulations and standards. **Section 1 Appendix B** provides a crosswalk between the ANA SPHM program standards and the corresponding sections of this toolkit.

b. Collect baseline incident/injury and cost data related to patient handling injuries

Collecting baseline injury data will help you identify the scope of patient handling related injuries at your facility or within your organization. For example, where and how often do injuries occur; what tasks are performed when injuries occur e.g., repositioning a patient in bed; the nature of injuries e.g., low back strain; the severity of injuries e.g., time loss from work; and the associated workers compensation costs related to these injuries.

Collecting injury data is a *first step* in developing your program plan and in determining how to track program performance and progress. However, injury data is a measure of past performance, i.e., a lagging indicator where injuries have already occurred. As you develop your program plan you will collect additional data to assist you prioritize and evaluate program efforts e.g., from employee surveys and worksite observations. This type of data provides a *leading* indicator that identifies injury risk that can be addressed *before* patient handling related incidents occur. Evaluating and sustaining a SPHM program using leading indicators are discussed in **Section 8**.

To examine and predict injury and other data trends, review at least 3 years of data from OSHA 300 logs, workers compensation insurance carrier/Third-Party Administrator (TPA) loss run reports, and other relevant sources of data as listed in **Table 2.1**. For privacy considerations, the data provided should not include employee identifiers such as name and date of birth, or information that is considered confidential under the Health Insurance Portability and Accountability Act (HIPPA).

Sources of Employee Injury Data and Where to Find Them	
Data Source	Location
OSHA 300 Log and 300A Summary of Work-Related Injuries and Illnesses*	Human Resources or Employee Health
Report used to file for workers compensation (this will vary by state)	Human Resources or Employee Health
Workers' compensation loss-run reports (includes information about individual injury costs)	Human Resources; Employee Health or directly from the organization's Workers Compensation Carrier or Third-Party Administrator (if self-insured)
First aid logs	Human Resources or Employee Health

* State and local health care entities may have an alternative accepted format for recording occupational injury and illness if not covered by an OSHA-approved state plan.

Table 2.1 Sources of Employee Injury Data.

Step 2

Analyze data collected to identify and prioritize units, departments, and employee groups, with higher risk of exposure to patient handling; and the nature, severity and cost of injuries associated with patient handling. Begin to identify hazards, overall risks & program elements that need to be addressed.

Using the data collected in **Step 1**, identify the following:

- **Units and departments** or locations where patient handling incidents occur.
- **Job tasks and employee groups** with higher risk of exposure to and/or with incidents related to patient handling.
- **The types of patient handling tasks** being performed when injuries occur e.g., repositioning in bed, lateral supine transfers, patient transfers in seated and in standing positions.
- **The nature** of employee injuries reported and diagnosed e.g., mild soreness, back pain, muscular strain, intervertebral disc damage, etc.
- **Information** (if noted in the incident description) about the **patient being handled** or mobilized such as, mobility status, clinical diagnosis, cognitive status, or weight.
- **The severity** of employee injuries related to patient handling i.e., the number of cases with lost workdays and/or restricted duty, and the *number of days* away from work, restricted or modified duty days.
- **The proportion (percentage)** of patient handling-related incidents, OSHA recordable injuries, lost workday and restricted duty cases and days, and workers compensation costs in comparison to the corresponding figures for all injuries occurring throughout the facility or organization.

This provides an overall view of the magnitude of patient handling-related injuries versus the causes of all other injuries such as slips, trips, and falls and workplace violence.

- Using at least 3 years of data, calculate the **annual average** number of patient handling-related injuries; the number of cases involving days away from work and/or



Quick Tip

Tools that can assist you to track, analyze and report workplace injury data

- **Tool 2a. Tracking and analyzing incident and injury data shows you how injury data can be collected, coded, and analyzed from a master spreadsheet.**
- **Tool 2b. Sample injury data summary. This tool provides an example of how injury data can be reported and the type of graphs you can create to illustrate the scope and nature of patient handling related injuries at your facility.**
- **Tool 2c. Calculating direct and indirect injury costs. This tool allows you to capture and calculate costs associated with patient handling related incidents.**
- **Tool 2d. Analyzing injury data and direct costs explains how to code your patient handling related data and evaluate related injury and cost data.**

Safe Patient Handling and Mobility – Section 2

restricted duty; and the *number of days* away from work, restricted or modified duty days. Calculate incident and severity *rates* of patient handling-related injuries per 100 full-time equivalent (FTE) employees (*Refer to Tool 2d*).

- Calculate the **direct costs** of injuries and estimate the **indirect costs** as feasible.
- Calculate the **average annual** totals of direct and indirect costs.

Calculating the average number and severity of injuries and costs allows you to inform leadership of future costs of patient handling related injuries if a SPHM program is not implemented.

Analyzing the data listed above can:

- Identify the broad scope of patient handling related injuries at your facility.
- Help prioritize which units or departments should be included in initial SPHM program efforts and potentially be a pilot unit(s) when initiating a program.
- Provide an initial indication about the general causes of patient handling tasks and/or scenarios that may be a priority to address e.g., frequently performed tasks which have caused many employee injuries such as repositioning patients in bed on an intensive care unit, or tasks involving standing and transferring patients to/from bed to chair in a medical unit.
- Provide the foundation for building a business case for your SPHM program and solutions you want to implement e.g., purchase and installation of SPHM technology
- Provide an opportunity for you to *build alliances and collaborate* with Human Resources, Employee Health, Finance, Patient Quality/Risk, and other departments that will assist you in analyzing data throughout development and evaluation of your SPHM program.

Other data such as date and time of incidents and information about the response to incidents and corrective action taken, can be collected at this time if convenient (and available), and analyzed later for use during development of the SPHM program plan in **Sections 3 and 4**.

If possible, examine the factors that contributed to incidents and injuries to identify trends in root causes. Typically, OSHA and workers compensation data alone do not provide sufficient data to determine the root cause of incidents. State workers compensation regulations, injury claims management, underreporting, and misclassification of injuries all affect the accuracy and completeness of these data



Quick Tip

Coding Injury Data

As you evaluate your injury and cost data, determine if definitions and injury related variables and descriptions are *standardized*. Standardizing terminology used to describe patient handling-related incidents allows you to accurately measure incident and injury data at the start of your program (baseline), and after the program is implemented and sustained.

Consistency in definitions, measures, and collection techniques is critical for obtaining meaningful, actionable data (ANA, 2013).

The *Master Data* spreadsheet in *Tool 2a*, provides an example of how injury data can be standardized to ensure accuracy of data measurement and management.

Coding of patient handling-related injuries is also discussed in *Tool 2d*.

Your worker's compensation insurance carrier should be able assist you to standardized descriptions of patient handling related incidents.

Safe Patient Handling and Mobility – Section 2

sources. Other data that should be used to develop and evaluate the SPHM program is described in **Sections 3 and 8**.

If you determine that analysis of the patient handling injury and incident and related cost data *is not sufficient* to identify the need to start a SPHM program and solicit leadership approval to develop a program at your facility, then review and incorporate information from other sources such as:

- Existing employee survey data e.g., satisfaction surveys
- Feedback from employee suggestion programs
- Minutes from employee and patient safety meetings
- State OSHA (as applicable) consultation or enforcement reports related to patient handling-related injuries and musculoskeletal disorders
- Grievances (filed with the Human Resources department and/or labor organizations)
- Patient reports or quality surveys e.g., Press Ganey Surveys

If you are soliciting support for an *existing SPHM program*, you may feel it necessary to gather information from multiple sources before meeting with leadership to gain support to revise the program. In addition to the review of employee injury data, these sources may include employee surveys, program gap analysis, worksite observation of patient handling activities (**Refer to Section 3**) and patient safety factors if related to SPHM activities, to help identify and prioritize areas for program improvement.

Summarize the employee injury data and any information collected for presentation to senior leadership. **Tool 2b** provides an example of how the injury data can be presented.

Calculating the Direct Costs of Injuries and Estimating the Indirect Costs

The full costs and impact of patient handling-related injuries to a health care organization can be summarized using the Iceberg Model shown in **Figure 2.1**.

An effective and ongoing business case that results in a fully funded and sustainable SPHM program, requires that all the costs and benefits of implementing a program are identified and quantified where feasible. This allows you to demonstrate a positive return on investment for the organization in terms of financial benefits and contribution to strategic organizational goals and clinical programs.

The costs of manual patient-handling and benefits of SPHM programs were detailed in **Section 1**. Measuring the benefits of SPHM program is discussed in **Sections 4 and 8**.

Direct and indirect costs related to employee injuries can be calculated more easily than the impact of manual patient handling on operational losses or costs such as patient safety related outcomes.

Direct injury costs include money paid for medical bills, out of pocket expenses and compensation for time away from work, litigation, and settlement costs, and vocational rehabilitation if required.

Safe Patient Handling and Mobility – Section 2

Calculating the Direct Costs of Injuries and Estimating the Indirect Costs

Direct cost information, including the productive hours needed to calculate injury, incident, and cost rates, can be gathered from Human Resources, Finance or Payroll, and Risk Management or Legal departments.

Indirect costs are the costs associated with investigation and management of injury claims, and the cost of temporarily replacing an injured employee such as, a nurse who is away from work or performing modified/restricted duty (**Refer to Section 7**). Safety literature indicates that indirect or 'hidden' injury costs that occur because of worker injury absence vary between 0.5 and 10 times the direct costs of an injury.

However, rather than estimate indirect costs, it is better to determine what 'hidden' costs can be measured or captured within an organization for each injury claim.

Indirect cost information related to investigation and management of injury claims, wages, benefit burden, and staff replacement costs, can be obtained from Human Resources, Worker Safety and Employee Health departments and Accounting or Payroll Departments.

Tool 2c allows you to capture and calculate costs associated with patient handling related incidents and calculate the impact on the organization's profit margin.

Operational losses/costs are often indirectly linked to manual patient handling and can be difficult to measure, for example the impact on patient safety and satisfaction associated with omission or delay in care e.g., consequences of not performing or missing ambulation and repositioning tasks.

Methods for identifying and measuring operational gains from an SPHM program are discussed in **Sections 4 and 8**.

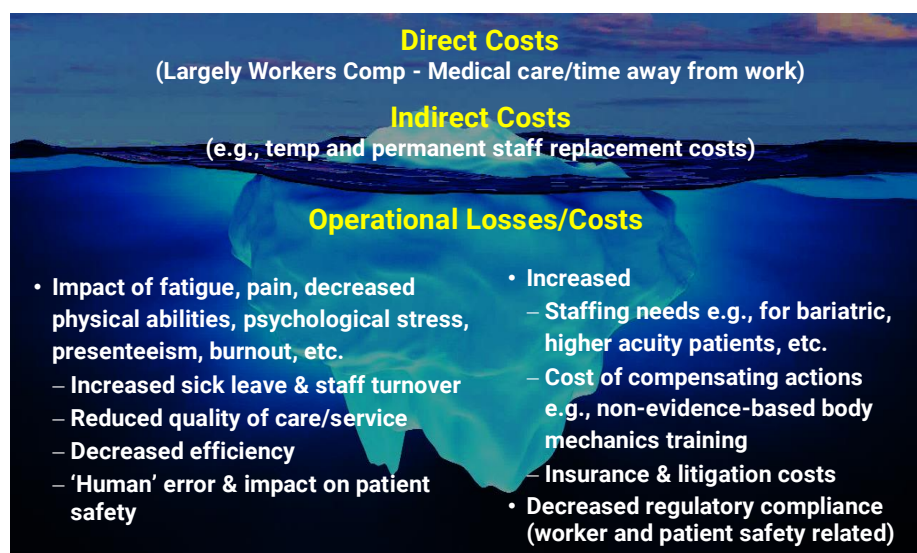


Figure 2.1 Full Costs of Patient Handling Related Injuries.

SPHM Program Foundation & Management

Step 3

Enlist support of senior leadership to develop a SPHM program plan

The goal of meeting with senior leadership at this stage of SPHM program planning is to gain approval and support to:

1. Further determine the scope, cost, and risk of patient handling-related injuries at your facility or within your organization and develop a draft SPHM program plan to address injury risk to employees and patients.
2. Approve resources to assist you achieve (1) above that is,
 - Forming a SPHM committee to steer the project
 - Appointing an SPHM program coordinator or manager
 - Selecting a SPHM program champion or sponsor from senior leadership

In addition, meeting with leadership allows you to understand:

- The overall level of support for an SPHM program
- How a SPHM program may support organizational goals
- Potential barriers to implementation of a SPHM program such as other new or potential program initiatives related to patient and/or employee safety that may compete for financial and personnel resources etc.
- What resources are available to support SPHM program implementation, and ongoing management of the program

Overall, meeting with leadership at this stage of program planning reduces the risk of *wasting* resources, and time to plan and implement SPHM program related activities that may not be fully funded or supported by the organization.

The senior leadership group you meet with will vary depending on the size and structure of your organization. However, it is recommended that the group includes decision makers such as, the chief executive, operating and financial officers, chief nursing and medical officers, leaders from human resources, quality and/or risk and patient safety, and employee health and safety departments. In some cases, the leadership group includes the Board of Directors for a health care organization.

Preparing for the meeting

Being prepared and demonstrating an understanding of the organization's strategic goals and business challenges will increase your credibility and the likelihood of obtaining support for developing an SPHM program.

Safe Patient Handling and Mobility – Section 2

Consider the following:

- Know your audience: Who has decision-making authority? What are their areas of expertise and professional interests and what matters to them? What are the potential benefits for them?
- What challenges do your organization and leaders face? What are the organization's priorities and strategic plans? How will an SPHM program contribute to the organization's success?
- What criteria are used for decision-making including quantitative (measurable, numerical) and qualitative (non-measurable, subjective) factors?
- Is there an ally from leadership or senior management who can provide organizational and executive insights? If so, consider inviting them to the meeting.
- Prepare real-world stories and case studies, data, or information to show how an SPHM Program can contribute to an organizational goal(s). You will provide detailed quantification of this contribution when presenting your proposed SPHM program plan to leadership (**Section 4**).

Ideally the SPHM program should be viewed as a positive strategic initiative rather than an additional cost center due to its significant positive impacts on financial performance, patient safety, and staff well-being.
- Use language that resonates with leadership and avoid overly technical language or jargon.
- Anticipate and be ready to address questions and obstacles to getting support.
- Practice your presentation with colleagues to gather feedback.



Quick Tip

Using the SBAR (Situation-Background-Assessment-Recommendation) framework can help when preparing and presenting your case for starting or improving a SPHM program in meetings with leadership.

- **S = Situation** (a concise statement of the problem)
- **B = Background** (pertinent and brief information related to the situation)
- **A = Assessment** (analysis and considerations of options – what you found/think)
- **R = Recommendation** (action requested/recommended – what you want)

Source: Institute for Healthcare Improvement (IHI), ND.

<https://www.ihi.org/resources/tools/sbar-tool-situation-background-assessment-recommendation>

(Source: Havard, 2017; Bottino, 2024; Computer One, 2023)

The questions and suggested responses provided in **Table 2.2** can assist you to plan and deliver your presentation to senior leadership.

Have enough time allocated for the presentation. Leaders may not be familiar with the scope and cost of patient handling injuries in health care, SPHM programs and/or with the organization's injury data and statistics that you will present.

Information from Section 1 of this toolkit could be used or adapted to share with leaders as a primer to SPHM. The benefits of SPHM programs and how they can assist an organization to achieve its

Safe Patient Handling and Mobility – Section 2

mission, and strategic goals should be shared.

Section 6 Tool 6a also contains links to other training resources that provide good background information about SPHM for facility leaders.

Tool i 'The Safe Patient Handling and Mobility (SPHM) Program Development, Implementation & Evaluation: Suggested Sequence of Activities Chart' can be used to provide an overview of program elements.

Sending a summary of the purpose for the meeting and organization's injury data reports to the leadership group ahead of the meeting can help facilitate discussion.

Ask personnel in the departments who provided patient handling data (as described in **Steps 1 and 2** above), to assist in determining the appropriate format for presenting data and information according to the standards typically used in your organization.

During the meeting

Communicate clearly and use active listening. If you cannot answer specific questions, make sure you follow up with a response afterwards.

Emphasize that a *performance improvement* approach will be used to develop a SPHM program, and that the many freely available resources including this toolkit will help facilitate program efforts.

Question from Leadership	Response
1. The purpose of the meeting	To gain support to further determine the scope of the issue, and to develop a plan to address, prevent, and control patient handling-related injury risk at your facility or within your organization.
2. What is SPHM?	Define SPHM, the scope of the issue within health care, and specifically within your specific type of health care entity e.g., hospitals (Refer to Section 1).
3. Why is SPHM so important?	- Define the cost of SPHM in terms of the impact on the workforce, patients, and health care organizations. - Provide an overview of the approaches to prevent patient handling-related injuries i.e., OSHA core elements for safety and health programs, the ANA SPHM standards, and in this toolkit. Highlight the benefits of a SPHM program including fiscal impact. Provide case studies of success stories from other similar organizations as needed (Refer to Section 10). Highlight that programs that incorporate the ANA SPHM standards have shown a decrease in worker's compensation costs (Refer to Section 1). <i>Providing a summary of this information to leadership before the meeting can be useful.</i>

Safe Patient Handling and Mobility – Section 2

Question from Leadership	Response
4. Do I, & should I, have to do anything about SPHM?	• What you know about the scope of SPHM at your facility in terms of injuries and associated monetary costs, and any other data you have collected to this point (Steps 1 & 2). • What has the organization done to address SPHM to date for example, purchase of SPHM technology for a specific patient care unit or department, and employee training, etc. Include if applicable, information about the impact of these efforts to reduce the incidence, severity, and cost of patient handling-related injuries including lessons learned. • Be prepared to discuss if, and why, <i>previous</i> SPHM efforts have stalled or are no longer effective, and how the proposed initiative will be different and successful. If you have not already identified why previous program efforts were not successful, highlight that barriers to program implementation, effectiveness and sustainability will be identified and addressed as you enhance/revive the SPHM program. • Legislative related requirements and standards e.g., state laws for SPHM, the ANA SPHM Standards, the CMS age friendly measure 2025 & IPPS etc (Refer to Section 1).
5. How much will it cost?	• Explain that until you have evaluated the full scope of the issue at your facility and developed your program plan you will not be able to answer this question. However, it may be important to highlight resources that you feel will be needed to implement or enhance the program e.g., SPHM technology and implementation of a robust employee training program. Highlight that there is a broad range of SPHM technology that will be reviewed to ensure employee and patient safety needs are met in a cost-effective manner.
6. What will the results be?	• Provide the high-level, broad strategic objectives of the SPHM program efforts, and how they can enhance or work in synergy with other programs at the facility, and support the organization's mission and goals e.g., ○ Reduce caregiver injuries, adverse events and costs related to manual patient handling ○ Provide a safer environment for patients and improve quality of care for patients ○ Improve employee morale and reduce turnover

Safe Patient Handling and Mobility – Section 2

Question from Leadership	Response
	○ Encourage early reporting of incidents and WMSD injuries ○ Overall, assist to promote a culture of patient and worker safety and wellbeing Highlight that measurable program outcomes will be included in the detailed program plan. • Emphasize the evidence that supports improved outcomes for patients and employees. Highlight the relationship between SPHM and the early, safe, and progressive mobilization of patients, and any patient focused organizational goals e.g., reducing patient falls, pressure injuries, etc.
7. What is our strategy?	• The overall strategy is to design a multifaceted evidence-based program that is founded on OSHA core elements for safety and health programs and the ANA SPHM standards. • Specific activities are to: 1. Identify a SPHM program champion or sponsor from senior leadership and 2. A SPHM project or program coordinator. 3. Form a multidisciplinary SPHM committee or team to determine the scope of the issue at your facility. 4. Define the scope of the issue through employee surveys, completion of a gap analysis and worksite evaluation as discussed in Section 3 of this toolkit. Explain why injury data is not sufficient to plan and manage a program successfully (Refer to Section 3). 5. Develop a draft SPHM program plan that will include the recommended scope of the program; <i>strategic</i> goals such as reduction in employee injuries, benefits to patients, cost savings, and return on investment (ROI); and a <i>tactical</i> plan that specifies how and who will implement and manage the program, potential budget, implementation timeline, program evaluation methods, sustainability measures, and change management for employee and patient acceptance. 6. Present the draft plan to the senior leadership group for evaluation, amended as needed, and final approval. 7. Implement, evaluate, and manage the SPHM program using a process improvement approach.

Safe Patient Handling and Mobility – Section 2

Question from Leadership

8. What do I need to do?

(i.e., what do you need from senior leadership?)

Response

A. Leadership understands that they must visibly commit, be accountable, and provide resources to foster a culture of employee and patient safety. This includes valuing SPHM as a standard of patient care and supporting all aspects of program implementation, evaluation, and maintenance. Thus, support is given to investigate the scope of patient handling risk at the facility and to develop recommendations to start or enhance an existing SPHM program plan.

B. Identify a SPHM program champion or executive sponsor from leadership who supports the position that SPHM is a standard of patient care e.g., the chief nurse executive or nursing officer or vice president of quality services.

Having a program champion or sponsor from a department such as nursing or rehabilitation versus employee safety and health, can assist in aiding the integration of SPHM efforts within an organization, and promoting SPHM as an employee *and* patient safety initiative.

SPHM programs require a change in practice primarily for nursing and rehabilitation staff in the acute care setting. Therefore, the program champion should be able to facilitate communication and partnership across all departments within a facility or organization, and with leadership. They should stay engaged and effectively help lead SPHM change management across the organization (**Refer to Section 7**).

The program champion or sponsor supports the program coordinator and SPHM committee by providing resources to facilitate successful implementation and sustainability of the SPHM program. This includes engaging nursing and rehabilitation management and staff in program activities, and communicating SPHM program needs, progress, and outcomes with executive leadership.

In addition, the program champion should be easily accessible to the SPHM program coordinator and committee and be able to engage with them on a regular basis e.g., participating in committee meetings and activities that involve in-person engagement of staff.

C. Identify a SPHM program coordinator (or manager) for this initial program planning phase who can organize and manage the SPHM committee and facilitate planning activities. If the program plan is approved, a SPHM program coordinator will be needed to oversee implementation and management of the program.

The program coordinator should ideally have knowledge about the topic of SPHM and experience in moving and handling patients. Certification in SPHM or occupational ergonomics is preferred

Response

(Refer to Section 10). A clinical background in nursing or therapy is recommended or at least a knowledge of risk management as related to occupational ergonomics, health, and safety.

The program coordinator should demonstrate strong project management capabilities, including the ability to oversee concurrent development of SPHM program components, communicate effectively, and foster collaboration among team members and across departments.

SPHM programs impact many departments in a facility and require changes in work processes, therefore a coordinator who has knowledge of systems thinking, LEAN strategies and change management is also useful. Some facilities may also be able to provide project management expertise to assist with program development. *Project management and facilitation resources are provided in Section 10.*

If the SPHM program coordinator lacks expertise in SPHM, it is essential to ensure that the SPHM committee includes at least one member with relevant SPHM expertise **(Refer to Step 4)**.

Provide the program coordinator opportunity for further education about effective SPHM programs and project management, etc., as needed.

The program coordinator must have the authority and knowledge to convene the committee and require participation; enough time and resources to coordinate and lead the program; and the authority to make decisions when planning and implementing the program and ensure its effectiveness.

The SPHM program and the program coordinator should be positioned within an organization to optimize effectiveness of the program and create a sense of urgency regarding SPHM practices and culture change (Kielich et al., 2025). SPHM not only prevents caregiver injuries but plays an invaluable role in improving patient outcomes **(Refer to Section 1)**. Patient mobilization is a core nursing task and SPHM practices support safe early mobility and falls and pressure injury prevention. Therefore, placing the SPHM program and the coordinator within nursing or patient care services can increase its effectiveness and leverage existing resources.

If SPHM is placed in an employee health and safety program (i.e., occupational health), or other non-nursing department ensure there is strong a strong link to nursing leadership and patient care

SPHM programs are multifaceted and require ongoing management to be effective. Therefore, it is recommended that there is at least one full-time coordinator per facility. Small facilities such as Critical Access hospitals may be able to implement and maintain their program with a part-time program coordinator. Alternatively, if having a full-time SPHM coordinator is not feasible, the program could be managed by 1 person who is responsible for the SPHM and a *related* patient safety initiative such as an early mobility or fall prevention program.

However, it is also important that management understand that *one person* cannot be responsible for implementing and managing the SPHM program. Having a visible and effective program champion and a dynamic well-chosen multidisciplinary SPHM committee are also

Response

critical for program success.

All employees or stakeholders who will be impacted by the program must also be engaged so that SPHM processes such as patient assessment and use of SPHM technology are institutionalized within the organization. Establishing a culture of SPHM facilitates program sustainability even if the program coordinator leaves.

Many health care organizations do not establish a dedicated coordinator position when initiating an SPHM program. However, appointing a dedicated SPHM program manager and coordinator is crucial for ensuring the ongoing success and sustainability of the program following initial implementation efforts (**Refer to Section 9**).

A recent article in *American Nurse Journal* highlights the significant contribution of dedicated SPHM coordinators to the effectiveness of SPHM programs (Kielich et al., 2025).

<https://www.myamericannurse.com/who-handles-the-handling/>

Examples of a SPHM program manager and coordinator job descriptions are provided in **Tool 2e**.

D. Approval and resources to form a multidisciplinary SPHM committee and investigate the issue further. This includes allocation of appropriate time for SPHM committee members to attend meetings, scheduling meetings, taking, and distributing minutes and action plans etc., and resources to conduct activities such as surveying employees, worksite assessment and analyzing data.

Highlight that the benefits of a well-structured and managed multidisciplinary SPHM committee can:

- Solidify program support within the facility
- Contribute to program compliance
- Provide more resources to developing and implementing the program
- Capitalize and engage a broad base of skills and expertise to ensure consideration of best-practice outcomes

Discuss the tentative structure of the committee, how long they may be working together, and specific responsibilities (**Step 4**).

Determine who the SPHM Committee will report to e.g., to the employee safety committee with joint reporting to patient safety related committees, and directly or indirectly to senior leadership.

It is important that leaders understand that an SPHM program is not just ‘another’ employee safety program but that it interfaces with many aspects of patient care throughout a facility such as early mobility, falls and violence prevention and rehabilitation, imaging perioperative services etc.

Response

If it is not possible to form a 'stand-alone' SPHM committee, then solicit support for the group who will develop and implement the program e.g., the employee safety committee or a patient safety-related committee (**Refer to Step 4 - SPHM Committee Reporting Structure**).

A decision-making process is necessary to prevent delays in program development and implementation. The program champion, program coordinator, and management representatives on the SPHM committee should escalate committee and program-related needs to leadership. A time frame for decision making to address needs should be established.

Determine how often leadership wants to be updated about the development of the program plan e.g., monthly, or quarterly.

E. Who do they want to see involved on the SPHM committee and with program efforts in general?

Review and agree on the key stakeholders that must be involved in SPHM program development and those that may assist in program development on an as-needed basis (**Refer to Step 4**).

Discussion points to emphasize:

- To facilitate employee engagement and buy-in as the program is developed and implemented, a balanced representation between management with decision-making authority and patient-care and support service employees with knowledge of how the work is done is important. Committee members should also be respected by their peers.
- Leaders must provide positive reinforcement for committee members' work, including facilitating engagement of patient-care employees committee members by ensuring they have staff coverage to attend committee meetings.
- The committee may start with a core group of key stakeholders who develop the draft SPHM program plan with assistance from 'ad-hoc' members. Once the program plan is approved, the committee can expand membership to reflect all departments/units that will be involved in program implementation.
- Make sure that leadership approves connecting with community or external stakeholders such as, the organization's workers compensation insurance carrier and any existing or potential SPHM technology vendors in the planning phase.
- Administrative support should be provided to assist with meeting arrangements and other support needs such as minute taking, data entry, etc.
- How committee goals and activities should be evaluated to ensure that they align with any evolving needs of the facility.

F. How should mid-level management be engaged at this preliminary stage of program planning?

For example, how will unit/department directors and managers be notified about initial program efforts such as employee surveys and walkthrough unit assessments? (**Refer to Communications planning in Section 4**).

Response
G. Are there any planned organizational changes that could have an impact on the resources you are requesting (e.g., budget for ceiling or overhead lifts; facility modifications, or SPHM employee training commitments)? For example: • Changes within senior leadership • Addition or change to a service line • Patient safety initiatives or new work processes and/or technology that are going to be introduced on a house-wide scale • New building or remodeling projects • Changes in capital budgets requirements and supervisory signature limits of operating budgets • Revenue focus for the current year on controlling costs versus growth You should request that leadership set the criteria for solutions development in advance e.g., capital budget limits, and availability of personnel-related support resources.
H. When will the draft SPHM plan be ready for review by leadership? The timeline depends on resource management, including staff and time to complete hazard assessment, solution development, and planning. Leadership will provide an estimated timeline but should note that careful preparation increases program success.

Table 2.2 What do Senior Leadership Want to Know?

Step 4

Identify a program champion or executive sponsor, and a program coordinator, and form a multidisciplinary SPHM committee

a. Identify a Program Champion or Executive Sponsor and a Program Coordinator -
Refer to Table 2.2. 8b & c. above.

b. Form a Multidisciplinary SPHM Committee

Identifying a core group of key stakeholders (**Figure 2.2.**) to be part of the SPHM program planning committee is important for success. A collaborative and structured approach that is founded on systems thinking to address patient handling-related injuries is essential. Core departments that are essential in the development of a successful program include Nursing, Rehabilitation, Employee Health, Patient Safety/Quality/Risk Management, Infection Prevention and Control, Wound Care, and departments responsible for facilities design, construction and medical device installation and maintenance.

Safe Patient Handling and Mobility – Section 2

Leadership representation should include individuals with decision-making authority such as directors from nursing and rehabilitation, managers from human resources, employee health and safety, and from units/departments with the highest rates of patient handling-related injuries e.g., intensive care and medical units.

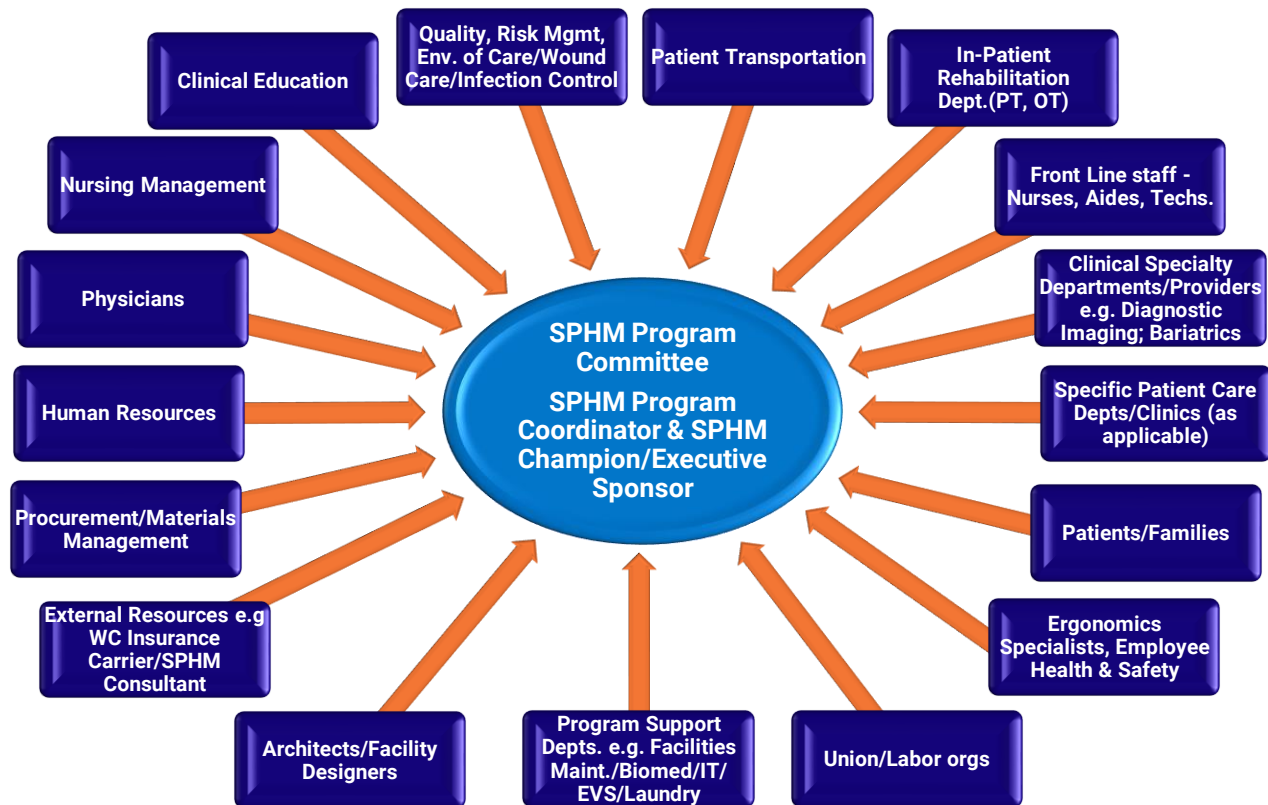


Figure 2.2 The Stakeholders (i.e., Disciplines, Expertise, and Departments), that may be Represented in a SPHM Committee at this Stage of Program Planning.

Caregivers in high-risk units/departments such as nurses, nursing aides, physical and occupational therapists who lift and mobilize patients *must* be involved. They bring important knowledge and perspective about day-to-day experiences related to patient handling and how work is done. They also play an essential role in helping to define the full scope of the issue at the facility and identifying barriers and facilitators to successful implementation and sustainability of the program.

Involving the caregivers facilitates employee buy-in and supports the *change* in work culture and practices that will be needed for successful program implementation. In addition, this collaborative approach to problem solving helps ensure the solutions and strategies chosen are user-centered and applicable to specific work environments and patient populations.

Facilities with an *existing* SPHM program should include unit-based SPHM champions or peer leaders and SPHM technology vendors on the committee.

Although having key stakeholders involved in the planning phase of a SPHM program is critical, it is

Safe Patient Handling and Mobility – Section 2

important that the committee is not so *large* that it is challenging to organize and manage during this ‘fact finding’ investigation stage of program planning.

To address this, a *smaller* group of individuals with expertise in SPHM, employee safety and health, human resources, risk management or environment of care, nursing and rehabilitation management, and managers and caregivers from units or departments with the highest risk and number of patient handling-related injuries may form the core SPHM planning committee.



Did You Know?

SPHM program stakeholders are individuals, groups, or organizations affected by the SPHM program and its activities.

SPHM Committee membership – examples of ‘Ad Hoc’ departments/stakeholders

- Legal and regulatory services
- Patient/customer services
- Finance
- Information technology
- Facilities maintenance
- Clinical engineering/Biomed
- Transportation
- Environmental services (housekeeping)
- Marketing, communications, and public relations support
- Facilities designers & architects
- Purchasing/procurement/material management
- Laundry or linen services
- Clinical specialty departments: imaging/radiology
- Volunteer services
- External stakeholders – workers compensation carrier/TPA; SPHM technology vendors/manufacturers; health care education schools e.g., nursing, physical therapy etc.

Other stakeholders can be engaged on an ‘ad hoc’ basis during this investigation stage. Committee membership can be expanded as needed after detailed program planning is approved following by senior leadership.

To facilitate communication during the program planning, implementation, and evaluation process, include stakeholders on the SPHM committee (in an ‘ad hoc’ role if necessary) who can provide *linkage* to the employee safety and patient related safety committees e.g., bariatric, fall prevention, workplace violence, infection control, etc., to ensure committees are working in sync with each other and not duplicating efforts.

In smaller organizations, one person may be responsible for multiple services and cover several areas of expertise on the committee.

At least one committee member should have subject matter expertise in SPHM and/or is willing to attend additional training/education. If no expertise is available within the facility, then to expedite program planning it may be necessary to seek outside SPHM expertise e.g., from the organization’s workers’ compensation carrier or an independent consultant. **Tool 3h** provides tips for choosing an external SPHM or Ergonomics consultant.

Other ‘ad hoc’ members of the committee should include external stakeholders such as the organization’s worker’s compensation insurance carriers. Vendors of SPHM technology can also become ‘ad hoc’ members of the committee when SPHM technology has been chosen for the program. They can provide invaluable expertise when

Safe Patient Handling and Mobility – Section 2

implementing the program and assisting with staff training.

Tool 2f defines stakeholders and their roles and responsibilities in the SPHM program.

SPHM Committee Reporting Structure

There are many program components or elements to consider and address when developing and implementing a SPHM program. Therefore, to expedite program development and implementation it can be more effective to have a 'stand-alone' SPHM committee who report to the facility or organization employee safety and health committee.

If this is the case, as noted above, make sure there is representation from the facility's employee safety committee and any other key patient safety committees together with clear reporting processes and understanding of how the groups can work together to achieve mutual goals and avoid redundancy.

For smaller hospitals having the SPHM program developed by the facility employee safety and health committee may be more efficient due to availability of staff resources/expertise.

Alternatively, combining or incorporating the SPHM program with other patient safety related programs such as fall prevention or early mobility, can help integrate SPHM into the standard of care and facilitate support for program needs (**Refer to Section 9**).

If the SPHM program is developed by an employee safety committee or a patient safety related committee, ensure that sufficient time and resources is allocated so that program development is not delayed due to a competing focus on other safety programs.

Wherever you decide to 'place' the SPHM committee, to assist SPHM program integration into the patient standard of care, it is important to have a strong relationship with patient care and safety versus a focus only on employee safety (**Figures 2.3 a & b**).

Overall, senior leadership should provide guidance on the desired SPHM committee reporting structure.



Quick Tip

Developing the SPHM program requires committee members to actively participate in committee meetings and work. However, with current staff resource challenges in health care this can be challenging for managers, front-line employees, and others.

To avoid delays in program development due to a committee member(s) absence, consider having a 2nd committee 'buddy' member from the same unit or program department who can represent their colleague at committee meetings as needed. 'Alternate' committee member(s) need to attend committee orientation and training and must be kept informed about committee activities e.g., via meeting minutes and updates from the primary unit/department representative.

Safe Patient Handling and Mobility – Section 2

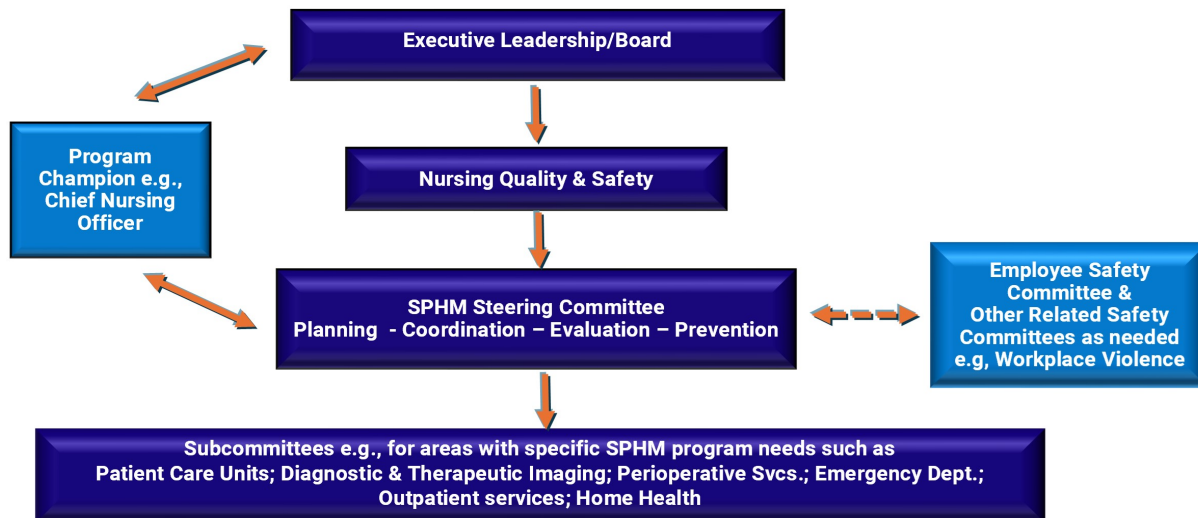


Figure 2.3a Example of Reporting Structure of the SPHM Committee in a Large Hospital System.



Figure 2.3b Example of Reporting Structure of the SPHM Committee in a Small Hospital or Health Care Facility.

SPHM Committee Roles and Responsibilities

The overall purpose of the SPHM committee is to provide multidisciplinary insight and assistance to the SPHM program champion, the program coordinator, and other groups of stakeholders in the design, implementation, and evaluation of the SPHM program.

Examples of the roles and responsibilities of an SPHM committee are listed in **Table 2.3**.

Specific roles and responsibilities of the committee may be further defined after the SPHM program plan is completed and approved by senior leadership.

Once the program is implemented and evaluated, the committee structure and function should be reevaluated and membership, role, and activities, defined in relation to maintenance of the SPHM program.

SPHM Committee Roles and Responsibilities

- Identify, consult, and engage key stakeholders during the development, implementation, evaluation, and management phases of the SPHM program to facilitate the culture change that is required for program effectiveness and sustainability
- Develop a draft SPHM program plan that includes short and long term strategic and tactical elements
- Identify immediate and future goals and objectives for the SPHM program
- Assess current SPHM policies and procedures, job tasks and work processes, and physical work environment, to identify and prioritize areas for improvement
- Identify solutions (SPHM technology and best work practices) to prevent patient handling-related injuries
- Assess organizational readiness for the SPHM program and associated changes
- Identify barriers and facilitators to program implementation and maintenance
- Establish timelines and deliverables
- Develop SPHM policy
- Assist the SPHM program champion and the program coordinator to:
 - Solicit appropriate allocation of resources (time, staff, and finance)
 - Develop and implement a communication plan
 - Implement SPHM policies and processes and technology
 - Develop competency based SPHM education and training program and informational resources for staff
 - Report and address barriers in program implementation and maintenance
 - Recruit and provide guidance, and support of unit-based SPHM champions or coaches
 - Root cause investigation of patient-handling related injuries and incidents and action to prevent future incidents
 - Conduct ongoing program evaluation including review of injury trends and costs and other metrics
 - Communication of program outcome and process measures to management and employees
 - Sustain and modify the program as needed

Table 2.3 Examples of the Roles and Responsibilities of a SPHM Committee.

Safe Patient Handling and Mobility – Section 2

Meeting structure

It may be necessary to meet frequently at this stage of program planning e.g., every 1-2 weeks, to establish the committee and educate members, and to collect and analyze data before drafting an SPHM program plan. Meeting frequency will also be dependent on direction given by senior leadership. Meetings could be monthly once the program is being implemented and evaluated.

Effective Committees/Teams

Cohen and Mohrman define a team as “a group of individuals who work together to produce products or deliver services for which they are mutually accountable” (Cohen and Mohrman, 1995).

Team members share goals, are mutually accountable, and their interactions impact results. Each member is responsible for integrating with others as part of their duties.

The following factors tend to enhance teams in health care:

- Clear and shared goals and vision
- Strong leadership
- Members understand their role and responsibilities
- Effective communication and decision-making processes
- Mutual respect
- Individual accountability for specific actions
- Shared accountability for team outcomes

Individual members of the SPHM committee will vary in their experiences and approaches to working as part of a team. There will be perceived differences in hierarchy and status, for example between patient care or front-line employees and managers or leaders on the committee and between members from non-clinical and clinical disciplines.

Tool 2g provides some tips for effective meetings and assisting committees in their work together.

The following resources provide more information about developing and managing effective teams and committees:

- Mendonca, K & Thorman, S. (2024). UC Berkley Guide to Managing Human Resources Team Building Toolkit. https://hr.berkeley.edu/sites/default/files/bpm_team_building_toolkit_6-5-2024.pdf
- American Library Association. Effective Committees: The Basics best practices in committee effectiveness. <https://www.ala.org/yalsa/aboutyalsa/yalsahandbook/effectivecommittees>
- American Society for Health Care Engineering (ASHE) 2021. ASHE Chapter Handbook Chapter 6. The importance of effective committees. https://www.ashe.org/sites/default/files/ashe/06_committees.pdf

Step 5

Educate the committee about the scope and risk related to manual patient handling in health care, the components of successful SPHM programs, the proposed approach to addressing SPHM at your facility and function of the committee. Develop the program vision and committee mission statements, and a draft project charter.

Once the SPHM committee is formed, provide them with information about the following:

1. Scope and cost of manual patient handling in health care, relevant laws and standards, why manual patient handling is so dangerous, and elements of SPHM programs to prevent injuries to healthcare workers and patients. Make sure they understand why the initiative is important to patients, themselves, and the organization (**Refer to Section 1**).
Customize this information for your health care setting e.g., hospital, clinic, nursing home etc. Use information provided in this toolkit including freely accessible web-based videos listed in **Section 6 Education and Training Tool 6a** such as the U Mass – Lowell online training 'Ergonomics in Healthcare: A Continuing Education Program for Nurses, Nursing Assistants and Healthcare Managers'. <https://www.uml.edu/research/cph-new/education-training/ergonomics/>
2. Steps taken to start SPHM program development at the facility.
3. Purpose of the SPHM program and proposed strategy to develop a draft program plan as detailed in this toolkit. Use information developed in **Step 2** and an understanding of requirements by senior leadership as identified in **Step 3**.
4. How an SPHM program can support the organization's strategic goals and mission.
5. The relationship between change management and the implementation of an SPHM program, along with common barriers that may arise and methods for addressing them (**Refer to Section 7**).
6. Roles and responsibilities of the committee overall and among the members of the SPHM committee; of the SPHM program champion and the program coordinator etc., The committee reporting structure and relationships to other employee and patient safety related committees together with leadership expectations of the committee.
7. Meeting schedule and realistic expectations for time commitment, length of service on the committee, and how management will support their participation.
8. How the committee will function (Refer to 'Effective Committees/Teams' above, and **Tool 2g**) decision making processes, and communication methods between committee members and the project coordinator etc.

Create a Vision Statement for the SPHM Program

Having a vision statement provides the foundation for the development of strategic goals and program communications or social marketing efforts. The SPHM vision statement should describe overall goal of

Safe Patient Handling and Mobility – Section 2

the SPHM program and reflect the organization's core values and mission through use of common language and intent.

If your facility has a marketing or communications department, ask if they can help the committee facilitate development of a vision statement.

Examples of Vision Statements for a SPHM Program:

'Create a Culture of Safe Patient Handling & Mobilization while Enhancing Health Care Provider & Patient Safety'

'Promote a Culture of Safe & Compassionate Patient Handling while Enhancing Caregiver & Patient Safety'

Providing examples of a vision statement will help expedite the development of a statement. Do not use an entire committee meeting to create a vision statement. Instead, make a draft that includes key words and themes, then spend 10-15 minutes in the next meeting(s) to revisit, refine and complete it.

Create a SPHM Committee Mission Statement

Create a mission statement for the SPHM committee i.e., a statement that clearly describes what the purpose of the committee is. This may be incorporated into the program's Project Charter.

Example of a mission statement for a SPHM committee.

The Safe Patient Handling and Mobility (SPHM) Committee will focus on implementing an SPHM program changing the organizational culture from manual lifting to SPHM where powered and non-powered assistive devices are used for the mobilization, transfer, and care of patients, to reduce patient and staff injuries. The focus will first be on ____ unit(s). These will be pilot units for the SPHM program. Program measurement will include employee injury data, patient falls data, patient experience, usage of SPHM devices, and other metrics as appropriate.

Develop a draft Project Charter

A project charter demonstrates the commitment of the organization and leadership to the SPHM program and committee activities and provides formal agreement about the project details. A charter assists as a communication tool to employees about this commitment and goals, scope, and high-level deliverables of the SPHM program overall.

It also assists the SPHM committee to *stay on course* during program development and implementation.

Use your organization's existing project charter template (if one exists).

Typically, a project charter summarizes the:

- Need for a SPHM program
- Program objectives
- Role of the program champion/executive sponsor

Safe Patient Handling and Mobility – Section 2

- Authority of the SPHM manager
- Main stakeholders
- Committee mission, function, and roles etc.

Once the draft SPHM program plan is completed, the project charter can be updated to include the:

- Performance improvement approach to problem solving
- Potential barriers to a successful SPHM program
- Anticipated resources
- Project milestones
- Specific performance measures and improvement goals
- **Tool 2h** provides an example of a project charter for an SPHM committee.

The charter should be amended as needed and approved by senior leadership as part of the process to finalize your SPHM program plan (**Refer to Section 4**).

As the SPHM program matures the mission and vision statements and project charter should be reviewed and revised, as necessary.

*Refer to the resources provided in 'Effective Committees/Teams' on **page 2-23** for more information on developing vision and mission statements and project charters.*



Quick Tip

To save meeting time, use your organization's template (if any) to develop the Vision, Mission and Project Charter and adapt the SPHM examples provided.

It may not be possible to finalize the Mission statement and Project Charter until the committee has developed the program plan that defines where and how SPHM needs will be addressed.

Section Summary



Getting Started

To build support and establish the foundation for your SPHM initiative:

STEP 1. Review best practices for preventing patient handling injuries and related regulations and standards to understand the why and how manual patient handling needs to be addressed.

Collect baseline incident/injury and cost data to identify the scope and impact of patient handling related injuries at your facility or within your organization.

STEP 2. Analyze data collected to identify and prioritize units, departments, and employee groups, with higher risk of exposure to patient handling; and the nature, severity and cost of injuries associated with patient handling. Begin to identify hazards, overall risks & program elements that need to be addressed.

STEP 3. Enlist support of senior leadership to further determine the scope, cost, and risk of patient handling-related injuries at your facility and to develop a draft SPHM program plan with a program champion, manager or coordinator, and multidisciplinary committee. Leadership approval is crucial to allocate resources and structure the program. Meeting with leadership at this stage helps avoid wasting resources and time on unfunded or unsupported SPHM program activities.

STEP 4. After obtaining leadership approval for program planning activities, identify a program champion or executive sponsor, and a program coordinator, and form a multidisciplinary SPHM committee. Determine the committee reporting structure and committee roles and responsibilities.

STEP 5. Educate the committee about the scope and risk related to manual patient handling in health care, the components of successful SPHM programs, the proposed approach to addressing SPHM at your facility and function of the committee. Develop the program vision and committee mission statements, and a draft project charter.

Seeking early leadership support and giving employees an opportunity to participate in SPHM program planning are critical first steps in assessing organizational culture and readiness for change. These actions help identify potential barriers to successful SPHM program planning and implementation while also preparing stakeholders for the necessary changes.

Additional references and resources related to this Section are listed in **Section 10**.

Safe Patient Handling and Mobility – Section 2

References and Resources Used in this Section

- American Library Association. Effective Committees: The Basics best practices in committee effectiveness. <https://www.ala.org/yalsa/aboutyalsa/yalsahandbook/effectivecommittees>
- American Nurses Association. (2021). Safe patient handling and mobility: Interprofessional national standards across the Care Continuum. 2nd edition American Nurses Association; 2021. Silver Springs, MD
- American Society for Health Care Engineering (ASHE) 2021. ASHE Chapter Handbook Chapter 6. The importance of effective committees. https://www.ashe.org/sites/default/files/ashe/06_committees.pdf
- Bottino, B. (2024, November 24). Selling safety to leadership. *Safe and Health*. NSC pub. <https://www.safetyandhealthmagazine.com/articles/26187-selling-safety-to-leadership>
- Computer One. (2023, November 2). Convincing the board: 5 strategies for technology leaders to secure funding for their initiatives now and into the future. <https://computerone.com.au/convincing-the-board/>
- Enos, L. A. (2011). Making the business case to initiate, sustain, and evaluate safe patient handling programs: Part 1. *American Journal of Safe Patient Handling and Movement*, 1(3), 8–15.
- Enos, L. A. (2011). Making the business case to initiate, sustain, and evaluate safe patient handling programs: Part 2. *American Journal of Safe Patient Handling and Movement*, 1(4), 8–16.
- Gallagher, S. (2013). Implementation guide to the Safe Patient Handling and Mobility Interprofessional National Standards. Silver Springs, MD: American Nurses Association.
- Institute for Healthcare Improvement / National Patient Safety Foundation. (2017). Optimizing a Business Case for Safe Health Care: An Integrated Approach to Safety and Finance. Cambridge, MA: Institute for Healthcare Improvement. Retrieved from <http://www.ihl.org/resources/Pages/Tools/Business-Case-for-Safe-Health-Care.aspx>
- Kielich, R., Jaworski, T., Boynton, T., & Hopewell, N. (2025). Who handles the handling? *American Nurse Journal*, 20(6). <https://www.myamericannurse.com/who-handles-the-handling/>
- Matz M, Celona J, Martin M, McCoskey K, Nelson GG. (2019). Patient Handling and Mobility Assessments (2nd ed.); https://www.fgiguilines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf
- McLellan, D., Moore, W., Nagler, E., & Sorensen, G. (2017). Implementing an integrated approach weaving worker health, safety, and well-being into the fabric of your organization. *Harvard T.H. Chan School of Public Health Center for Work, Health, and Well-being*.
- Mendonca, K & Thorman, S. (2024). UC Berkley Guide to Managing Human Resources Team Building Toolkit. https://hr.berkeley.edu/sites/default/files/bpm_team_building_toolkit_6-5-2024.pdf
- Mohrman, S. A., Cohen, S. G., & Mohrman, A. M. Sr. (1995). Designing Team-Based Organizations. San Francisco: Jossey-Bass.
- Occupational Safety and Health Administration (2016). Recommended Practices for Safety and Health Programs <https://www.osha.gov/sites/default/files/publications/OSHA3885.pdf>
- Safe Patient Handling and Mobility Guidebook VHA Center for Engineering & Occupational Safety and Health (CEOSH) St. Louis, Missouri. January 2016. https://www.stryker.com/content/dam/stryker/education-and-training/focusrn/resources/caregiver-safety/implementation-tools/VA%20SPHM_PDF.pdf
- The Joint Commission. (2012). Improving patient and worker safety: Opportunities for synergy, collaboration and innovation. Oakbrook Terrace, IL: The Joint Commission. <https://www.patientcarelink.org/the-joint-commission-improving-patient-worker-safety-opportunities-for-synergy-collaboration-innovation/>
- Toolkit for Using the AHRQ Quality Indicators. (2017, March). Agency for Healthcare Research and Quality, Rockville, MD. Retrieved from <http://www.ahrq.gov/professionals/systems/hospital/qitoolkit/index.html>
- Wählin, C., Stigmar, K., & Nilsing Strid, E. (2021). A systematic review of work interventions to promote safe patient handling and movement in the healthcare sector.
- Western New York Council on Occupational Safety and Health (WNYCOSH) (2016). Safe Patient Handling Workgroup Report to the Commissioner of Health. New York State Dept. of Health. https://www.health.ny.gov/statistics/safe_patient_handling/docs/sph_report.pdf

Hazard Identification and Assessment

Contents

Hazard Identification and Assessment	1
Step 6. Determine the scope of the issue & program needs	1
Introduction	1
Hazard Identification and Assessment Activities	2
<i>Figure 3.1 A Summary of Hazard Identification and Assessment Activities that can be used to Identify and Prioritize SPHM Program Needs.</i>	4
I. Gap Analysis	5
Why Conduct a Gap Analysis?	5
<i>Table 3.1 SPHM program components included in the Gap analysis tool.</i>	6
Completing the Gap Analysis	7
<i>Table 3.2 The Importance of Assessing an Organization's Culture.</i>	9
II. Worksite Assessment.....	9
Introduction	9
<i>Figure 3.2 Data to be Collected during Worksite Assessment.</i>	10
When to Conduct the Worksite Assessment	11
Who Should Conduct the Worksite Assessment?	11
A. Employee Surveys and Interviews	13
Employee Perception Surveys	13
Symptom Survey	14
Employee Interviews	15
Employee Focus Groups.....	15
B. Manager Survey of Unit/Department Characteristics.....	16
<i>Table 3.3 Summary of a Manager Unit/Department Survey</i>	17
C. Review of Additional Data Sources.....	17
D. Site Visit of Priority Units/Departments.....	18
The Goal of Conducting a Site Visit	18
When to Conduct a Site Visit(s).....	18
Who should Conduct a Site Visit(s)	19
Preparing for a Site Visit(s)	19
Scheduling the Visit.....	19
Conducting a site Visit(s)	20
Opening Conference	20
Observing Patient Handling Tasks.....	21
<i>Table 3.4 Summary of Activities Observed when Assessing Patient Handling Tasks</i>	23
Assessing the Physical Environment	24
<i>Table 3.5 Information to be Collected during Assessment of the Physical Environment.</i>	26
Closing Conference	26
After a Site Visit(s).....	27
Conducting Ergonomics Evaluation to Quantify Risk fFactors for WMSDs	27
Step 7. Analyze and prioritize survey and site visit data	30
<i>Table 3.6 Example of a Risk Assessment Summary.</i>	32
Assessing Readiness for Change	33
Section Summary	35
References and Resources Used in this Section	36

Hazard Identification and Assessment

Step 6

Determine the scope of the issue & program needs

Introduction

The primary purpose of hazard identification and assessment is to determine the hazards and level of risk associated with patient handling activities that have caused or may cause harm to caregivers and patients. Solutions are then developed and implemented to eliminate or minimize the risks identified.

Hazard identification involves identifying the physical hazards that contribute to work-related musculoskeletal disorders (WMSDs) associated with manual patient handling tasks such as repeated forceful exertion and awkward posture. However, as discussed in Section 1, psychosocial and organizational-related risk factors contribute to the development of WMSDs and must also be evaluated. These hazards are considered within the *Worksite Assessment* activities discussed in **Step 6**.

Risk assessment involves determining the likelihood of injury or harm that occurs together with the potential severity of harm to caregivers and patients during patient handling tasks. For example, manually boosting a non-mobile patient of size in bed is a frequently performed task that is known to increase risk of caregiver back injuries, and can contribute to pressure injury for the patient (due to friction and shear). Thus, potentially resulting in career-ending harm for caregivers and grave consequences for patients.

Initial and ongoing hazard identification and assessment provide the foundation of a comprehensive SPHM program. The goals are to:

1. Identify the hazards (risk factors) related to patient handling and mobility tasks that may contribute to caregiver and patient injury.
2. Provide a basis for prioritizing identified hazards by risk and severity to help determine units or departments that should be a priority for SPHM interventions.
3. Inform decision making when choosing and implementing controls to prevent hazards i.e., choosing SPHM technology and best work practices.
4. Determine organization-wide, and unit or department readiness for change by assessing work culture and identifying barriers to implementing SPHM solutions and the overall program.

Tools that Support Content in this Section

3a. Gap analysis tool

3b. Employee perception survey

3c. WMSD symptom/discomfort survey

3d. Manager survey of unit/department characteristics

3e. SPHM technology inventory survey

3f. Site visit assessment checklist

3g. Worksite assessment summary

3h. Tips for choosing a consultant

Safe Patient Handling and Mobility – Section 3

5. Determine SPHM program components and program implementation strategies that facilitate program success and sustainability.
6. Provide an opportunity to engage employees in the development and ongoing management of the SPHM program and prepare them for change.
7. Allow the SPHM committee with leadership support to design an SPHM program that will serve the needs of your facility and meet industry best practices and standards.

Identifying hazards, assessing patient handling tasks, and evaluating SPHM program activities are ongoing processes that follow a continuous-improvement model (**Refer to Section 1**). These activities require regular monitoring, reviewing, and communication to ensure the effectiveness of SPHM solutions and to address new hazards promptly.

Periodic program evaluation is a critical activity that supports the achievement of program goals and sustainability and facilitates program adaptation to ongoing changes in healthcare delivery, staffing and leadership. *Refer to **Section 8 Program Evaluation** and **Section 9 Program Sustainability**, for more information.*

The tools provided in **Section 8** will also help SPHM committees who need to complete hazard identification and risk assessment activities in an *existing* SPHM program.

Hazard Identification and Assessment Activities

The review of injury data described in **Section 2** provides a starting point for determining what patient handling tasks need to be addressed, the frequency and severity of injuries and where they occur i.e., potential high priority units/departments.

However, injury reports do not always provide enough information about root cause and context of patient handling related incidents. Underreporting and miscoding of injuries in health care can also limit the quality of data that is needed to determine what, and how, to prioritize patient handling related hazards that need to be addressed.

The following activities are highly recommended to identify and develop solutions to address patient handling related hazards, as well as determine the processes needed for the successful implementation of the SPHM program. Together they facilitate SPHM program development from a systems perspective.

- I. Comprehensive gap analysis of existing patient handling injury prevention efforts or SPHM program (if a program already exists). This includes assessment of an organization's safety culture and readiness for change.
- II. Worksite Assessment
 - a) Surveys and interviews that engage employees and determine their perception of the risk and challenges they experience when performing patient handling related tasks.
 - b) Survey of units to evaluate patient characteristics, the physical environment, staffing practices and any existing equipment that is used for patient handling and mobility tasks.
 - c) Site visit of units/departments with the highest number or rates of patient handling injuries/incidents (i.e., priority units/departments) as identified through analysis of injury data (**Section 2**), to assess patient handling tasks performed, the physical work environment and culture.

Safe Patient Handling and Mobility – Section 3

The following are examples of *additional* data sources that can also be used to identify SPHM program needs in your facility. The data source you choose to evaluate will depend on the availability and quality of the data, and resources available to evaluate the data.

- Employee focus groups (**Refer to page 3-15**)
- Existing employee survey data e.g., satisfaction surveys
- Feedback from employee suggestion programs
- Minutes from safety meetings
- Patient focus groups and/or surveys to elicit information about their experience when being mobilized manually and/or with SPHM technology. **Refer to Section 8 and Tool 8c for more information about patient surveys.**
- Patient reports or quality surveys e.g., Press Ganey
- Patient safety data such as incidents of patient falls that occur when caregivers are manually mobilizing patients and/or pressure injuries due to lack of in-bed repositioning and out of bed mobilization. **Refer to Section 1** for information about the relationship between SPHM and patient outcomes
- Employee and patient safety rounding and inspection reports conducted by facility staff e.g., *Environment of Care* surveys, and/or external agencies e.g., workers compensation insurance carriers, accreditation entities such as DNV, the Joint Commission etc.
- State or federal OSHA consultation or enforcement reports related to patient handling and mobility tasks
- Grievances made to union/labor representatives related to employee safety, staffing, and patient handling tasks

Once completed, information collected from the Gap Analysis together with data from surveys, site visits, injury and incident data and any other additional data sources, will provide a framework to develop your SPHM program or enhance an existing program. **Refer to Steps 7 and 8 for more information.**

Figure 3.1 summarizes the hazard identification and risk assessment activities that can be used to identify and prioritize SPHM program needs.



Quick Tip

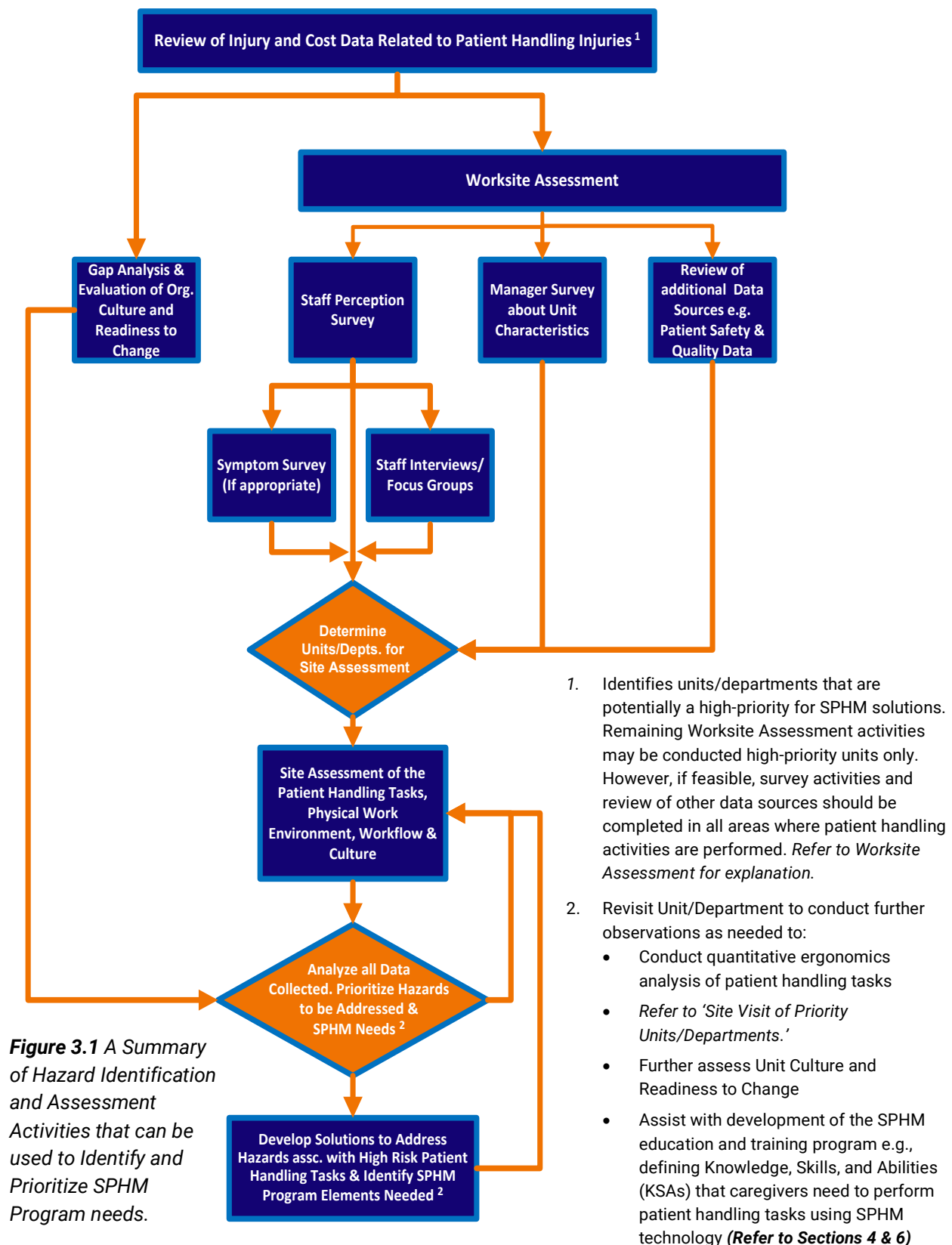
Hazard assessment activities described in this Section can be adapted to the size of a health care facility, and service line provided. The activities you choose to complete depend on the quality of hazard related data you may already have, resources available to complete assessment activities, and recommendations from leadership.

However, it is recommended that at a minimum a Gap Analysis, surveys to determine unit/department characteristics and if any SPHM technology exists, and site visit activities are completed. These activities are essential to provide sufficient data to inform SPHM program planning and development.

If it is not feasible to conduct a facility-wide survey of employees who perform patient handling activities, then have a strategy to engage employees in high priority units/departments as identified by review of injury data (**Refer to Section 2**) using surveys, interviews and/or focus groups as described in this Section. Soliciting employee input about current patient handling practices is crucial to informing solution development and facilitating change.

Safe Patient Handling and Mobility – Section 3

SPHM Hazard Identification and Assessment Process



I. Gap Analysis

Why Conduct a Gap Analysis?

The **purpose** of a gap analysis is to determine the current state or *what's happening* and desired future state or *vision* of an SPHM program. It facilitates the comparison of current SPHM activities in your facility and within individual units and departments with recommended best practices in SPHM.

The Gap Analysis tool (**Tool 3a**) includes details of published recommended evidence-based elements and current best practices of effective SPHM programs. **Table 3.1** provides a summary of contents.

Conducting a gap analysis allows the SPHM committee and other stakeholders to determine:

- What SPHM program elements and activities are in place
- Completeness and effectiveness of existing SPHM program elements, policy, and procedures
- Barriers that may impact SPHM program implementation and/or hinder sustainability of previous SPHM program efforts (*if any*)
- Which SPHM program elements and practices should be developed and implemented
- Prioritization of program activities to be completed

Completing a Gap Analysis also allows SPHM committee members to become more familiar with evidence-based program components and activities required to implement and sustain a successful SPHM program.

It also provides an opportunity to **assess organization culture and readiness for change**. Assessing readiness for the implementation or enhancement of an SPHM program is an important activity that helps the SPHM committee determine and prioritize implementation strategies. They can develop strategies to address potential barriers identified that can be discussed when presenting the draft SPHM program plan to senior leadership.

Change in a health care organization's leadership team and/or delivery of business services also necessitates that an organization's culture and readiness for change is evaluated on an ongoing basis to facilitate sustainability of the SPHM program.

The importance of assessing an organization's culture is summarized in **Table 3.2**. Determining the readiness of a health care facility to implement an SPHM program is discussed at the end of this Section.

The first section of the Gap Analysis tool provided, i.e., 'SPHM Program Foundation and Management,' identifies behaviors and practices that help determine if a culture of patient *and* employee safety exists, and any potential culture-related barriers to implementation of a successful program and associated procedures.

It is recommended that a gap analysis is completed *periodically* as a part of an ongoing program evaluation e.g., annually, as discussed in **Section 8** of this toolkit.



Quick Tip

The Gap Analysis can be completed by the SPHM committee while other assessment activities are being completed e.g., employee surveys, site visits etc.

Information gathered from surveys and onsite evaluation activities may help the committee to complete the Gap Analysis.

Safe Patient Handling and Mobility – Section 3

SPHM Program Components Included in the Gap Analysis Tool

- The *Gap Analysis* tool (**Tool 3a**) was developed from several resources and includes all elements of the ANA Safe Patient Handling and Mobility Interprofessional National Standards, 2nd edition, and OSHA recommendations for SPHM programs. It can be customized as needed e.g., to include required elements of state laws for SPHM. Program elements or activities can be adapted and/or added to the tool as the SPHM program matures.
- The tool is provided in several formats; however, the *MS Excel* version allows you to prioritize responses to individual questions and then offers a project planning format to identify specific strategies to address identified gaps; potential barriers and how anticipated problems will be averted or minimized; those responsible to carry out the strategies; timeline for implementation and resources needed. This tool focuses primarily on SPHM programs in hospitals and ambulatory care settings. Additional information may be needed when reviewing an SPHM program for long-term care or home health services. **Section 10** provides more information about SPHM for these health care settings.

SPHM Program Foundation and Management

- A. Management Leadership
- B. Employees Involvement
- C. Written SPHM Policy
- D. Program Management
 - I. Program Champion
 - II. SPHM Committee/Team
 - III. SPHM Program Manager/Coordinator
 - IV. SPHM Program Plan
- E. SPHM Champion Program
- F. Lift Team Program – if applicable
- G. Communications/Social Marketing

SPHM Program Hazard Analysis, Abatement and Evaluation

- H. Ongoing Hazard Identification/Analysis and Program Evaluation
 - I. Data Analysis - Injury & Incident Data
 - II. Data Analysis – Other Outcome Measures
 - III. Program Process Evaluation

SPHM Program Hazard Analysis, Abatement, and Evaluation cont.

- I. Equipment Selection, Tracking and Maintenance
 - I. Equipment – General
 - II. Sling Management Process
 - III. Infection Control Policy Related to Cleaning of SPHM Technology
 - IV. Maintenance and Inspection
 - V. Ongoing Equipment Management
- J. Patient Assessment Protocols
- K. Education
- L. Post Incident or Injury Management

SPHM Program Proactive Hazard Prevention

- M. Proactive Design
- N. Proactive – Hazard Identification and Gap Analysis

Table 3.1 SPHM program components included in the Gap analysis tool.

Safe Patient Handling and Mobility – Section 3

Completing the Gap Analysis

The SPHM committee and any other key stakeholders should complete the gap analysis. However, to expedite completion, it is recommended that a program section(s) of the tool is assigned to individual committee members or small groups within the committee for completion. For example, a committee member from the Employee Health department could complete questions related to Data Analysis if they have the best insight into collection and analysis of employee injury data. Unit managers and caregivers could complete questions related to selection, tracking and maintenance of any existing SPHM technology.

This approach allows you to gather different perspectives on current SPHM practices within your facility before establishing program priorities. It also facilitates input from individual committee members who may not be comfortable in expressing their viewpoint about existing safety culture and injury prevention practices in a committee meeting.

Individual committee members can also complete their assigned section of the gap tool together *with other staff* they work with to facilitate information gathering and employee engagement in program efforts.

It is recommended that all committee members answer the questions in 'Section A Management Leadership' and 'B. Employees Involvement' of the Gap Analysis tool, as it is important to gather all committee members' perception of the organization's culture.

Once individual responses are collected, review responses to each question together as a committee using a brainstorming approach. Discuss overall 'gaps' identified in each program component section to arrive at consensus to determine what program elements and activities:

- Exist and are functioning well
- Are only partially implemented
- Need to be developed
- Will not be implemented or are not applicable

Once complete, rank items in each program component section by those that:

1. Need to be developed
2. Are only partially implemented
3. Exist and are functioning well
4. Will not be implemented or are not applicable
(Note you may want to review these items again in the future to determine if they are applicable or should be addressed)



Quick Tip

As hazard identification and risk assessment activities are being conducted, identify all stakeholders who will be involved and/or impacted by SPHM program planning and implementation activities.

Stakeholders include employees such as senior leadership, unit/department managers, caregivers, and support service staff; departments; and external entities such as Emergency Medical Services (EMS).

Developing a Communications plan for the SPHM program is discussed in Section 4. Tool 2f provides examples of stakeholder groups who may be impacted by the SPHM Program.

Safe Patient Handling and Mobility – Section 3

Conducting a Gap Analysis on a Priority Unit

There is some evidence from other health care safety-related programs such as workplace violence prevention, that having individual units or departments complete a gap analysis related to their work areas can enable change and program sustainability.

This activity facilitates ownership of solutions by addressing specific processes and issues that are meaningful to that employee population for example, SPHM technology and training that is designed to address needs for how to move and mobilize a specific patient population (Hamblin et al., 2017, Wright, 2015).

The next step as a committee is to determine what you think must be done to move from the current state to the desired future state of the SPHM program at your facility or within your organization. This is discussed in **Section 4, Step 8**.

The Importance of Assessing an Organization's Culture

Competing business and service demands together with changing health care reimbursement rules and staff recruitment and retention challenges can make sustainability of comprehensive worker safety programs such as SPHM challenging.

Healthcare organizations that foster a “culture of safety for patients and workers” characterized by an atmosphere of mutual trust, shared perceptions of the importance of safety, confidence in the efficacy of preventive measures, and a no-blame environment that facilitates reporting of unsafe conditions and behaviors may be more successful at preventing harm to both patients and workers (TJC, 2012, HRET, 2016, NIOSH, 2023, OSHA, ND).

Assessing the organization's culture and readiness for change involves reviewing the organization's approach to a 'culture of safety.' OSHA summarizes an organization's culture as the product of individual and group beliefs, values, attitudes, perceptions, competencies, and patterns of behavior that determine the organization's commitment to objectives such as quality and safety.

Healthcare organizations that foster a culture of safety characterized by an atmosphere of mutual trust, shared perceptions of the importance of safety, confidence in the efficacy of preventive measures, and a no-blame environment are *more successful* at implementing programs that reduce injuries to both patients and workers.

Typical attributes of a culture of safety include:

- Staff and leaders who value transparency, accountability, and mutual respect
- Safety as everyone's priority
- Not accepting behaviors that undermine the culture of safety
- A focus on finding hazardous conditions or “close calls” at early stages before injuries occur

The Importance of Assessing an Organization's Culture

- An emphasis on reporting errors and learning from mistakes
- Careful language to facilitate conversation and communicate concern
- Principles of High Reliability Organization (HRO) and Just Culture are embraced (OSHA, 2015)

Assessing organizational culture and readiness to change, together with incorporating change management principles into program implementation efforts are critical for SPHM program success.

Assessing readiness for change is discussed at the end of this Section. **Change management** is discussed in **Section 7**.

Implementing an SPHM program that is manageable within an organization's current *business* capabilities, is designed to have a *positive impact or contribution* to the organization's business goals and contributes to achieving the organization's mission and stakeholders' (patients, staff) safety and satisfaction, has a greater likelihood of being sustained (ANA, 2021; Matz et al., 2019).

As discussed in Section 1, caregiver safety and wellbeing as a key factor in improving delivery of safe patient care. A well designed, implemented, and managed SPHM program may support progress towards or enhance a culture of patient and caregiver safety.

Table 3.2 The Importance of Assessing an Organization's Culture.

II. Worksite Assessment

Introduction

The analysis of injury data, as detailed in **Section 2**, should have identified and ranked the units and/or departments that should be a priority for SPHM program efforts. Specifically, units should be prioritized by the number or rate and severity of patient handling-related injuries.

The next step is to find out more about the patient handling tasks that have caused caregiver and/or patient injury on the priority units and identify SPHM solutions.

This involves soliciting information from caregivers, other employees, and management on priority units/departments about patient handling tasks conducted, the patient population and physical environment, staffing practices and existing SPHM equipment (if any). This is achieved using surveys and interviews followed by unit/department site visit(s) to assess patient handling tasks performed, the physical work environment, work practices, and culture.

Information to be collected in the Worksite Assessment is summarized in **Figure 3.2**.

Focusing SPHM program efforts on one or more priority units/departments helps provide direction for prioritization of program efforts and use of resources when starting an SPHM program.

However, injury data analysis may *not* yield enough information or detail to prioritize units based on the number or rate of patient handling related injuries. Conducting surveys of *a majority* or *all* units and departments where patient handling tasks are performed *before* conducting site visits can help better determine which units/departments are prioritized for on-site assessment.

Safe Patient Handling and Mobility – Section 3

The SPHM committee and program coordinator together with guidance from the program champion (with input from leadership) should make the decision to survey all units/departments or priority areas only.

Surveying *all* units or departments where patient handling tasks are performed can help to identify:

- Units/departments where the risk for patient handling-related injuries is high, but *few or no* injuries are reported, and further investigation is needed. *Also refer to Symptom surveys on page 3-14.*
- Where high-risk patient handling tasks needs to be addressed as soon as possible
- Where SPHM technology or solutions may already exist and the effectiveness of these solutions to reduce injury risk
- Planned changes to patient populations, or service lines e.g., a unit where the patient population will change and become more physically dependent thus increasing the need for SPHM technology such as powered lift systems
- Planned changes to the physical design of a unit/remodel or new build etc. For example, a unit and/or a unit that is to be remodeled or moved to another location within the facility providing an opportunity to install ceiling/overhead lift technology



Figure 3.2 Data to be Collected during Worksite Assessment.

Safe Patient Handling and Mobility – Section 3

Surveying all units also helps you gain a broader picture of the scope of patient handling activities in the facility for long term program planning purposes and ongoing efforts to prioritize SPHM program activities.

If only priority units are to be included in *Worksite Assessment* activities when starting or evaluating an SPHM program, then a strategy to investigate and address SPHM needs on other units must be determined and included in the SPHM program plan.

Considerations for selecting validated **measurement instruments** are discussed in **Section 8 Choosing SPHM Program Evaluation Tools**.

When to Conduct the Worksite Assessment

Employee and unit or department surveys are conducted before a site visit(s) to priority units/departments.

Survey data collected will help facilitate effective site-visit planning and assessment. Data gathered from these surveys can help to further prioritize which units/departments require a site visit and assessment.

Planning and communication with unit/department managers throughout the assessment process is critical for successful data gathering. Send information about the assessment process, and what you need managers to do and allow them time to gather data.

Allow sufficient time for survey data to be collected, analyzed and reviewed by the SPHM committee *prior* to the unit/department visit, to determine which locations are a priority for site assessment, and how observation of specific tasks, equipment, and work areas will be prioritized.

Who Should Conduct the Worksite Assessment?

A participatory ergonomics approach is recommended when conducting the worksite assessment. This approach focuses on engaging the caregivers who perform patient handling and care tasks and soliciting their expertise to ensure that the best SPHM solutions are implemented and are accepted by staff.

Worksite assessment should be conducted by a multidisciplinary group of employees that *includes* the SPHM program manager/coordinator together with members of the SPHM committee while working closely with employees and management from units and departments that are the target of SPHM efforts.

This approach can help:

- Provide context for observations conducted during site visits to priority units/departments
- Promote the likelihood of acceptance of SPHM solutions and program activities by caregivers, other employees, and managers
- Allow for a more effective and comprehensive identification of patient handling problems and solutions because input is solicited from a *diverse* group of employees related to the way patient care is delivered and work culture at your facility
- Provide the SPHM committee with invaluable information to assist with the development of the SPHM education and training program

Safe Patient Handling and Mobility – Section 3

- Set realistic goals for caregivers and managers about which patient handling tasks can and should be addressed immediately and in the future. Thus, caregivers understand potential limits of initial program efforts due to resources, budgetary constraints, etc., and why higher risk tasks must be addressed first followed by a plan to address all manual patient handling-related issues
- Those conducting the site visits to further develop problem solving skills/competence and build on their knowledge base
- Bring varied perspectives when identifying hazards and developing solutions/problem solving

It is important that the members of the Worksite Assessment group receive fundamental SPHM education about the hazards and risk factors associated with manual patient handling, SPHM program components and development process (**Section 2**), and SPHM technology and best work practices to reduce risk of employee and patient injury. *SPHM training resources are listed in **Section 6 Tool 6a**.*

This group should include *at least* one person with ergonomics expertise that is familiar with health care ergonomics and SPHM, together with employees that have direct knowledge of the tasks, equipment, and environments being evaluated. The group should include employees from nursing, physical/occupational therapy, and employee health and safety. It is also important to include employee representation from other patient care departments that may provide services on the unit/departments being assessed e.g., diagnostic imaging, respiratory therapy etc.

SPHM committee members from support service departments also provide valuable insight into current work processes and how they can be adapted to support SPHM program needs e.g., maintenance staff, and environmental services personnel, laundry services, and transportation etc.

Refer to **Tool 2f** for stakeholder roles within an SPHM program.

Soliciting Management Engagement in Worksite Assessment Activities

Before starting Worksite Assessment activities, ensure that the managers of the units/departments that will be evaluated, receive education about the SPHM program initiative, the importance of their engagement to the success of SPHM program development, and expectations/role in data collection and site visits.

To help managers prioritize and support SPHM efforts on their unit/department, it is imperative they understand that the purpose of SPHM activities is *not* to add more to their already busy and often challenging workload. They need to be able to understand how SPHM will assist them to address existing issues on their unit e.g., caregiver absence due to work-related injury, turnover and patient safety, and experience.

This activity helps the SPHM committee to build relationships with managers and facilitate 'buy in' for change.

However, using a participatory approach to worksite assessment may take longer because of the time required to train the assessment group and coordinate activities of multiple members.

Safe Patient Handling and Mobility – Section 3

An alternative approach is to have an SPHM/Ergonomics expert conduct *all or some* of the worksite assessment and assist with solution development. This expert may be an existing employee, or an external consultant.

External SPHM expertise can be *invaluable* especially in assisting to prioritize patient handling tasks that need to be addressed. They understand what SPHM technology will best reduce risk factors for WMSDs, is most compatible with the physical work environment, caregiver skills and abilities, and will meet the clinical goals for the patient population.

If the ‘expert’ approach is used when conducting the worksite assessment, then it is recommended that the benefits and drawbacks of this approach are carefully evaluated by the SPHM committee, program coordinator, and facility leadership.

If external SPHM expertise is used to conduct all or some of the Worksite Assessment, the SPHM committee, unit caregivers and management must remain actively engaged in the assessment, problem-solving, program implementation and evaluation process, to facilitate culture change and program success.

Tool 3i provides tips for choosing an SPHM/Ergonomics consultant to assist with SPHM program development.

Finding Ergonomics/SPHM Expertise

If you do not have internal ergonomics expertise, then your workers compensation insurance carrier, or state OSHA consultation department (if applicable) may be able to provide assistance at no cost.

External occupational health or rehabilitation clinics may have professionals who have training and experience conducting ergonomics assessments and may be able to provide fee for service assistance.

There are a few private companies that provide SPHM consulting services. Professional Ergonomics and SPHM related associations may offer a consultant’s directory (**Refer to Section 10**). Some SPHM technology vendors provide clinical consulting services. However, you do not want to commit to using (or continuing to use) a specific brand of SPHM equipment because you likely do not know what solutions will best fit your patient population, facility design etc., at this stage of program assessment and planning.

*Available courses in basic ergonomics are listed in **Section 10**.*

A. Employee Surveys and Interviews

Employee Perception Surveys

The goal of conducting employee surveys is to gain more knowledge about patient handling activities by assessing employees’ perception of risks and challenges and their ideas for potential solutions in addition to their feedback about existing SPHM technology (if applicable).

Safe Patient Handling and Mobility – Section 3

As previously discussed, you may decide to survey employees on priority units as determined by review of injury data, or survey employees in *all* units and departments where patient handling tasks are performed to help prioritize initial focus of the SPHM program.

Survey design and content vary depending on whether you are:

- i. Starting an SPHM program and have minimal or no SPHM technology at your facility, or
- ii. Are enhancing or reviving an existing program and have implemented elements of an SPHM program and technology

When starting a program, it is important to collect information from caregivers about:

- The type and frequency of patient handling tasks that they perform in their unit or work area
- Their perception of the physical difficulty or perceived risk to perform each task

Responses should be grouped by individual units or departments and then analyzed by shift to determine what and how often specific patient handling tasks are performed and ranked based on the highest to lowest perceived risk as provided by caregivers.

Tools 3b provide examples of employee perception surveys that can be used to collect this data.

A survey that can be conducted to assess staff perception of SPHM activities in an existing program or after implementation of a new program is provided in **Section 8, Tool 8b**.

How to conduct, analyze and report employee survey data is discussed in more depth in **Section 8 Evaluating the SPHM Program**.

Regardless of the survey tool used, ensure that there is an opportunity for employees to provide feedback about the ways they think manual patient handling and mobility tasks should be addressed in their work area e.g., use of open-ended responses.

Symptom Survey

Conducting a symptom or discomfort survey for WMSDs, in addition to the employee perception survey, can be valuable in identifying instances of discomfort, pain, or disability that may be linked to workplace activities, such as patient handling.

Symptom surveys can help prioritize hazard analysis when injury data is unclear or underreported. For example, they can reveal if high-risk patient handling tasks in certain units lead to symptoms of WMSDs despite few reported injuries.

Symptom Survey for Work-Related Musculoskeletal Disorders (WMSDs)

Commonly used symptom/discomfort surveys are based on the Nordic Musculoskeletal Questionnaire (NMQ) that was developed from a project funded by the Nordic Council of Ministers. The aim was to develop and test a standardized questionnaire methodology allowing comparison of low back, neck, shoulder, and general complaints for use in epidemiological studies. The tool was not developed for clinical diagnosis. (Crawford, 2007).

Safe Patient Handling and Mobility – Section 3

Symptom Surveys typically include nature, onset, location, timing, duration, and severity of MSD symptoms, what work activities employees perceive contributed to any symptoms noted, and how these symptoms could be prevented. A body map can be included so that employees can illustrate their discomfort.

NIOSH recommends administering surveys that are anonymous, voluntary, and completed on work time. Rank-order the frequency and severity of complaints for each body part and then average this data for each department and/or job. Out of respect for workers' personal information, use surveys only if the company/employer is prepared to act on the results. (NIOSH, 1997)

An example of a symptom survey and related resources are provided in **Tool 3c**.

Employee Interviews

Employee interviews can be conducted before or during the site visits to *priority units* based on scheduling preferences by the unit manager and the Worksite Assessment group.

Interviewing employees independently from management can facilitate open discussion about:

- Current practices related to patient handling tasks
- Whether existing SPHM technology is used or not and why
- What SPHM technology is needed
- Unit culture and
- Potential *barriers* and *facilitators* to implementing a SPHM program on a unit

Interviews can be used to verify and clarify information that has already been gathered prior to the site visit.

Gathering perspectives from employees with different service lengths and shifts, including unit managers, assistant managers, specialty practice leaders, clinical educators, and charge nurses, provides more accurate assessment of patient handling needs.

Including employees from other departments who provide patient care services, such as physical and occupational therapists and diagnostic imaging technicians, will help you understand how and when they handle and mobilize patients. This inclusion will also provide insights into their knowledge of SPHM protocols, how they collaborate with other unit staff and potential barriers to implementing SPHM solutions related to their patient care duties.

Employee Focus Groups

Another method to gain employee input about the SPHM program and facilitate readiness for change is to conduct focus groups. This can be used as an opportunity to engage and solicit input from all stakeholders (**Refer to Section 4**) or a specific group of stakeholders such as nursing and therapy staff, who will be impacted by the SPHM program. It can also be a useful way to gauge employee enthusiasm or buy-in for planned or existing SPHM program activities.

Safe Patient Handling and Mobility – Section 3

Schedule groups so that employees on all shifts have an opportunity to participate. Arranging in-person lunchtime meetings with boxed meals, while providing caregivers and other employees with the option to participate via video conference as necessary, may further facilitate attendance.

Determine what information you want to gather and have specific questions or discussion points to review with the group. Communicate the goal of the meeting and provide a brief presentation on SPHM and the program goals and activities that you are planning to conduct or implement etc.

It is also a good opportunity to communicate realistic expectations about the scope of SPHM solutions and program activities that a facility may or may not be able implement immediately.

This type of activity can also be used to check in with employee groups during program implementation and evaluation.

B. Manager Survey of Unit/Department Characteristics

Data about patient characteristics, the physical environment, staffing practices and any existing SPHM equipment should be gathered from each priority unit prior to the site visit. This will help plan and facilitate site visit activities.

As previously discussed, it may be beneficial to collect this data from *all* units and departments where patient handling tasks are performed to identify other units/departments that should be included in site evaluation.

Surveying all units/departments also provides a more comprehensive inventory of SPHM technology that may exist, a broader view of the patient population characteristics within the facility and help with future program planning activities. **Tools 3d and 3e** details the information that should be collected from each priority unit.

Having unit and department managers complete this survey facilitates their engagement and collaboration in SPHM program development and implementation. The information to be collected is summarized in **Table 3.3**.

Manager Survey - Unit/Department Characteristics

Information to be collected includes:

- Patient characteristics - diagnosis, physical and cognitive characteristics, and ability to mobilize including demographics about patients of size
- Census, admit, discharge, and transfer data
- Staffing characteristics – by shift; license status; skill mix; turnover
- Physical characteristics – number of patient rooms; beds per rooms; storage and space constraints for patient care tasks & use of portable equipment
- Patient assessment protocols used to determine mobility status and decision making for use of SPHM technology

Manager Survey - Unit/Department Characteristics
• The unit/dept. manager's perception of high-risk patient handling tasks, SPHM, and the use of SPHM technology (if available) by staff i.e., what is working well and any barriers • Planned changes to the patient population, staffing, and physical design of a unit • SPHM equipment inventory ○ The type of SPHM technology or assistive device; quantity; weight limit; condition; and frequency of use • Interactions with other units/departments in the facility such as rehabilitation, perioperative services, diagnostic imaging, transportation etc.

Table 3.3 Summary of a Manager Unit/Department Survey.

C. Review of Additional Data Sources

Reviewing other data such as patient safety and quality can offer valuable insight into patient safety trends that can inform SPHM program development and evaluation.

Risk management and/or patient safety and quality departments may be able to help identify relevant data such as patient falls related to manual mobilization activities; pressure injuries that may be attributed to lack of in-bed repositioning and mobility; and/or poor patient experience data related to missed mobility tasks etc.

Determining where patients of size e.g., over 300 and over 600 lbs. are typically admitted, their mobility needs, frequency of admission, and length of stay may be verified through the Manager Survey. However, evaluation of Electronic Health Records may provide a system-wide view that will be needed when determining SPHM technology needs for patients of size. Work with Information Technology to determine if this data can be provided.



Did You Know?

Find out if your organization participates in surveys that may provide useful information about patient experience, care, and safety at your facility such as the:

- **Consumer Assessment of Healthcare Providers and Systems (CAHPS)**
<https://www.ahrq.gov/cahps/index.html>
- **AHRQ Patient Safety Culture™ (SOPS®)**
<https://www.ahrq.gov/sops/index.html>
- **AHRQ SOPS® supplemental items related to workplace safety**
<https://www.ahrq.gov/sops/index.html>
- **National Database of Nursing Quality Indicators (NDNQI).** Some hospitals track and report various nursing-sensitive quality indicators to this national database.
<https://info.pressganey.com/press-ganey-blog-healthcare-experience-insights/your-comprehensive-guide-to-the-press-ganey-national-database-of-nursing-quality-indicators-ndnqi>

Safe Patient Handling and Mobility – Section 3

D. Site Visit of Priority Units/Departments

The Goal of Conducting a Site Visit

Site visits assist the Worksite Assessment team (and the SPHM committee) to ‘fill gaps’ or expand their understanding about information collected from the review of injury data and existing SPHM related policies, the gap analysis, employee and manager surveys and other data sources.

Use all data collected so far to identify priority units and/or departments for site visits, along with specific patient handling tasks and activities that require assessment.

These units/departments will be part of initial SPHM program efforts if you are starting a program, or where SPHM program activities need to be improved in an existing program.

The goals of a site visit are to:

- Evaluate high risk patient handling tasks that were identified from the review of data and determine hazards or risk factors that need to be addressed.
- Continue to prioritize handling and mobility tasks that need to be addressed based on the level of risk.
- Identify any other existing or potential conditions or hazards associated with patient handling tasks that may increase the likelihood of caregiver and patient injury e.g., patient characteristics such as risk of violence, and work tasks, point-of-care work, clinical or nursing practices and procedures, that may increase risk of injury.
- Assess the physical workspace where patient handling tasks are performed, storage and access to equipment and other potential work environment issues that may impact the safety of patient handling.
- Verify the inventory and working condition of SPHM technology.
- Identify SPHM technology and ergonomics work practices that will address the hazards and risks associated with patient handling tasks.
- Identify organizational culture and processes and factors that may facilitate or impede implementation of SPHM technology and related processes on a unit/department.
- Continue to solicit employee engagement through one-to-one conversations with individual caregivers and their ideas about potential SPHM solutions to minimize caregiver and patient risk of injury and to prepare them for change (*Refer to Employee Interviews*).
- Start collecting basic information about the knowledge, skills, and abilities that caregivers need to perform patient handling tasks which will provide a foundation for development of SPHM education and training programs.

When to Conduct a Site Visit(s)

Site visits should be conducted during the planning phase of a new SPHM program or when enhancing an existing program, and then periodically as part of a proactive approach to hazard prevention.

Safe Patient Handling and Mobility – Section 3

After completing *initial* site visits to priority units/departments and analyzing data collected as described in this Section, you can determine if additional visits are needed to gather more information to support SPHM solutions development. This includes visits to trial specific SPHM solutions (**Refer to Section 7**).

Site visit and assessment can also be used as part of the investigation process following a patient handling related incident to help determine if specific work practices or procedures, the physical design and/or maintenance of the work environment and/or SPHM technology etc., contributed to the event, and can be changed to prevent future incidents etc.

Who should Conduct a Site Visit(s)

Members of the multidisciplinary team who are performing the SPHM Worksite Assessment together with a person(s) with ergonomics/SPHM expertise should conduct the assessment of priority units/departments. *Refer to 'Who Should Conduct the Worksite Assessment?' on page 3-11.*

Having members with differing professional expertise involved in the site assessment process can provide broader insight into the work area being reviewed. In addition, committee members who may not provide direct patient care, can become familiar with the worksite from a safety perspective and gain insight into employees' perspectives about SPHM needs.

Preparing for a Site Visit(s)

Scheduling the Visit

- Coordinate with unit and department managers to discuss the purpose of the site visit and schedule the assessment.
- Follow your organization's process to gain permission to observe patient handling tasks and ensure HIPPA compliance. Your SPHM program champion and unit/department managers can provide guidance.
- When scheduling a site visit, consider the best time for accessing all areas of the unit or department and interviewing employees. Prior to the visit, provide the manager with a schedule of assessment activities and any materials needed to prepare the unit or department for the visit.
- Determine if the site visit team will assess all priority units or departments, or if the team should divide into smaller teams and be assigned to a specific unit(s)/department(s). Having a small group (e.g., 2-4) conducting the site visit is the least disruptive when assessing busy work areas such as an intensive care unit. Work with unit/department management to determine the size of the site visit team.
- Discuss protocols for observing patient handling tasks and interacting with patients with the unit manager and determine who from the unit/department can accompany the site visit team to answer questions and facilitate activities. This person should be knowledgeable about the unit, patient population, and workflow, etc. For example, a SPHM coach or peer leader (as applicable) on units with an existing SPHM program.
- It is recommended that at least one member of the site visit team is familiar with the work area being reviewed, as well as the patient population and tasks being observed, to expedite the assessment process. Such individuals can provide valuable insights into procedural activities and

Safe Patient Handling and Mobility – Section 3

ensure a comprehensive review of the workspace.

- Scheduling formal employee interviews to be conducted during the visit should be arranged unit/department management prior to the visit. Ensure there is a process to relieve those employees who the site assessment team want to interview.
- Schedule the site visit during times when the high-risk patient handling tasks to be observed are more likely to be performed e.g., rehabilitation tasks, wound care tasks, or specific clinical procedures that are more likely to be performed at certain times on a day shift.
- Conducting the assessment during *all shifts* also helps to engage employees and will highlight variations in work tasks and demands, and procedures. This will also help the site visit team gain a broader understanding of the unit and its culture.
- The length of a site visit will vary and be guided by the manager's input; site visit team members availability; and the assessment activities to be performed during the visit.
- Site visit team members should review all unit/department specific data collected prior to the visit (e.g., injury and incident data, employee, and unit survey data) before conducting an assessment.
- Before the visits, ensure the site visit team reviews the 'Site Visit Assessment checklist' (*Tool 3f*) and make necessary additions based on data already collected and/or recommendations from team members.
- Developed a concise plan that details the schedule of activities during the site visit including the patient handling tasks to be observed and work areas to be evaluated.

Team members must have a clear understanding of how site visit activities and observation of patient handling tasks will be performed. It may not be possible to have more than 1 – 2 team members observe a single patient handling task at one time due to patient privacy concerns and workspace limitations.

It may be necessary to visit a unit/department more than once to gather required information e.g., additional visits may be needed to ensure all high-risk patient handling tasks are observed.

The site assessment should be conducted without assigning fault or blame for patient handling-related or safety hazards that may be found. The process should be considered as an opportunity to address hazards and improve the environment using a systems approach.

Conducting a Site Visit(s)

Opening Conference

Start the visit with an opening conference between the site visit team and the unit manager and other designated staff who will assist the team during the visit.

Introductions should be made, and goals and activities of the visit confirmed based on earlier communication with the unit/department manager.

The following should be discussed and verified.

- Information obtained from the pre-site visit data collected. This includes confirming characteristics of the patient population including patients of size, and patients who are

Safe Patient Handling and Mobility – Section 3

cognitively impaired; patient handling tasks to be evaluated; staffing details, and planned changes to the patient population/service line and/or the physical location.

- Use of existing SPHM technology and reasons for non-use (if applicable), and if there are plans to purchase SPHM technology (for what purpose, type, and quantity).
- How a patient's mobility status is assessed and if a standardized assessment tool is used by nursing and physical and occupational therapy. If a tool(s) exists, when is a mobility assessment conducted and how is a patient's mobility status is communicated and documented between disciplines. Are the tool and communication processes etc., used accurately and consistently. If not, why? *SPHM patient assessment tools are discussed in **Section 5**.*
- Information such as room assignments by patient dependency e.g., total care; clinical acuity and diagnosis, physical and/or cognitive criteria. This can be helpful when choosing ceiling lift location and accessible storage for other SPHM technology.
- Communication processes used and their effectiveness, e.g., change of shift handover protocols; staff huddles; after incident review (patient or employee related); nursing team meetings, display boards, unit newsletters., etc. This will help to identify communication methods that will help when implementing the SPHM program etc.

Employee input about the above unit/department characteristics should also be solicited during the visit.

Following the meeting, a designated unit staff member or the unit manager should lead the site visit team on a tour prior to observing patient handling tasks and assessing the physical environment.

This allows the team to become familiar with the physical space as well as gain a better idea of the design, flow, and overall goals/activities of the unit and location of patients (e.g., room number), that they may observe.

Observing Patient Handling Tasks

The goal of observing patient handling tasks is to identify and determine the root cause of risk factors for WMSDs such as excessive lifting, awkward postures, repetitive movements, and other hazards that may contribute to both caregiver and patient injuries during mobility-related activities.

Determining the root cause of risk factors is essential for determining SPHM solutions. A summary of hazards and risk factors that should be considered when observing patient handling and mobility tasks is provided in **Table 3.4**.



Quick Tip

The following tools can be used to guide assessment activities:

3b. Employee perception survey

3d. Manager Survey of unit/department characteristics

3e. SPHM technology inventory survey

3f. Site visit assessment checklist

Section 10 for other relevant resources

Observing Patient Handling Tasks – A Summary

Physical Risk Factors

- Forceful exertion associated with lifting, pushing & pulling, carrying, and gripping
- Awkward postures
- Sustained or static postures
- Unstable or unbalanced postures
- Repetitive movement
- Exposure to environmental factors such as vibration, extreme heat or cold
- Overall duration of exposure to the task i.e., number of times a caregiver may perform the observed task(s) in a shift and if the same task(s) is performed every shift or occasionally.

Work Practices to be Observed

- Use of pre-task mobility assessment or check or information about a patient's mobility status to determine how the task is to be performed
- The number of staff performing the task and if sufficient for the task
- Availability of assistance from other caregivers if needed
- Environment prepared to reduce hazards
- Communication between caregivers and how well the task was coordinated
- Communication between the patient and caregiver(s)
- Soliciting patient assistance as much as possible
- Use of SPHM technology (if available) and appropriateness for task, and if used correctly
- The caregiver wears inappropriate footwear and clothing e.g., clothing that restricts movement, footwear with poor traction
- Caregiver lacks knowledge or training

The Physical Environment

- Physical layout of the room or work area e.g., caregivers' access to three sides of a patient's bed, and/or chair and toilet; other space limitations e.g., lots of equipment, clutter, etc.
- Access and clearance to patient surfaces if lift equipment is being used
- Slip, trip, and fall hazards such as wires and wet floors
- Poor lighting

Also refer to 'Assessing the Physical Environment'

The Patient

- Level of ability to assist during mobilization and reasons for any limitations to provide assistance and ability to mobilize e.g.,
 - Clinical condition/diagnosis and physical limitations such as pressure injuries; risk of falling; body size, sensory limitations etc.

Safe Patient Handling and Mobility – Section 3

Observing Patient Handling Tasks – A Summary

- Cognitive issues such as confusion and dementia
- Language and cultural differences
- Client anxiety and fear of moving
- Pain
- Medical attachments to client
- The patient's experience during the patient handling task. If feasible, ask the patient if they felt safe and comfortable during the task

Table 3.4 Summary of Activities Observed when Assessing Patient Handling Tasks.

The following approach is recommended when observing patient handling tasks.

- Observe a specific patient handling task such as turning and boosting in bed as *many times* as possible with *different* patients.
- If feasible, observe a *variety* of caregivers performing a specific high-risk patient handling task with the *same* patient e.g., a stand pivot transfer.
- This will give the assessment team a broader 'sense' of risk factors and provide insight into the variation of work practices, i.e., identify poor and better work practices and procedures that caregivers use when performing patient handling tasks.
- Ask caregivers questions to clarify process and techniques *immediately* (if feasible) after you have just observed them performing patient handling tasks.
- Capture the frequency that each task is performed and if, and how, tasks are performed differently from shift to shift. This information can be compared to data captured from the employee survey and further investigated for any discrepancy reported.
- If feasible observe high-risk patient handling tasks being performed with patients of size and with those who are cognitively impaired to identify differences in work practices/use of SPHM technology (as applicable) when handling these patients as compared to handling of other patients.
- Determine the root cause of physical risk factors observed and poor work practices.
- Discuss specific ideas to improve patient handling tasks and activities that were gathered from previous SPHM employee surveys, focus groups, and other interviews (as applicable) with caregivers to gauge interest and feedback.
- Ask caregivers if there are patient handling tasks that are missed during a shift and if so, find out more about which tasks are missed and why e.g., ambulation from bed to chair, and repositioning in bed.
- Document observations, including potential solutions as observations are conducted e.g., SPHM technology including the type and size of slings that might be needed, work practice solutions etc.

Safe Patient Handling and Mobility – Section 3

- Observe workflow throughout the task to identify root cause of any inefficiencies observed. For example, delays in gathering supplies, SPHM technology (if used) and caregivers to perform the task; having too many caregivers performing a task; time-consuming task elements etc.

Solicit information from the following employee groups if present during the visit:

- Assistant nurse managers, specialty/clinical practice leaders and clinical educators as applicable, to gain their perspectives on patient handling needs, unit culture, education, and training processes, etc.
- Service providers such as physical therapists and diagnostic imaging technologists providing patient care services (therapeutic/diagnostics), to gain their perspectives about patient handling related risks challenges and potential solutions on the unit. Rehabilitation therapists should be interviewed to gain their perspective on safe and early mobilization of the patient population, effectiveness of mobility assessment protocols, experience, and views on use of SPHM technology, and their relationship with nursing staff related to patient care and rehabilitation needs.
- Physicians should also be engaged to gain an understanding of their perspective of patient care and mobility needs and clinical challenges that SPHM may be able to help address etc.
- Support or ancillary employees such as environmental service employees can share information about cleaning protocols, clean and dirty linen handling etc.
- Transporters (if they exist) can provide insight into the patient handling tasks and challenges they may have when transporting patients to and from the unit/department.

If it is not feasible to gain information from the above employee groups during the site visit, you can do so later as you will work with these groups (and others) when you develop and implement your SPHM program plan.



Quick Tip

The patient handling tasks and associated work practices that create the highest risk of injury to employees have been clearly defined by over 20 years of research (*Refer to Section 1*). Therefore, when starting or evaluating an existing SPHM program it is not usually necessary to *quantify* the level of risk for WMSDs using ergonomics analysis tools. However, there are some situations when formal ergonomics analysis of patient handling tasks should be conducted. This is discussed on page 3-28.

Assessing the Physical Environment

Information collected during assessment of the physical environment is summarized in **Table 3.5**.

Tool 3f provides a detailed list of physical characteristics in a patient care area that should be assessed.

Make sure that the team captures reasons for lack of use of any SPHM technology that is available on the unit/department and suggestions to increase use by caregivers, managers, and the site-visit assessment team members.

Remember before purchasing SPHM technology and implementing a program, further review of the physical environment needs to be conducted to ensure technology will 'fit' and can be safely and easily be used in a unit/department. **Refer to Sections 5 and 7.**

Assessing the Physical Environment – A Summary of Information to be Collected

Confirm and update the information collected from the Unit survey about:

- Existing SPHM technology:
 - Type, brand, model, and quantity
 - Weight capacity
 - Condition
 - Accessibility
 - Use
 - Cleaning instructions that are clear and concise
 - Instructions for use that are easily accessible
 - Who repairs and maintains equipment and the process
 - Sling management if applicable
- Patient rooms: number of beds; size and configuration

Review

- Availability and accessibility of storage location(s) and capacity to house SPHM technology including lifts and accessories such as slings.
- Availability and location of power sources (outlets and batteries) for equipment.
- Physical characteristics of patient rooms, treatment areas and where transportation of patients occurs e.g., to and from a unit.
 - Structural, furniture and equipment issues that impede use of SPHM technology:
 1. That is already available in the unit/department
 2. May be purchased in the future

This includes:

- Ceiling characteristics (height, approximate space available for a lift track system over and around the patient's bed)
- Location of HVAC vents/TVs/sprinklers/lights/headwalls/storage cabinets etc)
- Hazardous materials located above the ceiling (e.g., asbestos) or in the walls (e.g., lead in paint, asbestos) if known.
- Toileting, showering and bathing facilities including design and capacity of commodes; height of toilet seats and if wall mounted
- Location of grab rails in bathrooms, toilets, or corridors
- Flooring - thresholds, coverings, changes between surface coverings
- Ramps
- Clearance through doorways on a unit and into, and within, a patient room or treatment area
- Clutter, limited space and access to working areas

Assessing the Physical Environment – A Summary of Information to be Collected

- Physical characteristics of beds, stretchers, treatment surfaces, and chairs, including commodes, wheelchairs, bedside chairs, recliners etc.
 - Height if fixed
 - Height range if adjustable.
 - Adjustable features e.g., head raises, beds that convert to chairs or tilt to stand, reclining chairs etc. Note if adjustment mechanism is powered, hydraulic assist or manual
 - General physical/working condition of features and controls including casters on mobile equipment
- Clearance under surfaces e.g., beds etc and around/under chairs
- Make and model of typical beds, stretchers and chairs used. Note specialty bed use e.g., Posey® and sand beds.

Table 3.5 Information to be Collected During Assessment of the Physical Environment.

Closing Conference

Once the observation period is completed, a closing conference or post-visit discussion can be conducted with the unit manager and key staff to summarize and verify the information collected and review the next steps. This can include discussion about SPHM technology and related processes that could be used to address existing patient handling-related hazards and the manager's response to these suggestions from the team.

The feasibility of the unit/department to be a potential *pilot site* for SPHM program implementation or enhancement of an existing program should also be discussed. Document the manager's and staff response including concerns and potential barriers.

Note that throughout the site visit the assessment team are gaining an understanding of the unit/department culture and identifying factors that support or hinder implementing a SPHM program on the unit/department. *Choosing a Pilot Unit(s) for SPHM implementation is discussed in Section 7.*

It is also important to manage employee and management expectations during and after the visit so that the unit does not anticipate immediate action and SPHM-related activities that may not be feasible for the organization to complete at that time.



Quick Tip

Document potential SPHM-related solutions and ideas identified by site visit team members and unit/ department employees as the assessment is completed while ideas are fresh.

If there are any safety related hazards or issues that need to be addressed immediately, discuss these with the unit/department manager (and/or shift charge nurse or supervisor as needed) during the visit. Follow your facility protocol for reporting and addressing urgent safety hazards.

Safe Patient Handling and Mobility – Section 3

After a Site Visit(s)

Arrange a debrief for the site-visit team(s) immediately after the unit/department assessment to capture and discuss ideas about SPHM needs while the information is fresh.

Summarize information collected and identify and prioritize patient handling tasks and situations that should be addressed e.g., consider injury risk factors observed (to employees and patients), the frequency that tasks are performed, and input from employees and management. Discuss potential SPHM technology solutions that may be best for the unit/department about the physical, cognitive, and clinical needs of the patient population and the physical design characteristics of the location etc.

Formal problem solving and solution development will be conducted by the Worksite Assessment team and SPHM committee (**Steps 7 and 8**).

Provide a summary report of the site assessment to the unit/department manager. This can also be used by the SPHM committee for problem solving activities described in **Section 8**.

Conducting Ergonomics Evaluation to Quantify Risk Factors for WMSDs

Formal ergonomics analysis is useful to evaluate:

- Hazards related to patient handling tasks that were observed during site assessment visit(s) and need further quantification to assist with prioritizing tasks to be addressed.
- Potential risk of WMSDs when new patient care tasks or processes are developed, and to quantify reduction of injury risk after implementing a new SPHM protocol or practice. For example, pre- and post- ergonomics analysis when implementing a process to prone a patient using different SPHM technology such as, a floor lift versus friction reducing sheets.
- Patient care tasks and workspaces that are to be created as part of a remodel or new building project where ergonomics design elements are proactively integrated in design concept phase and analysis is conducted during mock-up phase of new workspaces. Thus, eliminating or minimizing risk of injury to employees and mitigating risk of employee error when performing care tasks. *Refer to **Section 9** for information about proactive design.*
- Patient care tasks and workspaces after remodel or new build to determine if new risk factors for WMSDs (and other safety related hazards) were created inadvertently and need to be addressed. This can happen when ergonomics is not considered during design and construction planning.
- Effectiveness of SPHM technology to reduce risk of WMSDs when conducting trials of new SPHM technology including evaluation of different SPHM technology to reduce the risk of employee injury when being used for a specific patient handling task (**Refer to Section 5**). For example, evaluating force required to transfer a patient in a supine position to/from bed to stretcher when using assorted designs and/or brands of friction reducing devices such as air-assist mats and slippery sheets.

Formal ergonomics evaluation involves identifying and carefully evaluating the sequence of job steps that are required to complete a task, the physical and cognitive effort required, the tools and equipment used, and the physical environment where the task is performed, to determine the risk of WMSDs.

This detailed information can also be used to develop comprehensive employee job descriptions that include the essential physical requirements of a job that aid in the organization's hiring process.

Safe Patient Handling and Mobility – Section 3

Additionally, health care providers and employers can use this data to determine if, and when, an employee is able to return to work and safely perform their duties following an injury that required time away from work. *'Return to Work' programs are discussed in Section 7.*

Lastly, ergonomics evaluation can support development of the SPHM education and training program e.g. defining Knowledge, Skills, and Abilities (KSAs), that caregivers need to perform patient handling tasks using SPHM technology (*Refer to Section 6*).

Conducting Ergonomics Evaluation to Quantify Risk Factors for WMSDs

There are several validated **ergonomics analysis tools and methods** that can be used to assess MSDs injury risk to caregivers when performing patient handling tasks.

The following is a list of some of the tools that are more commonly used to evaluate the risk of WMSDs associated with patient handling and other tasks involving lifting, pushing, pulling, and carrying.

- **Rapid Entire Body Assessment (REBA)** Sue Hignett and Lynn McAtamney, Rapid entire body assessment (REBA); *Applied Ergonomics*. 31:201-205, 2000.

REBA is a validated postural analysis tool for estimating the risks of WMSDs. It is designed to be sensitive to the type of unpredictable working postures found in health care and other service industries.

A REBA assessment can be used quickly and systematically to assess body postures, forces used, types of movement or action, repetition, and couplings or hand holds to determine the degree of injury risk for a task via a scoring system (negligible, low, medium, high, or very high).

It can assist to determine root cause of risk factors and be used to quantify change in risk factors for MSDs before and after an ergonomics intervention is implemented.

Cornell University Ergonomics Web - Workplace Ergonomics Tools REBA

<https://ergo.human.cornell.edu/ahREBA.html>

The 'REBA app' is also available from the Apple IOS store.

- **Physical Job Evaluation Checklist - Washington State's Department of Labor & Industries (L&I) SHARP (Safety & Health Assessment & Research for Prevention)**

The purpose of the Physical Job Evaluation Checklist is to help identify aspects of the job that pose a risk for back, shoulder, hand/wrist, and knee injury, and prioritize injury prevention efforts by identifying the jobs or the aspects of the job that pose the greatest risk of injury. The Checklist is customized for various industries including health care and social assistance.

The interactive checklist can be downloaded from <https://lni.wa.gov/safety-health/safety-research/ongoing-projects/identifying-risks-wmsd#physical-job-evaluation-checklist>

- **The Physical Job Evaluation Checklist User Guide Health Care and Social Assistance. July 2017 SHARP Publication No. 40-21-2017** can be downloaded from <https://lni.wa.gov/safety-health/safety-research/files/2017/PhysJobEvalChecklistHealthcare.pdf>

Conducting Ergonomics Evaluation to Quantify Risk Factors for WMSDs

- **Manual handling of people in the healthcare sector: Technical report ISO/TR 12296: Annex A**, provides examples of other tools that can be used for risk assessment of manual patient handling tasks. <https://www.iso.org/standard/51310.html> (requires purchase)
- **The Revised NIOSH Lifting Equation** can be used to assess risk of low back disorders associated with *manual lifting* tasks that involve lifting and lowering. NIOSH [1994]. *Applications manual for the revised NIOSH lifting equation* <https://www.cdc.gov/niosh/docs/94-110/>

The Revised NIOSH Lifting Equation (RNLE) Applications Manual guides users on how to use the RNLE.
https://www.cdc.gov/niosh/ergonomics/about/rnle.html?CDC_AAref_Val=https://www.cdc.gov/niosh/topics/ergonomics/nlecalc.html

The RNLE is also available on an app (from Apple IOS store or Google play store) together with the composite lifting index (CLI) that can be used to calculate risk for multiple lifting tasks <https://www.cdc.gov/niosh/topics/ergonomics/nlecalc.html>
- **Liberty Mutual Manual Materials Handling** website provides tools to calculate risk associated with *materials handling* tasks involving lifting, lowering, pushing, pulling, and carrying. <https://libertymmhtables.libertymutual.com/>

Wearable sensor technology is increasingly being used to conduct direct biomechanical evaluation of body posture and movements used and forces exerted during patient handling and care tasks.

This method of ergonomics analysis increases accuracy of assessment techniques and improves overall efficiency. Data gathered helps objectively predict injury risk, and guide workplace or process improvements. (AIHA, 2024; Stefana et al., 2021; Bootsman et al., 2019).

This technology can also enhance occupational injury management by improving the accuracy of assessments regarding physical job demands and functional capacity evaluations, which can support worker accommodation following injury (Smith, 2018).

Future AI will be able combine workers compensation analytics data with employee specifics measurements and risk to predict the impact of solutions on future losses (Smith, 2018).

*More information about Ergonomics analysis tools is provided in the **Section 10 Resources**.*

Users of ergonomics analysis tools should be trained to select the appropriate tool to evaluate a task, use it correctly to ensure accuracy in data collection and analysis, and understand its limitations. For example, the NIOSH lifting equation is not suitable for evaluating tasks that involve certain conditions such as, lifting/lowering with one hand, and lifting/lowering while seated or kneeling, or unpredictable movement of the object being handled. Thus, it is *not* suited to evaluate patient handling tasks that involve a lifting motion due to numerous variables and unpredictable conditions (Waters et al., 1994; Waters, 2007).

Step 7

Analyze and prioritize survey and site visit data

Once the initial site visit(s) of priority units/departments are completed, the Work Assessment team and SPHM committee will need to summarize their findings and together with all other data gathered (e.g., injury/incident and cost data, gap analysis findings, employee and unit survey information, and patient safety related data), identify and prioritize areas of concern/risk, program needs and gaps, and where SPHM program efforts are to be directed overall.

Tool 3g provides a template to summarize hazard assessment activities.

When completing this step consider the following:

- **Determine** if there is more unit/departments specific information that is needed to address gaps in data. This should be collected as soon as possible.
- **Identify** the patient handling and mobility tasks that require attention or intervention.
- **Identify** the root causes of risk factors associated with patient handling tasks identified and any other hazards observed, by generating a list of reasons that contribute to or are the source of issue. Using quality improvement tools such as a fishbone/Ishikawa diagram to help map the cause-and-effect of hazards identified.
- **Rank or prioritize** patient handling and mobility tasks by the risk of injury or potential harm to caregivers and patients. Data from patient handling incidents, employee perception surveys, and task observations can inform this process (**Refer to Tool 3g**).

If ergonomics analysis of patient handling tasks is completed, then use the magnitude score or risk level of risk factors for WMSDs to help you rank tasks. For example, a very high score from analysis using the REBA tool (*Refer to Ergonomics Tools in this Section*) indicates that risk of injury is high and risk should be addressed immediately.

- **Consider the consequence** if a manual patient handling task is not addressed i.e., the likelihood of that task contributing to or facilitating a negative or adverse event for employee and/or patients, and the *severity* of the outcome if this event occurred. Injury claims data can help determine severity e.g., number of patient handling related injuries with lost workdays; the number of days lost per injury and associated workers compensation costs and indirect costs (**Refer to Section 2**). Patient safety and experience data may assist if related to manual handling activities that are associated with negative patient outcomes (*Refer to 'C. Review of Additional Data Sources' on page 3-17*).
- When prioritizing tasks, consider tasks performed with dependent patients first, i.e., those who provide little or no assistance when being mobilized, and the frequency that those tasks are performed. For example, repositioning a patient in bed is a frequently performed task in an intensive care unit (ICU). If this task is performed manually, evidence supports that it



Quick Tip

The Institute for Healthcare Improvement's 'Quality Improvement Essentials Toolkit' includes freely available tools and templates you can use to assist with problem solving activities.

<https://www.ihl.org/resources/tools/quality-improvement-essentials-toolkit>

More problem-solving tools can be found in Section 10.

Safe Patient Handling and Mobility – Section 3

creates a high risk of injury to nurses and aides etc. Additionally, the friction and shear that occurs may contribute to hospital acquired pressure injury in patients. Consider the consequences for the patient if this task is not performed as often as it should be because caregivers find it too physically challenging, and/or there is insufficient staff to complete the task e.g., when manually repositioning a patient of size who is immobile.

Consider patient handling and mobility needs for Bariatric patients and/or other patient populations that may be more challenging to move due to their diagnosis and/or clinical treatment protocols e.g., ventilated patients, patients on ECMO, patients with higher likelihood of aggressive behavior etc.

After evaluating all data gathered and prioritizing patient handling tasks, the SPHM committee should summarize findings to highlight areas of concern, risks, and program gaps. This will guide SPHM problem solving efforts described in **Step 8 (Section 4)**.

Table 3.6 provides an example of a risk assessment summary and outlines the work or task, culture and program related elements that should have been evaluated and identified as needed to implement an effective SPHM program.

Risk Assessment Summary Work or Task, Culture and Program Related Elements		
Patient Handling: Work and Task Characteristics • Unit/Department(s) • Job categories/titles of employees at risk • Type and frequency of patient handling tasks performed • Job tasks/activities/point of-care work practices where patient handling activities occurs • Characteristics of patients needing assistance with mobility • Characteristics of the physical environment • Risk factors for WMSDs, other employee injuries and patient harm • Caregiver competencies e.g., related to work practices when performing patient handling tasks • Types of patient handling activities associated with	Culture-Related • Culture-Related • Management leadership i.e., organizational/safety culture • Within senior leadership, within high-priority units/depts., and between professional disciplines such as nursing and rehabilitation. Consider unit-level work organization: job demands, overtime, staffing, supervisor support for safety, teamwork, employee training, competence, and employee involvement in other program initiatives and procedural changes. • Employees participation-employee perception of patient handling and knowledge of risks and prevention processes etc.	Program-Related • Hazard identification/assessment processes identified • Hazard control and prevention (Addressed in Sections 4 & 5) <i>Engineering Controls</i> – SPHM technology available and if used (compatibility to patient handling tasks/patient needs/physical environment; accessible; quantity; working condition etc.) – Patient handling-related workflow between units/departments – Support processes for the management of SPHM technology e.g., infection control; maintenance; logistics services etc. – Procurement process for SPHM technology

Safe Patient Handling and Mobility – Section 3

Risk Assessment Summary Work or Task, Culture and Program Related Elements		
employee injuries, discomfort, near miss incidents; the nature and severity of employee injuries reported and associated incident rates • Direct costs of injuries and indirect costs • Operational costs related to patient safety if measurable	• Written SPHM policy & procedures (if any) (Addressed in Section 4) • SPHM program management structure/organization • Communications structure (Addressed in Section 4) • Potential barriers and facilitators to program implementation and sustainability and overall readiness of the organization and individuals for change	<i>Administrative and Work Practice Controls:</i> – Incident reporting – Patient mobility assessment protocols – Unit-based support for SPHM e.g., coaches or peer champions – Incident response/ investigation & post incident procedures – Post-injury support of injured employees/ injury management – Proactive safety activities to identify potential hazards that may cause employee injuries (worksite audits, facility design -related) – Education & training (Addressed in Section 6) – Ongoing program evaluation, improvement, and sustainability

Table 3.6 Example of a Risk Assessment Summary.

Assessing Readiness for Change

As the SPHM committee is prioritizing needs and developing solutions, they should evaluate the organization's readiness for change i.e., to implement and sustain an SPHM program. Solicit input as needed from other stakeholders outside of the SPHM committee who are or will be impacted by the SPHM program including other senior leaders and mid-level managers.

Ensuring readiness prior to beginning the finalization and implementation of the SPHM program plan, eliminates potential time and resources wasted, and further identifies gaps in the safety culture and organizational structure that may need to be addressed.

This process begins when completing the Gap Analysis (**Tool 3a**) and continues as you develop SPHM solutions and identify barriers to implementing the program.

Determining the organization's readiness to change includes evaluating the readiness of the C-suite leadership, management of all unit/departments and employees that will be involved in the SPHM program. Understanding change management and being prepared for resistance to change is critical when implementing and sustaining a SPHM program. *Change management is discussed in **Section 7**.*

Developing and implementing a Communications Plan for the SPHM program that will assist in facilitating change is discussed in **Section 4**.

The following is a summary of key questions to consider when assessing readiness for change (RNAO, 2024; AHRQ 2024).

The SPHM committee should have addressed some of the questions below as they completed the program planning activities described in **Sections 2 and 3**.

- Does your organization have the right culture to embrace the work that needs to be performed? i.e., a culture of employee and patient safety; a focus on a systems approach to error reduction; engagement of employees in all safety efforts, etc.
- Why is change needed? What is your current state, what do you want to accomplish, and why?
- Is the organization ready for change?
 - Does senior leadership understand why this change is needed?
 - Do management and employees understand why this change is needed?
 - Is there a sense of urgency about the change?
 - Does senior administrative leadership support this initiative?
- How will you prepare the organization for change and manage it effectively?
- Who will take ownership of this effort?
- Which SPHM prevention and management practices do you want to use?
- What resources are needed?
- Does your organization have the right infrastructure to begin the intended change process?
- How will you measure SPHM program practices implemented and program management strategies?
- How do you sustain an effective SPHM program?

Safe Patient Handling and Mobility – Section 3

- What are the challenges and opportunities that you are facing?
- What if you are not ready and unable to implement some of the program elements recommended?

When reviewing the above questions consider how your organization has implemented new patient and employee safety programs and changes in work practices in the past. What worked well and what challenges occurred and how were they addressed?

Determine as a team which elements of an SPHM program are most important for success, and which elements may be harder to implement at the current time and in the future, due to resource or organizational and professional culture related challenges. This approach will increase the likelihood of approval of the SPHM program plan by senior leadership and successful implementation of program elements.

Nilsen & Bernhardsson, 2019, stated 'that contextual factors are interrelated; these factors work synergistically to promote or hinder program implementation efforts. For example, lack of staff time and insufficient funding will likely affect the organization's readiness for change. On the other hand, enthusiastic leaders and the presence of champions can help create a positive organizational culture and climate'

They also noted that "Deadly Combinations" of contextual factors can exist. 'Different contextual factors that are unfavorable to your change initiative can work together to hinder or even halt implementation efforts. For example, a culture that is not supportive of change, coupled with limited resources (time, funding) dedicated to the implementation effort, will likely negatively influence the outcome.

Ultimately, the decision to implement and sustain a SPHM program and define its scope is based on the organization's values and safety culture.



Quick Tip

The Agency for Health Care Research and Quality Indicators (AHRQ) www.ahrq.org, have published several toolkits related to patient safety initiatives that provide information about how to assess a health care organization's culture and readiness for change that can be adapted for use with any patient or employee safety program or initiative. Refer to *Section 10* for other related resources.

Section Summary



Hazard Identification and Assessment

Step 6. Determine the scope of the issue & program needs

Hazard identification and assessment activities are completed to determine the hazards and level of risk associated with patient handling activities that have caused or may cause harm to caregivers and patients. These activities inform solutions to eliminate or minimize harm to caregivers and patients and facilitate SPHM program development

from a systems perspective.

Hazard identification and assessment is achieved through several activities conducted by the SPHM committee and other internal stakeholders and external consulting assistance as needed.

Activities include:

- Completing a comprehensive gap analysis of existing patient handling-related injury prevention efforts or SPHM program (if a program already exists)
- Identifying all stakeholders who will be affected by the SPHM program
- Worksite Assessment that includes:
 - Employee surveys and interviews
 - Manager surveys to evaluate unit/department characteristics
 - Site visit of units/departments with higher risk of patient handling-related injuries
 - Ergonomics evaluation to quantify risk factors for WMSDs as needed
 - Assessment of the organization's safety culture and readiness for change

Step 7. Analyze and prioritize survey and site visit data

After completing the site visit(s) of priority units/departments, all worksite assessment information collected is reviewed to prioritize patient handling tasks by the risk of injury or potential harm to employees and patients. Findings are summarized to highlight areas of concern, risks, and program gaps and used to guide the development of solutions to address patient handling-related hazards.

Additional references and resources related to this Section are listed in **Section 10**.

Safe Patient Handling and Mobility – Section 3

References and Resources Used in this Section

- Abdul Halim, N. S. S., Mohd Ripin, Z., & Ridzwan, M. I. Z. (2023). Efficacy of Interventions in Reducing the Risks of Work-Related Musculoskeletal Disorders Among Healthcare Workers: A Systematic Review and Meta-Analysis. *Workplace Health & Safety*, 21650799231185335.
- Abdul Halim, N. S. S., Ripin, Z. M., & Ridzwan, M. I. Z. (2022). Effects of patient transfer devices on the risk of work-related musculoskeletal disorders: a systematic review. *International Journal of Occupational Safety and Ergonomics*, 1-21.
- ACC6075 Moving and Handling People Guidelines 2012 Accident Compensation Corporation New Zealand. <https://www.acc.co.nz/assets/provider/acc6075-moving-and-handling-people-guidelines.pdf>
- Adamczyk, M. A. (2018). Reducing intensive care unit staff musculoskeletal injuries with implementation of a safe patient handling and mobility program. *Critical care nursing quarterly*, 41(3), 264-271.
- Adult Obesity Prevalence Maps. Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and . (2014). *American Journal SPHM*, 4(4):111-117.
- Agency for Healthcare Research and Quality. (2024, February). Preventing falls in hospitals. <https://archive.ahrq.gov/patient-safety/settings/hospital/fall-prevention/toolkit/index.html>
- Agency for Healthcare Research and Quality. (2024, February). Preventing pressure ulcers in hospitals. Rockville, MD: Author. <https://www.ahrq.gov/patient-safety/settings/hospital/resource/pressureulcer/tool/index.html>
- AIHA, ASPHP, & ANA. (2024, November). Safe patient handling and mobility (SPHM): A process to protect health care workers and recipients. White paper. Falls Church, VA: American Industrial Hygiene Association, Association of Safe Patient Handling Professionals, & American Nurses Association. <https://www.aiha.org/education/white-papers/safe-patient-handling-and-mobility-sphm-a-process-to-protect-health-care-workers-and-recipients>
- American Nurses Association. (2021). Safe patient handling and mobility: Interprofessional national standards across the care continuum (2nd ed.). Silver Spring, MD: American Nurses Association.
- Association of Occupational Health Professionals in Healthcare (AOHP). (2020). Beyond Getting Started: A Resource Guide for Implementing a Safe Patient Handling Program in the Acute Care Setting (4th ed., Rev. Spring 2020). <https://www.aohp.org/aohp/Portals/0/Documents/ToolsForYourWork/BGSpublication/20-06%20BGS%20Safe%20Patient%20Handling.pdf>
- Bootsman, R., Markopoulos, P., Qi, Q., Wang, Q., & Timmermans, A. A. (2019). Wearable technology for posture monitoring at the workplace. *International Journal of Human-Computer Studies*, 132, 99-111.
- Burgess-Limerick, R. (2018). Participatory ergonomics: Evidence and implementation lessons. *Applied Ergonomics*, 68, 289–293. UMass Lowell. Problem-solving tools.
- Crawford, J. (2007). The Nordic Musculoskeletal Questionnaire. *Occup Med (Lond)* 57(4), 300-301.
- Dawson, A. P., Steele, E. J., Hodges, P. W., & Stewart, S. (2009). Development and test–retest reliability of an extended version of the Nordic Musculoskeletal Questionnaire (NMQ-E): a screening instrument for musculoskeletal pain. *The Journal of Pain*, 10(5), 517-526.
- Fray, M., & Hignett, S. (2013). TROPHI: development of a tool to measure complex, multi-factorial patient handling interventions. *Ergonomics*, 56(8), 1280-1294.
- Gabutti, I., Colizzi, C., & Sanna, T. (2023). Assessing organizational readiness to change through a framework applied to hospitals. *Public Organization Review*, 23(1), 1-22.
- Hamblin, L. E., Essenmacher, L., Luborsky, M., Russell, J., Janisse, J., Upfal, M., & Arnetz, J. (2017). Worksite walkthrough intervention: Data-driven prevention of workplace violence on hospital units. *Journal of Occupational and Environmental Medicine*, 59(9), 875–884.
- Health Research & Educational Trust. (2016, March). Culture of Safety Change Package: 2016 Update. Chicago, IL: Health Research & Educational Trust. https://www.gha.org/Portals/0/Documents/Initiatives/QualityPatientCare/HRETHEN_ChangePackage_CultureofSafety.pdf
- Hignett, S., & McAtamney, L. (2000). Rapid entire body assessment (REBA). *Applied Ergonomics*, 31, 201-205.

Safe Patient Handling and Mobility – Section 3

Johnston, H. Musculoskeletal Disorders (MSD) and Mental Health: The Role of Psychosocial Factors in Optimizing Prevention. <https://uwaterloo.ca/centre-of-research-expertise-for-the-prevention-of-musculoskeletal-disorders/musculoskeletal-disorders-msd-and-mental-health-role>

Joint Commission. (2012). Improving patient and worker safety: opportunities for synergy, collaboration and innovation. Oakbrook Terrace, IL: The Joint Commission. 2012. <https://www.patientcarelink.org/wp-content/uploads/2021/02/6-TJC-ImprovingPatientAndWorkerSafety-Monographpdf.pdf>

Lachman, P., Runnacles, J., & Dudley, J. (2015). Archives of Disease in Childhood: Education & Practice Edition, 100(1), 13–18.

Matz, M., Celona, J., Martin, M., McCoskey, K., & Nelson, G. G. (2019). Patient handling and mobility assessments (2nd ed.). https://www.fgiguideelines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf

Moore, L. L., Wurzelbacher, S. J., Chen, I. C., Lampl, M. P., & Naber, S. J. (2022). Reliability and validity of an employer-completed safety hazard and management assessment questionnaire. *Journal of safety research*, 81, 283-296.

Muthukrishnan, R., & Maqbool Ahmad, J. (2021). Ergonomic risk factors and risk exposure level of nursing tasks: association with work-related musculoskeletal disorders in nurses. *European Journal of Physiotherapy*, 23(4), 248-253.

National Institute for Occupational Safety and Health (NIOSH). (1994/2021). Applications manual for the revised NIOSH lifting equation (DHHS [NIOSH] Publication No. 94-110, Revised 9/2021). Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. <https://doi.org/10.26616/NIOSH PUB94110revised092021>

Nilsen, P., & Bernhardsson, S. (2019). Context matters in implementation science: A scoping review of determinant frameworks that describe contextual determinants for implementation outcomes. *BMC Health Services Research*, 19(1), 1-21.

Nilsen, P., Seing, I., Ericsson, C., Birken, S. A., & Schildmeijer, K. (2020). Characteristics of successful changes in health care organizations: an interview study with physicians, registered nurses and assistant nurses. *BMC health services research*, 20(1), 147.

National Institute for Occupational Safety and Health. (n.d.). Elements of ergonomics programs. Step 3: Collect health and medical evidence. Conduct interviews and symptom surveys. <https://www.cdc.gov/niosh/ergonomics/ergo-programs/gather-evidence.html>

National Institute for Occupational Safety and Health. [2023]. Safety Culture in Healthcare Settings. By Rogers B, Francis R, Dembski-Hart P, Hessels A, Hilton T, Casey M, Martin M. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2023-135, <https://www.cdc.gov/niosh/docs/2023-135/default.html>

Occupational Safety and Health Administration. (2013, September). Safety and Health Management Systems: A Road Map for Hospitals. https://www.osha.gov/sites/default/files/2.4_SHMS_roadmap_508.pdf

Occupational Safety and Health Administration. (2016). Recommended practices for safety and health programs. <https://www.osha.gov/sites/default/files/publications/OSHA3885.pdf>

Occupational Safety and Health Administration. Safe patient handling programs N/D <https://www.osha.gov/hospitals/patient-handling>

Prosci. (n.d.). How to use a readiness assessment for change management. <https://www.prosci.com/blog/when-should-you-use-a-change-management-readiness-assessment>

Ranavolo, A., Draicchio, F., Varrecchia, T., Silvetti, A., & Iavicoli, S. (2018). Wearable monitoring devices for biomechanical risk assessment at work: Current status and future challenges—A systematic review. *International journal of environmental research and public health*, 15(9), 2001.

Registered Nurses' Association of Ontario. (2012). Guide to implementation of best practice guidelines (2nd ed). https://rnao.ca/sites/rnao-ca/files/RNAO_ToolKit_2012_rev4_FA.pdf

Registered Nurses' Association of Ontario. (2024). Leading change toolkit (4th ed.). <https://rnao.ca/bpg/leading-change-toolkit>

Safe Patient Handling and Mobility – Section 3

VHA Center for Engineering & Occupational Safety and Health (CEOSH) (2016, January). Safe Patient Handling and Mobility Guidebook. St. Louis, Missouri. https://www.stryker.com/content/dam/stryker/education-and-training/focusrn/resources/caregiver-safety/implementation-tools/VA%20SPHM_PDF.pdf

Scott Smith (Dec 2018). Using Advanced Wearables and 3D Dynamic Biomechanical Modeling - AND - How Data From Workforce Wearables Is Impacting Worker Safety Today. <https://ergoexpo.com/on-demand-session-using-advanced-wearables-and-3d-dynamic-biomechanical-modeling-and-how-data-from-workforce-wearables-is-impacting-worker-safety-today/>

Stefana, E., Marciano, F., Rossi, D., Cocca, P., & Tomassoni, G. (2021). Wearable devices for ergonomics: A systematic literature review. *Sensors*, 21(3), 777. <https://pubmed.ncbi.nlm.nih.gov/33498904/>

Swensen, S., Pugh, M., McMullan, C., & Kabcenell, A. (2013). High-impact leadership: Improve care, improve the health of populations, and reduce costs (White Paper). Cambridge, MA: Institute for Healthcare Improvement. <https://www.ihi.org/library/white-papers/high-impact-leadership-improve-care-improve-health-populations-and-reduce>

Western New York Council on Occupational Safety and Health. (2016). Safe patient handling workgroup report to the Commissioner of Health. New York State Department of Health. https://www.health.ny.gov/statistics/safe_patient_handling/docs/sph_report.pdf

Wright, D. (2015). *Competency assessment field guide: A real world guide for implementation and application*. Springer Publishing Company.

Hazard Control and Prevention and Program Plan Development

Contents

Hazard Control and Prevention.....	1
Step 8. Develop solutions to address and control hazards.....	1
I. Choosing SPHM Technology Solutions	3
Employee-Related Factors	3
Patient-Related Factors.....	4
SPHM Technology-Related Factors.....	4
II. Choosing the SPHM Program Structure and Components to be Implemented	5
Table 4.1 Tips for Determining the Scope of the SPHM program.....	8
Developing the SPHM Program Plan	10
Step 9. Create a communications plan, education and training plan, and SPHM policy.....	10
Communications Plan	10
Why develop a Communications Plan for an SPHM program?	10
Figure 4.1 Considering Safe Patient Handling and Mobility (SPHM) Throughout the Continuum of Care Assists Patients to Safely meet Mobility and Rehabilitation Goals, Retain Function, and Improve Caregiver Safety.....	11
Table 4.2 SPHM Stakeholders.....	12
Developing the Communications Plan	13
Table 4.3 Methods of Communication.....	14
Education and Training Plan.....	16
Why develop an Education and Training Plan for the SPHM program?.....	16
SPHM Policy	17
Purpose.....	17
Developing the SPHM Policy	18
Implementing and Maintaining the SPHM Policy	20
Table 4.4 Elements of a SPHM Policy.....	20
Step 10. Complete the draft SPHM program plan	21
Table 4.5 Elements of a SPHM Program Plan.	23
Figure 4.2 Example of the Timeline for SPHM program roll-out -Year 1.....	24
Determining Specific Measurable Goals for the SPHM Program	25
Table 4.6. Examples of SPHM Program Measures.....	27
Considerations when Determining Measurable SPHM Program Goals.....	28
Table 4.7 Example of Goals for the First Year of an SPHM Program.	29
Demonstrating the Value of the SPHM Program to the Organization	29
Table 4.8 Factors to Consider when Demonstrating the Value of an SPHM program.....	33
Step 11. Obtain approval of the SPHM plan and policy from senior leadership.....	34
Step 12. Finalize the SPHM program plan and policy	35
Section Summary	36
Reference and Resources Used in this Section.....	37

Hazard Control and Prevention

Step 8

Develop solutions to address and control hazards

Using the findings and recommendations determined in Step 7, the SPHM committee need to:

1. Determine what SPHM technology, processes and program elements need to be implemented to eliminate or minimize identified hazards, risk factors, and achieve a successful and sustainable SPHM program.

This includes identifying the:

- I. SPHM technology solutions that can be used to reduce risk of caregiver and patient injury during high-risk patient handling and mobility tasks and
- II. SPHM program structure, components and activities that need to be developed and implemented that facilitate appropriate use of SPHM technology and ergonomic work practices by caregivers.

Solicit assistance from managers and employees of the priority units together with stakeholders from support service departments (if not already represented on the SPHM committee). This approach assists with staff buy in and support of SPHM program efforts. It also helps the committee identify the most suitable units or departments for program implementation, such as piloting SPHM technology and related activities within high-priority areas.

Note: SPHM technology trials should be conducted with caregivers in unit(s)/department(s) where the program is to be implemented *before* determining the technology vendor, brand and quantity of technology needed and final cost-justification modeling completed. Leadership approval of the SPHM program plan is recommended before any SPHM technology is formally trialed (**Refer to Sections 4 and 7**).

As noted in Step 7, using problem solving tools to determine the root cause of patient handling-related hazards, and process mapping of patient handling activities, can help facilitate solution development (**Refer to Step 7, Quick Tips**).

Resources for developing solutions are listed below.

Tools that Support Content in this Section

4a. Prioritizing level of risk for SPHM and solutions

4b. Tips for choosing solutions

4c. Project template

4d. Communications plan

4e. Policy samples

4f. Program plan summary template

4g. Unit-based SPHM champions/coaches

4h. Lift teams pros and cons

Refer to Section 6 for the Education and Training Plan Tool 6a

Resources for Developing Solutions

- Review the following Toolkit Sections:
 - **Section 1** to learn about SPHM Hierarchy of Controls to address patient handling issues and evidence-based SPHM program elements.
 - **Section 5** and the supporting Tools to learn about SPHM technology solutions and ergonomics best work practices.
 - **Section 6** to learn about SPHM training programs.
 - **Section 7** to learn about considerations when selecting, purchasing, and installing SPHM technology; pilot testing a SPHM program; and incident reporting, response, and management processes.
 - **Section 10** resources. These also include SPHM information for non-hospital environments e.g., long-term care, home health etc.
- Use the Gap, survey, and site-visit assessment data gathered in the Tools provided in **Section 3**.
- SPHM technology vendor(s) in facilities with existing SPHM programs where SPHM technology is used.
- SPHM and ergonomics-related journals and professional associations (**Section 10**).
- The ANA Safe Patient Handling and Mobility Interprofessional National Standards, 2nd edition.
<https://www.nursingworld.org/nurses-books/safe-patient-handling-and-mobility-2nd-edition2/>
- Use SPHM algorithms developed and published by the:
 - Veterans Health Administration (VAH) SPHM program (*available via a mobile app*)
<https://mobile.va.gov/app/safe-patient-handling>
 - Association of periOperative Registered Nurses (AORN) Ergonomic Tools for Perioperative environments. https://www.aorn.org/docs/default-source/aorn/toolkits/safe-patient-handling/safe-patient-handling-pocket-reference-guide.pdf?sfvrsn=36a9944f_0
 - National Orthopedic Association of Nurses (NAON)
<https://www.orthonurse.org/Portals/0/Docs/Publications/Position%20Statements/NAON%20Safe%20Patient%20Handling%20and%20Mobility%20Algorithms%20for%20the%20Adult%20Orthopaedic%20Patient.pdf?ver=rueoatTtX342xARJCn9kJw%3d%3d>

These algorithms provide decision-making guidance about when and what different types of SPHM technology may be used to perform various patient handling tasks based on a patient's physical and cognitive abilities and clinical needs. The VAH algorithms also consider guidance on safe handling of patients of size.
- Visit and/or communicate with nearby healthcare facilities with SPHM programs. Evaluate their use of SPHM technology and processes, vendors, and discuss pros and cons about their product and service etc. Learn from their program implementation strategy to inform your planning process.

Safe Patient Handling and Mobility – Section 4

Solutions and strategies identified will be incorporated into the draft SPHM program plan. *Finalizing the draft SPHM program plan is discussed in **Section 4**.*

Addressing SPHM needs is an ongoing process, as certain SPHM technology solutions and program components may require time to implement. Problem-solving is part of the process to continually improve the SPHM program.

I. Choosing SPHM Technology Solutions

Identify and prioritize at least 2-3 SPHM technology solutions that would eliminate or minimize risk factors associated with each high-risk patient handling and mobility task identified.

Consider the following criteria when choosing and prioritizing SPHM technology solutions (you may have additional criteria to add).

Employee-Related Factors

- **The frequency** that an individual caregiver is typically exposed to the high-risk task e.g., 8-10 times per shift.
- **The probability or likelihood** that the situation will occur e.g., the frequency that a specific type of patient handling task is performed in a shift (average, and minimum and maximum number of times) e.g., repositioning a dependent patient in bed. Consider how many patients and/or percentage of patients need assistance with specific care tasks such as showering, transfer from bed to chair, assistance from the floor after a fall and the level of assistance needed from full to minimal assistance.
- **The number or the percentage** of caregivers who are exposed to the task or situation per shift.
- **The degree (severity) of harm** that is likely to result from the exposure (*Tool 4a*).

SPHM Technology Categories

Refer to Section 5 for more information and Table 5.1 for task specific use.

- Ceiling/overhead lifts
- Powered floor-based lifts
- Powered Sit-to-Stand devices
- Non-powered stand assist aids
- Patient slings that are used with lifts and sit to stand devices
- Air-assist lateral transfer and repositioning devices
- Non-powered friction-reducing repositioning/transfer devices
- Powered specialty beds that turn patients or change into a sitting and/or standing position

Evidence supports that powered lift equipment and Air assist devices are the most effective for reducing injury risk (***Refer to Section 5***).

SPHM Technology - procedural factors to consider (Refer to Sections 5 & 7).

- Quantity
- Storage and accessibility/supply
- Cleaning and infection prevention
- Maintenance and repair
- Sling management, e.g., supply, laundering (if applicable), inspection, disposal etc.

Patient-Related Factors

- **The physical, cognitive, and clinical/rehabilitation needs** of the patient population e.g., the SPHM technology that is best suited to a patient's mobility status.
- If SPHM technology (and the program) results in **other measurable benefits**, such as facilitating early and safe patient mobility and patient independence, reducing patient falls, improving quality of care or safer care and mobilization of patients at risk of physical violence or with cognitive deficits.
- If technology is needed to address SPHM needs of a **specific patient population** e.g., bariatric or patients of size, pediatric, etc.

SPHM Technology-Related Factors

- **The type or category of SPHM technology** that can be used to perform the high-risk tasks identified (*Refer to Section 5*).
- If SPHM technology solutions **reduce the risk of work-related musculoskeletal disorders (WMSDs)** more effectively than other technologies. For example, friction reduction devices such as slippery sheets may not reduce force exerted by caregivers as well as an air-assist device (*Refer to Section 5*).
- **The physical environment**, where the SPHM technology is to be used e.g., sufficient space for safe use (e.g., rooms, hallways, door widths, ceiling height, etc.), furniture and medical equipment that is typically used, storage capacity and convenient access for quick use (*Refer to Section 5 for more information about space requirements*).
- **The feasibility of installing** chosen SPHM technology such as ceiling lifts.
 - **Note:** Further investigation of the physical building infrastructure will be needed to confirm if ceiling lift technology can be installed and be functional on a specific unit/location. Trial of floor based powered lifts and non-powered stand assist lifts may be needed to determine if they will go under and around beds, stretchers, furniture etc., and if they have sufficient vertical lift clearance over a transfer surface such as an exam table.
- If a SPHM technology solution can be used to **complete only 1 or 2 or multiple** patient handling tasks. For example, ceiling lifts with a track configuration that allow access to an entire patient room or work area, can be used to complete most patient handling tasks with patients who have a broad range of physical and cognitive abilities (when used with the appropriate sling). Alternatively, SPHM technology such as friction reducing devices, may only be able to be used to perform in-bed repositioning tasks and transfer patients between surfaces in a supine position.
- If SPHM technology solutions **improve task efficiency and workflow**. For example, using air assist mats or repositioning lift slings that may be left under patients who are transported on a bed or stretcher between patient care units and imaging or perioperative departments to reduce reliance on manual handling and optimizing efficiency and patient comfort. All departments/areas involved must have the appropriate SPHM technology to complete the patient transfers e.g., blowers or motors for use with air assist mats and/or overhead lifts for use with

Safe Patient Handling and Mobility – Section 4

repositioning slings. **Section 5** provides an example of this process and SPHM technology needed. Considerations when leaving slings and friction reducing devices under patients is discussed in **Section 5**.

- If SPHM technology **reduces the number of caregivers** needed to perform the task. For example, a sling and lift system that allows a dependent patient to maintain a side-lying position during pericare, wound care, or other procedures, with minimal assistance from 1 caregiver.
- If there are SPHM technology solutions/strategies that are based on a **higher level of evidence** than others e.g., ceiling lift technology (**Refer to Section 5**).
- If some solutions/strategies will **take longer** to implement. If so, can and how will risk be reduced in the meantime.
- Existing SPHM technology that can be **reallocated** to better meet program needs.
- **The approximate quantity needed** of each SPHM technology solution. This number will be based on factors such as task frequency per shift and the number or percentage of patients who will require use of the technology per shift (**Refer to Section 5**).
- **Available budget and resources** to purchase, install and maintain SPHM technology and implement SPHM program elements such as a peer champion program and education and training.

Note: You may gain some knowledge about budget parameters during the initial meeting with leadership and subsequent input from the SPHM program champion (**Section 2**). However, budget availability may not be fully known until you meet with senior leadership to gain final approval of the SPHM program plan (**Section 4**) and have presented a complete business case for implementing the plan and purchasing SPHM technology etc (**Section 7**).

- **Potential barriers** to successfully implementing SPHM technology solutions and how they will be addressed. These should have been identified as hazard analysis activities were being completed but can now be reviewed, discussed, and consolidated for inclusion in the SPHM program plan.

Tool 5a provides additional guidelines for choosing SPHM technology and includes ergonomics design and usability considerations.

II. Choosing the SPHM Program Structure and Components to be Implemented

Evaluating data collected from hazard analysis activities and identifying SPHM technology solutions will also assist in determining the structure or organization of the SPHM program and which program components or activities should be implemented to facilitate program success.

Determine potential strategies/solutions (and supporting rationale) for each program related activity to be implemented. *Evidence based elements of SPHM programs are listed in **Section 1** and are included in the **Gap Analysis Tool 3a**.*

When determining SPHM program-related activities, consider the following:

- Are there patient handling tasks that should be **addressed immediately** due to the high level of risk i.e., before the program is implemented? If so, how will this be accomplished?

Safe Patient Handling and Mobility – Section 4

SPHM program components that contribute SPHM program success (*Refer to Section 1*)

- Management leadership (senior and supervisory) and a safety climate that supports the use and supply of SPHM technology, program sustainability, and facilitates culture or behavioral change to promote SPHM
- Active ongoing involvement of employees to facilitate and support all facets of an SPHM program.
- Well-communicated SPHM policies that promote minimal manual lifting and handling of patients who cannot move independently and clearly defined SPHM protocols for specific patient populations e.g., bariatrics, orthopedics
- Patient-centered SPHM assessment protocols and decision-making algorithms for selecting appropriate SPHM
- Ongoing competency-based hands-on SPHM education and training.
- Facility champions (SPHM program coordinators or managers)
- Well trained and resource-supported unit-based peer leaders or SPHM coaches that reinforce safe use of SPHM technology and work practices
- A well-defined and administered process for the reporting, recording, and responding to patient handling-related injuries and incidents
- Reporting processes and culture that facilitate early reporting of injuries and effective return to work and after injury care to minimize disability
- Patient handling tasks and practices included during rounding and related periodic worker and patient safety and risk assessments.
- Proactive design i.e., including SPHM in design and new construction and remodeling of health care facilities
- Periodic (at least annually) evaluation of program performance.

- Are there some strategies or program components that must be **implemented before others**?
- Are there solutions or program elements that should be implemented to meet **state SPHM law**, if applicable?
- Are there hazards or risks that can be **easily corrected**? Effective solutions to highly visible safety issues that are implemented early in program adoption can assist to gain employee and/or management "buy in" to program efforts.
- Will some solutions/strategies take **longer to implement**? For example, developing and implementing a standardized SPHM patient assessment protocol; installing ceiling lift systems etc.
- Are there program strategies that are based on a **higher level of evidence** than others?

Safe Patient Handling and Mobility – Section 4

- What strategies are best to ensure SPHM becomes a standard of patient care e.g., unit-based coaching by a peer(s); access to designated SPHM clinical expertise within the facility together with SPHM education and training, safety huddles, etc. Refer to **Tool 4g** for more information about unit-based SPHM champions or coaches.

Other strategies that should be discussed include the use of a team(s) of employees who use SPHM technology and best work practices to assist with patient handling and mobilization tasks either on specific patient care units or facility wide e.g., Lift Teams, Early Mobility Teams. **Tool 4h** provides more information about the 'pros and cons' of Lift Teams. Early mobility teams and coaches are discussed in **Sections 5 and 9**.

- How will the program be rolled-out? Is using a pilot approach the best method to implement and evaluate some or all the SPHM program components/activities before expanding the program to all patient care areas? Which unit(s)/departments will be part of a pilot initiative? Refer to **Table 4.1**.
- Should the SPHM program be partnered with or integrated with a patient care initiative such as early mobility and falls prevention? How will the program be managed during implementation, maintenance, and future expansion? For example, will the SPHM committee oversee general program activities while subcommittees handle specific elements such as implementing a SPHM patient assessment protocol or pilot programs in certain units or departments? Does program management require a dedicated SPHM program coordinator if one does not already exist?
- What are the benefits and drawbacks of each strategy or activity?
- What is the available budget and resources to implement program elements such as a unit-based champion program, and SPHM education and training?

Document the rationale or evidence supporting your decision to designate certain patient handling activities as high hazard, as well as the interventions and program components selected. For example, refer to previous patient handling incidents that might have been preventable or less severe if specific SPHM controls had been implemented, or cite an intervention that is strongly supported by published research or mandated by law. Ensure you include potential benefits related to patient quality of care, safety, and experience.

This information can assist in gaining support when requesting and justifying budget and resources from senior leadership. It is also relevant for evaluating SPHM processes and outcomes following program implementation.



Quick Tip

Refer to the following resources to assist with developing and prioritizing solutions:

3g Template to summarize hazard assessment activities

4a. Prioritizing level of risk for SPHM and solutions

4b. Tips for choosing solutions

4c. Project template

Tips for Determining the Scope of the SPHM program

Once the committee has determined the type of SPHM technology, processes and program elements that need to be developed and implemented, then you can decide how best to implement the program (or enhance an existing program). There is no single way to do this. Individual health care organizations choose the approach that best suits their needs. For example:

- When starting a SPHM program, implementing a pilot program on 1-2 high-priority patient care units may be the most manageable approach. A pilot approach utilizes fewer resources and less time to evaluate the effectiveness of SPHM interventions in achieving desired objectives versus implementing a new program on many units or facility wide.

The types, brands, and models of SPHM technology that address a broad range of patient handling hazards can be identified for priority locations. A pilot helps select standard SPHM technology for future facility-wide use and develop support processes for implementation and management of SPHM technology e.g., infection control, and equipment maintenance

This approach also allows for development and evaluation of a SPHM education and training program and determining the best implementation strategies in preparation for expansion of the program to other units/departments.

Starting an SPHM program on a small scale allows you to demonstrate successes and gain further buy-in and support from leadership, unit management and employees. *Implementing a pilot program is discussed in **Section 7**.*

For high-priority units, implementing a program using friction-reducing devices (FRDs) for patient repositioning and transfers while budgeting and planning for installation of equipment like ceiling lifts and slings can allow high risk tasks to be addressed sooner in a cost-effective manner. By introducing FRDs and demonstrating a commitment to further investment in equipment, staff can experience the benefits of reduced strain and improved safety, which can foster support for the larger SPHM program.

- Another approach is to choose 1-2 patient care units to pilot a SPHM program as described above, while simultaneously addressing a high-risk and frequently performed patient handling task such as lateral supine transfer of immobile patients, in 1 or more departments such as diagnostic imaging and/or perioperative areas.
- Alternatively, specific patient handling tasks are addressed systematically throughout a facility based on prioritization of risk (**Step 7**).
- *When enhancing an existing program*, it may be possible to address several program gaps that have been prioritized by need, at the same time.

The SPHM program champion and SPHM manager/coordinator, managers from high priority units/departments and other key stakeholders such as design and construction and/or building engineering departments, should help guide decision making when choosing what and how to implement SPHM program solutions and processes.

Table 4.1 Tips for Determining the Scope of the SPHM program.

Safe Patient Handling and Mobility – Section 4

The SPHM committee will need to (continued from page 4-1):

2. Identify potential barriers to implementation of solutions/strategies identified and how they will be addressed. Barriers can be related to budget, skills, leadership, workload, and staff resources, competing projects, cultural or attitudinal issues.

Refer to 'Assessing Readiness for Change' at the end of **Section 3** for more information to assist you identify potential barriers to program implementation.

3. Start to determine broad short-and long-term program goals. These will be important when conducting ongoing program evaluation. Measurable program goals and Key Performance Indicators (KPIs) are discussed on **page 4-26**. More information about measuring SPHM program outcomes can be found in **Section 8**.
4. Identify the person(s) who are willing and able to carry out the strategies.
5. Identify strategies and resources that will be needed to implement, evaluate, and maintain solutions. Consider budget, staff resources, administrative support, sample documents & templates, external assistance etc. Refer to **Sections 7 and 8** for more information about implementing and evaluating SPHM programs.
6. Draft a proposed timeline for implementation of program activities and how strategies/solutions will be monitored, evaluated, and revised as needed.

The above activities provide the framework for the draft SPHM program plan that you will present to senior leadership (**Refer to Section 4**).

It may be necessary to continue development of some solutions and/or implementation strategies, identifying resources required and timelines, as the committee finalizes the draft SPHM program plan (after leadership approval) and starts program implementation. More research may be needed related to the feasibility of some solutions, and stakeholder feedback during program implementation may require adaptation of plans and timelines etc.

A sample project management form is provided in **Tool 4c**.

Once potential SPHM technology solutions and program model and activities are chosen then the cost of the solutions such as the cost of purchasing, installing, and maintaining equipment, SPHM training, and management of the program, need to be calculated and compared to potential cost savings through injury reduction and other operational gains or benefits i.e., cost-benefit analysis, and the timeline for benefits to be realized i.e., return on investment (ROI) modeling (**Refer to page 4-29**).

Note: Technology and program costs are *finalized* after SPHM technology is trialed and chosen and then presented to leadership for approval. This is discussed in **Section 4**.



Quick Tip

When identifying barriers to developing and implementation SPHM solutions, use the diverse expertise within your committee and have members share their experience and lessons learned related to implementation and maintenance of other employee and patient safety related initiatives or programs.

Developing the SPHM Program Plan

Step 9

Create a communications plan, education and training plan, and SPHM policy

Step 9 describes how to complete your SPHM program plan by developing an SPHM policy and other plans that provide a critical foundation for your SPHM program efforts i.e.,

- Developing a communications plan provides you with a key tool that will help to facilitate culture change (e.g., required changes in practices and procedures), and guide efforts to implement and sustain the SPHM program.
- Developing an education and training plan at this stage allows you to determine resources (budget, personnel etc.) needed, that you will request from leadership to implement an ongoing employee/stakeholder SPHM training program.
- Developing or updating an existing SPHM policy allows the organization to clearly state to all employees that prevention of patient handling related injuries is paramount for caregiver and patient safety. It defines how the organization will implement and sustain a comprehensive SPHM program to prevent these injuries and the responsibilities of caregivers and other employees to achieve the goals of the SPHM program.

Communications Plan

Why develop a Communications Plan for an SPHM program?

Effective ongoing communications or social marketing to all employees in a health care facility is essential to facilitate and manage change within an organization. Poor communication can actually increase resistance to the program.

There are many people and departments who are interested in and affected by SPHM program efforts. These stakeholders should be identified during hazard identification activities and development of solutions (**Refer to Section 3**).

SPHM program management is as much about **organizational culture change** as it is about implementing and/or enhancing SPHM technology and program elements. To aid facilitation of culture (or behavior) change, it is essential to inform stakeholders about their role within the program, the benefits for them and their patients or clients, and the program progress and outcomes. Engaging stakeholders from the beginning and throughout the program is essential to avoid barriers to implementation and sustainability.

Developing and implementing a communications or social marketing plan helps to achieve that goal.

Table 4.2 lists the stakeholders typically affected by a SPHM program.

Tool 2f describes the roles and responsibilities of primary stakeholders in an SPHM program.

The message should be *tailored* to fit the audience. Examples of SPHM efforts within the organization

Safe Patient Handling and Mobility – Section 4

highlighting positive outcomes for patients and caregivers and the progress of the SPHM Committee, should be shared regularly. Positive reinforcement of good work practices and behaviors is encouraged. Recognition is given to employees that develop solutions to improve employee and patient safety. Communication efforts with groups outside of the hospital or organization are also important and can strengthen the relationship between the facility and local community (**Figure 4.1**).

Developing a *communications plan* provides the SPHM project coordinator and the SPHM committee with a road map for getting their message to stakeholders.

Sharing well developed and meaningful information with managers, caregivers, and other employees about SPHM activities in their departments and units, and across the organization, helps them align with and contribute to SPHM program goals. It helps to foster and cultivate a culture in which every individual in a care unit/department is responsible and accountable for implementing SPHM techniques and procedures.

A SPHM program communications plan:

- Gives you a structure to determine whom you need to reach and how
- Helps to ensure that all stakeholder groups are identified and included in the plan
- Helps to determine what each target group needs to know
- Makes your communication efforts more efficient, effective, and lasting



Creating the plan at this stage of program planning facilitates project management during the implementation and management stages of the SPHM program. The plan also provides the foundation for development of the SPHM program education and training plan.

As with managing a SPHM program, the communications plan and efforts should be regularly evaluated and revised as needed.

Figure 4.1 Considering Safe Patient Handling and Mobility (SPHM) Throughout the Continuum of Care Assists Patients to Safely meet Mobility and Rehabilitation Goals, Retain Function, and Improve Caregiver Safety.

Safe Patient Handling and Mobility – Section 4

SPHM Stakeholder Groups – Example	
• CEO, senior leadership & governing board including the SPHM program champion • Committee or group that the SPHM committee report to (if applicable) e.g., employee safety committee or patient safety/quality • Other patient and employee safety related groups that may be impacted by the SPHM program e.g., committees for fall prevention, early mobility, patients of size, and workplace violence prevention • SPHM program committee and • Program coordinator • Directors and unit/department managers and supervisors/assistant managers • Unit RNs, LPNs and CNAs including Float Pool nursing staff • Other caregivers such as techs and medical assistants (MAs) • Physicians and other medical providers e.g., nurse practitioners (NPs), physician assistants (PAs) etc. • Contract staff e.g., traveling nurses; physicians; support services; building contractors etc. • Rehabilitation (physical and occupational therapists) • Other staff groups e.g., diagnostic, and therapeutic imaging, respiratory therapy; transportation, etc., who may have direct contact with patients and perform care related tasks that involved patient handling and mobilization	• Employee health and safety • Support service departments– environmental services, laundry/supply logistics, facilities maintenance/clinical engineering, information technology, design and construction, administrative personnel, human resources etc. • Infection prevention • Wound and ostomy • Clinical education/professional development • Procurement/purchasing & finance • Union/labor representatives • Patient population and their families • Nursing students (and/or other student groups) • Emergency medical services • Volunteers • Staffing agencies • Case management/Social work for discharge placement • External facilities or clinics in the community where patients are admitted from or discharged to, e.g., skilled nursing facilities, nursing homes, home health care agencies. • SPHM technology vendors or suppliers

Table 4.2 *SPHM Stakeholders.*

Developing the Communications Plan

Tool 4d provides a template that can be used to develop your communications plan.

1. **As a committee, determine how information is communicated within your facility currently, and if there are methods of communication that are more effective than others.** Does effectiveness vary by stakeholder group e.g., senior leadership vs. direct care staff? All employees may have access to work email but are some stakeholder groups (or target audience) more likely to read their email and in a timely manner than others? This would be important to consider before implementing a broad email-based communication campaign. It can be helpful to identify methods of communication as listed in **Table 4.3**.
2. **Determine what the objectives of communications related activities are.** What are the results you want to achieve through your communications about the program, program goals, and SPHM in general? Objectives and messaging will change as the SPHM program matures.
3. **Identify your audience** (if not already completed), i.e., the SPHM program stakeholders *such as* all employee groups, contractors, students, patients, families, other visitors, volunteers, and community agencies (as applicable), etc., who may be impacted by the SPHM program policies and procedures.
4. **What do you want to communicate (the message)?**
 - a. What do stakeholders need to know? For example:
 - i. The scope of SPHM in health care and current trends in preventing patient handling- related injuries for caregivers and patients.
 - ii. Why is the SPHM program being developed or enhanced at your facility (i.e., the rationale for why a change is needed). This may include a summary of SPHM incident and injury data, the employee SPHM survey, and the information gathered from site visits of the high priority units/departments.
 - iii. The goal of the SPHM program or the vision of future outcomes after the initiative is completed.
 - iv. An overview of the SPHM program plan and activities i.e., what, how, and when the program will be implemented, evaluated, and sustained.
 - v. Where they can get more information, assistance as needed, and provide feedback about the program activities during and after the program is implemented etc.
 - vi. Updates on the status of program implementation and management, including success stories.
 - b. How will the SPHM program and associated practices and procedures be meaningful to each stakeholder group or audience? Messaging should be customized for each stakeholder group and/or a specific unit/department, and relevant to the patient population and care services provided.
 - i. The stakeholder's role in the initiative, i.e., expected behaviors and activities during and after the SPHM program implementation, including organizational expectations. For example, use of SPHM technology to safely move immobile or partially immobile patients; feedback and

Safe Patient Handling and Mobility – Section 4

suggestions about program activities via site audits, surveys etc; and active participation in SPHM training.

- ii. The impact of the SPHM program and related procedures on the day-to-day activities of managers and employees (what will they have to do?), and job functions, if applicable.
- iii. Identify 'what's in it for them' or how SPHM will benefit them and their patients. What are the benefits of the program and how it will impact the stakeholder outweigh the costs? Some benefits of the SPHM program may not be immediately obvious or impactful for all individuals. For example, changing preferred behaviors, taking time to learn new practices, or the emotional effort required can deter adoption. When costs appear greater than benefits, employees may resist new practices. Tailoring motivating exchanges for each stakeholder group can help gain their support by showing that benefits surpass the costs of changes affecting their work.

Methods of Communication -Examples	
<u>On a unit/dept.</u> • Face to face (informal) during care tasks and/or SPHM/safety evaluations • Staff meetings • Shift change handoff • Safety huddles • Via SPHM unit champions or coaches • Email • Intranet • Notice boards/posters/frequently asked questions (e.g., in staff breakrooms/restrooms) • Dashboard for safety metrics • FAQs • Feedback forms/suggestion boxes or email • Education and training • Executive rounding • SPHM awareness games/competitions	<u>Within a healthcare facility</u> • Employee safety and/or Environment of Care Committee • SPHM resource/training intranet page • Newsletters • Hallway information boards • Director/manager meetings • Executive rounding • SPHM technology fairs & trials • Nursing practice related events e.g., <i>Nurse's Week</i> • Education and training • SPHM awareness games/competitions <u>External</u> • Community newsletter • Local media when program established • School of nursing and/or other disciplines • Staffing agencies

Table 4.3 *Methods of Communication.*

Safe Patient Handling and Mobility – Section 4

Use the information about how to address common misconceptions about SPHM provided in **Section 7**.

5. What is the best method(s) to communicate with each customer group?

- a. Identify direct and indirect methods of communication using multiple media as appropriate. Customize the content to each stakeholder group as needed.
- b. Consider developing a theme or brand for the program with a logo and 'eye-catching' promotions if feasible to help distinguish the program from other safety efforts and promote communication. When creating your message, consider content, mood, language, and design.
- c. Use multiple media to disseminate information rather than a single delivery method e.g., showing positive program trends on visibly displayed dashboards together with conducting brief updates at staff meetings and program information in newsletters.

Using multiple methods to deliver information about SPHM program activities, processes, and outcomes etc., will help facilitate engagement in the program, and help ensure that employees on all shifts will receive the information you are sharing.

6. When does the communication need to be conducted/sent and how often?

For example, at the beginning of the SPHM program initiative to engage key stakeholders early on during the program planning stages so that they are motivated to participate in the program implementation. Regular communication should continue throughout the implementation process and periodically during program maintenance.

The frequency of communication depends on the progress of program implementation and questions or concerns of stakeholders. The important thing is to maintain regular two-way dialogue with all stakeholders about the SPHM program and related activities, especially those that impact them directly, to ensure all stakeholder questions are addressed.

Leadership should guide the scope and scheduling of communications, particularly at the start of program activities. They may share general information about the SPHM initiative with all or targeted employee groups early in implementation, such as those involved in the pilot units.

Detailed information on successes and future plans can be shared facility-wide after initial activities are complete and lessons learned have been integrated for program expansion.

7. Who will develop communication contents or messaging?

- a. Do you need assistance from other departments, e.g., the marketing or communications department?

8. Who will conduct and distribute the communications?

- a. Do you need assistance from other departments e.g., education, information technology (IT) etc.?

A 2023 study by Prosci Inc., examined the success factors associated with change initiatives in a wide variety of business and industry (including health care), from 10,800+ respondents in 101 countries.

It was found that employees perceived the most effective source of communication about the *personal impacts* of change is their immediate supervisor followed by the head of their department.

Safe Patient Handling and Mobility – Section 4

Messages regarding the business reasons for the change are generally preferred to be delivered by the CEO or president, followed by executive managers (Prosci, 2023).

Therefore, communicating and training leaders and managers about SPHM and the program plan etc., should occur before other employee stakeholder groups so that they understand why the SPHM program is necessary, and the related benefits, and their role in the implementation of the program. This assists to enlist leader and manager support for the change during the employee rollout, including delivering communications to their employees.

Consider how employees who work part-time and/or do not work regular shifts will receive communications about the SPHM program e.g., per diem employees, employees who work nightshifts, weekends, and employees who are on medical or personal leave.

9. **Is follow-up needed to review if the communication/message and delivery method was effective** i.e., were your objectives achieved? If 'yes' how and who will perform this task?

Education and Training Plan

Why develop an Education and Training Plan for the SPHM program?

Education and training are critical elements of a successful SPHM program. The goal of *education* in a SPHM program is to facilitate employee understanding of the scope, and principles of SPHM as related to their work environment and the organization as a whole. *Education* reinforces that manual patient handling is not an acceptable part of health care work¹ and the scope of the organization's SPHM policy. *Training* provides employees with the skills to identify and report potential hazards and protect themselves from injury. It facilitates safe and early mobility of patients using SPHM technology and best work practices.

Overall, an ongoing SPHM education and training program engages employees in development, implementation, and sustainability of the SPHM program serving as a crucial element in effective change management.

Developing a draft education and training plan allows you to identify resources (budget, personnel, time for development of training materials, and scheduling of training, etc.), that will be needed to implement an ongoing SPHM training program. It also allows you to identify what training resources are available, and where there are gaps in resources needed. For example, can you develop and conduct SPHM training required for all stakeholder groups (as identified in your Communications Plan) using internal resources, or do you need to find an external provider etc.?

Once your plan is developed, draft an SPHM education and training budget for leadership as part of the SPHM program proposal. This budget is finalized after selecting and purchasing SPHM technology when you will also be able to finalize training content and determine class length and capacity.

Development and implementation of an SPHM education and training program plan for a SPHM Program is discussed in detail in **Section 6**. **Tool 6a** provides a sample education and training program plan together with links to training resources that are available in the public domain.

¹ *Manual patient handling may occur in certain patient care situations e.g., involving life-threatening medical emergencies and the handling of patients with spinal injuries. Refer to SPHM procedures in Section 7.*

SPHM Policy

Purpose

The foundation of an effective SPHM program is the creation and implementation of a well written SPHM policy and supporting procedures that are actively communicated, followed, enforced, and maintained.

A SPHM policy that clearly defines management commitment to the program, program objectives and expectations, and employee roles and responsibilities is essential for achieving the program goals.

It is an essential element in a multifaceted program that guides both leadership and employee decisions and actions to reduce patient handling-related injuries.

The policy is also a tool that helps promote a culture of safety by communicating to staff that employee safety is as important as patient safety.

Whether the organization decides to name the SPHM policy as a 'zero lift, no lift, safe lift or minimal lift' policy, the intent of the SPHM program and the policy should be made clear i.e., to eliminate manual lifting of patients by employees in all *but* exceptional or life-threatening situations where it's not possible to do so, and implement controls to minimize risk where SPHM technology cannot be used.

However, no policy can be effective if the program infrastructure is not in place to support it, i.e., all the elements of a comprehensive SPHM program as described in **Section 1**, including a culture of safety that supports all SPHM activities and access to sufficient quantities of appropriate SPHM technology.

Table 4.4 provides an example of SPHM program elements that can be included in an SPHM Policy.

A SPHM policy should:

- Provide a clear statement of the organization's position and commitment to the implementation, evaluation, and ongoing maintenance of the SPHM program.
- Clearly define the intent and scope of the SPHM program.
- Define the roles and responsibilities of *all* key stakeholders in the program i.e., those identified in your SPHM program communications plan.
- Define the need for a balanced approach that considers the wishes and needs of the patient and the provision of quality care while providing a safe work environment e.g., a process to address patient/family refusal to use SPHM technology while maintaining caregiver safety.
- Reference applicable SPHM regulations such as state SPHM laws and the ANA SPHM standards.
- Define the risk management process that is used to identify, prevent and mitigate hazards related to manual patient handling. These include injury data review, site assessments, employee surveys, use of SPHM assessment protocols, SPHM technology and ergonomics work practices, staff training, unit-based champions or coaches, integration with facility design, and procurement and maintenance of SPHM technology etc.²
- Reference SPHM protocols for specific patient populations e.g., patients of size, pediatrics, patients at risk of falling, patients who may be violent, etc.

Safe Patient Handling and Mobility – Section 4

- Reference safe work procedures for evacuation of dependent patients in emergencies and in emergent situations when the use of SPHM technology is not usually appropriate e.g., medical emergencies such as cardiac/respiratory arrest.
- Encourage employees to report incidents or safety concerns related to patient handling without fear of reprisal for reporting incidents, and outline the reporting, investigation process, and support process after injury occurs e.g., return to work policies.
- Instruct all employees that they are responsible for complying with the policy.
- Explicitly state the consequences of violation of the SPHM policy by employees.
- Acknowledge an employee's *Right of Refusal* to perform a manual handling task if they believe the safety of themselves or the patient is at risk and outline the process for seeking assistance to resolve the situation.
- Identify resources available to meet the program goals and assist stakeholders to comply with SPHM policy and procedures including how they can provide feedback and improvements for the program.



Quick Tip

It may not be possible to complete all elements of the policy and specific safe patient handling procedures at this stage of program planning until you know what SPHM program, elements, technology, and processes will be implemented.

SPHM procedures that need to be developed are discussed in Section 7.

You will present the draft policy to leadership for review and final approval.

² To keep the policy as concise and user-friendly as possible specific SPHM related protocols referenced in the policy can be included in Appendices at the end of the policy document, or as a link provided for access via computer.

Developing the SPHM Policy

- Drafting a SPHM policy should be a collaborative effort led by the SPHM program coordinator and committee together with help from the SPHM program champion and other departments such as Human Resources and Risk Management as needed. As discussed previously, engaging stakeholders who will be affected by the SPHM program in the development of the SPHM policy and related procedures will help increase stakeholder compliance with the policy.
- Use SPHM committee resources to gather existing policies and procedures related to patient handling mobility e.g., fall prevention, early mobility, post injury return-to-work policies, infection control etc. You may find that there are policies that overlap or are related and reside in different departments such as Human Resources, Quality/Risk Management, and Employee Safety and Health.
- If you have policies that overlap or are redundant, consider combining, simplifying them, and storing them in a location that is easily accessible for employees.

Safe Patient Handling and Mobility – Section 4

- Determine the structure of the policy. For example, do you want to develop a brief and simple policy statement and provide information about related procedures in supporting operating manuals, or keep program and procedural details within the policy document?
- Use a policy template that is approved by the organization if applicable. As you develop your draft policy determine what information will be included in the policy appendices, or referred to via cross reference (e.g., via intranet link) to another policy document that exists.
- Determine what written *procedures* need to be developed (*Refer to **Section 7***) or updated to address specific patient populations and clinical needs may have been identified during the *Gap Analysis* review described in **Section 3** of this toolkit. For example:
- SPHM related procedures that are unique to specific clinical areas such as, rehabilitation, critical care, emergency room, perioperative services, imaging, behavioral health, transportation, and outpatient clinics. For example, safe handling and mobility techniques for dependent or semi-dependent patients on a behavioral health unit or for critical care patients with delirium; for patients who require turning to a prone position for a clinical procedure, diagnostic test, or as part of care etc.
- SPHM procedures for specific patient populations such as, patients of size.

Include SPHM clinical algorithms that can aid decision making when assessing a patient's handling and mobility needs and help to determine the safest method to mobilize the patient. Refer to **Section 3** *Resources for Developing Solutions* and **Section 5** *SPHM Patient Mobility Assessment Tools*.

A list of other related SPHM related policies and procedures that should be reviewed can be found in **Tool 3a** *SPHM Gap Analysis tool*.

As you review and develop your SPHM policy, ensure that procedures meet any relevant laws and standards such as state SPHM regulations, state and local building standards related to installing ceiling lifts and use of electrically powered lift technology. Consider including a reference to the ANA SPHM standards that provide the framework and evidence base for a comprehensive SPHM program.

Consult with your organization's human resources and legal departments when drafting your SPHM policy and reviewing potential legal implications.



Quick Tip

SPHM policies differ widely in scope and content.

***Tool 4e* provides an example of a SPHM policy template.**

Other examples are included in the resources provided in the *Section 10*.

Safe Patient Handling and Mobility – Section 4

Implementing and Maintaining the SPHM Policy

- Determine when and how the policy should be shared with employees. This information should be included in your communications plan.
- Determine when enforcement of the policy will begin and what it will entail.
- Determine how often the policy should be reviewed for effectiveness and relevancy and who will conduct the review.
- Ensure that the policy and related procedures are easily accessible by all stakeholders including temporary or contract staff.

Implementation and evaluation of the SPHM policy and associated procedures is discussed further in **Sections 7 and 8**.

Example of the Elements that can be included in a SPHM Policy	
• Objectives or Purpose of the SPHM Policy • Policy Statement about the intent of the SPHM program and organizations' executive management commitment to support the program etc. • Scope of the policy • Definitions • Reference to state law (if applicable) and the ANA SPHM standards • Non-retaliation policy/reporting • Expected compliance with the policy • Information about patient handling e.g., scope and cost of injuries, why it is hazardous, high-risk tasks, etc. • Roles and responsibilities of specific groups within the program e.g., executives and management, clinical and non-clinical employees, SPHM coordinator and committee, SPHM unit champions or coaches, etc. • Incident /injury investigation considerations • Post incident review support of the injured employee (or reference to occupational injury management policy)	• How patient handling-related hazards are addressed e.g., ○ SPHM technology and ergonomics best work practices ○ SPHM patient mobility assessment protocols ○ Unit champions or coaches ○ Education and training Reporting procedures • Program evaluation • Record keeping/data analysis • Policy review timeline • Appendices, checklists, tools etc. This may include detailed information about: ○ SPHM technology - what, where, how to use etc. and protocols related to cleaning, supply, and maintenance ○ SPHM patient mobility assessment and communication protocols ○ Unit champions or coaches ○ Education and training • Links to other related information/resources for employees e.g., state SPHM laws; incident reporting access; internal on-line SPHM program resources.

Table 4.4 Elements of a SPHM Policy.

Step 10

Complete the draft SPHM program plan

By this stage of program development, hazards and risks associated with manual patient handling and mobility tasks have been identified and prioritized (**Step 7**), together with solutions to address and control hazards, including program elements to be developed and implemented. The program structure and approach to implementing the program have been determined; and potential barriers to implementing the program plan and specific solutions have been identified (**Step 8**). A communications plan, education, and training plan, and SPHM policy have been drafted (**Step 9**).

If not already completed, organize the above information in a project planning format (**Tool 4c**).

You can now formalize the written SPHM program plan that will be presented to leadership for approval prior to implementing the program.

The SPHM communications and education and training plans and policy should be kept with the program plan and integrated as needed to guide program implementation.

The SPHM program plan provides a 'road map' for development, implementation, evaluation, and sustainment of the SPHM program. The plan should include strategic elements that define the overall goals and objectives of the program (the 'what') and tactical elements that outline the specific actions and steps needed to achieve those goals (the 'how').

The systematic process used for identifying, assessing, and prioritizing patient handling-related risks using data and sound reasoning, is an essential component of strategic planning for program development. This approach facilitates effective allocation of resources to address risks while aligning the SPHM program with the organization's mission and strategic goals. Communicating this alignment in the program plan is critical when seeking leadership commitment to implement and sustain an SPHM program.

This approach enables leadership to effectively allocate resources to address risks while aligning the SPHM program with the organization's mission and strategic goals

Table 4.5 lists examples of the Strategic and Tactical elements that can be included in a SPHM program plan.

Strategic and tactical planning for the SPHM program is an ongoing process that occurs as the program grows and matures.

As you finalize the plan, consult with key stakeholders in your organization who can provide information that could affect the timeline of program implementation.

Consider drafting a contingency program plan that is scaled down in scope and targets only the highest risk patient handling tasks on a high-priority unit (*as determined in Section 3, Step 7*) that can be proposed to leadership if they do not approve your primary plan. **Refer to Step 11.**

Elements of a SPHM Program Plan - Example

Strategic Elements

- Program Vision, Mission, Scope
- Organization of the program, responsibilities of key stakeholders including the SPHM program coordinator and the committee, & reporting structure
- SPHM program linkage to other facility programs, e.g., wound care, infection control, bariatric, quality, rehabilitation therapy, employee health and safety, etc.
- The nature and severity of employee injuries related to patient handling and associated incident rates
- Direct costs of patient handling related injuries. Indirect costs and operational losses including costs related to patient safety as feasible (**Refer to Section 2**).
- Risk Assessment & Hazard Identification – summary of findings from:
 - Assessment of the organizational/safety culture and readiness for change.
 - Completion of a program gap analysis; employee and manager surveys and on-site visits.
- Identification and prioritization of high risk depts/units, patient handling tasks and patient populations including pilot unit(s) chosen (if applicable)
- Engineering and work practices solutions to address identified patient handling-related hazards and risks
- Clearly defined, measurable and realistic program goals, key performance indicators (KPIs), and measurement systems (employee & patient safety metrics) **Refer to Tables 4.6 and 4.7 and Section 8**
- Budget (financial and personnel) for immediate and future needs and economic justification e.g., return on investment (ROI). *Note – this will be finalized after SPHM technology is trialed and selected.*
- Barriers to program implementation and sustainability and approach to address them i.e., change management strategy to be used (**Refer to Section 7**)
- Evaluation of program interventions and processes
- Program sustainability
- Communications to constituents - social marketing (Who, What, How, When, etc)
- Written SPHM policy and procedures

Tactical Elements

- Plan for program rollout (What, Where, Who, When & How) **Refer to Figure 4.2**
- Hazard control and prevention

Note: You will not be able to finalize some of this information until SPHM technology is trialed and selected.

 - Plan for implementation of SPHM technology solutions/intervention and processes (trials, usability testing etc.) - Target units/departments

Elements of a SPHM Program Plan - Example

- i. *Engineering Controls - SPHM technology*
 - Selection to meet patient's clinical, physical, and cognitive needs; the task performed and physical environment
 - Sufficient quantity and easily accessible
 - Storage and battery charging
 - Changes needed to physical workspace to accommodate SPHM technology
 - Infection control procedures for SPHM technology (inc. slings)
 - Supply, storage and ongoing management of SPHM technology
 - Inspection schedules & maintenance procedures (inc. slings)
 - Future build or remodel projects and need for SPHM technology installation & considerations
- ii. *Administrative and Work Practice Controls*
 - SPHM patient mobility assessment and communication protocols (performed prior to moving and handling patients to ensure safety method to complete task)
 - SPHM protocols for each identified patient handling and mobility task to be addressed including procedures for specific patient populations/situations (**Refer to Section 7**); Wound and ostomy considerations when using SPHM technology such as patient lift slings. The role of SPHM technology in-patient rehabilitation related activities (**Refer to Section 7**)
 - SPHM unit champions/peer coaches
 - Clinical expert resource
- Education & training plan (initial and ongoing training) including development of instructional resources
- Injury Reporting & Management (**Refer to Section 7**)
 - Recommendations for facilitating injury reporting and the capture and analysis of injury data
 - Post incident procedures inc. incident investigation/*After Action* review and
 - Injury management inc. processes to facilitate return to work i.e., modified duty programs
- Plan to *prevent* patient handling-related risk/hazards
 - Incorporating SPHM and ergonomics into the design of new and remodeled workspaces and healthcare facilities, and in new or modified processes/procedures and changes in service line
 - Proactive evaluation/audit of patient handling tasks; SPHM equipment and process use and patient experience, etc
- Ongoing program evaluation and improvement; reporting, project tracking & documentation of processes; sharing program outcomes etc.

Table 4.5 Elements of a SPHM Program Plan.

Safe Patient Handling and Mobility – Section 4



*Committee activities:

- Market program to managers and staff etc.
- Sling management and storage finalized
- Patient assessment/communication protocols involving the pilot patient care units, key nursing, and rehabilitation stakeholders
- Written procedures for specific patient populations and patient handling-related situations
- Education & training detailed planning, materials developed etc.
- Program evaluation

Figure 4.2 Example of the Timeline for SPHM program roll-out -Year 1.

Safe Patient Handling and Mobility – Section 4

Key components of the SPHM program plan include well defined measurable and realistic program goals and measurement systems, and financial justification for purchase of SPHM technology and implementation of program elements. These are discussed below.

Determining Specific Measurable Goals for the SPHM Program

The broad SPHM program goals identified at the beginning of program development activities (**Refer to Section 2**) should now be finalized to include specific measurable program outcomes. *Refer to Section 8 for more information about measuring the effectiveness of SPHM interventions and processes.*

Define whether the metrics and goals apply to certain units or departments, such as pilot program locations and identify those target areas. Identify a timeline for expected results.

Short-and long-term program goals should be defined; however, it may only be possible to set board long term goals e.g., for years 2-5 of the program at this stage of program planning. Once initial program implementation and evaluation activities are completed, additional data will be available to assist the committee and leadership determine attainable goals for the future.

Using SMART objectives can be helpful when developing specific program goals. SMART stands for specific, measurable, achievable, relevant, and time-bound.

Definition of SMART Objectives (Source: SAMHSA, 2025)		
What is the SMART criteria?		
S	Specific	What will be accomplished? What actions will you take? Objectives are clearly stated so anyone reading it can understand what will be done and who will do it.
M	Measurable	What data will measure the goal? (How much? How well?) This helps you determine if you are making progress. It keeps you on track and on schedule
A	Achievable	Is the goal doable? Do you have the necessary skills and resources? Setting reasonable objectives helps set the project up for success
R	Relevant	How does the goal align with broader goals? Why is the result important? it fits the purpose of the program, it fits the culture and structure of the organization, and it addresses the vision of the project
T	Time-Bound	What is the time frame for accomplishing the goal?

There are many measures that may be used to evaluate SPHM program performance and progress towards goals. Examples are provided in **Table 4.6**.

However, it is recommended to limit the metrics chosen and keep measurement tools/systems simple especially at the start of the program. This allows you to effectively demonstrate outcomes and in turn gain support for program expansion and sustainability.

Safe Patient Handling and Mobility – Section 4

The measures chosen should be able to quantify current conditions (lagging indicators) and to provide insight into the future (leading indicators). Lagging and leading indicators are discussed in **Section 8**.

Measures, Metrics, and Indicators

- It is important to note that the terms “measure,” “metric,” and “indicator” are frequently used interchangeably, and their meanings may differ across organizations. (BetterEvaluation, ND) contexts
- Within this toolkit, the following definitions apply to these terms; however, ensure that these terms and their associated meanings are consistent with the usage within your organization.
- *Measures* are raw, quantitative data such as patient handling related injuries and results of employee SPHM surveys that are needed for performance tracking and are generated from tools, mechanisms, and program evaluation systems.
- *Metrics* offer context for measures by examining trends, relationships, or patterns in the raw data to assess performance over time and progress toward a goal. . For example, this can include changes and trends in the number of patient handling-related injuries reported across two years, or comparisons between employee SPHM survey results after program implementation in year 1 versus year 2.
- *Key Performance Indicators (KPIs)* are a subset of metrics, specifically chosen because they directly measure performance against specific strategic goals and objectives. In the case of a SPHM program the objective is to reduce caregiver injuries and associated costs related to patient handling. However, as noted in **Section 1**, SPHM activities can improve patient outcomes; therefore, it is important to include a well-defined, measurable patient safety KPI, such as reduced incidence of patient falls resulting in injury.

Establishing, monitoring, and reporting Key Performance Indicators (KPIs) clarifies whether programs goals are being met and informs ongoing program improvement strategies.

When determining KPIs for the program consider:

- What is the desired outcome? Refer to **Table 4.7** for examples
- How will you measure progress?
- How can tactical strategies in the SPHM program plan assist in achieving desired results?
- How often will you evaluate performance?
- How will you know when each KPI is achieved?

Choose metrics that are directly related to achieving the program’s strategic goals.

Program measurement systems including KPIs chosen should be discussed and approved by leadership when finalizing the program plan. The SPHM KPIs should be consistently tracked, reviewed, and discussed as part of the organization’s business metrics dashboard to support the implementation of SPHM activities aimed at reducing employee and patient injuries throughout the organization.

SPHM Program Measures		
Employee Patient-Handling Related Injuries • # of Patient-Handling Related Injuries • Total recordable injury/incident rate (TRIR) per 100 clinical area full-time employees (FTEs) • Lost workday (LWD) incident rate • Days Away Restricted or Transferred (DART) rate per clinical area FTEs • Average number of LWDs per injured worker per injury • Number of injury cases • Number of lost workday cases • Total (and/or average) Workers' Compensation cost • Total (and/or average) costs to replace an injured employee can be permanent or temporary replacement costs, i.e., caregiver who is injured and away from work and/or modified duty per shift • Non-OSHA recordable cases/incidents (can be tracked as numbers and/or rates)	Patient-related As related to mobility and use of SPHM to promote patient mobility • Hospital acquired conditions: – Pressure injuries – Ventilator and non-ventilator acquired pneumonia – Venous thromboembolisms – Falls with injury • Goals for ambulation per shift/missed repositioning and ambulation • Length of stay • Readmission within 30 days • Functional Independent Mobility scores (rehab-related)	Organization-related • Nursing turnover rate • Employee satisfaction • Patient satisfaction • Measurement of program processes and activities, e.g., training compliance and effectiveness; SPHM technology utilization; SPHM process utilization such as, SPHM mobility assessment • Benchmarking against: – ANA SPHM interprofessional standards – OSHA program checklist – State SPHM standards – Facilities within a health care system – ISO 45001:2018 Occupational health and safety management systems. Requirements with guidance for use. (AIHA, 2024)

Table 4.6. Examples of SPHM Program Measures

Considerations when Determining Measurable SPHM Program Goals

It is important to ensure that leadership understands there will be program goals that the SPHM committee feel may *not* be feasible within the first year of the program, such as being able to substantially reduce the *number* of patients handling related incidents (e.g. non-OSHA and OSHA recordable cases) because early reporting of injuries will be promoted.

Encouraging early reporting of work-related incidents and injuries at the start of a safety program can cause an initial increase in the incident rates, but a decrease in severity rates and costs.

Setting and controlling goals for reduction in the number of injuries that involve days away from work and/or modified duty and the number of days away from work and/or on modified duty, will be influenced by how injury claims are managed by the organization and state worker compensation laws.

SPHM committee members from employee health and human resources departments can help determine realistic goals based on injury management practices and workers compensation regulations.

Ensure baseline data for *patient safety and quality related metrics* that may be evaluated is accurate and reliable so that relationship between a SPHM intervention(s) on patient outcomes can be clearly defined. For example, if measuring a reduction in patient falls, baseline data used is the number and severity of patient falls that occur when staff perform a standing transfer or ambulate a patient and *does not* include falls that occur if a patient attempts to get out of bed while unattended.

Using SPHM patient assessment protocols and appropriate SPHM technology to mobilize patients can then be evaluated related to decreasing patient falls.

Table 4.7 provides examples of measurable goals for the first year of an SPHM program. Goals should be based on reliable and accurate data that was collected during the program planning activities (**Sections 2 and 3**).

Goals for the First Year of an SPHM Program - Example

SPHM Program Specific Goals –Year 1

Define if goals apply to one or multiple units/departments and identify those target areas.

Employee injuries related to patient handling and mobility

- Reduce the number of OSHA recordable injuries by **25%**
- Reduce the number of lost workday cases injury cases and the severity (# days away from work) by **50%**
- Reduce the number of restricted workday cases and severity (restricted duty days) **by 50%**
- Reduce TRIR and DART rates **by 25%**
- Reduce workers' compensation costs (direct costs) **by 50%**
- Reduce indirect costs related to temporary replacement of nursing staff who are on restricted duty and/or away from work by **50%**

Goals for the First Year of an SPHM Program - Example

- Decrease in musculoskeletal discomfort in nursing staff by **75%**
 - *This goal would be applicable if a MSDS symptom survey (**Refer to Section 3**) was conducted to determine baseline data*
- Decrease WMSDs risk from **high risk to low risk** e.g., as measured with REBA analysis tool
 - *This goal would be applicable if risk factors for WMSDs were quantified by ergonomics analysis before and after implementation of the program (**Refer to Section 3**)*

Patient safety related metrics

- **Reduce** falls and 'near-miss' events (i.e., manual fall prevention) associated with bed to/from chair transfers and ambulation per 1000 patient days **by 50%** and
- **Meet early mobilization goals per physician and rehabilitation orders** e.g., ensure patients are **ambulated x 3 daily**; transferred from **bed to chair x 3 daily**

Define when measurement of program goals will begin e.g., when all SPHM technology and processes are in place and after a majority of staff training is completed.

Note: Measurement of SPHM process goals can be added to the Specific Goals listed above e.g., number of employees to be trained; specific SPHM protocols to be completed etc., **Refer to Section 8 for more examples.**

Table 4.7 Example of Goals for the First Year of an SPHM Program.

Demonstrating the Value of the SPHM Program to the Organization

Recommendations to address patient handling-related hazards typically need to be supported by formal cost benefit analysis (CBA) and demonstration of return on investment (ROI) e.g., how long will it take for the organization to recover the full costs (**Table 4.7**) of installation of ceiling lifts and purchase of other SPHM technology. A CBA systematically evaluates whether the financial benefits of implementing SPHM technology exceed the associated costs.

The outcome of the analysis can be used to guide decisions and obtain buy-in from leadership when benefits exceed costs.

Factors to consider when identifying benefits versus costs of an SPHM program are shown in **Table 4.8**.

*Resources To Help You Make a Business Case for SPHM are listed on **page 4-31**.*



Quick Tip

Tools that provide more information when developing the business case for an SPHM program:

2c. for more information on calculating costs of SPHM incidents and

2d. Analyzing injury data and direct costs

3h. for determining effectiveness of a solution to eliminate or reduce the risk factors versus cost effectiveness of a solution.

7b. provide examples of elements to consider when calculating cost of the SPHM program and calculating ROI

Safe Patient Handling and Mobility – Section 4

When developing your cost benefit analysis consider the following:

1. What problem do you want to solve by spending this money?
2. How much is this problem costing the organization?
3. How much will it cost to fix the problem?
4. How long will it take before the hospital has saved money by addressing the problem equal to the cost of the problem (the ROI) ?

(LaDuke 2020; Kielich et al., 2025)

You will not be able to finalize a program budget and ROI until SPHM technology is chosen.

Finalizing the budget occurs after:

- A formal trial of SPHM technology to gain employee input and determine the best technology to meet program needs
- A review of the physical structure to determine if installation of ceiling lifts is feasibility (as applicable), and
- Final quotation for purchase and installation of SPHM technology.

When requesting leadership approval of the SPHM program plan (**Step 11**), you will also ask for their approval to conduct formal SPHM technology trials, after which you will present a final program budget for their approval.

Refer to Section 7 for more information about selection, purchase, and approval of SPHM technology.

However, it is possible to develop an estimate of costs and benefits at this stage. SPHM technology vendors can provide estimated costs of product purchase, supplies, and maintenance.

Purchase of SPHM technology often requires use of capital budget funding. Your program champion and other managers on the SPHM committee should be able to assist with the process to request capital funds including the *timeframe* to make requests and process to distribute funds.

Program implementation may be impacted if the capital approval cycle was just completed and you have to wait another 9 months for the next one e.g., to obtain approval for installation of overhead lifts.

The committee should determine if there are 'lower tech' SPHM solutions that could be purchased as non-capital items to help meet immediate patient handling needs such as washable or disposable friction-reducing devices for transfers and repositioning.

Unit/department managers may be able to purchase these devices depending on their supervisory budget limits. They may also be aware of other funding



Quick Tip

Do not forget to check with your worker's compensation carrier to see if they will provide a discount on future premiums and/or reimbursement if the number and severity of patient handling-related claims is reduced because of the SPHM program.

Some state government entities such as OSHA offer grants for ergonomics related worksite improvements and/or development of training programs.

Check your state's Department of Labor and Industries or your state's OSHA-approved plan websites.

Safe Patient Handling and Mobility – Section 4

sources in the organization that may be available e.g., from safety/risk management budgets, hospital related foundations, etc.

Resources To Help You Make a Business Case for SPHM

- **The Facilities Guidelines Institute (FGI) Second Edition of the Patient Handling and Mobility Assessments (PHAMA)** provides further information about cost-justification of SPHM programs in 'Chapter 3: Making the Business Case for a Safe Patient Handling and Mobility Program'. The guidelines can be downloaded from <https://www.fgiguideguidelines.org/resource/patient-handling-and-mobility-assessments-2nd-ed/>
- **The Institute for Healthcare Improvement/National Patient Safety Foundation** offers a free toolkit to guide collaboration among health professionals and financial leaders to demonstrate the value and return on investment for safer, quality care. The '*Optimizing a Business Case for Safe Health Care: An Integrated Approach to Safety and Finance*' toolkit, can assist you develop business case for employee and patient safety initiatives and can be accessed at <http://www.ihl.org/resources/Pages/Tools/Business-Case-for-Safe-Health-Care.aspx>
- **Other useful tools/articles:**
 - **OSHA Safety Pays Tool**
<https://www.osha.gov/dcsp/smallbusiness/safetypays/estimator.html>
 - **WorkSafe BC Workplace Incident Cost Calculator**
http://worksafebcmedia.com/media/calculators_html5/wicc/index.html
 - **The AIHA Business Case in Environmental Health and Safety (EHS) Tool**
<https://www.aiha.org/public-resources/consumer-resources/apps-and-tools-resource-center/business-case-tool>
 - Dang, T., Roberts, D., Murray, A., & Wiggermann, N. (2022). **A return-on-investment model using clinical and economic data related to safe patient handling and mobility programs in the ICU.** *International Journal of Industrial Ergonomics*, 92, 103372.
<https://www.sciencedirect.com/science/article/pii/S0169814122001135>

Factors to Consider when Demonstrating the Value of an SPHM program Benefits vs. Costs

Financial Benefits of Solution(s)

Decreased:

- **Direct costs** of patient handling related injuries e.g., workers compensation costs
- **Indirect injury costs e.g.,** associated with temporary replacement of employees who are away from work and modified duty, and incident investigation and management costs etc.
- **Operational Benefits**
 - *Staff Related*
 - Decreased cost of staff turnover such as costs from job transfers to less physically demanding roles and replacing employees who are permanently disabled due to manual patient handling injuries.
 - Improved job satisfaction and morale associated with reduced burnout and presenteeism and the impact of losing a team member temporarily or permanently due to a patient handling injury etc.
 - *Quality of Care/Service*
 - Impact on patient safety and satisfaction associated with:
 - Decreased omission or delay in care related to tasks such as patient ambulation and repositioning.
 - Improved early, safe, and progressive patient mobility resulting decreased:
 - Patient injuries during mobility
 - Pressure ulcers
 - Length of patient stay
 - Fall rates and an

Increase in dignity, security, satisfaction with mobility

Cost of the Program & Solution(s)

- Program administration - staff time & costs i.e., SPHM coordinator & Steering Committee
- SPHM technology costs including accessories such as slings
- Staff time for evaluation of SPHM technology/program processes/pilot programs
- Facility Design - equipment installation e.g., for ceiling lifts
- Structural expense/Storage
- Maintenance (preventative and as needed) including training of staff as applicable
- Cost of replacement parts for equipment due to breakage, loss or theft, or 'life' of equipment and/or components
- Cost of borrowing money if financed
- Communication tools
- Employee training. Costs related to training:
 - Initial
 - Periodic
 - As needed

Cost related to staff time away from work to attend training and staff backfill; trainers; development of training content and training materials; training location; supplies; tracking attendance and other documentation etc. (*Refer to your Education and Training plan*)
- Time to provide input on renovation and building projects and cost of new equipment when expansion is planned
- Costs of a SPHM unit peer champion/coach program
- Program evaluation activities i.e., surveys, data analysis, and report development

Factors to Consider when Demonstrating the Value of an SPHM program Benefits vs. Costs	
• Operational Benefits cont.: ○ <i>Improved Efficiency related to:</i> – The potential need for <i>fewer</i> caregivers especially when mobilizing patients of size, combative patients, and patients with complex clinical needs – Reduced health care worker fatigue that may contribute to clinical/medical error and other occupational injuries such as, slips, trips, and falls due inattentiveness, and/or non-patient handling related MSDs. ○ Other – Improved Regulatory & Legal compliance e.g., avoiding citations and fines for not meeting state SPHM law; OSHA General Duty Clause ; CMS Age Friendly Hospital related measures, etc.	

Table 4.8 Factors to Consider when Demonstrating the Value of an SPHM program.



Something to Think About

What Approach Should We Take to Measure and Demonstrate the Value of SPHM Programs?

- Understand the business (from leadership and senior management's perspective)
- Move from injury reduction to assisting to achieve organizations' business goals
- Move from overhead to bottom line
- Know and be of use to your customer
- Prioritize needs
- Understand how financial information is presented at your facility

(Alexander, 1994; Bhattacharya & McGlothlin, 2012)

Cost-benefit information plays a significant role in decision-making, but decision-making is a complex process. It is therefore more valuable to highlight how investment in safety and health (SPHM) contributes to the achievement of company objectives company goals, such as safe patient care, rather than simply stating its costs (De Greef et al, 2004).

The cost of occupational injuries and illness represents money taken away from patient care and families of employees (UW, 2011)

Step 11

Obtain approval of the SPHM plan and policy from senior leadership

The SPHM committee should then determine how the draft SPHM program plan and SPHM policy will be communicated to senior leadership for approval. Use approved protocols that already exist in your organization for presenting and gaining project approval by senior leaders.

Tool 4f provides a sample of how the SPHM program can be summarized for presentation to leadership. Your project charter (if developed) could also be expanded to provide a summary of the overall program etc.

Presenting the draft SPHM program plan and policy to senior leadership enables them to ask questions, clarify issues, and understand their role in program implementation. It allows the SPHM committee to revise the plan as needed based on leadership input. Be prepared to discuss your contingency program plan as needed (**Refer to Step 10**).

A formal presentation can also boost leadership commitment, encourage active support, and enable them to demonstrate their commitment to preventing caregiver and patient injuries associated with manual patient handling.

If you are presenting your plan during a regularly scheduled leadership meeting or during a stand-alone meeting, make sure to schedule your presentation well in advance and request enough time for the presentation and discussion etc., to avoid delay of program implementation.

The SPHM project coordinator together with the program champion should present the plan with assistance from key members of the SPHM committee. Committee members such as managers of potential pilot units/departments, rehabilitation staff, employee safety and health and patient safety, should be present to provide additional insight as needed related to program implementation that involves their unit/department or professional care services delivered.

Leadership should be familiar with the SPHM initiative if they have been engaged as described in **Section 2, Step 3**, and have received updates about development of the SPHM program plan and related activities from your program champion.

Ideally, any concerns from leadership about proposed project activities related to resources and timeline for implementation will have been passed along to the SPHM committee and considered during development of the draft SPHM program plan.

Review the **'Tips for presenting to Leadership'** that are described in **Section 2** of this toolkit when planning your presentation.

Your presentation should enable leadership to have a clear understanding of the following:

- A summary of why the SPHM program is needed, the planning activities that the leadership previously agreed to support and the goal of the meeting
- The program planning steps completed to date
- The scope of the program and policy
- SPHM program objectives (short- and long-term) with timeline and measurable outcomes

Safe Patient Handling and Mobility – Section 4

- Recommendations (i.e., what program activities need to be implemented, sequence of implementation such as pilot initiatives and related rationale) including trials of SPHM technology and finalization of the program budget for leadership review
- How recommendations will be implemented including resources needed and cost justification as applicable
- Any potential barriers that have been identified and how they will be addressed
- Roles and responsibilities of stakeholders involved implementation
- Proposed timeline for implementation activities
- How the program will be managed and sustained, and outcomes and process evaluated

Provide the leadership group with your program summary that you developed in *Step 10* and have project details (electronic or printed) available upon request.

Step 12

Finalize the SPHM program plan and policy

Incorporating senior leadership recommendations, the SPHM coordinator and committee can then finalize the SPHM program plan and policy and start implementing the strategy to select SPHM technology through formal trials (***Refer to Section 7***).

Leadership should provide guidance about what and how communication of initial SPHM program efforts to managers and employees should be conducted at this stage of program planning and implementation.

Section Summary



Hazard Control and Prevention

Step 8. Develop solutions to address and control hazards

The SPHM committee together with other stakeholders such as managers and employees of priority units/departments determine what SPHM technology, processes and program elements need to be developed and implemented to eliminate or minimize identified hazards and risks to achieve a successful and sustainable SPHM program.

Developing the SPHM Program Plan

STEP 9. Create a communications plan, education, and training plan, and SPHM policy

The Communications plan is a key tool that will help engage all stakeholders in the SPHM program and facilitate culture change.

Developing an education and training plan helps to determine resources (budget, personnel etc.), that are needed to implement an ongoing employee/stakeholder SPHM training program.

Creating or updating an SPHM policy communicates the organization's commitment to preventing patient handling injuries and promoting safe care.

It defines the purpose, procedures, and responsibilities for using SPHM technology and evidence-based practices to minimize risks for both employees and patients.

Step 10. Complete the draft SPHM program plan

The draft SPHM program plan provides a 'road map' for development, implementation, evaluation, and sustainment of the SPHM program. The plan includes strategic elements that define the overall goals and objectives of the program (the 'what') and tactical elements that outline the specific actions and steps needed to achieve those goals (the 'how'). Specific measurable goals for the SPHM program and a proposed timeline for implementation are incorporated into the plan.

Step 11. Obtain approval of the SPHM plan and policy from senior leadership

Formally presenting the draft SPHM program plan and policy to senior leadership enables them to ask questions, clarify issues, and understand their role in program implementation. It allows the SPHM committee to revise the plan as needed based on leadership input.

Step 12. Finalize the SPHM program plan and policy.

Incorporating senior leadership recommendations, the SPHM coordinator and committee can then finalize the SPHM program plan and policy and start implementing the strategy to select SPHM technology through formal trials.

Additional references and resources related to this Section are listed in **Section 10**.

Safe Patient Handling and Mobility – Section 4

Reference and Resources Used in this Section

- Accident Compensation Corporation. (2012). ACC6075 Moving and handling people guidelines. New Zealand. <https://www.acc.co.nz/assets/provider/acc6075-moving-and-handling-people-guidelines.pdf>
- Action Planning Tool Infographic for the AHRQ Surveys on Patient Safety Culture® (SOPS®). (2024, February). Agency for Healthcare Research and Quality. (Prepared by Westat, Rockville, MD, under Contract No. GS-00F-009DA/75Q80123F80005). AHRQ Publication No. 24-M004.
- Alexander, D. C. (1994, October). The economics of ergonomics. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 38, No. 10, pp. 696-700). Sage CA: Los Angeles, CA: SAGE Publications.
- American Industrial Hygiene Association (AIHA), Association of Safe Patient Handling Professionals (ASPHP), & American Nurses Association (ANA). (2024, November). Safe patient handling and mobility (SPHM): A process to protect health care workers and recipients (White Paper). Falls Church, VA: Author. <https://www.aiha.org/education/white-papers/safe-patient-handling-and-mobility-sphm-a-process-to-protect-health-care-workers-and-recipients>
- American Nurses Association. (2021). Safe patient handling and mobility: Interprofessional national standards across the Care Continuum. 2nd edition American Nurses Association; 2021. Silver Springs, MD
- Association of PeriOperative Registered Nurses. (2015). Pocket reference guide: Safe patient handling and movement in the perioperative setting. https://www.aorn.org/docs/default-source/aorndocuments/toolkits/safe-patient-handling/safe-patient-handling-pocket-reference-guide.pdf?sfvrsn=36a9944f_0
- BetterEvaluation ND. <https://www.betterevaluation.org/frameworks-guides/rainbow-framework/describe/use-measures-indicators-or-metrics>
- Bhattacharya, A., & McGlothlin, J. D. (Eds.). (2012). *Occupational ergonomics: theory and applications* (2nd edition). CRC Press.
- Brace, T., & Nusser, J. (2021, April). Guided brainstorming: A method for solving ergonomic issues. Professional Safety PSJ, 35-39.
- Cote, C. (2020, October). Why is strategic planning important? Harvard Business School. <https://online.hbs.edu/blog/post/why-is-strategic-planWning-important>
- De Greef, Marc, Karla Van den Broek, Javier Pinilla, Lluís Pujol, and Jesús Portillo. "Quality of the working environment and productivity." In *Workshop Dortmund*, vol. 8, pp. 11-2004. 2004.
- Harvard T.H. Chan School of Public Health Center for Work, Health, and Well-being (August 2017). Implementing an Integrated Approach Weaving Worker Health, Safety, and Well-being into the Fabric of Your Organization https://centerforworkhealth.sph.harvard.edu/sites/default/files/10.12.17_Guidelines_Screen_post.pdf
- Kielich, R., Jaworski, T., Boynton, T., & Hopewell, N. (2025, June). Who handles the handling? A look at the need for a full-time dedicated Safe Patient Handling and Mobility Coordinator. American Nurse Journal. <https://www.myamericannurse.com/who-handles-the-handling/>
- La Duke P. Going for broke: Building a business case for safety. OHS Professional. March 2020:14-7. <https://issuu.com/safetyinstitute/docs/ohspromarch2020final?fr=sZGE3NDk4NDY0Nw>
- Matz M, Celona J, Martin M, McCoskey K, Nelson GG. (2019). Patient Handling and Mobility Assessments (2nd ed.); https://www.fgiguideelines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf
- Minnesota Department of Health. (n.d.). Objectives and goals: Writing meaningful goals and SMART objectives. <https://www.health.state.mn.us/communities/practice/resources/phqitoolbox/objectives.html>
- Prosci. (2023). Best practices in change management: 12th edition executive summary. <https://www.prosci.com/blog/change-management-best-practices>
- Registered Nurses' Association of Ontario. (2024). Leading change toolkit (4th ed.). <https://rnao.ca/bpg/leading-change-toolkit>
- SAMHSA - Substance Abuse and Mental Health Services Administration. (n.d.). Setting goals and developing specific, measurable, achievable, relevant, and time-bound objectives. <https://www.samhsa.gov/sites/default/files/nc-smart-goals-fact-sheet.pdf>

Safe Patient Handling and Mobility – Section 4

Satusky, M. J. (2021). Safe patient handling and mobility in the orthopaedic setting. *Orthopaedic Nursing*, 40(2), 60-63.

SMART goals. (2025, May 24). In Wikipedia. https://en.wikipedia.org/wiki/SMART_criteria.

University of California Smart Goals a How to Guide https://www.ucop.edu/local-human-resources/_files/performance-appraisal/How%20to%20write%20SMART%20Goals%20v2.pdf

VHA Center for Engineering & Occupational Safety and Health (CEOSH). (2016, January). Safe patient handling and mobility guidebook. St. Louis, Missouri. https://www.stryker.com/content/dam/stryker/education-and-training/focusrn/resources/caregiver-safety/implementation-tools/VA%20SPHM_PDF.pdf

Washington safe patient handling steering committee (2011). Safe patient handling programs are best practices guide for Washington hospitals. University of Washington NW Centre for Occupational Health and Safety.

Yount N, Edelman S, Sorra J, Gray L. Action Planning Tool for the AHRQ Surveys on Patient Safety Culture® (SOPS®). (Prepared by Westat, Rockville, MD, under Contract No. HHSP233201500026I/ HHSP23337004T). Rockville, MD: Agency for Healthcare Research and Quality; November 2022. AHRQ Publication No. 23-0011. <https://www.ahrq.gov/sites/default/files/wysiwyg/sops/sops-action-planning-tool.pdf>

Hazard Control and Prevention – SPHM Solutions

Contents

Hazard Control and Prevention – SPHM Solutions	1
Introduction	1
Engineering Controls	2
<i>Table 5.1. Overview of SPHM Technology Categories and their Patient Handling & Mobility Applications.</i>	4
Overhead Lifts	5
General Description	5
Applications for Overhead Lifts	7
<i>Table 5-2 Examples of Tasks that can be Completed using an Overhead Lift.</i>	9
<i>Table 5.3 Health Care Environments and Settings Where Overhead Lifts Can Be Used.</i>	11
Advantages of Using Overhead Lift Systems	11
Disadvantages and Challenges with Installing and Using Overhead Lifts	14
Overhead Lift Systems – Features and Configurations	16
Weight capacity	16
Charging	16
Hanger bars	17
<i>Table 5.4 Examples of Hanger Bar Styles and Configurations.</i>	19
Overhead lift controls	19
Overhead Lift Track Configuration	21
<i>Table 5.5 Overhead Track Configurations.</i>	26
Aesthetics	26
Overhead Lift Selection: Quantity, Location, Space Requirement, and Installation	27
<i>Table 5.6 Overhead Lift Configuration, Design, and Installation.</i>	29
Maintenance	29
Standards and Regulations related to use of Overhead Lifts	29
Portable Floor-Based Lifts	30
General Description	30
Advantages	32
Disadvantages	32
Floor-Based Lift Features	34
Weight capacity	34
Charging	34
Hanger bars	34
Controls	34
Storage	34
Quantity	35
Maintenance and Cleaning	35
Standards and Regulations Related to Use of Floor Lifts	35
Portable Sit-to-Stand Lifts or Aids	35
General Description	36
Advantages	37
Disadvantages	39
Sit-to-Stand Lift and Aid Features	39
Weight capacity	39
Charging	39
Controls	40
Storage	40
Quantity	40
Maintenance and Cleaning	40
Standards and Regulations Related to use of Sit-to-Stand Lifts and Aids	40
Slings for Patient Lifts	41
Description	41

Safe Patient Handling and Mobility – Section 5

Table 5.7 Sling and Hanger Bar Compatibility.....	44
Sling Types & Styles	45
Table 5.8 General Sling Categories, Associated Tasks, and Applicable Patient Populations.	59
Non-Rigid Sling Fabric or Material	59
Table 5.9 Leaving a Sling under a Patient.	62
Sling Laundry & Cleaning	62
Flammability.....	63
Sling Management.....	63
Choosing Slings.....	64
Considerations when determining sling quantity and type.....	64
Sling management processes to be developed.....	65
Storage.....	66
Periodic sling inspection	66
Sling Sizing	67
Table 5.10 Essential Body Dimensions for Sling Sizing.	69
Friction Reducing Devices (FRDs).....	70
General Description	70
1. Air Assist Transfer Devices.....	71
General safety considerations	73
Weight capacity and size	73
Storage.....	73
Cleaning	74
Maintenance.....	74
Quantity	74
Standards	74
2. Friction-Reducing Slide Sheets/Tubes	75
General safety considerations	77
Weight capacity & size	77
Storage.....	77
Cleaning	77
Quantity	78
Standards	78
3. Transfer Boards.....	78
Slider boards	78
General safety considerations.....	78
Short transfer boards	79
General safety considerations.....	79
Slider, Roller & Transfer Boards	80
Storage	80
Weight capacity	80
Cleaning.....	80
Quantity	80
4. Bed Overlay Systems for Repositioning	80
Fall Recovery.....	80
Fall Recovery for Patients who Cannot Stand with Minimal Assistance	82
1. Air Assisted Full Length Lifting Devices	82
General safety considerations	83
Weight	83
Storage.....	83
Cleaning	83
Maintenance.....	84
Quantity	84
2. Electric Inflatable Lifting Cushions.....	84
Weight capacity	84

Safe Patient Handling and Mobility – Section 5

Storage.....	85
Cleaning	85
Maintenance.....	85
Standards	85
3. Mobile Electric Chair and Platform Lifts	85
Weight capacity	86
Cleaning	86
Maintenance.....	86
Standards	86
Miscellaneous Assistive Devices.....	87
Gait Belts	87
Transfer Belts.....	87
Beds, Stretchers, Exam Tables, Transport Assistive Devices and Stretcher Chairs	88
Electric Profiling Beds	88
Stretchers/Gurneys	90
Height-Adjustable Powered Exam Tables	91
Transport Assistive Devices	91
Powered Devices for Non-Motorized Beds and Wheelchairs.....	91
Stretcher Chairs	93
<i>Table 5.11 Compatibility of SPHM Technology and Beds, Stretchers, Exam Tables and Stretcher Chairs.</i>	95
Selected Ergonomics Hygiene Equipment.....	95
Shower Trolley	95
Shower Chairs	96
Assistive Toilet Seats	97
Bathtub Lifts.....	97
Administrative Controls	98
How to Determine a Patient's SPHM Needs.....	98
SPHM Mobility Assessment and Decision-Making Tools.....	99
<i>Table 5.12 Common Elements of SPHM Mobility Assessment Tool.</i>	103
Why is a Standardized SPHM Mobility Assessment Protocol Needed?.....	104
Common SPHM mobility assessment and screening tools	105
<i>Table 5.13 SPHM Mobility Assessment and Decision-Making Tools.</i>	108
When is a SPHM Mobility Assessment Conducted?.....	109
Who Should Conduct an SPHM Mobility Assessment?	110
Documenting and Communicating a Patients' SPHM Needs	112
<i>Table 5.14 Factors to Consider When Developing an Individualized SPHM Mobility Care Plan</i>	116
Developing an SPHM Mobility Assessment Protocol	116
<i>Table 5.15. The Role of SPHM in Early Mobility Programs.</i>	121
Section Summary.....	122
Appendix A Published Research on the Benefits of Overhead Lifts in Hospital Specialty Departments and in Non-Hospital Settings	123
Appendix B Periodic Inspection and Maintenance of Overhead Lifts, Floor-Based Lifts and Sit-To-Stand Technology.....	125
Appendix C How Much SPHM Technology Do You Need?	127
Appendix D Cleaning and Disinfecting SPHM Technology	130
Appendix E Regulations and Standards Related to Design and Installation of SPHM Technology	134
Appendix F Sling and Lift Compatibility: A Brief Summary	138
Appendix G Sling Labels.....	141
References and Resources Used in this Section.....	144

Safe Patient Handling and Mobility – Section 5

Please note that photographs of Safe Patient Handling Technology (SPHM) technology included in this section are identified with the names of their manufacturers. They are reprinted with permission from and copyrighted by the manufacturers, all rights reserved.

Hazard Control and Prevention – SPHM Solutions

Introduction

This Section provides information about primary Engineering and Administrative Controls that can be used to mitigate the hazards and risks associated with manual patient handling tasks while enhancing patient safety (*Refer to Hierarchy of SPHM Controls in Section 1*).

Engineering controls are designed to isolate the worker from a hazard and reduce the risk of caregiver injury to as low as reasonably achievable.

The use of SPHM technology such as powered mobile patient lifts, ceiling or overhead-mounted lifts, and friction-reducing devices serve to reduce biomechanical load on the musculoskeletal system associated with manual patient handling. However, the effectiveness of SPHM technology to achieve this goal varies. Evidence supports that powered patient lift and transfer equipment are more effective in minimizing biomechanical demands related to manual patient handling than non-powered small aids such as sliding sheets. (AIHA, 2024; Frey & Davis, 2024).

SPHM Technology is the core component of a successful SPHM program however, having sufficient technology available does not guarantee that caregivers will use it. Effective utilization depends on having a comprehensive ongoing SPHM program supported by a systemwide culture of safety to address and mitigate the risk of work-related musculoskeletal disorders (WMSDs).

Administrative controls are also a key program component that must be implemented to facilitate safe use of SPHM Technology. Administrative controls do not eliminate or change a hazard, but aim to reduce the duration, frequency, or intensity of exposure to hazards through changes in work practices.

This section reviews SPHM mobility assessment protocols that help plan safe care and choose suitable technologies to meet patients' mobility needs.

Other administrative controls are addressed in other sections of this Toolkit and include:

- Using unit-based SPHM champions/peer coaches to support change in caregiver behaviors i.e., to use SPHM technology and ergonomics work practices appropriately (*Section 4*).
- Written SPHM policy and supporting procedures that are actively and positively enforced, followed, and maintained (*Section 4*).

Tools that Support Content in this Section

- 5a. SPHM technology purchasing checklist
- 5b. Sling safety checklist and tips for users
- 5c. Sling & hanger bar compatibility picture guide
- 5d. Sling inspection checklist
- 5e. Point-of-care pre-mobility safety check
- 5f. Ergonomics best practices for SPHM

Safe Patient Handling and Mobility – Section 5

- Education and training programs that are customized to stakeholders' job responsibilities and role within the SPHM program and facilitate caregiver use of SPHM technology and best work practices (**Sections 4 & 6**).

This toolkit does not cover specific SPHM technology and practices for patient populations with specialized SPHM needs including patients of size, pediatrics, or those with dementia. Please refer to **Section 10** for informational resources related to these topics.

Engineering Controls

The following provides descriptions of general categories of SPHM technology, including their purpose and specific features.

Information provided includes:

- General description
- How and where the technology can be used
- Advantages and disadvantages
- Weight capacity
- Storage considerations
- Maintenance
- Cleaning
- Determining quantity needed
- Standards and regulations related to design and use

The categories of SPHM technology outlined here are not exhaustive. This information serves as a *guide* for assessing and selecting suitable SPHM technology for a variety of care settings.

It is *essential* to consult the manufacturer's instructions and equipment manuals when selecting, utilizing, and maintaining SPHM technology. Caregivers *must* receive proper training in the use of all SPHM technology.

Non-mechanical small assistive aids, such as bed ladders, bed poles, and turning discs, are not addressed in this section. For more information about non-mechanical assistive aids see the Home Health, Long Term Care, and Emergency Medical Services resources in **Section 10**.

Selection of SPHM technology should occur *after* you have identified the patient handling related hazards to be addressed e.g., the type of lift, transfer, movement or patient care task, the needs of the patient population (physical and cognitive abilities and clinical needs), the physical environment where SPHM technology is to be used, and the work systems the equipment is used within (**Refer to Sections 2 - 4**). Strategies for choosing, purchasing, and implementing SPHM technology are discussed in **Section 7**.

Table 5.1 provides a summary of the general categories of SPHM technology described in this Section that may be used for lifting, repositioning, transferring, and mobilizing patients together with examples of the activities they can be used for.

This section also covers additional categories of health care equipment that support SPHM-related activities including beds, stretchers, exam tables, transport assistive devices, stretcher chairs, and selected ergonomic hygiene equipment.

Safe Patient Handling and Mobility – Section 5

SPHM Technology Task ↓ →	Overhead Lift	Powered Floor Lift	Powered Sit-to - Stand	Non- Powered Stand Aid	Air Assist Transfer Devices	Friction Reducing Sheets	Transfer Boards
Patients who can provide limited or no assistance to mobilize¹							
Repositioning in bed/ on exam or treatment surface (e.g., to head of bed, side to side/ turning for pressure relief and hygiene/ wound care tasks)	X With supine/ repositioning sling	X May be used with supine/ repositioning sling under appropriate circumstances as determined by a risk assessment			X	X	
Holding a patient on their side for hygiene and other care tasks	X With turning/holding sling/bands	X (See above) With turning/ holding sling/bands					
Limb holding e.g., during wound care	X With limb sling	X With limb sling					
Lifting a pannus	X With a pannus sling						
Placing patients in a prone position	X With supine/repositioning sling	X (See Repositioning above) With supine/repositioning sling			X	X	
Placing an x-ray plate under a who is in bed/on a stretcher/exam table	X With supine/repositioning or seated style sling				X	X	
Lateral Supine Transfers	X With supine/repositioning sling	X (See Repositioning above) With a rigid stretcher sling (some models)			X	X	X Slider/ roller boards
Seated Transfers	X With seated style sling; with supine/ repositioning sling in reclined position to reclining chair	X With seat style sling					

Safe Patient Handling and Mobility – Section 5

SPHM Technology Task ↓ →	Overhead Lift	Powered Floor Lift	Powered Sit-to - Stand	Non- Powered Stand Aid	Air Assist Transfer Devices	Friction Reducing Sheets	Transfer Boards
Patients who can provide partial assistance to mobilize¹							
Moving patient to edge of bed/treatment surface (in seated position)	X With limb sling to support leg(s)					X	
Standing Transfers	X With ambulation harness		X	X		X With ambulation harness	
Ambulation Including intubated patients as determined by a risk assessment	X With ambulation harness	X Some models of floor lift with ambulation harness.	X Some models	X Some models			
Rehabilitation Tasks Various	X Multiple tasks with appropriate sling ²	X Seated transfer & ambulation	X Stand, sit & balance therapies	X Stand, sit & balance therapies		X Assist with seated mobility tasks	X Short boards seated transfer
Other Miscellaneous Tasks							
Fall Recovery With no spinal injury - <i>Also Refer to Fall Recovery</i> in this Section for information about other fall recovery technology	X With supine/repositioning or seated style sling (no injury) Some models with a rigid stretcher sling if injury suspected	X If lift boom lowers close enough to the floor, with full support seated style sling (no injury) Some models with a rigid stretcher sling			X With air assist lift device		
Weighing a Patient	X	X	X Some models				
Vehicle Transfers	X With seated style sling	X Specialty models of floor lift with seated style sling	X (patient can partially bear weight)	X (patient can partially bear weight)	X With air assist lift device		X Full body (immobile patients). Short board for seated transfers

1. Refer to **page 5-99** and **Figure 5.45** for more information about selecting SPHM technology based on a patient's ability to mobilize.
2. Rehabilitation tasks include gait training with weight bearing adjustment; interactive balance training; sit-to-stand maneuvers; traversing stairs, and entry into and/or assistance during water therapy; range of motion exercises for limbs.

Table 5.1. Overview of SPHM Technology Categories and their Patient Handling & Mobility Applications.

Overhead Lifts

Overhead lifts (also known as ceiling lifts or hoists) were developed in Scandinavia and first introduced into healthcare applications in the early 1980s (Mechan and Wright, 2015).

Overhead lifts are considered the gold standard in SPHM technology due to their versatility, ease of use, efficiency, and minimal storage needs, in addition to significantly reducing injury risk for caregivers and facilitating early safe and progressive patient mobility. (Lee and Rempel, 2020; Latvala and Masterman, 2020).

Patient handling tasks that can be completed with overhead lifts are detailed in **Tables 5.1** and **5.2**.

Note: The term overhead lift is used in this toolkit because these lifts can be mounted on an overhead track that is attached to the ceiling or walls or on a free-standing gantry system in a patient care area.



Source: Alpha Modalities

General Description

An overhead lift consists of a motor that is attached to an overhead track or support bar via a trolley or device with rollers that allows the motor to be moved along the track either manually by the user or via powered control.

A strap that can be raised and lowered mechanically, connects the motor to a hanger bar (also known as a spreader or carry bar). The hanger bar is connected to a sling, that is used to support the patient's body. The caregiver uses a handset controller to raise and lower the hanger bar to move the patient. **Figure 5.1** illustrates examples of overhead lift motors and basic components. Overhead lifts are powered using a rechargeable battery system.

Some overhead lift motors incorporate the hanger bar or attachment points for a sling into the body of the motor (**Figure 5.2**). Refer to **page 5-17** for information about hanger bars.

The track system that supports the lift motor can be permanently connected to the building infrastructure in the ceiling, such as an I-beam or concrete floor or deck above the ceiling (ceiling-mounted) or attached to the structural components of a wall (wall-mount).

Overhead lift motors can also be connected to a free-standing gantry system that is composed of vertical supports and a support bar that can be placed over a bed or in a work area where patient care is to be provided.

An overhead lift motor that is mounted on a ceiling or wall-mounted system track or freestanding gantry system with a *single track* can only move in 2-directions (i.e., side to side) along the track.

XY Gantry or H-track overhead systems use a mobile traverse rail that is connected to two fixed tracks in the ceiling or on a gantry system, allowing the motor to be moved in 4 directions (i.e., side to side and front to back). This configuration increases functionality by allowing SPHM tasks to be performed in any location accessible to the lift motor within the range of the traverse track. **Figure 5.3** illustrates examples of how overhead track can be mounted in the ceiling or walls or free standing.

Safe Patient Handling and Mobility – Section 5

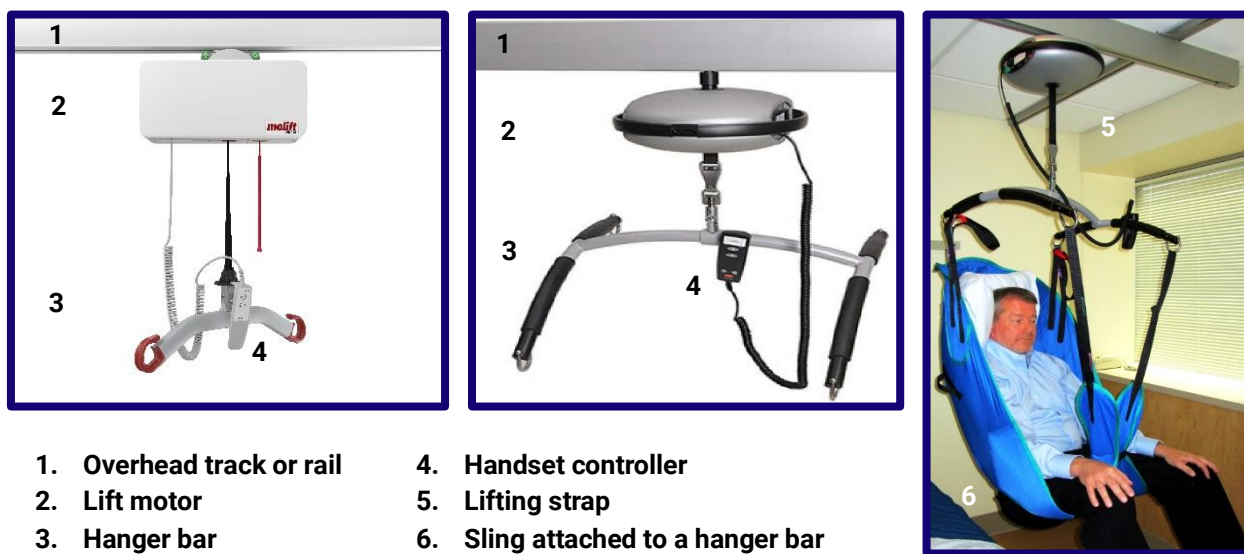


Figure 5.1 Examples of Overhead Lift Motors and Basic Components Parts.

Note: Design and location of controls vary by device manufacturer

Source: Etac/Molift; HumanFit, & Alpha Modalities

The size and orientation of the track system can be customized to fit the workspace such as a patient room, and the mobility needs of the patient population. For example, a track configuration with motor capacity up to 1000 lbs. to accommodate patients of size; or one that is installed to cross doorways or can follow a curve and/or change direction 90 degrees. *Examples of overhead track configurations are provided in Table 5.5.*

Overhead lift motors may be *fixed*, that is, they cannot be removed from the overhead track unless for maintenance or repair, or *portable* where the motor can be detached from the overhead track and attached to a compatible ceiling/wall mount track or gantry system in another patient care room or area.

Portable motors can be useful in settings such as nursing or residential homes where need for use in one location maybe lower within a 24-hour period than in a hospital setting (**Figure 5.4**).



Figure 5.2 Overhead Lift with Integrated Hanger Bar.

Source: Etac/Molift

Safe Patient Handling and Mobility – Section 5



1. Ceiling mounted single track

Source: Savaria



2. Ceiling mounted H-track



3. Wall mounted H-track

Source: HumanFit



4. Freed standing gantry with portable overhead

Source: Savaria

Figure 5.3 Examples of Overhead Lift Track Mounting.

Applications for Overhead Lifts

Overhead lifts can be used with a variety of sling types to allow caregivers to perform a majority of patient handling and mobilization tasks. They can be used to support patients who are dependent (passive) and need extensive assistance to be repositioned, lifted, or transferred, and to assist patients who are weight bearing and can participate in transfers (active) to meet mobility and rehabilitation goals.

Tasks that can be performed depend on the configuration of overhead track that the lift motor is mounted on, the style of hanger bar that is attached to the lift motor, the weight capacity of the lift system, and the type and design of sling available. Refer to **page 5-41** for information about slings.

Table 5.2 summarizes the primary patient handling and mobility tasks that can be completed using an overhead lift with the appropriate sling that is designed for a specific task(s).

Overhead lifts can be installed in a wide variety of health care settings and environments (**Refer to Table 5.3**).



Figure 5.4 Example of a Portable Overhead Lift Motor.

Source: Etac/Molift

Safe Patient Handling and Mobility – Section 5

Tasks Performed with Overhead Lifts

Repositioning in a bed, other treatment surface and chair e.g., turning for pressure relief and hygiene/wound care tasks, boosting, moving a patient to/from supine or seated position in bed, to a sitting position on the edge of the bed, and cartridge placement for portable x-rays.



Source:
Guldmann



Source: HumanFit

Tasks Performed with Overhead Lifts

Limb holding during dressing changes; turning and holding a patient on their side for hygiene and other care tasks such as catheterization.



Source: Baxter

Lateral transfers in a supine or a semi-reclined position between two surfaces, e.g., bed and stretcher or exam table, bed and cardiac or other chair that is in a reclined position.



Source: Alpha
Modalities/
HumanFit

Transfers in a seated position between two surfaces e.g., bed and chair, commode, or wheelchair; in and out of vehicles.



Source: Baxter

Safe Patient Handling and Mobility – Section 5

Tasks Performed with Overhead Lifts	Tasks Performed with Overhead Lifts
Fall recovery i.e., lifting a patient from the floor after a fall. Refer to <i>Fall Recovery</i> on page 5-81 for more information.  Source: Alpha Modalities	Placing patients in a prone position.  Source: Alpha Modalities
Bathtub, shower and toileting activities.  Source: Stock Image	Supporting a panniculus to provide access for care tasks.  Source: Alpha Modalities
Standing transfers and ambulation.  Source: Alpha Modalities/HumanFit	Rehabilitation tasks such as, gait training with weight bearing adjustment; interactive balance training; sit-to-stand maneuvers; traversing stairs, and entry into and/or assistance during water therapy.   Source: Guldmann Source: HumanFit

Not Shown – Weighing a patient. Lift motors can have scales incorporated in the motor or portable scale can be attached to the lift strap and hanger bar.

Table 5-2 Examples of Tasks that can be Completed using an Overhead Lift.

Safe Patient Handling and Mobility – Section 5

Healthcare Environments and Settings Where Overhead Lifts can be Used

Below are examples of healthcare environments where overhead lifts can be used if structural requirements permit.

Hospital Settings for example:

- Patient care units e.g., medical-surgical, intensive and cardiac care units, orthopedics, neurology/stroke etc.
- ED & Ambulance-vehicle bays



Source: Alpha Modalities

- OR
- Diagnostic imaging and treatment e.g., Magnetic Resonance Imaging (MRI) staging areas, Computer Tomography (CT), General Radiology (X-Ray), Radiation Oncology, Nuclear Medicine, etc.
- Procedural areas or suites, e.g., cardiac catheterization, gastrointestinal lab, infusion, dialysis, etc.
- Rehabilitation gyms
- Pediatrics



Source: Alpha Modalities



Source: Stock Image



Source: Stock Image

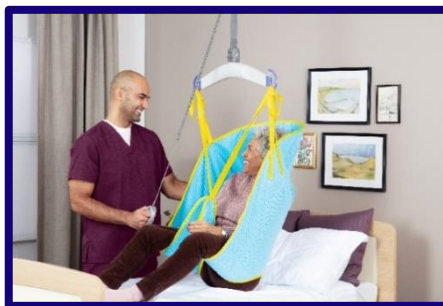
Safe Patient Handling and Mobility – Section 5

Healthcare Environments and Settings Where Overhead Lifts can be Used

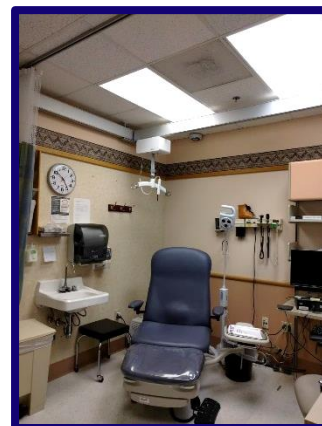
- Labor and delivery
- Wound care and Hyperbaric Therapy

They can also be used in other healthcare settings, for example,

- Outpatient clinics
- Long-term care facilities e.g., in resident bedrooms, bathrooms and living and therapy areas
- Dental offices
- Home care and recreational vehicles
- Adult foster care
- Schools
- Mortuaries and funeral homes



Source: ARJO



Source: VA, 2016

Published research on the benefits of overhead lifts in hospital specialty departments and in non-hospital settings is detailed in **Appendix A**.

Table 5.3 Health Care Environments and Settings Where Overhead Lifts Can Be Used.

Advantages of Using Overhead Lift Systems

Effectiveness at reducing the risk, incidence, and cost of WMSDs

The use of overhead lifts has shown to significantly reduce the incidence, severity, and costs, of WMSDs associated with patient handling and mobility (Abdul et al., 2023; Alamgir et al., 2008; Anyan et al., 2013; Chhokar et al., 2005; Jung & Bridge, 2009; Koppelaar et al., 2012; Miller et al., 2006; OSHA 2006; Ronald et al., 2002; Silverwood & Haddock, 2006; Tiesman et al., 2003; Vieira & Miller, 2008; Vinstrup et al., 2020).

Several studies indicate that overhead lifts are an effective and preferred solution to reduce caregiver injury when used as part of a multifaceted SPHM program (Weinel, 2008; Marras et al., 2009; Dutta et al., 2012; Lee & Rempel, 2020).

A study by Powell-Cope et al., indicates that increased access to overhead lifts, i.e., the number of beds with overhead lifts in a patient care area, is directly related to a decrease in WMSDs (Powell-Cope et al., 2014).

Overhead lifts reduce WMSD risk factors such as spinal compression and shearing forces more effectively than floor-based lifts. Floor lifts require greater application of force especially when moving a loaded lift over uneven or carpeted surfaces and/or in tight spaces (**Refer to Floor-Based Lifts on page 5-30**).

Safe Patient Handling and Mobility – Section 5

Efficiency

There is evidence that overhead lifts require *less time* to complete patient transfers than floor-based lifts (Curran & Fray, 2019).

Efficiency is *improved* when using overhead lifts because they are accessible at point of care for caregivers to use in real-time, minimizing delays in patient care. They reduce the need to change workspace layout (i.e., move furniture etc.) which is required when using floor-based lift equipment so that it can be maneuvered around furniture and over floors. Floor lifts, unlike ceiling lifts, also require sufficient clearance under beds, stretchers and around chairs to be functional.

Overhead lifts eliminate the need for floor storage e.g., storage closet or alcove (Mechan, 2014; Alamgir, 2009; Latvala & Masterman, 2020; Lee & Rempel, 2020; Matz et al., 2019; Wiggermann et al., 2024).

As noted in **Section 1**, time to retrieve SPHM technology is a key barrier to its use.

Wiggermann et al., reported that the ‘use of ceiling lifts is particularly effective in supporting SPHM practices,’ thereby enhancing caregiver adoption of SPHM protocols (Wiggermann et al., 2024).

The versatility of overhead lifts enhances efficiency compared to floor-based lifts or friction-reducing devices, which are limited in the range of patient handling tasks they can perform (**Refer to Table 5.1**).

In some circumstances, overhead lifts may also allow for operation by a single caregiver (Dutta et al., 2012; Nightingale Hammerson et al., 2024). *Refer to Single-Handed Care in Section 9.*

Anecdotally, it has been observed that overhead lift use is facilitated when:

- A repositioning sling remains under a patient in bed in a room with an overhead lift and
- Patients are boosted to the head of the bed with an overhead lift and repositioning sling while kept in a semi-reclined position (**Figure 5.5**). Once moved up in bed and with the patient lifted off the bed, turning is completed by placing pillows or wedges under one side of the patient prior to lowering the lift.

Time to complete this task is reduced as the head of the bed *does not* need to be adjusted and intravenous lines and other medical devices that may be attached to the patient often require less management. In some cases, it was observed that caregivers can turn and boost dependent patients using this method in about *1 minute*.

In comparison, the process of adjusting lines, lowering the head of the bed, positioning the bed in Trendelenburg to utilize gravity, manually repositioning the patient with a drawsheet, levelling the bed, raising the head again, and readjusting lines required approximately *4-5 minutes* to complete.

Overhead lifts may lower the risk of missed nursing care related to patient repositioning and ambulation due to their accessibility, ease of use and in some circumstances, the need for fewer caregivers.



Figure 5.5 Semi-reclined Position used for Boosting a Patient up in Bed Quickly or for Transferring a patient to a Reclining Chair or Stretcher.

Source: Alpha Modalities

Safe Patient Handling and Mobility – Section 5

Cost and return on investment

Research indicates that the return on investment (ROI) when installing overhead lifts is between 2 and 6 years, depending on whether only direct or both direct and indirect cost savings from fewer musculoskeletal injuries are measured. Indirect costs include items such as, the cost of temporary or permanent caregiver replacement, time to investigate incidents, and management of injury claims (Yassi et al., 2002; Chhokar et al., 2005; Joseph & Fritz, 2006; Alamgir et al., 2007; Dang et al., 2022).

A similar return on investment has been reported when implementing comprehensive SPHM programs that include overhead lifts and other SPHM equipment (Siddharthan et al., 2006). This is especially important considering that overhead lift systems can have a working life of 10 years or more if properly used and maintained.

Impact on patient outcomes

Research on patient outcomes related to the use of overhead lifts is limited. Alamgir et al., reported no positive or detrimental relationship was found between patient outcomes such as falls and pressure ulcers and overhead lift coverage, however, the use of overhead lifts was viewed as favorable by patients (Alamgir et al., 2009).

Weinel reported that patients rated overhead lifts to be comfortable, safe, and secure when used in a spinal cord injury unit at a Veterans Hospital (Weinel, 2008). Enos & Hess, 2011, reported similar findings when asking patients about their experiences prior to discharge from a Critical Access Hospital in Oregon (Enos & Hess, 2011).

Overhead lifts with the appropriate sling can safely mobilize patients of different physical and cognitive abilities, making them valuable for promoting safe, early, and progressive mobility and preventing patient falls.

Research shows that SPHM technology use in general is linked to positive patient outcomes, including fewer skin tears, less pain, improved dignity, better continence, and reduced aggression (**Refer to Section 1**).

Benefits for care of patients of size

Overhead lifts are recommended when caring for non-and partially mobile patients of size. Some models of overhead lifts have a load capacity of 1200 lbs.

Some floor-based lifts can support a load of 600-1000 lbs. but moving them under heavy loads requires more force and increases the risk of WMSDs (**Refer to Floor-Based lifts on page 5-30**).

More caregivers are often required when using a larger capacity floor lift and greater workspace is needed for safe maneuverability. They also require more storage space than regular capacity floor-based lifts (Muir & Archer-Heese, 2009; VHA 2015; Gallagher, 2015). Overhead lifts generally provide more clearance above beds, making repositioning and mobilization easier than with bariatric floor lifts, which may not have sufficient vertical lift clearance, or fit under bariatric beds or around chairs.

The Facility Guidelines Institute (FGI) Guidelines for Design and Construction of hospitals and outpatient facilities (<https://fgiguideelines.org/>), details specific requirements for designing patient care areas to

Safe Patient Handling and Mobility – Section 5

accommodate the patients of size including space required to perform SPHM tasks and the number of overhead lifts recommended (Matz, 2019).

Overall, several studies have indicated that overhead lifts are favored over floor lifts amongst nursing staff (Lee & Rempel, 2020; Dutta et al., 2012).

Overhead lifts offer key biomechanical and efficiency benefits, making them the preferred SPHM technology for addressing patient handling WMSDs whenever possible.

Disadvantages and Challenges with Installing and Using Overhead Lifts

Cost

The cost of purchasing and installing overhead lifts can be higher than purchasing other SPHM equipment such as floor-based lifts. This can be due to several factors including:

- The need to purchase an overhead lift for each patient room or treatment area versus using mobile floor-based equipment that can be moved from room to room. While portable overhead lift systems exist, they may be less convenient to move and transport than floor lifts.
- Overhead lift use is limited to the area of coverage, so other SPHM technology may be required for tasks outside their operational area.
- Structural deficiencies in existing buildings and especially in the overhead ceiling space, may prevent lift installation. For example, electrical wiring, HVAC systems, gas lines, sprinkler below the ceiling systems above the ceiling, and light fixtures, curtain and intravenous infusion support tracks, and fixed case work below the ceiling etc. These items can be costly to relocate to accommodate overhead lifts (**Figure 5.6**).



Figure 5.6 Examples of (1) Wall Mounted Equipment and Privacy Curtains and (2) Overhead Booms and Track that must be Considered when Installing Overhead Track.

Source: HumanFit

- Other costs may include asbestos and lead abatement in older buildings, as well as compliance with life safety codes and state and/or local building code structural requirements e.g., seismic (earthquake) regulations.
- Installing overhead lifts in bathrooms within *existing* patient rooms is challenging, mainly because of fire code requirements and fire-rated walls between a room and the bathroom.

Safe Patient Handling and Mobility – Section 5

- The cost of obtaining architectural design drawings and installation permits also must be considered.

The cost of an overhead lift system also depends on the extent of lift coverage within a given room or area, and the features such as turntables that enable directional changes and access through doorways, which are needed to meet specific coverage and operational needs.

Other activities that should be considered when calculating the cost of installation include the time required to close patient rooms for lift installation and infection control requirements for terminal cleaning after installation.

For these reasons installing tracks in the ceiling or mounted on walls in an existing care area can be cost prohibitive or physically infeasible (Nelson et al., 2009). Thus, overhead lift installation in new facilities is cheaper than retrofitting older healthcare facilities (**Refer to Section 9**).

Clearance and access

Sufficient vertical lift clearance

Whether overhead lifts are installed into ceilings or walls, or on freestanding gantry systems, there must be sufficient clearance to lift a patient fully off a bed or other transfer surface i.e., vertical clearance. Clearance needed is greater when lifting patients of size.

As a general rule, a minimum of 9 feet between the ceiling and floor is needed for overhead lift installation (VA, 2021). Items such as weigh scales attached to hanger bars, hanger bar configuration, combined lift motor and hanger bar dimensions, the ceiling installation method (recessed or suspended track), depth of traverse rail used e.g., jumbo or longer span rail, can all reduce lifting height. The height adjustability of beds and support surfaces should also be considered.

Challenges also occur when ceiling height differs between rooms where room-to-room tracking is desired. Vertical clearance and structural integrity of support surfaces required for lift installation can be especially challenging in older health care buildings and home environments.

Compatibility with other overhead-mounted equipment and bed accessories

Installing overhead lifts in other patient treatment or diagnostic areas such as the Operating Room and Diagnostic Imaging can be especially challenging when ceiling space is already taken with monitors, lamps, other vital equipment, and equipment tracks.

Other equipment compatibility considerations include safe use of an overhead lift with full bed trapeze frame apparatus or a bed that has a canopy attached to prevent patient falls. These fixtures limit physical access to a patient and often prohibit safe use of overhead lifts.

Other

Use with Certain Patient Populations

Overhead lift use is generally not advised in patient care areas such as Behavioral Health Settings and in acute care unit rooms that may accommodate suicidal or psychiatrically unstable patients. Overhead lifts and their support structures can provide a source of potential ligature points (Monaghan, 2011).

Overhead Lift Systems – Features and Configurations

Weight capacity

Individual overhead lift motors are available in a wide range of lift weight capacities from 350 lbs. to 1000 lbs. The common weight capacity for individual overhead lift motors in the US is 500-600 lbs.

For patients who weigh over 600 lbs., a single 1000 lbs. capacity motor mounted on one traverse rail or two 500 -600 lbs. overhead lift motors that are mounted on 2 separate traverse rails, can be used to perform SPHM tasks. Some overhead lift manufacturers utilize twin lift motors with individual hanger bars or with a shared hanger bar that are mounted on a rotatable turntable attached to the lift track. One handset typically controls the lift motors (*Figure 5.7*).

The advantage of a dual or twin motor system is that the patient position in space can be more easily adjusted, e.g., the patient's head and chest can remain elevated while keeping an open angle of the hips desired for patient comfort throughout a lift or transfer. This can be more challenging to achieve using a single-motor lift system.



Did You Know?

Weight Capacity

For the purposes of this document the weight capacity of SPHM Technology is the same as 'maximum load' which is defined by ISO 10535:2021 as the greatest permissible load that can be applied to a lift (excluding a sling), or a sling.

If the *maximum* load capacity of a sling, lift or hanger bar differ, the patient's weight *must not* exceed the *lowest maximum load capacity* of any of these individual component parts (ISO, 2021).

Charging

Overhead lifts are powered using a rechargeable battery system. Some systems require the lift motor and or the lift handset to be placed in a docking station to charge the battery. Others have an 'on-rail' charging system that allows the lift motor to be charged at a specific location on the rail.

Motors can be manually guided by the user to the charging station or on-rail charging location by moving the hanger bar, or by a powered return to charge that is activated via the handset lift controls. One disadvantage of a 'return to charge' design, is if the motor or handset does not 'dock' or sit correctly in the charging station, or the specific area for charging on the rail, the motor will not charge and thus may be unavailable for the next use.

This issue is avoided if continuous or 'on-rail' charging system is installed that allows a motor to charge in *any location* on the overhead rail to which it is connected. Continuous charging lift systems have become increasingly available in recent years. However, it is important that caregivers are trained *not to* leave the lift motor hanging where a patient can easily access it and inadvertently harm themselves.

Safe Patient Handling and Mobility – Section 5

Hanger bars

A hanger bar is used to connect a sling to either an overhead lift motor or a floor-based lift.

Hanger bars (also known as a spreader or carry bars) have rigid construction with more than one connection point, onto which a sling is attached. A hanger bar may attach to a flexible lifting strap that is attached to a motor or may be integrated with the lift motor itself (**Figure 5.2**).

Hanger bars vary in shape and dimensions and the number of attachment points (also known as coupling points). They may have e.g., 2, 3, 4, 5, 6 and/or 8-point connections which vary in design (AASPHM, 2016). *Examples of different hanger bar styles and configurations are provided in **Table 5.4**.*

The shape and width of a hanger bar can significantly affect patient positioning in a sling and should be considered when selecting a lift system.

Sling attachment methods also differ, for example loop style or key clip. Hanger bars are designed for use with loops or with clip attachments only. A sling with a clip attachment **must** only be used on a hanger bar that is designed for a clip attachment. A sling with a loop attachment **must** only be used on a hanger bar designed for a loop system (**Refer to Slings on page 5-41**).

Attachment points for slings must be designed to prevent inadvertent detachment of the sling e.g., use of a locking device. Locking systems should not cause a pinch or entrapment point for the user (ISO-10535:2021).

Sling and hanger bar compatibility is discussed in table 5.7 and in Appendix F.

Some hanger bars may be detached from the lift strap via have a quick release system which allows caregivers to use a wider choice of hanger bars depending on the task to be performed and patient needs.

The weight and size of detachable hanger bars affect how easily caregivers can swap them with other hanger bar styles.

Hanger bars that are designed for overhead lift with 1000 lbs. capacity can be larger and heavier than hanger bars used with lower capacity lifts. Storage requirements for larger hanger bars should also be considered. Providing a cart for storage and transportation minimizes manual handling of heavier hanger bars and may facilitate use.



Source: Baxter



Source: HumanFit

Figure 5.7 Examples of
(1) Dual Overhead Lift Motors on Rotating Turntable and
(2) Dual Overhead Lift Motors Mounted on 2 Traverse Rails.

Hanger Bar Configuration

Two-point hanger bars

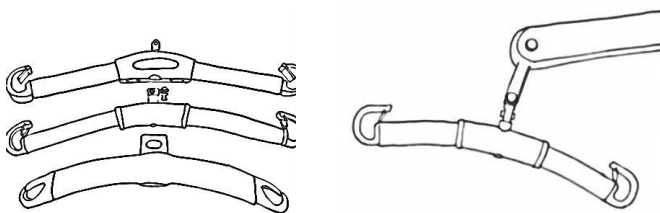
Hanger bars with 2-point attachment points. These are used with slings that have loop attachments only.

When used with a seated or repositioning style of sling, a 2-point hanger bar places the patient in a more 'closed or forward bent posture' which may not be comfortable for some patients e.g., patients of size or taller patients.

The width of a 2-point hanger bar influences how well a patient's shoulders can remain in a neutral position (to minimize discomfort) when being lifted and transferred especially when used with a seated sling.

Some 2-point hanger bars have adjustable width arms.

Portable overhead lift motors have 2 attachment points hanger bar integrated with the motor.

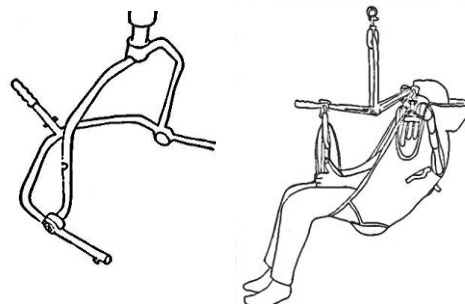


A portable motor with 2 integrated sling attachment points.

Source: Savaria

Four-point clip style hanger bars

This style of hanger bar is also known as a pivot or tilting hanger bar because patient positioning is adjusted i.e., to/from upright seated to a reclining position with the use of a 'handle' on the hanger bar versus having to adjust the length of the sling straps as is required with loop style slings. Some pivot style hanger bars have a powered positioning system which adjusts the patient's position. These hanger bars are more commonly found on floor-based lifts however, a few vendors also offer them for overhead lifts.



Seated or universal sling with key or clip attachments connected to a hanger bar with 4 attachment points for key or clip style slings.

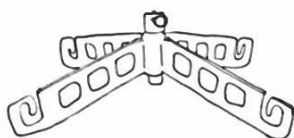
Hanger Bar Configuration

Four-point (H and X configurations) loop style hanger bars

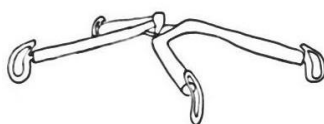
These hanger bars are used with slings that have loop attachments.

When using a seated or repositioning sling, a 4-point hanger bar lifts a patient in a more open posture. Some X-configuration bars have shorter and longer arms with variable widths to facilitate different lifting postures.

H-configuration hanger bars may have floating or fixed attachment arms.



Hanger bars with 4 attachment points



Hanger bar with floating 4-point attachment

Multiple configurations (e.g., six, eight-point bar)

These hanger bars are used with slings that have loop attachments.



6-Point hanger bar



Source: Etac/Molift



Source: ARJO

Hanger bar with 8 attachment points used with a supine/repositioning sling

Table 5.4 Examples of Hanger Bar Styles and Configurations.

Overhead lift controls

An overhead lift motor may be operated via an electrically powered handset or an air supply (pneumatic function) handset. Handset controls may be attached to the lift motor or operated via wireless remote control. Overhead lift controls may be duplicated on a handset and on the motor itself e.g., emergency stop and emergency lower.

In accordance with ISO 10535:2021, the following are some of the essential controls and displays that must be present on any powered patient lift:

Safe Patient Handling and Mobility – Section 5

- An emergency stop, which allows the user to stop the motor if it does not function correctly and could pose a safety hazard. Emergency stop controls must be clearly identified and red in color, easily visible, and quickly accessible. Once activated, the emergency stop must remain engaged until manually reset, and the lift only restarts after a separate start signal is given.

The emergency stop can also be used to lock out a lift motor to prevent use by patients and other non-caregivers as needed. However, it is important to note that in some designs of powered patient lifts, the lift battery does not charge when the emergency stop is activated.

- An emergency lowering function that is easily accessible to the lift operator which allows the user to lower the patient safely if the lift motor stops functioning e.g., the battery loses power.
- Power on, battery charging and low battery indicators.
- An automatic cutoff that prevents operation of the lift if the load exceeds 1.5 times the maximum load of the lift motor.

ISO10535:2021 also mandates the maximum velocity at which a hanger bar on any powered lift can be raised and lowered and stipulates other anthropometric requirements such as forces and torques for hands, arms, and feet that are required when operating a lift.

Tool 5a, SPHM Technology Purchasing Checklist lists the safety features that are required by ISO 10535:2021 that should be considered when selecting and purchasing an overhead lift system.

The integration of advanced computer chip technology in overhead lift systems has grown, offering a diverse range of features that improve system functionality.

Some or all of these features are available on various brands and models of overhead lifts and include:

- Angle sensors and limit switches to detect if the lift strap is used at an angle or is twisted etc.
- Integrated weigh scale
- Digital displays with built-in diagnostics that inform the end-user of technical errors and service reminders for preventative maintenance (PM) checks
- Lift counter to track use

Some manufacturers provide software to track lift usage and other metrics that can support SPHM program management.

Certain overhead lift manufacturers provide a feature enabling the caregiver to move the overhead lift motor along the traverse rail or track using powered controls. Some lift systems also include powered movement for the traverse rail in H-track configurations.

There are potential benefits and disadvantages of both the manual and the powered options. In laboratory and field studies conducted at the James A. Haley Veterans' Hospital in Tampa, staff preferred the two-function (up/down) lifts. Manually moving a motor along the overhead track was found to require minimal effort and allows the caregiver to maintain exact control over the speed of movement and positioning of the motor.

A powered return to charge option reduces potential physical effort required by the caregiver that can be experienced when manually moving the motor. This function allows independent transfers for some able patients e.g., in the home setting. However, the studies conducted at the Veteran's Health Administration showed that when offered the multi-functional systems with powered tracking, the nurses actually

Safe Patient Handling and Mobility – Section 5

worked against the motor and pulled the motor/lift because the powered tracking was too slow (VHA, 2016).

Overhead Lift Track Configuration

There are many types of lift track configuration. Choice of configuration depends on the existence of structural deficiencies and the intended function of the overhead lift system.

Refer to **Table 5.6** for more information about space requirements for overhead lift installation and other considerations related to track configuration. The table below summarizes common overhead track configurations (Nelson, 2009, Alamgir, 2009, Matz, 2019).

Overhead Lift Track Configurations

Single track overhead lift system

A lift motor can be moved along a single line of overhead track in a horizontal direction only. The track may be attached to a ceiling or gantry system.

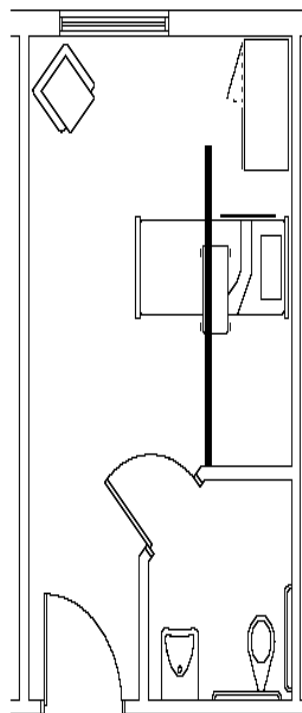
This configuration of track is more limited in functionality as a patient can only be moved in the direction of the track e.g., from bed to stretcher or chair.

If other tasks are to be performed such as boosting in bed, the lift can be used to raise a patient in a sling, but the bed must be moved to position the patient towards the head of the bed. Moving a bed or other furniture to accommodate a single-track system increases task time which may reduce the likelihood of lift use by caregivers.

Straight track overhead lift systems can be effective in some patient care areas such as, diagnostic imaging where the imaging table can be moved into a desired position under the track, or in an imaging holding area if patients are only transferred to/from wheelchair/bed to an imaging stretcher.



Source: Savaria



Overhead Lift Track Configurations

H-track ceiling and wall mounted systems (also known as X-Y track, traverse track or full room coverage systems)

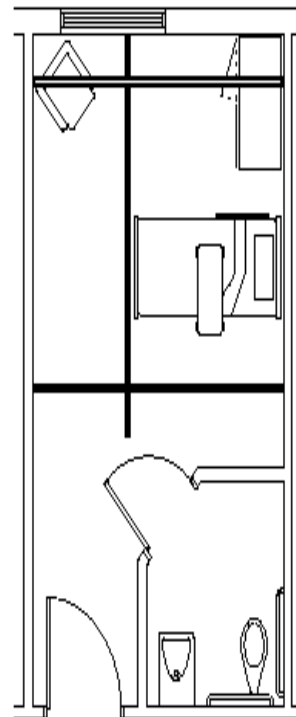
A traverse rail is supported between 2 fixed parallel rails (H track) that are installed in the ceiling, or via support structures that are mounted to the walls of the room. Track installed in the ceiling may be recessed in the ceiling, mounted at or near the ceiling, and either suspended from the structure above, or on stand-off structural pilasters. A lift motor can be moved along the traverse rail and the traverse rail itself can be moved along the H track.

This configuration allows for greater functionality because the lift motor can be moved throughout the space covered by the traverse track allowing SPHM tasks to be performed in any space that can be accessed by the overhead lift motor.

In addition, tasks that require repositioning a patient in bed, lifting limbs and ambulating using an appropriate sling are facilitated. H-track provides greater access to the patient for fall recovery.

This type of room coverage is preferred for the care of patients of size.

The length of an H-track and traverse rail can vary depending on room coverage needed and structural limitations etc.



Source: Savaria



Source: Savaria

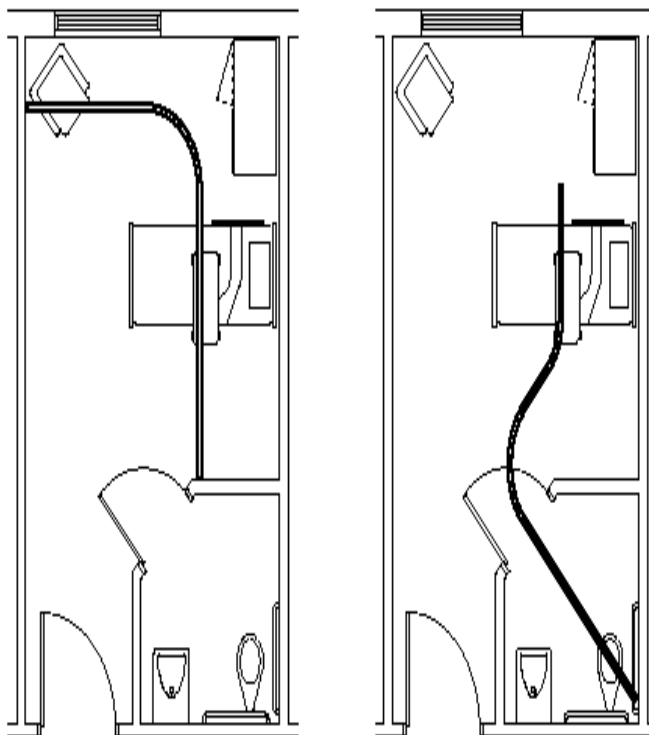
Overhead Lift Track Configurations

Angled overhead track:

This allows an overhead lift motor to navigate corners and bends.



Source: Savaria



Turntables and switch tracks:

Turntables provide a junction to allow the rail system to be run in several directions thus allowing the overhead lift to move in multiple directions.

Switch track also allows an overhead lift motor to be moved in 2-3 different directions

These systems are typically operated electrically to avoid user exertion.

Weight capacity of lift motors used on these tracks may be limited to 500-600 lbs.



Source: Savaria

Overhead Lift Track Configurations

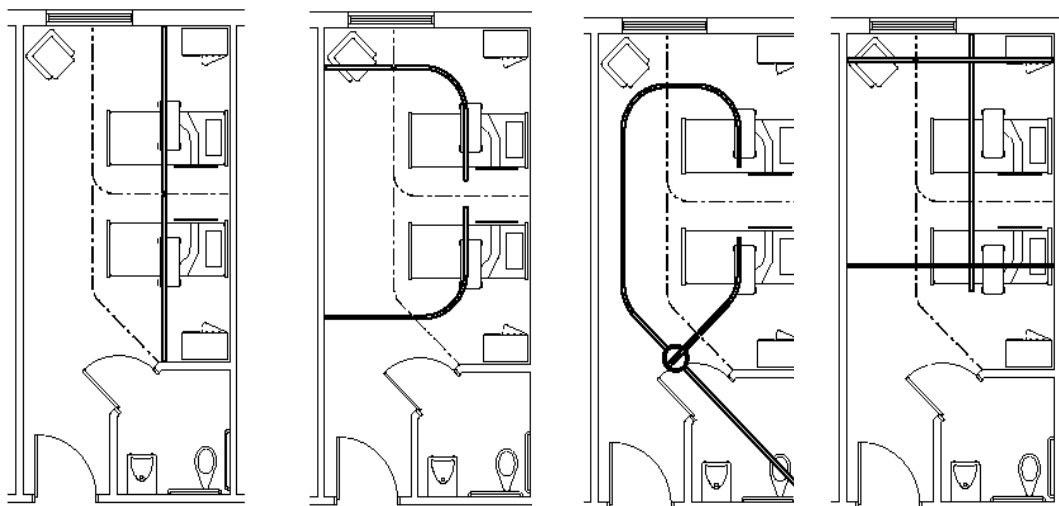
Connecting track between adjacent rooms e.g., bathrooms, or across 2-bed rooms:

To connect rooms, track can be either run through a cut out in the wall or door frame between rooms or if this is not feasible, a hook system connection can be used.

Having overhead lift access in a bathroom can reduce the number of transfers caregivers may have to complete and facilitate patient comfort and dignity by reducing the need to use a bedside commode. However, as previously discussed installing track into existing bathrooms can be costly due to fire prevention regulations. Ease of use and task time should be evaluated if a hook system connection is used between rooms.

When a larger space is to be tracked such as room covering system in a dual-bed patient room, then combination locks or connectors or gates can be used to prevent a motor from disconnecting and allow a motor to run smoothly when moving between 2 rails that are placed end-to-end.

Options are available to allow tracks to pass through privacy curtains.



Source: HumanFit



Source: ACC, 2012

Overhead Lift Track Configurations

Positioning lock:

This locks the lift motor in a specific position on the traverse rail which can be useful during patient treatment and for rehabilitation tasks where the motor needs to remain stationary.

Source: Guldmann



Other configurations

Overhead lifts mounted on boom systems

Some manufacturers offer overhead lift motors that can be mounted on boom systems. These may be an option for use in areas such as Operating Rooms or Imaging Suites. Like single track systems, lift operation is limited to the designated work area and must follow the prescribed direction of boom movement.

Overhead gantry or free-standing systems:

These systems are available as a 2-point or 3-point linear, or 4-point X-Y track. Some manufacturers offer gantry systems with a weight capacity of 1000 lbs.

Freestanding gantry systems can be a viable alternative to permanent ceiling track systems in areas where installation into the ceiling or walls is not always possible e.g., in the home environment.

2-point gantry systems can be adjustable in width and height so they can be 'collapsed' to move them from room to room if needed. However, they are not designed to be moved while a patient is in the lift.

Some gantry systems can be *pressure fitted* between the floor and ceiling to aid stability especially if floor surfaces are uneven.

The *vertical lift height* available when using a gantry system is usually less than with ceiling mounted track, so it is important to ensure that adequate space, ceiling height, and other structural components and factors below the ceiling do not hinder use of a gantry.

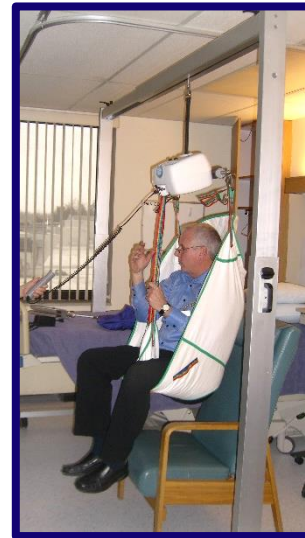
Overhead Lift Track Configurations

4-point gantry systems often require more effort and time to set up but as with H-track ceiling mounted systems, they allow greater movement of a lift thus facilitating use for a broader range of SPHM tasks.

Lastly, gantry systems should not create a trip hazard for caregivers or facility members etc.



Source: ACC, 2012



Source: Alpha Modalities

Table 5.5 Overhead Track Configurations.

Aesthetics

The integration of an overhead lift with existing room décor is an important consideration in acute care, long-term care, and home care environments.

Some options that facilitate aesthetic goals include:

- Embedding or recessing ceiling track into the ceiling to minimize exposed tracks if structural elements above the ceiling allow (Matz, 2019).
- Creating custom cabinetry or partitions to hide the lift motor and hanger bar when not in use.
- Casework that serves multiple functions (e.g., storage that accommodates both a lift and slings and linens).
- A headwall system that conceals a traverse track when it is not in use.
- Painting support track in the ceiling or attached to walls to match the room décor.

If overhead lift motors and hanger bars are stored in cabinetry ensure that caregivers, environmental service, and maintenance personnel can easily access them, i.e., forward, and vertical reach distance to access the hanger bar and headset control should accommodate most users.

Overhead Lift Selection: Quantity, Location, Space Requirement, and Installation

Table 5.6 lists resources and tools that provide more information about determining the quantity of overhead lifts needed, lift configuration, design, and installation.

Quantity

Determining how many overhead lifts are needed in a care environment and how to prioritize installation, depends on many factors such as:

- Fiscal feasibility that considers cost of the lift systems and slings, installation, and maintenance.
- The physical structure and layout of the patient care area where a lift is needed, including the space requirements of rooms that need lift capacity to 1000 lbs., as well as the compatibility of an overhead lift with existing equipment (Refer to ‘Disadvantages’ on **page 5-14**).
- Work areas where caregiver injury and severity rates due to patient handling are high such as intensive care units, units that care for patients of size, and medical units.
- The SPHM tasks that need to be performed in the care area and frequency of occurrence e.g., repositioning in bed; transfers to a stretcher or chair; early ambulation etc.
- Patient characteristics such as:
 - The percentage of patients who require total or extensive assistance to mobilize daily and in a worst-case scenario. This number helps to determine how many rooms should be tracked on an in-patient unit if overhead lifts cannot be installed in all rooms. For example, if 50% of patients require total or extensive assistance on a unit with 30 private rooms unit, then at a minimum 15 rooms should be tracked.

This number may decrease when double rooms are considered; however, these rooms often necessitate separate track and lift installations above each bed rather than utilizing a continuous track and sharing a single lift motor between two patients. Consider lift usage patterns and infection prevention and control requirements when determining track configuration in double rooms.

If admissions of dependent patients fluctuate widely or will likely increase in the future, then tracking more rooms is advised.

There is generally greater long-term cost efficiency when installing as many overhead lifts as feasible at one time. This approach can reduce expenses related to obtaining permits, architectural drawings, labor costs, potential increases in equipment and fixture pricing, as well as minimizing future disruptions and room closures within a unit.

- Medical condition or diagnoses e.g., surgical (type), orthopedic, neurological etc.
- The number, frequency, and length of stay of patients of size e.g., over 300 lbs. and over 500-600 lbs. This can help determine how many higher capacity lifts may be needed and accommodate the greatest range of patients.
- The number of beds on a patient care unit and number of single and double rooms.
- Patient census (daily average; peak load; range).
- Future changes to patient characteristics and/or census.

Safe Patient Handling and Mobility – Section 5

- Future changes to unit/dept. design.
- Staffing ratios, mix and variance.

It is important to note that there is some evidence that the greater the overhead lift coverage within a comprehensive SPHM program, the more likely staff will consistently use overhead lifts and MSDs are reduced (Powell-Cope et al., 2014).

Elements to consider when selecting rooms for overhead lifts in an acute care environment

1. Rooms with appropriate structural elements and room design to accommodate overhead lift systems.
2. Typical room assignment on an in-patient unit where non-mobile higher acuity patients would be placed i.e., where frequent repositioning and bed-to-chair transfers are performed. These may be rooms that are near the nurse's station.
3. Rooms that can accommodate largest track configuration. These may also be best for patients of size.
4. Rooms for patients immediately post-surgery where overhead lifts can be used to facilitate early mobility and rehabilitation.
5. Rooms used for patients who are a fall risk/monitored via camera may *not* be suitable, depending on camera set up.
6. If only some areas of a unit can be tracked, consider staffing patterns—such as nurses, aides, and therapy staff. If adjacent rooms are tracked, how does this affect caregiver assignments to high-acuity patients and exposure to WMSD risk factors? For instance, one aide may be assigned to multiple patients in rooms with lifts while another is given dependent patients in non-lift rooms for several consecutive shifts.
7. For lifts with wall-mounted charging stations, ensure there is enough wall space to install the handset charging station and wall mount hook for hanger bar storage (if chosen) in a corner of the room away from areas where routine tasks are performed or where patients and visitors could easily access them. For lifts with continuous charge, designate a location where they can be stored when not in use to meet similar requirements.
8. Consider any future changes to patient population or workflow that might impact room choice.

Overhead Lift Configuration, Design, and Installation

Refer to the following tools and resources for more information about overhead lift configuration, design, and installation.

- **Tool 5a SPHM Technology Purchasing Checklist**
- **The Facility Guidelines Institutes Patient Handling and Movement Assessments (PHAMA) 2019**, provides useful recommendations for Overhead lift Coverage Recommendations by Clinical Unit/Area, design specifications and more. <https://www.fgiguideelines.org/wp-content/uploads/2022/10/Patient-Handling-and-Mobility-Assessments.pdf>

Overhead Lift Configuration, Design, and Installation
○ Appendix I: Overhead Lift Coverage Recommendations by Patient Care Area ○ Appendix K: Design/Layout Considerations for Overhead Lift Systems ○ Appendix L: Checklists for Installation and Maintenance of Ceiling-Mounted Patient Lifts ○ Appendix N: Infection Control Risk Assessment Matrix of Precautions for Construction and Renovation ● The Veterans Health Administration https://www.publichealth.va.gov/employeehealth/patient-handling/index.asp ○ Installation or Relocation Checklist for Ceiling Mounted Patient Lifts ○ VHA Corrective and Preventive Maintenance Checklist for Ceiling Mounted Patient Lifts ○ Patient Handling (Lifting) Equipment Coverage & Space Recommendations ○ VA Barrier Free Design Standard A Supplement to the Architectural Barriers Act Accessibility Standards (ABAAS) Jan 2017 rev 5/01/25. https://www.cfm.va.gov/til/etc/dsBarrFree-2025-05.pdf ○ Safe Patient Handling and Mobility Design Criteria August 2021. https://www.cfm.va.gov/til/etc/dcSPHM.pdf – Section 3.0 SPHM design illustrations for overhead lifts – Section 4.0 Design checklist for overhead lift application installation and documentation. – Section 5.0 Overhead Lift type utilization by room/department. – APPENDIX I: Room Diagrams – APPENDIX II: Case studies

Table 5.6 Overhead Lift Configuration, Design, and Installation.

Maintenance

Refer to **Appendix B** for information about inspection and maintenance of overhead lifts.

Standards and Regulations related to use of Overhead Lifts

Overhead lifts are considered medical devices in the U.S. and are regulated by the Food and Drug Administration (FDA) thus, they must meet the design and testing specifications detailed in ISO 10535: 2021 Assistive products – Hoists for the transfer of persons – Requirements and test methods. Other standards and codes that must be met include electrical and National Fire Protection Association requirements for healthcare facilities. Refer to **Appendix E** for more information about Standards and Regulations related to use of powered SPHM technology.

Portable Floor-Based Lifts

Mobile floor-based lifts, also known as full-body sling lifts, have been used to lift and transfer patients in healthcare since the late 1950s (Mechan & Wright, 2015).

Floor-based lifts are mostly used to lift and transfer dependent patients (i.e., non-weight bearing and needing extensive assistance) between 2 surfaces e.g., bed and wheelchair, commode, shower chair, in a seated position.

However, some electric/battery powered floor lifts have attachments that allow them to be used for patient ambulation with a walking sling, and some are also designed to lift patients in and out of vehicles.

Some floor lifts are designed specifically for use with bathtubs – Refer to *Selected Ergonomics Hygiene Equipment* on **page 5-95**.

The dimensions and weight capacities of floor-based lifts differ by manufacturer (see below).

Table 5.1 summarizes the patient handling and mobility tasks that may be completed using a floor-based lift.

Floor-based lifts can be used in any healthcare setting such as hospitals, outpatient clinics, long term, and home care however, suitability will depend on the factors described in *Advantages* and *Disadvantages* below.



Source: Baxter



1



2

Figure 5.8 Examples of a Floor-Based Lift used to:

(1) Transfer a Patient from a Vehicle to Stretcher

(2) Ambulate a Patient

Source: Baxter

General Description

Floor-based lifts consist of a 'C' or U-shaped support base with casters and a vertical fixed mast with a pivoting boom (lifting arm) attached. A hanger bar (also known as a spreader or carrier bar) is located at the end of the boom to which a patient sling is attached (**Figure 5.9**).

Safe Patient Handling and Mobility – Section 5

Some lifts may have a rigid seat (sling) attached to a pivoting boom e.g., bathtub lifts (**Refer to Slings on page 5-41**).

Like overhead or ceiling lifts, floor lifts have a variety of styles of hanger bars (**Refer to Hanger Bars on page 5-17**) with connection points to accommodate either slings with plastic clips or with fabric loops.

The boom can be raised and lowered either manually e.g., via a hydraulic pump mechanism or using a powered mechanism e.g., a rechargeable electrical battery.

The legs of a floor lift can be widened to accommodate use with furniture such as chairs, and other transfer surfaces.

Powered floor-based lifts have a handset that is attached to the motor battery that is used to raise and lower the lift boom and, in some cases, to change the width of the lift legs.

Manual hydraulic lifts use a pump handle to raise and lower the boom and manual control to widen the lift legs.

Floor-based lifts require manual effort by a caregiver when transferring a patient between two surfaces (Refer to *Disadvantages* below). However, *motorized* floor lifts are available that reduce the physical effort needed to maneuver a lift when transferring a patient. Some floor lifts may have built-in scales to weigh patients.

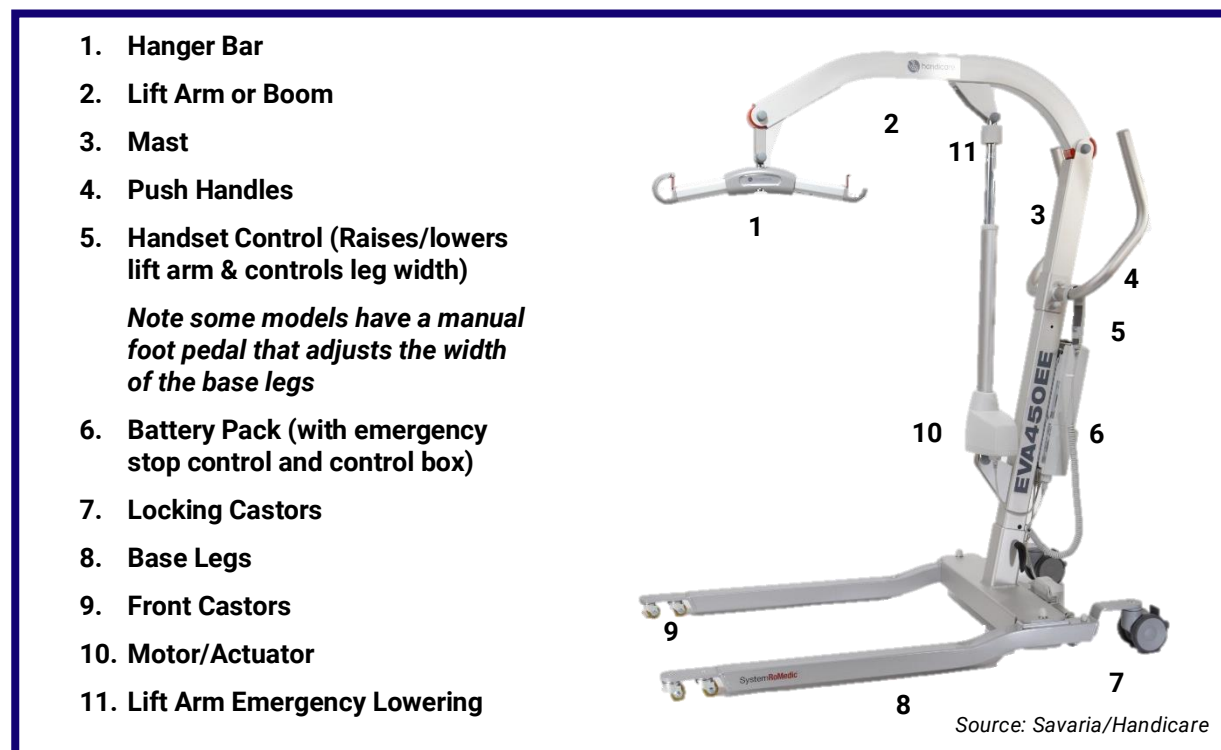


Figure 5.9 Example of a Powered Floor-Based Lift and Basic Components Parts.

Note: Design and location of components vary by device manufacturer.

Safe Patient Handling and Mobility – Section 5

Advantages

The cost of purchasing a floor lift is lower than an overhead lift primarily because there are no installation costs.

They may be the preferred option when caregivers need to transfer patients on an infrequent basis, e.g., in a clinic setting.

Floor lifts are portable and can be used wherever overhead lifts are not available or cannot be installed, provided there is enough space to maneuver them (*see below*). *Compact and/or foldable* compact floor lifts with lower weight capacities are designed for easy transport and use in community-based care.

While they may not be as versatile as overhead lifts, powered floor lifts can be used for a variety of SPM tasks.

Floor lifts (vs. overhead lifts) are a safer option for use when lifting and transferring patients with behavioral health issues as they can be secured away from the care area after use.

Disadvantages

Floor-based lifts are not as effective as overhead lifts in reducing the risk factors for WMSDs such as spinal compression and shearing forces. Floor lifts require greater application of force with a patient load especially when being pushed on uneven or carpeted surfaces, sloping floors, over thresholds, and maneuvered in a non-linear direction e.g., in small patient rooms and when transferring a patient of size. (Dutta et al., 2011; Lachance et al., 2016; Marras et al., 2009; Rice et al., 2009; Santaguida et al., 2005; Waters et al., 2012).

Interestingly, Dutta et al., (2011) found that the use of 2-caregivers to maneuver a loaded floor lift did not compensate for the poorer performance of floor lifts.

In laboratory-based studies at the James A. Haley Veterans' Hospital in Tampa, overhead-mounted lifts required 55 percent less effort to maneuver than portable floor lifts (VHA, 2016). *Refer to Advantages of Overhead Lifts.*

Floor-based lifts, unlike overhead lifts, also require sufficient clearance under beds and stretchers, around chairs, through doorways, and within patient rooms/care areas e.g., to access a toilet/bathroom and space to turn safely, to be functional (**Figures 5.10 and 5.11**).



Figure 5.10 Sufficient Clearance under a Bed. Source: Savaria/Handicare



Figure 5.11 Sufficient Clearance Around a Chair. Source: ARJO

Safe Patient Handling and Mobility – Section 5

Some models of floor lift have *smaller wheels* or casters to improve clearance; however, this design can increase the force that caregivers must exert when moving a low-base lift with patient load (**Figure 5.12**).

Beds used in behavioral health settings or care areas (e.g., emergency rooms), may have a solid base and be fixed to the floor which can prohibit use of floor lifts. Similarly, exam tables in clinic and imaging settings may have a solid base which hinders lift access.

Floor lifts also need sufficient vertical clearance to be operated (**Figure 5.13**). Furniture such as beds and exam tables must be able to lower sufficiently and/or the lift boom must be able to rise high enough to lift a patient completely on and off a surface. Vertical clearance available typically diminishes when lifting patients of size.



Figure 5.13 Sufficient Vertical/Lift Clearance from a Surface.

Source: ARJO

As with all portable floor-based patient lifts and assistive devices, improper use, lack of maintenance, and/or insufficient caregiver training may increase the risk of device instability or tipping.

Importantly, mechanical and powered floor lifts are *not* designed to be used as transportation devices.

Lastly, floor-based lifts typically require a minimum of 2 people to operate them safely.



Figure 5.12 Low-Based Floor Lift with Sufficient Clearance Under a Chair.

Source: Savaria/Handicare

The recommended clearance when using a floor lift for patient transfers (inpatient room) is 6' 0" x 10'6" (VHA, 2021).

Large capacity floor lifts are available for lifting and transferring patients of size e.g., 600-1000 lbs. Due to their large footprint these lifts require greater room clearance for use and storage space. They can be more difficult to maneuver without motorized assistance. This is one of the key reasons why overhead lifts, when feasible, are recommended for care of patients of size.

Manual hydraulic lifts have been used in healthcare for several decades. However, because of the manual pumping mechanism they require greater force to operate safely than a powered lift.



Quick Tip

The Facility Guidelines Institutes Patient Handling and Movement Assessments (PHAMA) 2019, Appendix D, provides useful recommendations for 'Clearances for Safe Use of Patient Handling and Mobility Equipment' including floor lifts.

<https://www.fgiguilines.org/wp-content/uploads/2022/10/Patient-Handling-and-Mobility-Assessments.pdf>

Safe Patient Handling and Mobility – Section 5

Floor-Based Lift Features

Weight capacity

Floor lifts are available in a wide range of lift weight capacities up to 1000 lbs.

Charging

Powered floor-based lifts are powered by batteries that need regular charging either through direct connection to an electrical outlet or a detachable battery pack that can be removed for charging via a battery charger that is connected to an electrical outlet. This type of charging mechanism requires that a second battery pack be available for use while one battery is being charged.

It is important to note that some floor lifts with plug in to charge batteries will not charge if the emergency stop control is activated.

Hanger bars

Similar to overhead lifts, floor lift hanger bars are available in a variety of configurations (*Refer to Hanger Bars on page 5-17*).

Controls

Powered floor-based are operated via a battery powered handset.

Like overhead lifts, there are essential safety controls and features that must be included on floor-based lifts (*Refer to Overhead lift controls on page 5-19*).

Tool 5a, SPHM Technology Purchasing Checklist lists the safety features that are required by ISO 10535:2021 that should be considered when selecting and purchasing a floor-based lift.

Storage

To facilitate use by caregivers, floor lifts require an easily accessible storage area such as an alcove that is ideally near the care area where it will be used. Powered floor lifts also require storage to include a place for charging batteries via an electrical outlet.

Dimensions of floor-based lifts vary from approximately 24 to 40 inches wide and 54 to 72 inches long.



Quick Tip

SPHM Technology - Storage and Access Considerations

To facilitate caregiver use of SPHM technology, storage locations should be close to point of care and use. However, even if storage is nearby, consider other *barriers* to access to SPHM technology such as storage spaces that:

- Are cluttered - other equipment must be moved to access SPHM devices/slings
- Require keycode access
- Have automatically closing doors
- Are not obvious to find
- Have power outlets that are too low or high to access and/or are used to charge other medical devices and not available for use

Safe Patient Handling and Mobility – Section 5

Quantity

Refer to **Appendix C** for more information about how to determine the number of floor-based lifts needed.

Maintenance and Cleaning

Refer to **Appendix B** for information about inspection and maintenance of floor-based lifts.

Refer to **Appendix D** for information about cleaning and disinfecting SPHM technology.

Standards and Regulations Related to Use of Floor Lifts

Floor-based lifts are considered medical devices in the U.S. and are regulated by the Food and Drug Administration (FDA) thus, they must meet the design and testing specifications detailed in ISO 10535: 2021 and other electrical and National Fire Protection Association standards for healthcare facilities.

Refer to **Appendix E** for more information about Standards and Regulations related to use of powered SPHM technology.

Portable Sit-to-Stand Lifts or Aids

A sit-to-stand (or stand assist) lift or aid allows a patient to stand from a seated position, be transferred to another surface and return to a seated position e.g., to/from edge of a bed and a commode/toilet. Caregivers manually move a sit-to-stand (or stand assist) lift to transfer a patient between 2 surfaces.

These types of lifts and aids can also be used to assist with dressing, grooming, and performing peri-care, etc., when a patient needs to be supported in a standing position.

Sit-to-Stand Aids are either powered or non-powered. The functional differences between powered and non-powered sit-to-stand lifts and aids are described below.

Some models of powered sit-to-stand lifts have a removable foot plate to facilitate ambulation, and some are designed for ambulation only (**Figure 5.15**).

Sit-to-stand lifts and aids can be used in any healthcare specialty areas and settings such as imaging, post operative recovery, outpatient clinics, long term, and home care. However, suitability will depend on the factors described in *Advantages* and *Disadvantages* below.

The dimensions and weight capacities of sit-to-stand lifts and aids differ by manufacturer (see *below*).

Table 5-1 summarizes the patient handling and mobility tasks that may be completed using a powered and non-powered sit-to stand lift.



Source: Etac/Molift

Safe Patient Handling and Mobility – Section 5

General Description

Powered sit-to-stand lifts consist of a 'C' or 'U' shaped movable stand or base with casters, and a battery powered lifting arm that can be raised and lowered to assist a patient to/from seated to standing position. A waist belt style sling is placed around the patient and is attached to the end of the lift arm, to prevent the patient falling during a transfer. The patient stands on a foot plate and an adjustable knee pad with a security belt secures the patient's lower legs to the lift to offer stability and comfort when the patient is in a standing position (**Figure 5.14**).

The base legs of the lift can be widened to accommodate use with furniture such as chairs, and other transfer surfaces. Some powered sit-to-stand lifts can include a scale for weighing patients.

Powered sit-to-stand lifts are used with patients who have partial weight bearing abilities and upper body strength, can grasp with at least one-hand, can follow simple instructions, and have no risk of combative behavior while in the device. Refer to **Disadvantages** for information regarding usage limitations.

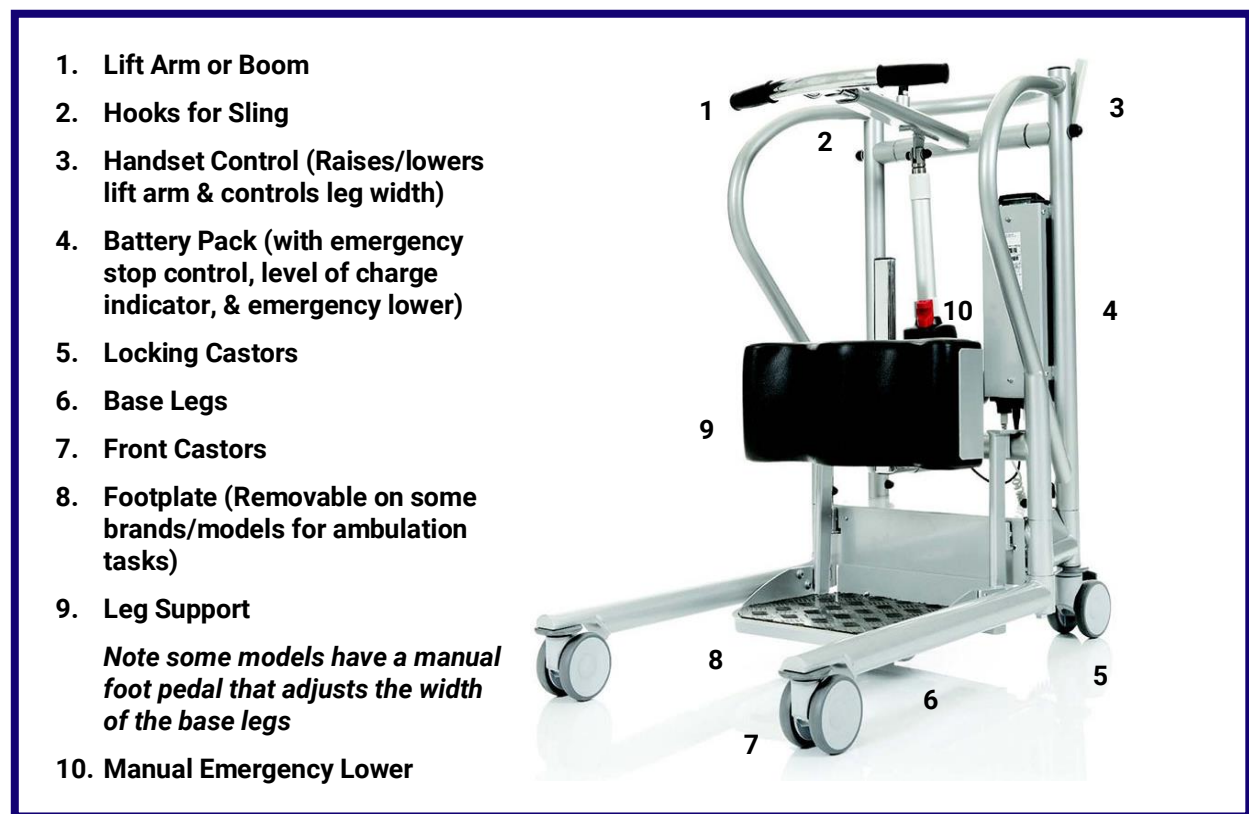


Figure 5.14 Example of a Powered Sit-to-Stand Lift and Basic Components Parts. Note: Design and location of components vary by device manufacturer.

Source: Savaria/Handicare

Non-powered sit-to-stand aids consist of a 'C' or 'U' shaped movable stand or base with wheels, a foot plate for a patient to stand on and handlebar support for the patient to hold on to. Some non-powered sit-to-stand aids have seats that can drop down for patients to lean against or sit on during transfers. Some non-powered sit-to-stand aids may have adjustable width legs.

Safe Patient Handling and Mobility – Section 5

In general, non-powered sit-to-stand aids are used with *higher functioning* patients e.g., the patient must be able to stand and sit unaided but may not be able to ambulate. They should be able to follow simple instructions and have no risk of combative behavior while in the device. Refer to **Disadvantages** for information regarding usage limitations.

Some non-powered sit-to-stand aids do not have a 'seat' feature, i.e., the patient remains in a standing position during a transfer. These aids are designed to allow a patient to stand on a turntable with knee support and pull themselves to a standing position. Some aids use a strap or belt placed around a patient and attached to the device to provide additional security. The caregiver manually rotates the aid to turn the patient towards another surface and/or can manually move the aid a short distance to complete a transfer between 2 surfaces. There are also powered standing aids that assist a patient to a standing position for ambulation.

*Examples of several types of sit-to-stand lifts/aids are shown in **Figure 5.15**. Refer to 'Slings' on **page 5-41** for information about slings that are used with sit-to-stand lifts and aids.*

Advantages

In general, sit-to-stand lifts and aids require less clearance for transfers than powered floor-based lifts, making them advantageous in small spaces like patient bathrooms. Recommended clearance for patient transfers (inpatient room) when using a powered Sit-to-Stand Lifts is 5' 0" x 10'6" (VA, 2021).

These devices can be used to reduce fall risk in patients who are not able to reliably use a walker e.g., in postpartum following an epidural during labor where a mother can stand but is too weak to ambulate following labor; a patient who is at risk of falling due to the potential effects of narcotic medications, postural hypotension from the prescription of a new medication after surgery when the patient first requires the bathroom (Monaghan, 2018).

There is some research to support that sit-to-stand lifts and aids can decrease the biomechanical load and injury risk to caregivers. Additionally, these lifts are associated with positive patient experience, such as increased patient satisfaction and dignity which may facilitate increased adherence and cooperation with caregivers during mobilization and rehabilitation (Goh et al., 2014; Riccoboni et al., 2021; Tang et al., 2020).

Sit-to-stand lifts may be effective in facilitating rehabilitation and active participation by a patient to achieve their mobility goals (Darragh et al., 2013; McIlvaine et al., 2011, Tang et al., 2017).

Powered sit-to-stand lifts have been shown to reduce a decline in mobility and functional outcomes in long term care settings and a decline in the incidence of pressure ulcers (Gucer, 2013).

Some newer designs of sit-to-stand devices facilitate greater active motion for lower limbs thus mimicking a more normal performance of movement patterns e.g. a flexible knee support that allows more forward knee movement and more bodyweight to be distributed through the feet, which can provide rehabilitation benefits (Fray et al., 2019).

One caregiver may operate a powered sit-to-stand lift in some circumstances e.g., if the patient is not of size and does not have medical devices attached to them such as an intravenous infusion system. Non-powered sit-to-stand aids are designed for use by one caregiver unless a second caregiver is needed to manage medical devices that are attached to the patient etc.

Safe Patient Handling and Mobility – Section 5



Powered Sit-to-Stand Lift.

Source: Savaria/Handicare



Powered Sit-to-Stand Lift.

Source: ARJO



Powered Sit-to-Stand Lift with Removable Foot Plate for Ambulation.

Source: Savaria/Handicare



Non-Powered Sit-to-Stand Aid.

Source: ARJO



Powered Sit-to-Stand Aid with Removable Foot Plate for Ambulation.

Source: TR Equipment



Non-Powered Sit-to-Stand Aid.

Source: Savaria/Handicare

Figure 5.15 Examples of Powered and Non-Powered Sit-to-Stand Lifts and Aids.

Safe Patient Handling and Mobility – Section 5

Disadvantages

Like floor lifts, powered and non-powered sit-to stand lifts and aids require sufficient clearance under beds, stretchers and exam tables, around chairs, and through doorways to be functional.

Furniture such as beds and exam tables must be able to *lower* sufficiently to allow a patient to easily place their feet on the device footplate (or floor if ambulating) easily before standing and to be able to sit with buttocks supported on a surface when returning to a seated position after a transfer.

These devices can be more challenging to move on carpeted, uneven or sloping floors, over thresholds, and when moving patients of size etc., thus, increasing the force exerted by caregivers.

Patients who are very tall or short in stature may not 'fit' in a sit-to-stand lift or aid safely and comfortably.

As with the floor-based lifts, care must be taken to ensure stability of the lift during use. Unlike most floor-based lifts, the brakes on sit-to-stand lifts and aids *must* be locked for safety when a patient is moving to/from a seated to standing position.

Sit-to-stand lifts and aids *may not* be suitable for use with:

- a. Orthopedic patients following knee, hip, or shoulder surgery. A rehabilitation professional should determine if it is appropriate to use.
- b. Patients who cannot tolerate or for clinical reasons should not have a belt around their torso e.g., recent spinal/abdominal incisions/stomas etc.
- c. Patients who have shoulder injuries and shoulder pain may not be able to tolerate a sit-to stand lift sling that supports the patient around their upper torso and under their axilla.

For 'b' and 'c' above, the patient's medical provider should determine if use of a sit-to-stand lift or aid is appropriate.

Sit-to-Stand Lift and Aid Features

Weight capacity

The weight capacity of many powered and non-powered sit-to-stand lifts and aids is typically 400-440 lbs., however there are some powered models with a higher capacity to 800 lbs. for mobilization of patients of size. The weight capacity of standing turning aids typically ranges from 375-440 lbs.

Charging

Powered sit-to-stands lifts are powered by batteries that need regular charging either through direct connection to an electrical outlet or a detachable battery pack that can be removed for charging via a battery charger that is connected to an electrical outlet. This type of charging mechanism requires that a second battery pack be available for use while one battery is being charged.

It is important to note that some sit-to-stands lifts with plug in to charge batteries will not charge if the emergency stop control is activated.

Safe Patient Handling and Mobility – Section 5

Controls

Powered sit-to-stands lifts are operated via a battery powered handset.

Like overhead and floor-based lifts, there are essential safety controls and features that must be included on sit-to-stand lifts (*Refer to Overhead lift controls on page 5-19*). **Tool 5a SPHM Technology Purchasing Checklist** lists the safety features that are required by ISO 10535:2021 that should be considered when selecting and purchasing sit-to-stand lifts and aids.

Storage

To facilitate use by caregivers, sit-to-stand lifts and aids require an easily accessible storage area that is ideally near the area they will be used. Powered sit-to stand lifts also require storage to include a place for charging batteries via a plugged-in to an electric outlet.

Dimensions of sit-to-stand lifts vary depending on weight capacity and range from approximately 23 to 30 inches wide and 36 to 50 inches long.

Quantity

*Refer to **Appendix C** for more information about how to determine the number of sit-to-stand lifts needed.*

Maintenance and Cleaning

*Refer to **Appendix B** for information about inspection and maintenance of sit-to-stand lifts and aids.*

*Refer to **Appendix D** for information about cleaning and disinfecting SPHM technology.*

Standards and Regulations Related to use of Sit-to-Stand Lifts and Aids

Sit-to-stand lifts and aids are considered medical devices in the U.S., and as such are regulated by the Food and Drug Administration (FDA) thus, they must meet the design and testing specifications detailed in ISO 10535: 2021 and if electrically powered, other electrical and National Fire Protection Association standards for healthcare facilities. *Refer to **Appendix E** for more information about Standards and Regulations related to use of powered SPHM technology.*

Slings for Patient Lifts

Slings can be defined as accessory devices that are used with SPHM technology such as overhead lifts, mobile floor-based lifts and sit-to-stand lifts and aids, to support a patient's body or body part during transfer, lifting, repositioning, ambulating, or holding tasks. The design of the sling determines the position of the patient or patient's body part when attached to a lift or transfer device e.g., a seated, recumbent, supine, or upright position.

Over the past decade, the design of patient lift technology, including slings, has evolved and expanded. There are numerous styles of patient slings that are designed to suit a patient's body type and abilities, meet clinical care needs, and facilitate a wide variety of patient care SPHM tasks.

Sling design, sizing and weight capacities, and cleaning requirements vary between manufacturers. Refer to **page 5-67** for more information.

The broad choice of slings and lack of design and sizing standardization between manufacturers increases the risk of caregivers unintentionally misusing lifts and slings, potentially causing patient harm (ISO 10535:2021).

To ensure safe use of this SPHM technology, it is essential that a *systems approach* be used when purchasing, using, maintaining, and managing sling supplies to facilitate the success of a SPHM program.

This includes when feasible, *standardizing* sling style and size range by manufacturer, and the brand and model of patient lifts—including hanger bar configurations and attachment points, within a facility or organization to minimize user errors and reduce patient harm from unintentional misuse.

Tool 5a SPHM technology purchasing checklist can be used together with the information provided in this Section to guide the selection of slings. **Tool 5b Sling safety checklist** and **Tool 5c Sling & hanger bar compatibility picture guide** may be used to educate caregivers about safe use of slings.

When choosing slings and managing supply, it is *essential* to collaborate with the facility's linen service, materials management/supply chain teams, infection prevention and control, wound and ostomy departments, and EVS/Housekeeping, to ensure they support desired SPHM procedures for safe and efficient use of SPHM technology including slings. These include protocols for leaving slings under a patient, ensuring adequate sling supply and cleaning procedures for SPHM technology etc.

Description

Slings are manufactured from flexible materials such as fabric, which adapts to the shape of the body, or from rigid materials such as plastic or stainless steel.

Slings made of flexible materials connect to the hanger bar on an overhead or floor lift, or to the lifting arms of powered sit-to-stand lifts, or to the frame of stand assist aids (**Refer to Figures 5.1 to 5.3, 5.5 and 5.7-5.15**)

Slings made of rigid materials may have straps to attach them to a lift hanger bar or are permanently integrated into the design of the lift (**Table 5.8 - II Rigid Slings**).

Figure 5.16 shows the basic components of a non-rigid seated and a repositioning or supine sling.

Safe Patient Handling and Mobility – Section 5

Slings may be laundered between uses with different patients; may be disposable (non-washable) and designed for use with only one patient; or may be designed to wipe clean between use with different patients (AASPHM, 2016; ACC6075, 2012; Matz et al., 2019).

The number and type of attachment points such as loops that can be used to connect a sling to a mechanical lift or stand assist device vary depending on the design and function of the sling. For example, seated slings typically have 4 or 6 attachment points; supine or repositioning slings may have eight to twelve; and limb slings may only have 2 attachment points.

There is also variation in the method used to attach a sling to a mechanical lift or sit-to-stand device. A sling can have loop, and/or clip or key style attachment points (**Figure 5.17**).

Loop attachments can be made of fabric, plastic or synthetic materials, or metal. Loop attachments can vary in dimension and design. Clip or key attachments are typically made of plastic and can vary in design e.g., size and shape of the keyhole (AASPHM, 2016; ISO, 2021).

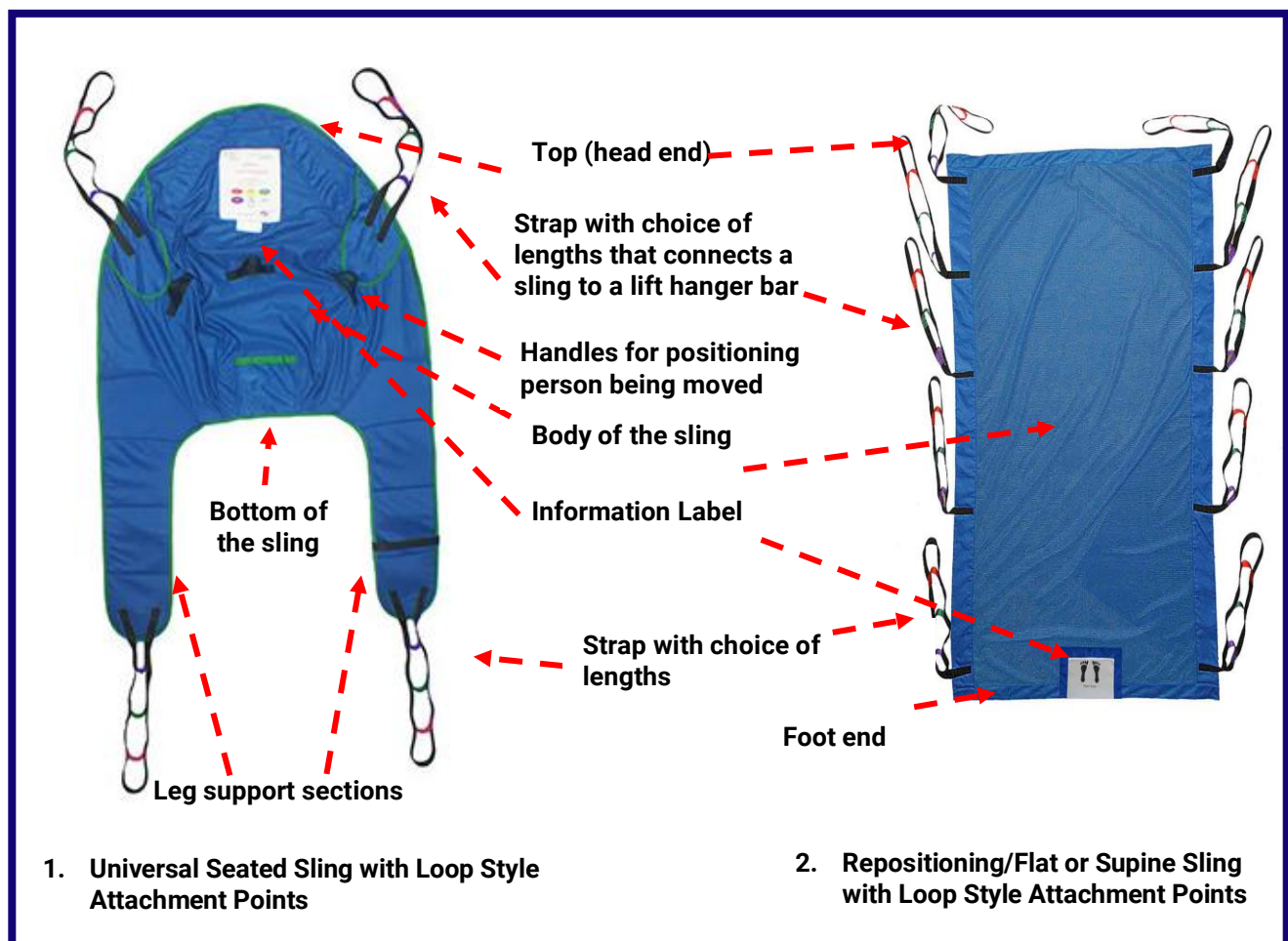


Figure 5.16 Basic Components of a (1) Non-Rigid Seated Sling and (2) a Supine or Repositioning Sling.

Source: Alpha Modalities

Safe Patient Handling and Mobility – Section 5

Loop-style attachments allow you to adjust sling strap length and vary the position of the patient. For example, a patient who is positioned in the style of seated sling shown in **Figure 5.16**, may be positioned in an upright posture using shorter loops or in a reclined posture using longer loops at the head end of the sling depending on clinical and functional needs during a transfer.



Source: Baxter



Source: HumanFit

Loop Attachments



Source: ARJO



Source: HumanFit

Key/Clip Attachments

Figure 5.17 Examples of Slings with Loop Style and Key/Clip Style Attachment Points.

Hanger bars are designed for use with loop or with clip attachments. A sling with a clip attachment should only be used on a hanger bar that is designed for a clip attachment. A sling with a loop attachment should only be used on a hanger bar designed for a loop system. **Refer to Hanger Bar Configuration on page 5-17.**

Clip and loop slings should *never* be used interchangeably as there is a high risk that the sling will detach from the hanger bar and cause patient injury or death (FDA, 2018; AASPHM, 2016). Refer to **Table 5.7** and **Appendix F** for more information about sling and hanger bar compatibility.

Safe Patient Handling and Mobility – Section 5

Slings are an integral component of mechanical lift and sit-to-stand or stand assist systems and should be designed and manufactured to at a minimum meet the requirements of the International Organization for Standardization (ISO) 10535:2021 *Assistive products - Hoists for the transfer of persons-Requirements and test methods* (**Refer to Appendix A**).

Sling and Hanger Bar Compatibility

As mentioned above there are a variety of sling designs with different methods of attachment to a hanger bar and a variety of configurations and sizes of hanger bar. So, it is imperative that the sling to be used is compatible with the hanger bar on the lift device to facilitate safe use.

Slings and lifts provided by the same manufacturers are usually compatible. However, according to ISO 10535:2021, a manufacturer of lifts and/or slings should provide information that states which design of lift hanger bar and attachment style (e.g., loop or clip) is suitable for use with a specific style of sling i.e., a compatibility statement.

Slings may be purchased from different manufacturers for various reasons e.g., the style of sling needed is not available from the lift manufacturer or the sling from a different manufacturer is better for patient care.

If the lift and sling are from *different* manufacturers, the sling manufacturer should provide a compatibility statement.

Ultimately, each healthcare organization has the final responsibility to ensure any slings purchased from a lift manufacturer, and/or from a third-party sling manufacturer are compatible with the hanger bar(s) in their system(s) or facility (Enos, 2019; Enos, 2022; ISO, 2021).

Therefore, before using slings and lifts from different manufacturers, a compatibility risk assessment should be conducted, and the results documented in an appropriate place for future use within the facility's SPHM program. It is suggested that a copy of this is also placed in the patient's care plan, especially if lift devices and slings are not standardized e.g., by manufacturer and style, within a facility.

As previously discussed, when possible, *standardization* of lifts, hanger bars, and slings is recommended within a setting to reduce the risk of healthcare worker error and simplify training. A setting using lifts with hanger bars accommodating loop slings should avoid, when possible, the use of lifts with hanger bars accommodating clip slings (AASPHM, 2016).

If special needs arise requiring a mix of hanger bars and sling types, the facility must take precautions to prevent healthcare worker error, such as labeling of hanger bars to indicate use with the appropriate sling and provide additional training for staff in appropriate use of hanger bars and slings (AASPHM, 2016; Nagavarapu et al., 2017).

Appendix F provides more information about sling and hanger bar compatibility and adverse events associated with hanger bars and slings. **Tools 5 b & c** provide additional guidance.

Table 5.7 Sling and Hanger Bar Compatibility.

Safe Patient Handling and Mobility – Section 5

Sling Types & Styles

Slings can be divided into types based on their function or the type of SPHM task they are designed for.

Basic categories of sling are as follows:

- I. Non-rigid or flexible slings
 1. Seated
 2. Supine
 3. Limb slings and turning bands
 4. Walking/ambulating harnesses/gait trainers
 5. Sit-to-stand belts or slings
 6. Specialty slings
- II.. Rigid slings

Table 5-8 presented below outlines general sling categories, identifies the applicable SPHM tasks, and specifies the patient populations for which each sling type is suitable. It does not describe the full range of sling options available. *Always* consult a sling manufacturer's instructions for specific information about the proper use of their slings.

I. Non-Rigid or Flexible Slings

1. Seated Slings – Non-Rigid

Seated slings are used to lift and transfer patients who require full body support (i.e. non-weight bearing) in a seated or semi-reclined position, e.g. bed to/from commode or toilet, wheelchair, chair, stretcher or exam table, when attached to an overhead lift or to a portable floor-based lift.

Seated slings differ in style and design by manufacturer.

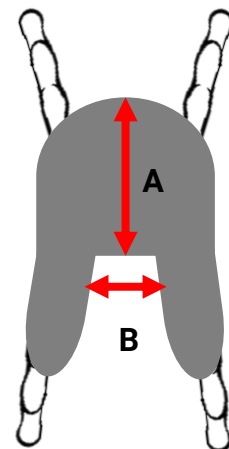
Some manufacturers offer many different styles of seated slings; each suited to a specific SPHM task and/or patient need.

However, seated slings can be categorized into 3 basic types:

- Universal or general-purpose seated sling
- Hammock sling
- Toileting/hygiene sling

Seated slings may vary in the amount of trunk and head support offered (**A**) i.e.,

- High back (with head support)
- Medium back (without head support but supporting the complete torso) and
- Low back supporting the pelvis and waist



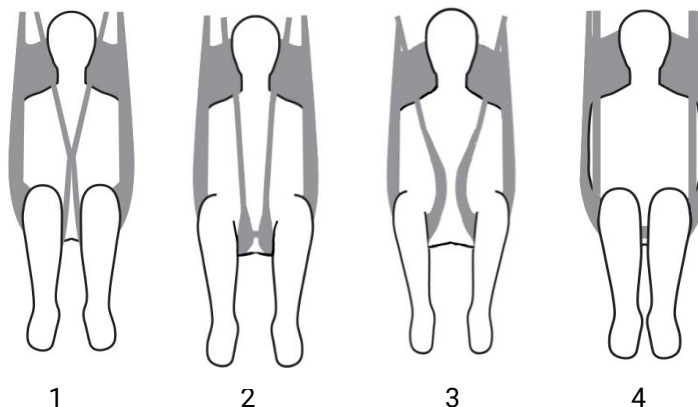
I. Non-Rigid or Flexible Slings

They may or may not have:

- An opening to allow for toileting
- Divided leg support pieces which can vary in length and width i.e., narrow, standard, wide split leg support opening **(B)**
- Padded or quilted leg support pieces that can reduce the incidence of leg straps bunching under legs, creating discomfort and a risk to skin integrity
- Removable plastic supports or 'stays' located in the body and or head of the sling to provide additional support

Slings with divided leg support: The method of connecting leg supports to a lift hanger bar varies and is dependent on the design of the leg strap. Common configurations are:

1. Crossed - where leg supports come up between the patient's thighs and the leg strap on one support is passed through the loop of the strap on the other support to secure the legs supports in place in a cross over style
2. Security strap - where leg supports come up between the patient's thighs and one leg support is passed through a strap located on the other leg support to secure both legs supports together and allow a more open leg/hip position
3. Open position - where leg supports come up between the patient's thighs and are attached directly to the sling bar without being crossed or using a security strap
4. Closed or cradle position: One leg support is positioned under both thighs followed by the other leg support and attached to the hanger bar



Each of the above configurations have advantages and disadvantages depending on a patient's body habitus, presence of lower limb amputation, and level of trunk control.

The choice of leg support configuration used should be in accordance with the sling manufacturer's instructions.

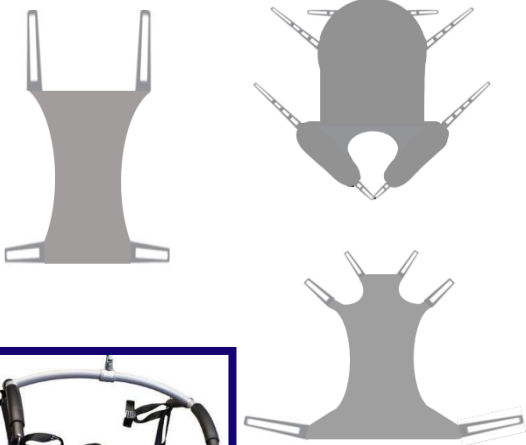
I. Non-Rigid or Flexible Slings

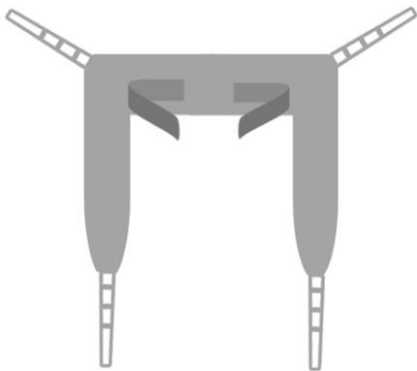
1. Seated Slings – Non-Rigid

Style of Sling and Description	General Guide for Suitable Use
<u>Universal or general-purpose seated slings</u> Sometimes referred to as a 'Quick Fit' sling. This is a U-shaped sling that provides full back support but may or may not provide head support. The sling is divided into two leg support sections at the mid to lower pelvic area. The leg supports can be placed between the legs to support each leg separately or positioned to support the legs together (<i>Refer to 'slings with divided leg support' above</i>).  <u>Function</u> Universal slings are the most commonly used slings for general transfers of patients in a seated, or reclined to/from bed, commode or toilet, wheelchair, chair, stretcher or exam table, or off the floor (with head support) following a fall (<i>if uninjured</i>).  <i>Example of a low back universal seated sling</i> Source: Guldmann  <i>Example of a high back universal seated sling</i> Source: Etac/Molift	<u>Advantages</u> • Offers a larger support area for patient comfort compared to a toileting sling • Easier to put on and remove when the patient is sitting or lying and allows some access for washing and toileting • When properly positioned, the leg supports reduce the risk of the patient slipping or falling out of the sling <i>May be appropriate for patients who:</i> • Cannot assist or provide active participation • Can tolerate sitting position • Have adequate hip and knee flexion • Require head support (high back) e.g., patients with spasticity or extensor spasm • Require lateral trunk support (high back) • Can tolerate leg supports <u>Disadvantages</u> • May be challenging to use for toileting and bathing if clothes are to be removed and replaced • The leg bands or straps can be uncomfortable for the patient if they are not positioned correctly, or if the patient is left sitting in the sling with the leg bands in place (<i>Refer to Table 5.9</i>)

Safe Patient Handling and Mobility – Section 5

Style of Sling and Description	General Guide for Suitable Use
 <i>Example of a high back universal seated sling with key/clip attachments</i> <i>Source: ARJO</i>  <i>Example of a high back universal seated sling in net fabric for bathing with loop attachments</i> <i>Source: Etac/Molift</i>	May not be appropriate for patients with: • “Hip precautions” (especially internal or external rotation) • Pelvic fractures • Spinal injuries • Extreme fixed kyphosis • Shoulder/thoracic injury or surgery • Single or bilateral above knee amputation • External fixation or support devices such as HALO or TLSO braces • Wounds or painful body areas, tubing, and stomas, which may be compressed by sling application and patient positioning • Contractures, spasms or risk of unexpected stiffness and movement in the sling during the transfer
<u>Hammock slings</u> Also called full body slings or split leg slings depending on the sling design. Typically, a rectangular shape sling that provides full back and pelvic support but may or may not provide head support or an opening for toileting. Some designs of Hammock slings provide split leg support which require the use of multiple specifically designed leg loops. These leg supports can be applied in an open or closed position depending on the amount of leg support required. Some designs have additional straps attached to the body of the sling for added support. <u>Function</u> Hammock slings can be used for transfers of patients in a seated, reclined position to/from	<u>Advantages</u> • Provides a high level of support for the torso, hips and sacrum and thighs • Each leg may be supported independently and in a neutral position (depending on the style of Hammock sling) May be appropriate for patients who: • Cannot assist or provide active participation • Have limited upper body function and tone • Can tolerate sitting position • Have adequate hip and knee flexion • Require head support (high back) • May be suitable for a unilateral or double above knee amputee

Style of Sling and Description	General Guide for Suitable Use
bed, wheelchair, chair, stretcher or exam table, commode, or toilet (if opening for toileting present), and off the floor (with head support) following a fall.   <i>Example of a full body sling or comfort sling with no opening for toileting.</i> <i>Source: Alpha Modalities</i>  <i>Example of a hammock sling suitable for a bilateral above knee amputee</i> <i>Source: ARJO</i>	Support needs may vary depending on length of stump and level of support provided when using the sling in a closed leg position • Experience pain while in a sling and for patients of size. This sling distributes weight over a larger area, providing more comfort <i>Additionally:</i> • It may be more suitable to leave under a patient after being lifted to a chair if the sling has no opening for toileting (Refer to Table 5.9) • Depending on the Hammock sling style, it may accommodate patients with hip precautions by adjusting the leg straps to keep hips neutral (not rotated) Disadvantages • Some styles can only be applied and removed with patient in a lying positioning to ensure fabric is under the patient's buttocks • Has limited access for hygiene tasks May not be appropriate for patients: • Who need lateral trunk support (a universal sling may provide more lateral support) e.g., patients who may have seizures or involuntary spasms • Have spinal injuries • Have extreme fixed kyphosis • Who want or need to have the sling removed when seated in a chair (this is usually not possible) • Wounds or painful body areas, tubing, and stomas, which may be compressed by sling application and patient positioning

Style of Sling and Description	General Guide for Suitable Use
<u>Toileting or hygiene slings</u> This U-shaped sling is designed to leave the entire buttocks area <i>uncovered</i> to facilitate toileting and washing, and to provide access to remove/lower the patient's clothing while they are being supported by the sling and lift. This type of sling provides support around the midback and the lower torso under the arms. It splits into two wide straps at waist level which provide support to the legs under the mid-thigh area. Some hygiene slings have a belt that is secured around the patient's waist for added security, and some may have the option of higher back and head support <i>Function</i> Toileting slings are used for transfers of patients in a seated position, to/from bed, commode or toilet, wheelchair, or chair. 	<u>Advantages</u> • Easy personal access for e.g., dressing, personal hygiene etc. • Easy application due to the smaller amount of fabric than other types of slings • Some patients with access to lifts in the home setting may be able to put this sling on independently <i>May be appropriate for patients who:</i> • Have good trunk control • Have head and neck control and do not require head support • Have good muscular endurance i.e., trunk and hip control required to tolerate and maintain a safe upright posture in sling • Can demonstrate some level of hip extension/gluteal strength • Can re-position their arms independently • Are cooperative and predictable <u>Disadvantages</u> • Limited to use for: ○ Patients who meet the physical and cognitive criteria above ○ Toileting/hygiene tasks only <i>May not be appropriate for patients who:</i> • Have weak or flaccid core strength/lacks trunk control as there is a risk of slipping through the sling e.g., patients who may have seizures or involuntary spasms • Require head and neck support

Style of Sling and Description	General Guide for Suitable Use
 <i>Example of a toileting sling</i> <i>Source: Baxter</i>  <i>Example of a toileting sling</i> <i>Source: Etac/Molift</i>	• Have cognitive impairment e.g., there is a risk of slipping through the sling if the patient is uncooperative and raises their arms over their head • Have unilateral above-knee amputation, or bilateral lower limb amputations • May not be suitable for patients with hip precautions • Cannot be used to lift a patient from the floor • Have wounds or painful body areas, tubing, and stomas, which may be compressed by sling application and patient positioning

2. Supine Slings – Non-Rigid

Supine or repositioning slings are typically rectangular in shape with several attachments points and are designed to cover the bed surface and in most cases support the full body. Designs vary in width, length, number, and length of loop attachments.

Some styles of supine slings require a flat sheet to be placed between the patient and the sling for patient comfort e.g., mesh fabric supine slings.

Function

Supine or repositioning slings are used to reposition (boost and turn) and transfer patients who are lying in a supine position and cannot move themselves.

Repositioning may occur when moving a patient from side to side or rolling to a side lying position for pressure relief, skin care and/or bathing, moving or boosting toward the head of the bed and moving from surface to surface (such as bed to/from stretcher) as a lateral

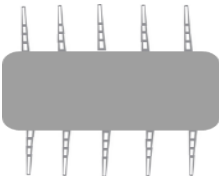
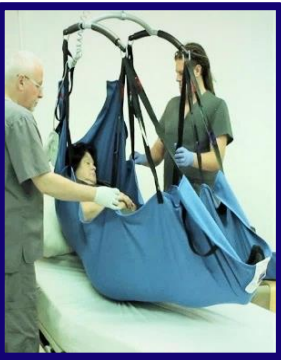
Advantages

- If left under the patient, supine slings may facilitate the frequency of repositioning and reduce the friction and shearing forces typically generated during when a patient is manually boosted in bed (**Refer to Table 5.9**)
- If in situ can assist a patient to a sitting position in bed to place portable x-ray plates or pillows
- Can be used to place patients to and from supine to prone position when used with an overhead lift and as appropriate with some styles of powered floor-based lifts

May be appropriate for patients who:

- Must remain flat
- Can tolerate supine position

Safe Patient Handling and Mobility – Section 5

Style of Sling and Description	General Guide for Suitable Use
transfer. These slings are typically designed for use with overhead lifts especially when used for lateral supine transfers. If a powered floor-based lift and supine sling is to be used to reposition and/or transfer a patient, ensure that the lift and sling manufacturer(s) approve this use and complete a thorough risk assessment to ensure the task can be performed safely. These slings can also be used with overhead lifts and some larger capacity mobile floor-based lifts to rescue a patient from the floor after fall. The sling can be used to support a patient on a rigid back board during fall recovery if a potential spinal injury has occurred (Refer to Fall Recovery on page 5-81). Depending on the strap configuration of the sling and the style of lift hanger bar, some supine slings allow movement and transfer of patients in a <i>semi-reclined</i> position e.g., for boosting in bed and for transfer to a reclined chair with foot support such as, a cardiac chair.   <i>Example of mesh repositioning/supine sling.</i> Source: Etac/Molift   <i>Example of a repositioning sling</i> Source: Alpha Modalities	• Cannot tolerate sitting position or has restricted hip and knee flexion • Have hip precautions when used with a wedge system or similar, to abduct hips and legs, and with pelvic fractures if tolerated • Have external fixation or support devices such as HALO or TLSO braces or traction if the device does not damage the sling during use Disadvantages • The patient may feel claustrophobic or dislike being 'wrapped' or 'cocooned' in the sling when lifted in a supine position <i>However, if the sling and hanger bar allow movement in a semi-reclined position, patients may feel less claustrophobic because this position offers a wider field of view</i> May not be appropriate for patients with: • Spinal trauma where the spine must remain in alignment • Respiratory compromise and cannot tolerate laying in a supine position • Should <i>not</i> be used for transferring a patient to an <i>upright</i> chair, wheelchair etc., as there is a risk of the patient sliding out of the chair due to the amount of sling fabric under the patient

Style of Sling and Description	General Guide for Suitable Use
3. Limb Slings and Turning Bands	
Function These slings may consist of one or multiple straps or bands of fabric or wipeable material designed to lift and support a body part(s) e.g., supporting limbs during dressing changes and foot care, and turning a patient to view their back or bottom and to provide care. These slings may vary in shape and dimension e.g., rectangular, or triangular and may be padded for extra support and comfort.   <i>Example of a limb sling</i> Source: Baxter  <i>Example of a limb sling</i> Source: Alpha Modalities  <i>Example of a turning band</i> Source: Alpha Modalities	Advantages - Enhances accessibility to different areas of a patient's body for performing a range of care tasks - May reduce the need for caregivers to support a limb or the number of caregivers required hold a patient in a side lying positioning - Limb slings may be used for range of motion exercises when attached to a ceiling or floor lift - A limb sling(s) can be used with an overhead lift to support a patient's leg(s) as they move in and out of bed. May be appropriate for patients who: - Require limb holding or positioning for wound care; venous wrapping; hygiene tasks, etc. Disadvantages - Placing and removing a <i>turning bands</i>(s) under a patient, especially a patient of size - may add to time to complete a care task May not be appropriate for patients who: - Cannot tolerate lifting of a limb - Cannot tolerate being turned to a side lying position - Have impaired skin integrity and/or neurovascular deficits to the limb requiring lifting (additional precautions should be taken) - Lacks range of motion in the joints or other restrictions of the lifted limb (i.e., lack of ankle, knee, hip flexion)

Safe Patient Handling and Mobility – Section 5

Style of Sling and Description	General Guide for Suitable Use
 <i>Example of a rehabilitation support sling</i> <i>Source: Guldmann</i>	 <i>Example of a turning bands</i> <i>Source: Baxter</i> - Have wounds that the sling would occlude when in use Additionally: - Turning bands may not be appropriate to use with unconscious clients who have no active trunk control or with spinal or hip precautions - Turning bands or limb slings <i>should not</i> be used for lifting a patient off a surface - Limb slings should not be placed under joints - Pillows, small soft towels can be used as padding as needed

4. Walking/Ambulating Harnesses/Gait Training Slings

Function

These slings assist patients with partial to full weight bearing capabilities from a sitting to standing position and movement in a standing position e.g., pivot transfers, ambulation, and toileting.

The design of these slings varies. These slings may provide upper body or lower torso/hip support with or without head support and may or may not have crotch or leg supports.

Some are built to support a pannus for larger patients.

Leg straps (if present) are not designed to support the client's weight or maintain the client in a standing position. They can assist to prevent the chest harness from rising on the patient's body and assist to control the patient's movement if they lose balance when ambulating (fall prevention).

Gait training slings may also have leg support straps that allow adjustment of the amount of

Advantages

- Can promote safe and early ambulation and assist a patient to meet rehabilitation goals

May be appropriate for patients who:

- Have upper extremity coordination of at least one limb
- Have upper body strength/trunk control
- Can transition from sit-to-stand with no or minimal assistance
- Have at least partial weight-bearing capability
- Are cooperative and can follow simple activity commands (a risk assessment should occur to determine if use is appropriate with a patient who may become aggressive/combatative is safe)
- Have the endurance required of the task
- Can engage in rehabilitation e.g., Sensori-motor training

Safe Patient Handling and Mobility – Section 5

Style of Sling and Description	General Guide for Suitable Use
weight a patient is to apply through their legs when ambulating. These slings are compatible with overhead lifts and some floor-based lifts. A suitable floor lift is one that is equipped with a lift boom that offers sufficient vertical clearance for patients to stand under the hanger bar and with drop-down horizontal arms to offer support during ambulation.   <i>Example of an ambulation harness/sling</i> <i>Source: Savaria/Handicare</i>	<u>Disadvantages</u> <i>May not be appropriate for patients:</i> • Who do not meet the criteria listed above • Have groin injuries • Have rib injury • Where the sling occludes wounds on the torso etc.   <i>Example of an ambulation harness/sling</i> <i>Source: Baxter</i> <i>Example of a gait training harness/sling</i> <i>Source: Guldmann</i>
5. Sit-to-Stand Slings	
These slings can consist of a single band that is secured around a patient's waist. They may or may not be used with a buttock support or leg extension strap that goes around the upper thigh to further secure the patient. The height of torso support offered and the girth dimension for security straps can vary. Standing slings usually connect at two points on a sit-to-stand lift or non-powered device via loops, clips, or ropes attachments.	<u>Advantages</u> • Can facilitate rehabilitation goals related to standing and walking activities and activities of daily living such as toileting • Can facilitate assessment and peri and/or wound care of the back and buttocks of a patient when in a device • Can facilitate removal and replacement of clothes

Safe Patient Handling and Mobility – Section 5

Style of Sling and Description	General Guide for Suitable Use
Some manufacturers offer special support straps to secure uncontrolled limbs. Some slings have a non-slip material on the inside of the sling to prevent movement of the belt up the patient's torso. Padding may be provided on the top edge of the sling to provide comfort to the patient under the arms. Function These slings are used with powered and non-powered mobile sit-to-stand or non-powered stand assist devices to complete tasks such as transfers to/from bed, commode or toilet, wheelchair, or chair, and in some environments to/from a height adjustable stretcher or exam table.   <i>Example of a sling for a powered sit-to-stand lift</i> Source: ARJO  <i>Example of a sling for a powered sit-to-stand lift</i> Source: Guldmann	<i>May be appropriate for patients who:</i> • Have upper extremity coordination of at least one limb including being able to hold at least one handle or frame of a non-powered stand assist device • Upper body strength/trunk control and head control • Has at least partial weight-bearing capability • Is cooperative and can follow simple activity commands • Can actively straighten his or her hips when raising to a standing position <u>Disadvantages</u> <i>May not be appropriate for patients:</i> • Who do not meet the criteria listed above • Have spinal injuries or surgery • With hip or knee precautions • With shoulder pain or instability • If the sling occludes wounds, drains or a stoma, etc., on the torso • Orthostatic hypotension  <i>Example of a wipeable sling for a powered sit-to-stand lift</i> Source: Alpha Modalities  <i>Example of a sling for a non-powered sit-to-stand aid</i> Source: Guldmann

Safe Patient Handling and Mobility – Section 5

Style of Sling and Description	General Guide for Suitable Use
Specialty Slings	
These include but are not limited to slings that are specifically designed for use with amputees, lifting and support of a pannus, and for use in the Morgue. There are also combination slings that have been developed for multiple purposes, for example: • An air-assisted lateral transfer device that can also be used to lift a patient in a spine or seated position with an overhead or floor-based lift. • Supine slings that have friction reducing properties so they can be used with an overhead lift or for manual repositioning in bed and lateral transfers. It is important to ensure that combination slings meet ISO 10535: 2021 design and compatibility standards, and that purchasers conduct a thorough risk assessment to ensure safe use with the lift systems that will be used. Refer to Appendix F for more information. <i>Example of a combination sling & air assist device for repositioning and transfers</i> <i>Source: HoverTech</i>	Refer to the manufacturer's instructions for appropriate use of specialty slings. <i>Example of a pannus sling.</i> <i>Note – some pannus slings can be used without an overhead lift system</i> <i>Source: Alpha Modalities</i> <i>Example of sling straps that can be used in a mortuary</i> <i>Source: Guldman</i>

Safe Patient Handling and Mobility – Section 5

Style of Sling and Description	General Guide for Suitable Use
II. Rigid Body Slings	
These slings are manufactured from rigid materials such as plastic (which may or may not be padded) or from flexible materials encased by a frame. Depending on the design of the attachment system or coupling, they may be used with some models of overhead lift systems or power floor-based lifts.	
<u>Rigid Seated Slings</u> Slings where the patient is sitting on a platform which is suspended to an overhead lift by means of a frame. A rigid body support for seated transfers may also have non-rigid body support components such as fabric bands or straps that support a patient's legs.	<i>Advantages and Disadvantages - Refer to Toileting slings above.</i>  <i>Example of a rigid style seated sling with leg supports</i> <i>Source: The Library of Congress, 2011</i>
<u>Rigid Supine Slings</u> Some rigid supine slings are designed to lift a patient from the floor or perform a transfer from surface to surface when the patient's back or spine must remain immobile. They can be attached to overhead or powered floor-based lifts with a 4-point hanger bar (<i>See figure on right</i>). Others are designed using a rigid framework attached to a special hanger bar or support frame to support a body e.g., for use in morgues and funeral homes or for use with bathing lifts.	

Style of Sling and Description	General Guide for Suitable Use
 <i>Example of a rigid supine sling or stretcher used with a mobile bath lift</i> <i>Source: TR Equipment</i>	 <i>Example of a rigid supine scoop sling.</i> <i>Source: ACC, 2012. Etac/Molift</i>

Table 5.8 General Sling Categories, Associated Tasks, and Applicable Patient Populations.

Source: ACC, 2012; Alexander, 2008; Ballarat Health Services, 2013; Baptiste et al., 2008; DLF, 2014; Enos, 2019; ISO 2021; Murry & Monaghan, 2012; Smith et al., 2023; VHA, 2016.

Non-Rigid Sling Fabric or Material

Non-rigid slings are made from different fabrics. The fabric type, mix, thickness, weave, stretch (tight or loose), and placement of support bands and binding strips affect sling function, patient comfort, skin impact, and laundering needs.

Sling materials can be divided into 3 broad categories:

1. Reusable washable slings:

These are made of fabric and should be laundered when soiled and before use with another patient. Reusable slings may be made of solid or mesh synthetic materials such as polyester and nylon and may include padding.

The most common categories of sling fabric are:

- *Plain polyester*

Plain polyester knitted fabrics are common and are hard wearing with some element of 2- way stretch. They can usually tolerate laundering well and may be easier to slide into/out of position under the patient.

Safe Patient Handling and Mobility – Section 5

- *Polyester mesh*

Polyester mesh dries quickly, making it ideal for baths and showers. It should only be left under a patient briefly due to its design and composition.

- *Nylon rip-stop fabric, also known as parachute fabric/silk or “slipfit”*

Slipfit fabrics are thin, non-breathable, parachute silk like materials that reduce friction for easy insertion and removal.

However, their tight weave lacks stretch and ventilation, thus they may not be suitable to leave under a patient for a prolonged length of time.

- *‘Spacer’ fabrics.*

Spacer fabrics are three-dimensional knitted textiles made of two separate layers, joined or kept apart by spacer yarns. They consist of an initial layer for moisture release, a middle layer for air flow, and an outer layer for heat dissipation. The ventilating properties of spacer fabric help to remove moisture away from the skin, and its soft, cushioning characteristics reduce force, allowing 4-way stretch whilst remaining relatively light. These properties allow the fabric to mold to the patient’s body and together with the pressure re-distribution properties, breathability and wicking properties, make it be more suitable to leave under a patient (based on risk assessment). (Webb et al., 2018).

Webb et al., demonstrated that if a sling needs to be left in situ, then the spacer fabric is more likely to reduce the risk of pressure ulcer development (Webb et al., 2018).

2. Reusable wipeable slings

These slings should not be laundered between use with patients. Instead, they should be wiped down with sanitizer/disinfectant that is approved by the facility and sling manufacturer, before use with each patient.

Wipeable slings usually have a coating that keeps them from being breathable, which usually means that they are not a good choice to stay under a patient or in direct contact with the patient’s skin (VHA, 2016).

3. Disposable slings

Disposable or single ‘patient’ use slings are designed to be used by *only one patient* and disposed of when soiled, damaged, or no longer needed by the patient. Disposable slings are designed not to be laundered and reused. Disposable sling fabrics vary from nonwoven fabrics to many textures of cotton, polyester, and/or polypropylene, among others, each of which may have their own effect on breathability and environmental footprint. These slings can be useful for patient specific solutions or when spread of infection or cross-contamination between patients is a concern.

Leaving a Sling under a Patient

There is international agreement that SPHM devices should be used when repositioning and transferring patients to reduce friction and shear caused when manually lifting and moving patients (Brienza et al., 2015; NAIPA, EPUAP, PPPIA, 2025).

The 2025 International Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline states that ‘manual handling equipment (*SPHM technology*) should not be left under the individual after use, unless the equipment is specifically designed for this purpose’ (NAIPA, EPUAP, PPPIA, 2025).

The following is also stated in the guideline ‘Principles of safe manual handling should be used to ensure the safety of the individual, their informal carers, and the collaborative care team. Selection of manual handling techniques should consider preventing skin exposure to pressure and shear forces. Specialized equipment (including but not limited to mechanical lifting devices, transfer sheets, lateral air transfer devices, turn systems/devices, low friction fabrics, turn-assist devices and turn-assist features on beds and manual handling techniques (e.g., ergonomic techniques, two- to four-person lifts, etc.) that reduce the risk of friction and shear should be available and implemented’ (NAIPA, EPUAP, PPPIA, 2025).

Regardless of whether SPHM technology is intended to remain under a patient, clinicians should assess each patient's clinical situation and consider if features of the technology such as a sling, could contribute to pressure injury development.

Leaving a sling such as a supine sling under a patient in bed may facilitate more frequent repositioning of the patient when used with an overhead lift thus reducing the risk of pressure injury to the patient and injury to caregivers from manual lifting.

Conversely if a bed-sling must be removed and reapplied each time a patient is to be repositioned, the extra workload and time hinders caregiver use of overhead lifts. The frequent placement and removal of a sling create a risk of injury for caregivers. (Nagavarapu et al., 2017; VHA, 2015). Pulling and tugging a sling to remove and replace it may also increase risk of damage to the patient's skin.

Based on over 10 years of experience at one large hospital, breathable repositioning slings are left under patients in rooms with overhead lifts without increased skin damage or pressure injury. These slings are specifically designed to be left in situ.

Studies by Edupuganti & Price (2013), Nelson et al., (2014) and Clark et al. (2015) support these findings. These studies conducted with various in-bed slings and bed surfaces did not yield significant increases in pressure or temperature compared to baseline measurements without a sling. Furthermore, Clark et al., reported that leaving the specific style of repositioning sling used in their study under a patient had no detrimental effect on the pressure-redistributing performance of the bed mattress (Clark et al., 2015).

A few studies have examined the impact of leaving seated slings under a patient in a chair and have concluded that this depends on the design of the sling including the fabric type and how long the sling is to be left in-situ (Crane et al., 2015; Van Dyck, 2016; Webb et al., 2018).

Leaving a Sling under a Patient

Overall, there is little evidence to support that leaving slings under patient increases the risk of pressure injury, but further research is needed.

The SPHM manager/coordinator in collaboration with healthcare providers and wound care nursing staff should carefully evaluate both the risks and the benefits for individual patients when considering the practice of leaving a sling beneath patients to meet repositioning requirements.

When determining whether a sling can be left under a patient consider the following:

- Is the patients' skin compromised or is there a specific skin sensitivity?
- What fabric is the sling made of and how breathable is it?
- Does the sling present rough or raised uneven edges which can cause pressure points if left under patient?
- If a sheet must be left on top of a supine sling for comfort and/or an incontinence pad - will this impede breathability of the sling and/or the function of the bed support surface?
- Can a repositioning sling be secured in some way so that creases are minimized e.g., elastic straps to secure the sling to the mattress, tucking straps under the mattress etc?
- If a sling manufacturer claims their sling (or any other SPHM technology) can remain under a patient, can they provide independent third-party pressure mapping and breathability test results to verify the claim?

Table 5.9 *Leaving a Sling under a Patient.*

Sling Laundry & Cleaning

Reusable fabric slings

Laundry requirements for reusable slings can vary depending on the fabric composition of a sling. A sling manufacturer and/or supplier should provide laundering instructions which should include a) types of washer and dryer systems that should be used, b) washing and drying instructions, and c) clarification on use of chlorine and/or oxygen-based bleach systems. Unfortunately, commercial laundries may not be able to launder slings per the manufacturer's instructions due to cost and laundry equipment available. Laundries may use high heat wash and/or drying and/or bleach, which often damages slings.

Additionally, laundering instructions should be followed to meet the following Environmental Infection Control in Health-Care Facilities guidelines published by the Centers for Disease Control (CDC) which may differ from a manufacturer's laundering requirements for their slings.

The lifespan of a reusable sling is mostly related to how a sling is laundered e.g., washing, and drying method and temperature used; the detergent/disinfectant used; and the frequency of laundering. Misuse of a sling or damage that occurs as result of contact with medical devices such as external fixation braces etc., is also a factor that influences how long a sling will be safe to use.

Safe Patient Handling and Mobility – Section 5

Manufacturers have varying 'lifespan' for their slings, however, if a sling is maintained well many manufacturers say that a typical reusable sling has a 3 - year lifespan. A manufacturer may void a sling's warrantee if their laundering or cleaning instructions are not complied with due to safety and liability concerns.

Wipeable slings

Wipeable slings should be wiped down/disinfected with a sanitizer that is approved by the facility and sling manufacturer before use between different patients. The sling manufacturer should provide information about the types of sanitizer or disinfectant that can be used to wipe down or clean a sling. Ensure that all components of the sling can be cleaned effectively (Refer to *Sling Accessories* below). Frequent use of bleach-based cleaning agents may damage wipeable slings. Tolerance to liquids if soaked during cleaning should also be determined. Sling manufacturers should also meet FDA published guidelines for reprocessing non-critical medical devices (FDA, 2015).

Single patient use or one-time use slings

This type of sling should never be laundered and reused. Sling labels should include identification that indicates that they must not be laundered and include a symbol that indicates if the sling has [been](#) laundered and thus should not be reused.

Sling accessories

Some slings have accessories that should be reviewed to ensure they can be cleaned to meet infection prevention and control needs, e.g. seat belts on toileting slings with Velcro® fasteners or buckles, ropes attachments on some sit-to-stand slings, or synthetic sheep skin on legs of ambulating slings.

Refer to **Appendix D** for information about cleaning and disinfecting SPHM technology.

Flammability

Sling manufacturers must include information about flammability in instructions for use (ISO 10535: 2021) e.g., if they have added flame retardant chemicals to the sling material. Refer to any local or state fire code related to flammability of fabrics and equipment used, such as in an operating room environment.

Sling Management

A well-designed sling management system is an essential component that facilitates safe use of patient lift technology by caregivers.

The SPHM manager/coordinator and committee should collaborate with key stakeholders to develop, implement, and sustain an effective sling management process.

Choosing Slings

Overall guidance for choosing SPHM technology is discussed in **Section 7**.

Considerations when determining sling quantity and type

The quantity and types of slings needed to facilitate appropriate use of overhead and floor-based lifts and sit-to-stand lifts and aids, is based on many factors such as:

- Use requirements including the type and frequency of SPHM tasks to be performed in all areas where patient lifts are used, and the mobility related characteristics of the immediate and future patient population, etc. The quantity of each type of lift device and how slings will be used should be considered. For example, if repositioning slings are left under patients in rooms with overhead lifts on inpatient care units, there needs to be sufficient par stock of slings to allow for frequent changes due to soiling etc.
- The range of sling sizes and weight capacity needed. Remember sling sizes vary by manufacturer. Per ISO 10535:2021, sling manufacturers should provide key dimensions for each of the sling types they offer. **Refer to Table 5.10.**
- If sling types and sizing will be standardized or if slings will be supplied by more than one manufacturer and will vary in design, use, and style of attachment points e.g., loop and key/clip. Consider the risk of user error and training requirements and processes needed to ensure caregivers will choose and use a sling correctly etc.
- Sling materials that comply with facility infection prevention and control protocols i.e., washable, wipeable, and/or disposable/single-patient use slings. Consider if your laundry provider can comply with the manufacturer's washing and drying requirements for washable slings and if facility cleaning methods meet the manufacturer's requirements for wipeable slings.
- The *service life* (i.e., the length of time during which a sling can be used once opened) and the *shelf life* (i.e., the length of time that a sling can remain *unopened* before it should no longer be used). These factors will vary by manufacturer and sling type i.e., washable, single patient use, or wipeable.
- Initial purchasing costs and ongoing costs to maintain sling supply including estimated sling loss. Sling loss estimates should consider if the process for cleaning a sling after use is not followed e.g., a washable sling is put in the trash, theft, damage, and end of service life replacement.
- For washable slings –
 - The costs of laundering e.g., by weight (lbs.) or by quantity of slings and
 - Delivery and return time to/from laundry for washable slings during normal workdays, holidays, weekends etc.
- Time to deliver slings from a facility's sling storage area(s) to units/departments and required par stock to meet usage needs for twenty-four hours a day, seven days a week etc.
- Storage availability for ongoing stocking of slings in a patient care area.
- Disposal process and cost and environmental impact especially if using disposable slings.

Safe Patient Handling and Mobility – Section 5

The factors above should be considered when calculating the overall cost of purchasing slings and maintaining and managing sling supply.

Tool 5a lists considerations when choosing a sling vendor.

Sling management processes to be developed

Consider the following:

- Washable slings –
 - How slings will be collected from point of use e.g., caregivers place soiled/used slings in a linen bin located in the patient room with other laundry.

Disposing of used/soiled slings in a separate laundry bin and/or location away from point of use increases caregivers' workload and may discourage lift use. It also adds time and effort for EVS or housekeeping staff when preparing patient rooms and/or treatment areas where slings are needed. Consider how temporary caregivers and other staff will be trained in the use of, access, and disposal of slings. A user-friendly process will help mitigate sling loss.
 - When and how a damaged washable sling should be removed from service.
- Disposable slings - When and how should they be discarded.
- Wipeable slings - When and how should they be cleaned and removed from service if damaged.
- How caregivers obtain slings if none are available on their unit/department.
- The process to replace or repair (as feasible per the sling supplier) damaged slings.
- Who will develop and distribute instructions and job aids for sling use, ordering, cleaning, and disposal protocols that are relevant for all stakeholder groups.
- An inventory system that tracks the purchase, service life, and use of slings to help forecast when slings should be replaced based on their usage and condition and to mitigate sling loss.

For each sling purchased, the inventory may document a) date of purchase, b) date of first use, and for reusable slings c) date of periodic sling inspection, by “competent person” assigned by the facility or organization. (Enos, 2018; ISO 10535:2021). Recording sling damage and the process to dispose of or replace damaged slings is recommended. Refer to ‘*Periodic Sling Inspection*’ below.

Radio Frequency Identification (RFID) tracking systems can be used to track slings within a facility. RFID tagging is available for washable slings.

Monitoring sling recalls or upgrades is also part of an effective sling management system. Regularly check the [FDA's Medical Device Recall Database](#) and their dedicated recalls page for updates on specific products. Look for press releases, product updates, and other information about recalls directly on the *manufacturer's* website. Enroll in the free [Recalls.gov](#) service to receive electronic notifications about recalls from the FDA and other agencies. Refer to **Appendix E** for more information on SPHM technology related regulations and recalls.

Safe Patient Handling and Mobility – Section 5

Storage

Sufficient styles (seated, repositioning, etc.), sizes, and quantities of slings should be readily available near the point of use to facilitate use of lift equipment by caregivers.

Shelves or bins used to store slings should be labeled so that caregivers can quickly grab the correct style and size of sling. Storing slings in a manner so that caregivers can view sling labels to verify style and size easily can facilitate quick access e.g., slings are folded so that the label and any other size indicator such as trim color, is salient.

Storage locations should be within easy horizontal and vertical reach of most users.

Washable slings are often stored with clean linens and disposable and wipeable slings with other clean and sterile supplies. Collaborate with unit/department staff and the department who will maintain the sling supply to determine the optimal place for storage etc.

Slings that are used infrequently, e.g., for a specific task or patient population, could be stored in a central location if caregivers can order them easily for timely delivery to the care area when needed. For example, to reduce storage needs on patient care units, pannus slings and XXL seated slings that are used on a monthly basis or less by a few patient care locations could be stored centrally in one or two locations if slings can be accessed easily when needed etc.

Periodic sling inspection

A sling inspection process is important to reduce the risk of structural failure of a sling when in use and potential for patient harm.

A visual inspection of a sling should be conducted by the caregiver *prior to each use (Refer to **Tool 5b**)*. However, slings should also be inspected by a *competent* person when they are placed into first use, and on a periodic basis.

Manufacturers of reusable slings (washable/wipeable) should indicate how often their slings should be inspected, however, ISO 10535:2021 recommends periodic sling inspection at least every *6 months*. More frequent inspection may be needed if slings are used or cleaned more frequently than normal.

Slings that are found to be defective or damaged by users or the person(s) who conducts periodic sling inspections, must be removed from service immediately.

Periodic sling inspection should include assessment of:

- **Fabric or structural materials** for rips, tears, holes, or fraying and signs of chemical or heat damage such as discoloration, brittleness, stiffness, thinning.
- **Stitching and bindings** at seams and load-bearing areas for loose, broken, or frayed threads, particularly at stress points where straps connect to the body of the sling.
- **Straps, loops and clips or fasteners** for signs of wear or damage.
- **Label legibility** to ensure the manufacturer's label is intact and all information is readable (*Refer to **Appendix G** for more information about sling labels*).

Refer to *Tool 5d Sling Inspection Checklist* for more information.

All sling management activities should be documented including periodic inspection activities for legal and safety purposes.

Safe Patient Handling and Mobility – Section 5

ISO 10535:2021 recommends that inspection documentation includes the inspection date, identification details and serial number of the sling, the sling's condition, if the sling was removed from service, the date of the next inspection and the inspector's name and signature.

A *competent person* is defined in this context, as an individual with the relevant technical knowledge and practical experience with SPHM technology to enable her/him to detect defects and/or weaknesses and to assess their importance in relation to the safety and continued use of the slings being examined (AASPHM, 2016).

Tool 5a provides more considerations to assist in developing an effective sling management system.

Sling Sizing

Manufacturers provide slings in various styles and sizes, such as seated slings ranging from extra extra-small to extra extra-large.

Sling sizes are not consistent across manufacturers (Smith et al., 2023; ISO 10535:2021). For example, a medium size universal seated sling from one manufacturer will have a different recommended weight range and dimensions than a medium size universal seated sling from another manufacturer.

Several manufacturers use a color-coding system to identify the size range of a sling e.g., a sling with yellow edging is a medium, however there is no standardization of color coding between manufacturers (ISO 10535:2021).

The shape of a sling and number of attachments within a style of sling e.g., hammock style slings, also varies between manufacturers.

Additionally, sling designs can alter over time, so a new sling from a manufacturer may differ in size or attachment strap length from one that was previously purchased from the same manufacturer (NHS, 2015).

A sling may need to be changed if a patient gains or loses weight and/or as a medical condition or clinical needs changes (Gibson, 2015).

The factors listed above can contribute to user error when choosing a sling, especially if there is a wide variety of sling styles available in a facility and/or a variety of slings of the same style from different manufacturers.

Therefore, it is essential when choosing a sling for an individual patient to ensure the correct 'fit.'

Caregivers should be knowledgeable about the weight capacity of the specific sling being used; however, it is equally important to recognize that weight capacity alone does not determine appropriate sling fit, as factors such as the patient's body shape and weight distribution play a significant role (Alexander, 2008; Smith et al., 2023). Therefore, caregivers must also know how to correctly fit a sling to meet an individual patient's SPHM needs.

Manufacturers should provide instructions on how to choose the correct fit of sling for a patient. Some provide only weight range as a sizing guide while others will also provide dimensions of a sling and how to measure the patient correctly to ensure an appropriate fit. Body measurements required will depend on the style of sling.

ISO standard 10535:2021 recommends that in addition to the maximum weight capacity, manufacturers of slings provide the following dimensions for each type of sling offered.

Safe Patient Handling and Mobility – Section 5

Sling Type	Body Dimensions
Non-Rigid Slings	
Seated Slings	• Weight range of the sling • Level of trunk and head support – high, medium, low support (Table 5.8) • Slings with split leg support opening, the type of opening support – narrow, standard, wide (Table 5.8) • Hip breadth • Sitting height • Shoulder breadth • Body length • Chest circumference • Thigh circumference
Supine/Flat Repositioning Slings	• Shoulder breadth (deltoid) and if other part of body is broader • Hip breadth in supine position • Body length
Limb slings, turning bands & other slings that support part of a body	• Essential body dimensions will depend on the intended use of the sling • Maximum weight capacity of the sling in relation to the lifted body part
Ambulation/walking/ gait training slings	• Sitting height • Chest circumference • Waist circumference • Thigh circumference for legs straps if present
Sit-to-stand slings	• Sitting height • Body length • Chest circumference • Waist circumference
Rigid Slings	
Seated rigid slings	• Level of trunk and head support – high, medium, low support • Hip breadth • Sitting height • Chest circumference

Safe Patient Handling and Mobility – Section 5

Sling Type	Body Dimensions
	• Waist circumference
Rigid slings for supine transfers.	• Shoulder breadth (deltoid) and if other part of body is broader • Hip breadth in supine position • Body length

Table 5.10 Essential Body Dimensions for Sling Sizing.

Source: ISO 10535:2021

Additional information about definitions of body dimensions and guidelines for color coding for size of non-rigid slings can be found in ISO 10535:2021.

Other information that should be provided either on the sling label or in the manufacturer's instructions are reviewed in **Appendix G**.

Other factors that influence the choice and fit of a sling include a patient's physical, cognitive, and clinical needs as described in **Table 5.8** and the design of the sling and lift hanger bar. For example:

- **The shape and size of a sling.** Generally, a sling with more material e.g., a universal sling provides greater comfort and support than a sling with less material such as a hygiene or toileting sling.
- **The number and position** of attachment points such as loops or clips on a sling.
- **The adjustability** of the attachments on sling e.g., a loop style attachment that allows a choice of lengths to be used. For example, when using shorter shoulder loops on a universal seated sling and longer leg loops the patient's body will be in a more upright seated position (if the sling is sized correctly and fits well).
- **The shape** of the hanger bar to be used and number of attachments points. For example, a 2-point hanger bar used with a seated or repositioning style of sling can place patients in a more 'closed or bent forward posture' which may not be comfortable for larger patients or those with joint pain and certain orthopedic conditions.
- **The width** of the hanger bar, for example a wider hanger bar may help reduce discomfort and pressure on the shoulders and legs when using a seated style sling.

Additionally, sling fit should be checked when performing patient handling tasks, including when a sling is first placed on the patient, during attachment of the sling to the lift hanger bar or attachment points, and when raising the lift motor to apply tension to the sling before lifting the patient of a surface.

Therefore, it is important that selection of a sling for a patient is determined by assessment of the patient and their mobility needs on admission, when a patient's clinical condition or needs change, and every time a SPHM handling and mobility task is performed (**Refer to Administrative Controls**). Risk Assessment for Safe Use of Slings is discussed in **Tool 5b**.

Friction Reducing Devices (FRDs)

General Description

Friction reducing devices (FRDs) are used to transfer a patient in a supine position from one surface to another e.g., to/from bed and stretcher. Some FRDs can also be used to reposition a patient on a flat surface such as boosting and turning a patient up in bed, and/or repositioning a patient in a chair, and placing a patient to and from a supine and prone position. Some types of FRDs can be used to assist insertion and removal of a lift sling under a non-mobile patient and assist a patient to the edge of the bed prior to a standing transfer.

FRDs lower the coefficient of friction (frictional resistance) between two surfaces, such as a patient and a drawsheet or bed sheet, making movements such as bed-to-stretcher transfers or repositioning in bed easier (Baptiste, 2018).

The goal is to decrease the physical effort (pulling force) required by caregivers to move a patient and to reduce the friction and shearing forces on a patient's skin when they are being repositioned or transferred.

Friction reducing devices can be placed into 4 general categories:

1. Air-assisted transfer devices
2. Friction-reducing slide sheets/tubes
3. Transfer and roller type boards
4. Bed overlay systems for repositioning

Table 5.1 summarizes the patient handling and mobility tasks that can be performed using Friction Reducing Devices.

In the acute care setting, repositioning a patient in bed is one of the most frequently performed tasks and is known to be a leading cause of low back injuries in caregivers (Callison and Nussbaum, 2012; Kotowski et al., 2013; McCoskey, 2007; Poole Wilson et al., 2015; Pompeii, 2009; Wiggermann et al., 2021).

For over 100 years, cotton sheets or draw sheets have been commonly used to boost patients in bed or on a treatment surface and are still widely used in healthcare settings. However, evidence supports that the forces required to boost a patient in bed using a cotton sheet or drawsheet *far exceed* the safe force limits for the spine (Bartnik and Rice, 2013; Larson et al., 2018; Wiggermann et al., 2021). Thus, using a sheet/drawsheet to boost a patient on a surface or to transfer a patient between 2 surfaces in a supine position is unlikely to prevent caregiver injuries related to patient handling.

Friction reducing devices can be used in various repositioning and transfer scenarios to reduce the physical demands placed on caregivers. They have been found to produce less internal spinal loads as compared to traditional cotton sheets (Amini Pay et al., 2021; Bartnik and Rice 2013; Elnitsky et al., 2014; Larson et al., 2018; Koppelaar et al., 2012; Lloyd & Baptiste, 2006; Theou et al., 2011; Weiner et al., 2017; Wiggermann et al., 2021).

However, the ability of an FRD to reduce spinal load (forces) during repositioning and lateral transfer tasks varies by device. Unlike mechanical lifts such as an overhead or floor-based lift, FRDs do not fully support the weight of the patient, so when using an FRD, caregivers still must exert some force to pull horizontally when transferring or repositioning the patient on a surface.

Safe Patient Handling and Mobility – Section 5

The friction between the FRD and the surface significantly affects how much force a caregiver needs to move the patient.

Factors that influence the amount of resistance between 2 surfaces and thus how much physical effort a caregiver must exert to break the starting friction to initiate movement include the:

- Patient weight and size. Physical stress is greater when moving heavier patients (Wiggermann et al., 2021; Muona et al., 2022).
- Composition of the support surface e.g., smooth and firm vs. soft

Air-assisted transfer devices appear to be the most effective type of FRD to reduce spinal loads in caregivers especially as patient weight increases (Wiggermann et al., 2021).

The number of caregivers required to complete transfers tasks and repositioning using a FRD will depend on a patient's weight and body habitus, the width of both the initial and the receiving surfaces during lateral supine transfers, and other factors such as the presence of lines and monitoring equipment, and if support of the patient's airway, head and/or lower limbs is required.

1. Air Assist Transfer Devices

Air assist transfer devices consist of a motorized blower, hose, and a mat or pad with tiny pinholes on the bottom and handles along each edge. The mat is positioned beneath the patient, ensuring appropriate support for both the head and legs. The blower is attached to the mat via a hose. Once started, the blower uses an electrical motor to force air into the mat to inflate it. After the mat is inflated, the blower continues to push air into the mat and through the tiny holes on the base of the mat creating a cushion of air that reduces friction so the mat can easily slide along a surface or between 2 surfaces. These devices remain inflated when completing a repositioning or transfer task and must be deflated once the task is completed.

The blower motor, hose and mat can be stored in a cart for easy access and transportation.

Air Assist transfer devices need to be connected to an electrical outlet for use. However, some can be operated by a portable re-chargeable battery which is a useful option if there is no readily available electrical power source.

A minimum of 2 caregivers is normally required to use an air assist device for lateral supine transfers.

Air assist devices mats can be:

- Reusable and wiped clean between patient use or
- Disposable (single patient use) and used for only one patient. However, a single disposable device can typically be used repeatedly to move the same patient multiple times if it remains clean.

Air Assist transfer devices can be used in a wide variety of healthcare settings although they are more commonly used in hospital settings in perioperative and imaging departments and patient care units.

Safe Patient Handling and Mobility – Section 5

Some examples of use in these areas include:

- **Imaging and perioperative settings**

A *deflated* air assist transfer device can be left under a patient when they are transported to/from patient care units and other treatment areas such as imaging and perioperative departments, where it can be inflated to facilitate safe transfers.

Air assist transfer devices are typically radio-translucent so can be used in a variety of imaging settings including Magnetic Resonance Imaging (MRI). For MRI-use, a long hose (e.g., 25 feet) enables caregivers to use the mat in MRI areas by keeping the blower (air supply motor) out of an MRI room. Check with the device manufacturer to ensure an air assist mat and hose are compatible with MRI.

Mats are offered in different widths and lengths and shapes depending on function e.g., a half-air assist mat may be used in the operating room for gynecological and urology surgeries where a full-length air assist mat could interfere with surgical access when using specialty tables.

- **Patient care units**

In-bed repositioning. Air assist devices are designed to remain under a patient during procedures or imaging. Depending on the manufacturer's recommendations and approval by a facility's wound and ostomy department, an air assist mat may be left under a patient for longer periods to facilitate repositioning (i.e., boosting, turning and proning) in bed. This is especially useful when caring for dependent patients of size in a room with no overhead lift system. Two small studies indicate that leaving a single-patient-use air assist mat or a reusable mat does not increase risk of pressure injuries (Deter et al., 2013; Lloyd, 2010).

Bed-side imaging. An air assist device can be inflated to facilitate easier placement and removal of an x-ray plate under a patient. The device is deflated while an x-ray is taken.

Fall recovery. An air assist mat can be placed under a patient who has fallen in a confined or awkward space. While deflated, the mat's handles can be used to slide the patient to an area suitable for using a mechanical lift or air assist lifting device to raise the patient off the floor **(Refer to page 5-81)**. A patient must be assessed for injuries before determining if this is the safest way to move them and when determining the safest method to lift them from the floor using SPHM technology.



Source: ARJO



Source: Hovertech

Figure 5.18 Examples of an Air Assist Transfer Device - Full Length Mat.

Safe Patient Handling and Mobility – Section 5

General safety considerations

An air assist mat must be *wide enough* to support the patient's torso and hips and *long enough* to support their head, torso, and legs. A patient's legs will need to be manually supported during a transfer or repositioning task if not supported by the mat e.g., when using a half-mat.

A patient must be centered on an air assist mat prior to inflation to prevent the risk of tipping to one side. It is also imperative that caregivers are trained to move an air assist transfer device slowly to reduce the risk of the patient being moved too quickly or too far.

When transferring a patient between 2-surfaces, surfaces should be at the same height, and the brakes **must** be applied on both transfer surfaces.

Caregivers should not attempt to use a mat that is not fully inflated to transfer a patient.

These devices are not typically used for patients with undiagnosed or unstable (none-cleared) spinal injuries unless they are used with a rigid back board placed on top of an air assist mat to support the patient.

Obtain approval from the device manufacturer and patient's medical team if an air assist transfer device is to be used with patients who have Ventricular Assistive devices (VADs) or similar medical devices that may be impacted by exposure to static. In environments with lower humidity static may occur during a transfer when using an air assist device.

It is essential to inform the patient prior to transfer that the device will produce noise during both mat inflation and movement. For individuals with dementia or other neurocognitive disorders, assess whether the abrupt sound from the blower may cause distress or act as a potential trigger for aggressive behavior.

Refer to the manufacturer's instructions for additional instructions about safe use.



Figure 5.19 Example of an Air Assist Transfer Device – Half Length Mat.

Source: Hovertech

Weight capacity and size

The weight capacity of air assist transfer devices ranges from 600-1200 lbs. They are available in different widths and lengths.

Storage

The blower and mats can be stored on a purpose-built cart. If blowers are not stored on a cart there is a risk of damage when they are placed on the floor under a height adjustable surface e.g., a bed, and caregivers inadvertently lower the bed onto the blower. Some blowers are equipped with hooks to secure them to a transfer surface.

Battery operated air pumps will require electrical outlets for re-charging in storage areas.

Blowers should be located in or close to areas of use e.g., in a surgical suite, or accessible for use between 1 or more adjacent imaging rooms.

Safe Patient Handling and Mobility – Section 5

Cleaning

Reusable mats – wipe down between patient use. Some reusable mats may be laundered by following the manufacturer's specific washing instructions.

The blower and hose should be cleaned (wiped down) between use with individual patients.

Some manufacturers offer disposable covers for reusable air assist devices and disposable 'sleeves' for the motor hose to facilitate cleaning.

Disposable mats – some manufacturers offer a fee for service to clean and reprocess mats.

*Refer to **Appendix D** for information about cleaning and disinfecting SPHM technology.*

Maintenance

Blowers and battery systems should be inspected as part of a facility's routine inspection process for electrical medical devices.

Quantity

A workflow assessment is recommended to identify the locations, methods, and frequency of air assist device usage.

The type of mat to be used i.e., reusable, disposable or both, is also a factor that will determine quantity needed.

Like patient lift slings, a process for mat management should be developed that considers the supply process for staff to access mats, disposal process for single use mats and damaged reusable mats, infection prevention and control measures, and reporting of non-working blowers and carts.

As with other SPHM technology, users should inspect air assist mats and blowers for damage etc. before use.

There should be enough blowers so that staff can access them quickly and easily. If blowers are not easily located, staff are more likely to transfer or reposition a patient manually using a deflated mat. Although a deflated mat has some friction reducing properties, they are not typically designed to mitigate risk of caregiver injury when used in this way.

Refer to **Appendix C** for more information about how many air assist mats and blowers are recommended.

Standards

Air-assisted transfer devices are classified by the FDA as Class II medical devices. *Refer to **Appendix E** for more information about Standards and Regulations related to use of powered SPHM technology.*

Safe Patient Handling and Mobility – Section 5

2. Friction-Reducing Slide Sheets/Tubes

These are low-friction sheets that readily slide across other materials or each other in a horizontal direction while decreasing frictional resistance when manually repositioning or transferring a patient (**Figures 5.20 & 5.21**).

These devices can be made of lightweight material such as nylon fabric that is coated with silicon to reduce friction or a flexible plastic material.

They are available as a single sheet or a tube of material. Tube slides have 2 sheets sliding against each other, so they have greater friction reducing ability than a single slide sheet. Slide sheets may also be filled with a thin layer of silicone gel that may improve patient comfort when being used for repositioning and lateral transfer tasks.

Some slide sheets only move in one direction and are designed to reduce patient slippage down in the bed and/or in a chair/wheelchair.

Slide sheets can be helpful when inserting and removing lift slings with dependent patients and promoting patient mobility such as moving a patient's leg (s) in and out of bed (**Figure 5.22**) or pivoting a patient in a seated position to the edge of the bed. They can also be used as rehabilitation aids when teaching patients how to mobilize in bed and to the edge of the bed.

Larger slide sheets may be tucked under a patient who has fallen in a confined or awkward space and used to carefully slide the patient to a place where a mechanical lift or air assist lifting device can be used to raise them from the floor. *A patient must be assessed for injuries before determining if this is the safest way to move them and when determining the safest method to lift them from the floor using SPHM technology.*

Some slide sheets are designed to be placed under a drawsheet or folded bed sheet, which is then used to move the patient. Slide sheets are then removed after a task is completed (**Refer to General Safety Considerations below**).



Source: Guldman



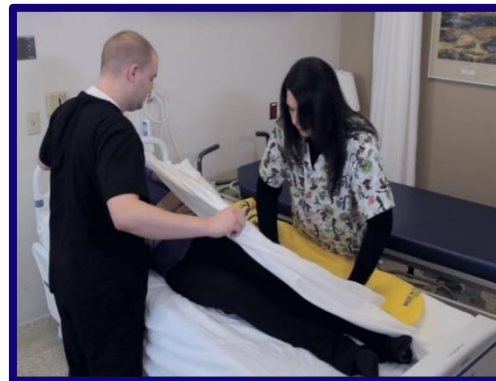
Source: Alpha Modalities

Figure 5.20 Examples of Boosting a Patient with a Friction Reducing Slide Sheet.

Safe Patient Handling and Mobility – Section 5



Source: ARJO



Source: Wright Products

Figure 5.21 Above & Right - Examples of Lateral Supine Transfers with a Friction Reducing Slide Sheet.

However, there are some slide sheets that are designed to remain under a patient in bed (also known as 'in-bed' slide systems). This type of in-bed slide sheet may be beneficial when the tasks of inserting and removing slide sheets have a detrimental impact on the patient or put the caregivers at risk of injury. They are indicated when a patient is in pain and spends considerable time in bed and when they are moved frequently (Smith et al., 2023).



Source: Wright Products

Sturman-Floyd found 'no increase in the incidence of new pressure injuries during a six-months monitoring trial of 110 clients who each used an 'in-bed' satin-finished woven textile slide system on top of tissue viability mattress. The incidence of pressure ulcers of all grades was reduced in clients with existing pressure injuries; and the number of carers required for patient handling procedures, even for bariatric clients, was significantly reduced.' There were also significant projected savings related to patient care and pressure injury management costs (Sturman-Floyd, 2011).



Figure 5.22 Example of Using a Friction Reducing Slide Sheet to Facilitate Moving a Patient's Legs.

Source: HumanFit/Wright Products

Some 'in-bed' slide systems do not reduce friction as effectively as removable slide sheets or air assist devices and may not sufficiently lower caregiver injury risk with larger patients (Wiggermann, 2021).

When choosing slide sheets consider evaluating and comparing their friction-reducing properties through mock-ups when repositioning and transferring individuals of varying weights on and between common support surfaces in your facility, such as bed mattresses with sheets or stretchers.

Ensure that wound and ostomy staff approve of use 'in-bed' slide systems before purchase. **Refer to Table 5.9 for more information.**

Safe Patient Handling and Mobility – Section 5

General safety considerations

Except for in-bed slide sheets and one-way slide sheets that are designed to stay in a chair under a patient, all other slide sheets should be removed from under the patient after completing a repositioning or transfer task. This practice minimizes the risk of the patient sliding off the support surface.

A slide sheet should be of adequate length and width to fully support the patient's shoulders, trunk, and buttocks during a patient handling task. Using a slide sheet that supports the entire length of the patient's body for lateral supine transfers reduces the need for caregivers to support the patient's legs and head during a transfer unless specific clinical reasons require otherwise.

When transferring a patient with a slider sheet between two surfaces, any gap larger than 1-2 inches should be bridged with a full-length slider board (per manufacturer instructions), both surfaces should be set at the same height, and the brakes **must** be applied on both transfer surfaces.

It is important that caregivers are trained to use slide sheets correctly and practices are monitored so that the devices are not used to 'lift' patients. Caregivers should follow ergonomic work practices when placing or removing slide sheets to reduce awkward movements and strain.

Refer to the manufacturer's instructions for additional instructions about safe use.

Weight capacity & size

Weight capacity is variable. Some manufacturers indicate that their slide sheets do not have a specified weight limit; however, as patients' weight increases, more caregivers may be needed to use a slide sheet safely.

Slider sheets come in several sizes and lengths. Short slider sheets can be more practical for repositioning tasks and for pivoting a patient who is in a seated position to the edge of a bed. Longer slide sheets are suited to transferring supine patients from one surface to another, such as from bed to stretcher.

Slide sheets that do not require a top sheet for use need to be large enough to fit the patient and allow caregivers material to grasp the sheet using a power grip (whole hand grip) and not a pinch grip without uncomfortable contact with the patient.

Storage

Slide sheets are typically foldable for storage. Some are provided in wall mount dispensers that can be placed in patient rooms or treatment areas for easy access.

Larger silicon filled slide sheets have optional grommets placed at one end so they can be hung on hooks in the work areas they will be used in (**Figure 5.23**).

Cleaning

Slide sheets may be disposable, wipeable, or washable.

*Refer to **Appendix D** for information about cleaning and disinfecting SPHM technology.*



Figure 5.23 Example of Friction Reducing Slide Sheet with Grommets for Hook Storage.

Source: Wright Products

Safe Patient Handling and Mobility – Section 5

Quantity

When determining quantity, the type of slide sheet to be used must be considered i.e., reusable, disposable, or both.

As with patient lift slings, a process for management of slide sheets should be developed that considers the supply process for staff to access slide sheets, disposal process for single use sheets and damaged reusable sheets, and infection prevention and control measures.

Caregivers should inspect slide sheets for damage before use.

Refer to **Appendix C** for more information about how many slide sheets are recommended.

Standards

Slide sheets are classified by the FDA as Class I medical devices as they present minimal potential for harm. *Refer to **Appendix E** for more information.*

3. Transfer Boards

Slider boards

These boards are made of lightweight plastic (polyethylene). They may be flexible or rigid in design.

Slider boards are used with friction-reducing slide sheets/tubes or drawsheets to perform lateral supine transfers between 2 adjacent horizontal surfaces.

Roller boards are another style of transfer board that uses a system of rollers encased in vinyl covering.

General safety considerations

Flexible slider boards and roller boards are not designed to replace rigid back or trauma boards for spinal immobilization.

Ensure the patient's skin/part of their body cannot become caught between a slider or roller board and the transfer surface when applying and removing a board and during a transfer.

Most slider and roller boards are not designed to be left under a patient and should be removed immediately after a transfer. However, some slider boards may be radiolucent and are designed to stay under a patient during imaging procedures. Some have anti-static surface coatings to protect patients from sticking to the surface while reducing static build-up.

Review whether a slider or roller board is appropriate for use with a patient who has impaired skin integrity.

Slider and roller boards should be of adequate length and width to fully support the patient's body to reduce the need for caregivers to support the patient's legs and head during transfer unless specific clinical reasons require otherwise.

When transferring a patient between 2 surfaces, the surface must be at the same height, and the brakes **must** be applied on both transfer surfaces. *Refer to the manufacturer's instructions for additional instructions about safe use.*

Safe Patient Handling and Mobility – Section 5

Short transfer boards

These boards, constructed from either wood or plastic, are designed to assist patients who are unable to stand or bear weight in transferring between two surfaces such as a bed and a wheelchair in a seated position, either independently or with caregiver support.

Short transfer boards may be straight (**Figure 5.24**) or curved. Curved transfer boards make it possible to transfer around fixed armrests. Some offer a gliding attachment that facilitates lateral sliding movement of the patient across the board (**Figure 5.25**).

To use a shorter transfer board a patient must be able to hold themselves upright in a seated position, be able to transfer their weight naturally, and have cognitive ability to understand the task and follow commands.

Short transfer boards are typically used by physical therapists as part of a rehabilitation process for specific patients.

When being used during rehabilitation, a therapist may use a transfer belt that is secured around the patient's waist to guide the patient across the surface. However, therapists and other caregivers may still apply horizontal forces in awkward postures when assisting with these transfers. Fingers may be trapped under board edges.

These boards can also be used together with an overhead lift and walking sling to support the patient's trunk as part of the rehabilitation process when transferring from surface to surface.



Figure 5.24 Example of Straight Short Transfer Board.

Source: Stock Image

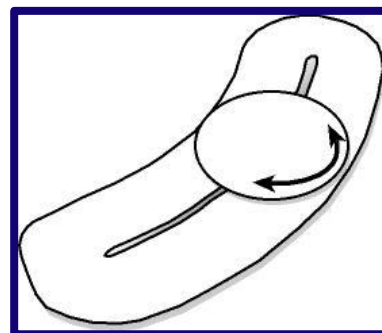


Figure 5.25 Example of Curved Short Transfer Board.

Source: OSHA, 2009

General safety considerations

The surfaces between the transfer board must be the same height and stable e.g., brakes are applied on a wheelchair or any surface with wheels. Adequate space should be provided at the intersection of surfaces to position the chair at a 60° angle. The board must be smooth and that any grips on the underside are intact (Smith et al., 2023). Refer to the manufacturer's instructions for additional instructions about safe use.

Safe Patient Handling and Mobility – Section 5

Slider, Roller & Transfer Boards

Storage

Easily accessible and close to point of use.

Weight capacity

Weight capacity is variable by manufacturer but typically range from 300-500 lbs.

Cleaning

Slider, roller and transfer boards are cleaned (wiped down) between patient use, however, some slider and roller boards have disposable covers to facilitate cleaning. Refer to **Appendix D** for information about cleaning and disinfecting SPHM technology.

Quantity

Refer to **Appendix C** for more information about how many slider boards are recommended.

4. Bed Overlay Systems for Repositioning

These systems can be placed on top of existing beds and in some cases the bed mattress. A powered motor is attached to a specialized sheet system and used to move the patient up in bed. Some models incorporate a patient tilt or offloading feature for continuous lateral rotation (**Figure 5.26**).

Other SPHM technology is needed to complete tasks such as lateral supine and seated transfers between the bed and another surface.

Weight capacity varies but is typically 480-500 lbs.



Figure 5.26 Example of a Bed Overlay System with Powered Function to Boost a Patient and Tilt and Hold a Patient in an Offloaded Position for Pressure Relief.

Source: Seneca Devices

Fall Recovery

Safe rescue of a patient following a fall can be achieved using several different types of SPHM technology such as an overhead lift with a flat repositioning sheet or a universal seated sling with head and shoulder support. Powered floor-based lifts can also be used if the lift boom lowers close enough to the floor (**Figure 5.27**).

Ceiling and floor lifts should *not* be used to lift patients from the floor if they have suspected spinal injury or fractures or are unconscious with a non-rigid sling. However, use of an overhead lift (or in some cases a larger capacity floor lift) with a rigid spine board that is placed in a full-length repositioning/supine sling; or with a rigid supine sling, may be used to lift a patient if a spinal injury is suspected (**Refer to Table 5.8**).



Source: Baxter



Source: Alpha Modalities

Figure 5.27 Example of Fall Recovery with (1) a Powered Floor-Based Lift with a High Back Universal Seated Sling and (2) an Overhead Lift with Full Body Repositioning/Supine Sling.

However, there are other SPHM devices that are specifically designed to safely raise a patient from the floor following a fall. These include:

1. Air assisted full length lifting devices
2. Electric inflatable lifting cushions
3. Mobile electric chair and platform lifts

The choice of SPHM technology to lift a patient after a fall will depend on the patient's ability to be able to stand with minimal assistance from caregivers, and the extent of any injuries that occurred because of the fall.

The number of caregivers required to complete a fall recovery task when using these devices is usually significantly less than manually lifting a patient from the floor and is dependent on the patient's injury status, clinical needs, and size.

In outpatient, long term care and community settings, emergency services are typically called for assistance with fall recovery when patient or resident injury is suspected. However, Emergency Medical Services are often requested to assist residents who have fallen and are unable to get up, even when no injuries have occurred (Quatman et al., 2018). This practice is increasing and, in some cases, prevents EMS workers from being able to respond to emergencies (Washington Post, 2024). Some EMS agencies

Safe Patient Handling and Mobility – Section 5

have started to charge for lift assists with no injury at nursing and medical facilities (Oregon Live, 2021). The use of the mechanical fall recovery devices described below could help long term care facilities better manage client falls without injury and reduce help needed from EMS (Houghton et al., 2024).

Fall Recovery for Patients who Cannot Stand with Minimal Assistance

1. Air Assisted Full Length Lifting Devices

This device consists of a large inflatable mat with several chambers that are filled with air sequentially from the bottom chamber to top chamber using a motorized blower with a hose to lift the patient in supine position to a safe height for transfer (**Figure 5.28**).

The deflated mat is placed under the patient on the floor, and the mat is inflated. Once the mat is fully inflated the patient can then be transferred in a supine position to another surface such as a stretcher or bed using an air assist transfer device or transfer board (**Refer to Friction Reducing Devices on page 5-70**).

The mat has handles around the edge of the top chamber and a reduced friction bottom surface. Once inflated this device can be carefully pulled a short distance and moved to an area where the patient can be transferred to another surface such as the bed in a patient's room.

If a patient falls into a confined space, a mat may be placed under the patient on the floor and the handles on the mat used to slide the mat to a location where the mat can be inflated and the patient transferred to a bed or stretcher (**Also refer to page 5-72**).

This device can be partially inflated (2-3 chambers) to help a patient who has fallen but uninjured be lifted off the floor in a supine position and then moved into a seated position on the device. The patient's mobility status can then be assessed to determine if they can stand and mobilize with or without minimal assistance from caregivers. This technique is especially useful when assisting an uninjured patient of size after a fall but who cannot pull themselves to a kneeling and then standing position.

If air assisted full length lifting devices *and* air assisted lateral transfer devices are provided from one manufacturer, then the same blower may be used for both devices.



Source: ARJO



Source: Hovertech

Figure 5.28 Examples of Fall Recovery with an Air Assist Lift Device.

Safe Patient Handling and Mobility – Section 5

As with the air assist lateral transfer device, some brands of these mats can be operated with a battery powered motor or blower, so they can be used in settings where electrical power supply is not available such as an outside bay in an emergency department or a parking structure.

These devices may also be used together with an air assist transfer device to *extract a patient from a vehicle* provided that the vehicle seat with patient is at the same height as the air assist lifting device i.e. transfer surfaces are even or the vehicle seat is slightly higher than the surface of the air assist device.

Some manufacturers offer air assisted full length lifting devices that are designed for *emergency patient evacuations downstairs* (**Figure 5.29**).



Figure 5.29 Example of an Air Assist Lift Device that can also be used for Emergency Evacuation.

Source: Hovertech

General safety considerations

Air assisted full length lifting devices *do not* have brakes so caution must be taken when transferring a patient from the device to another surface.

Assess the lift device's maximum inflated height to confirm that other transfer surfaces, such as stretchers, can be adjusted to match.

Although some manufacturers claim that these devices are firm enough to perform CPR, it is recommended that resuscitation protocols and use of air assisted full length lifting devices are reviewed by your trauma or medical team especially as they relate to caregiver safety when performing CPR and effectiveness of compressions.

Refer to the manufacturer's instructions for additional instructions about safe use.

Weight

The weight capacity of air assisted full length lifting devices ranges from 1000-1200 lbs. They are available in different widths. A patient must be able to fit on the device.

Storage

The blower and mat can be stored on a purpose-built cart. Battery operated air pumps will require electrical outlets for re-charging in storage areas.

Cleaning

Air Assist full length lifting devices are reusable and wiped clean between patient use. The blower and hose should be wiped cleaned between use with individual patients.

Some manufacturers offer disposable covers for reusable air assist devices and disposable 'sleeves' for the motor hose to facilitate cleaning.

*Refer to **Appendix D** for information about cleaning and disinfecting SPHM technology.*

Safe Patient Handling and Mobility – Section 5

Maintenance

Blowers and battery systems should be inspected as part of a facility's routine inspection process for electrical medical devices.

Quantity

Typically, these devices are not used on a frequent basis so can be stored in a central location that is easily accessible to users such as rapid response teams. Therefore, 1-2 devices may be sufficient per facility especially if there are many overhead lifts and/or floor lifts in patient care areas.

A process should be developed and communicated to staff to ensure they know when, and how to obtain and use a fall recovery device, and who will provide assistance when using the device etc.

As with other SPHM technology users should inspect an air assist full length lifting device and blower for damage before use. A process to report and address damaged or non-working components should be implemented.

Refer to **Appendix C** for more information about how many air assisted full length lifting devices are recommended.

Standards

Air-assisted full length lifting devices are classified by the FDA as Class II medical devices. *Refer to **Appendix E** for more information about Standards and Regulations related to use of powered SPHM technology.*

The following equipment requires the patient to be capable of completing a weight bearing transfer from the equipment once they have been raised from the floor in a supported seating position. The patient must also have reasonable sitting balance, core strength, and be able to understand and follow simple commands.

2. Electric Inflatable Lifting Cushions

Inflatable lifting cushions may be battery operated or connected directly to an electrical outlet for operation. They are constructed in sections, and a motor is used to inflate the cushion section by section and raise the patient from the floor until they are in a seated position and able to transfer to another surface (**Figure 5.30**).

Inflatable cushions are available without or with an inflatable backrest. The backrest provides more support for the patient during the task and allows the caregiver to provide more support to the patient from behind when raising them from the floor.

Weight capacity

They are available in variable sizes and capacities from 485-980 lbs.



Figure 5.30 Example of a Powered Inflatable Lift Cushion.

Source: ACC, 2012

Storage

The blower and cushion can be stored on a mobile cart for convenience. Battery operated air pumps will require electrical outlets for re-charging in storage areas.

Cleaning

Electric inflatable lifting cushions are reusable and the cushions together with the battery case should be wiped clean between use. Refer to **Appendix D** for information about cleaning and disinfecting SPHM technology.

Maintenance

They should be inspected as part of a facility's routine inspection process for electrical medical devices.

Quantity

Refer to *air assist full length lifting devices*.

Standards

These devices are classified by the FDA as Class II medical devices. Refer to **Appendix E** for more information about Standards and Regulations related to use of powered SPHM technology.

3. Mobile Electric Chair and Platform Lifts

These types of lifts are battery powered and use a powered handset control to raise a patient from the floor on a seat or platform in a seated position from which they can transfer to another surface (**Figure 5.31**). Some styles of electric chair lift can raise a patient from a supine position on the floor into a semi-seated and then upright seated position for transfer.

Safe Patient Handling and Mobility – Section 5

Once raised from the floor into a seated position, an SPHM mobility assessment should be conducted to determine if the patient can stand and mobilize without assistance, or if a SPHM device such as a non-powered sit-to-stand aid is needed to complete the transfer.

Some chair lifts can be disassembled and carried in bags to easy transportation. These types of lifts are typically used in long-term care and community-based settings.

Weight capacity

Variable - 300-440 lbs.

Cleaning

These devices should be cleaned (wiped down) between patient use. *Refer to **Appendix D** for information about cleaning and disinfecting SPHM technology.*

Maintenance

They should be inspected as part of a facility's routine inspection process for electrical medical devices.

Quantity

Refer to *air assist full length lifting devices*.

Standards

These devices are classified by the FDA as Class II medical devices. *Refer to **Appendix E** for more information about Standards and Regulations related to use of powered SPHM technology.*



Figure 5.31 Example of a Powered Fall Recovery Platform Lift.

Source: IndeeLift

Miscellaneous Assistive Devices

Gait Belts

A gait belt is an assistive device that is placed around a patient's waist and used by a caregiver to provide a secure grip when assisting a weight bearing patient to mobilize with supervision during standing transfer and ambulation and gait training tasks. They may also be used to guide a patient when completing a seated transfer between 2 surfaces on a short transfer board.

Gait belts are straight straps made of fabric e.g., cotton webbing or nylon, or vinyl, that are about 2" wide with an adjustable plastic or metal buckle (**Figure 5.32**). Vinyl belts can be cleaned and disinfected between use with different patients.

As discussed in **Section 1**, gait belts **do not** reduce the risk of caregiver injury when mobilizing patients.

Gait belts are appropriate for steadying and guiding patients as they walk and help with minor body position adjustments to improve balance, *provided* the patient has adequate strength and function in their legs to support themselves, is cooperative and can follow simple activity related commands.

Gait belts are **not** designed to lift a patient in any manner.

Additionally, research supports that spinal loads of caregivers who tried to manually assist a patient to the ground during a fall with or without use of a gait belt exceed safe limits (Arnold, 2025).

In addition to the risk of caregiver injury when used as a lifting aid, this author has observed serious soft tissue injury to patients when gait belts have been applied and used incorrectly.

One study indicates that gait belts may reduce the risk of patient falls that result in injury (Venema et al., 2019), however, the potential mitigation of patient injury risk comes at the expense of caregiver safety (Arnold, 2025).



Figure 5.32 Example of a Gait Belt.

Source: Stock Image

Transfer Belts

Like gait belts, transfer belts are designed to assist with ambulation and gait training tasks. However, they are usually wider and padded for patient comfort and have handles to facilitate neutral hand, wrist and arm postures of the caregiver (**Figure 5.33**). Handles may be positioned vertically, horizontally, diagonally, or in any combination of the three.

Transfer belts come in a variety of sizes and shapes, and they fasten with a quick release buckle or clip.

Some transfer belts can be laundered or wiped clean between use.

There is some evidence that transfer belts may be better at reducing spinal loads of the caregiver than gait belts (Tang et al., 2018).



Figure 5.33 Example of a Transfer Belt with Handles.

Source: Stock Image

Safe Patient Handling and Mobility – Section 5

If *gait and/or transfer belts* are to be used by caregivers in an SPHM program, then policy and procedures should be implemented that promote safe and appropriate use of gait/transfer belts. Policy should include:

- When it is appropriate to use gait/transfer belts with minimal risk of injury to caregivers and patients.
- The consistent use of validated patient mobility screen (**Refer to page 5-98**) that allows caregivers to determine the appropriate SPHM technology to mobilize a patient and when a gait belt may be used safely.
- Training on how to use gait belts safely, when they are appropriate to use, and when to use more supportive SPHM technology to promote patient mobility.
- A focus on use of more appropriate SPHM technology to support patient mobility needs and prevent caregiver harm as described in this Section. This includes the use of overhead or floor-based lifts with walking slings and non-powered sit-to-stand devices that are easily accessible at point of care.
- Positive reinforcement of safe behaviors such as consistent use of mobility assessment screening tools and mechanical lifts and mobility technology, to promote a culture of employee and patient safety (Arnold, 2025).

Refer to **Appendix D** for information about cleaning and disinfecting SPHM technology.

Beds, Stretchers, Exam Tables, Transport Assistive Devices and Stretcher Chairs

Refer to **Table 5-11** for more information about compatibility of SPHM technology described in this Section and beds, stretchers, exam tables, transport assistive devices, and stretcher chairs.

The following information *is not* all inclusive. Please also refer to the manufacturer's instructions for the technology detailed below including safety protocols related to ligature and entrapment risks if applicable, and instructions for cleaning and maintenance.

Electric Profiling Beds

These beds are classified as patient handling technology due to their design features, which assist in patient repositioning and mobility and may influence the use of SPHM technology.

The design of the mattress used on an electric profiling bed can also influence the choice of SPHM technology that can be used to mobilize an individual patient. For example, a mattress that has a cover with high co-efficient of friction properties i.e., a strong resistance to sliding or movement, and a soft filling, such as an Air Fluidized Therapy Bed or sand bed, may *reduce* the effectiveness of friction reducing devices.

Electric Profiling Beds offer features that improve patient comfort and clinical outcomes, and when used properly, they also help caregivers reduce awkward postures such as bending and reaching and exertion during patient repositioning and other care tasks (**Figures 5.34 & 35**).

Safe Patient Handling and Mobility – Section 5

Features of these beds can include:

- Height adjustability
- Elevation of the backrest to various angles to allow a patient to sit unsupported in an upright position as needed
- Auto contour features that allow a knee support platform to be raised as the back rest is raised. This feature reduces the likelihood of the patient sliding down in bed reducing shear and friction on their skin
- Trendelenburg and reverse Trendelenburg
- Extension to accommodate a tall person
- Retractable footboard
- Higher weight capacities and width to accommodate a patient of size
- Lateral tilt function/continuous lateral rotational therapy. Note this feature does not negate the need to use SPHM technology to turn a dependent patient to perform peri or wound care etc
- Bed-to-seat and/or bed-to-standing and egress features that promote early progressive mobility
- Percussion/vibration
- Weight scales
- Smart cardiopulmonary resuscitation function
- Fall prevention features
- Lockout features to prevent accidental operation by the patient
- Motorized drive with powered steering

There is an increasing availability of beds that use computer driven smart features that can include automated bed positioning, vital sign monitoring, data collection and storage and patient-provider communication tools.

Motorized electric profiling beds reduce the physical effort required to move them, making them especially useful when pushed for long distances, moved on uneven walkways, or on inclines. Studies show that use of beds and stretchers with a power drive significantly reduces spinal loading and thus risk of WMSDs (Kotowski et al., 2022; Wiggermann, 2017).

If a powered bed's battery is depleted during patient transport, its heavier construction necessitates greater manual effort to maneuver compared to a non-motorized bed. This increases the risk of WMSDs to caregivers and other employees such as transport staff. To minimize this risk motorized beds should remain connected to an electrical outlet when not being used for transportation purposes and a system should be in place to inspect and replace batteries periodically per manufacturer's instructions.

A mechanical bed pusher can be used to assist with mobility of the beds non-motorized electric beds especially for transport of patients over longer distances, inclines etc. **Refer to page 5-91.**

It is important that caregivers are trained in the use of bed controls to minimize their exposure to risk factors for WMSDs and facilitate patient care. This includes the appropriate use of power drive functions

Safe Patient Handling and Mobility – Section 5

on motorized beds and stretchers and of steering and neutral controls on non-motorized transport equipment to reduce forces exerted.



Figure 5.34 Example of a Motorized Electric Profiling Bed.

Source: ARJO



Figure 5.35 Example of a Motorized Electric Profiling Bed with Bed Chair and Tilting Features.

Source: ARJO

Stretchers/Gurneys

Stretchers or gurneys should also be evaluated to determine if their design impacts the use of SPHM technology.

Motorized stretchers reduce caregiver pushing force when moving the bed. *Refer to Electric Profiling Beds and battery depletion during transportation.*

Additional design features that can reduce the use of forceful exertion when using a stretcher include:

- A wheel system that helps steer and maneuver non-motorized stretchers

Safe Patient Handling and Mobility – Section 5

- Electric or hydraulic raising and lowering mechanism
- Electric mechanism which facilitates lifting of the head of a stretcher.

This author has frequently evaluated the force necessary for one caregiver to *manually* elevate the head section of a non-powered stretcher containing a patient, using either one hand or both hands. Force exerted increased as a patient's torso mass increased.

The forces measured consistently *exceeded the recommended biomechanical safety thresholds for most caregivers* thus significantly increasing the risk of WMSDs involving the neck, upper back, and shoulders. Evaluations were conducted in response to reports of WMSDs by nurses related to manually raising the head of non-powered stretchers with patient load in perioperative post-anesthesia departments at 2 large hospitals.

Height-Adjustable Powered Exam Tables

Access to height adjustable exam tables is essential to facilitate safe use of floor-based lifts and sit-to-stand devices.

Title 36 CFR Part 1195 Standards for Accessible Medical Diagnostic Equipment of the Americans with Disability Act requires that transfer surfaces such as examination tables must have transfer surfaces that are adjustable in height, offering a low transfer position of 17 inches and a high position of 25 inches, and with at least four intermediate settings. Additionally, each transfer surface shall provide two unobstructed sides for patient transfer e.g., for wheelchair and patient lift access.

These standards are mandatory for state and local government-owned or operated healthcare facilities. However, for other healthcare facilities, they are considered as the industry's best practices and should guide planning for use of SPHM technology in settings where exam tables are used such as clinics. For more information go to <https://www.ecfr.gov/current/title-36/chapter-XI/part-1195/appendix-Appendix%20to%20Part%201195>.

Refer to **Appendix E** for information about ADA accessibility requirements and use of SPHM technology in clinic settings.

Overall access to height adjustable exam and treatment surfaces e.g., in imaging departments, rehabilitation gyms, clinics etc., is important to facilitate proper patient care and to eliminate the occurrence of manual patient transfers and need for caregivers such as therapists to provide treatments while using awkward postures. When wheelchair bound patients cannot be easily transferred to an exam surface they may need to be treated in their wheelchair. In some cases, patients must be rescheduled to return to a facility on a stretcher by EMS transport so that they can be transferred to and from an exam table to receive examination or treatment, thus delaying care and increasing costs etc.

Transport Assistive Devices

Powered Devices for Non-Motorized Beds and Wheelchairs

Weston et al. found that manual wheelchair pushing posed biomechanical risk to the lumbar spine (in compression and A/P shear) and to the shoulders which worsened as patient weight increased (Weston, et al., 2017).

Safe Patient Handling and Mobility – Section 5

Battery powered transport assist devices attach to non-powered beds or wheelchairs and allow caregivers and other staff to transport patients more easily thus reducing the risk of injury. They are especially helpful for safe transportation of non-powered beds and wheelchairs over long distances, on inclines, and varying floor surfaces.

These devices attach to the head or foot of a non-powered bed or back of a wheelchair and are then steered in the desired direction by the operator (**Figures 5.36 and 5.37**).

These devices increase the overall length of the bed or wheelchair that they are attached to, and they may need additional clearance to turn and maneuver the attached equipment.

Weight capacity is variable.

Considerations when choosing a powered device for non-motorized beds and wheelchairs include:

- Compatible coupling mechanism between the assistive device and beds and/or wheelchairs.
- Additional storage required with a power source for charging a device.
- Sufficient space to accommodate use of the device along the intended path of use e.g., along hallways with space for other foot traffic and equipment, around corners, through doorways, in patient rooms, treatment and diagnostic spaces, and elevators etc.
- Features that may be needed for wheelchair transports e.g., IV pole arm mount and oxygen cylinder holder.
- Determining where devices should be kept for easy access when needed.

Alternatively, motorized wheelchairs are available to transport patients of size in a health care setting.

Quantity

To determine quantity of devices needed, evaluate the number of beds or wheelchairs that require powered transport assist devices, the anticipated frequency of use, and the travel routes within the facility to determine the appropriate quantity and optimal storage locations for convenient access by users.



Figure 5.36 Example of a Battery Powered Transport Assist for Non-Motorized Beds.

Source: ACC, 2012



Figure 5.37 Example of a Battery Powered Transport Assist for Wheelchairs.

Source: HumanFit

Stretcher Chairs

Portable stretcher chairs allow for easy patient transfers by converting between a chair and a stretcher and usually have four wheels to facilitate patient transportation (**Figure 5.38**).

These devices can be used for patient transportation in places of difficult access for stretchers and beds and as treatment surfaces in ambulatory care settings.

Caregivers can use a lateral transfer device to move patients in the supine position between bed or stretcher and stretcher chair when in a flat position. If available, overhead and floor-based lifts may be used to transfer a patient.

Some stretcher chairs models are also designed to assist with standing for early patient mobilization.

Weight capacity, surface dimensions, and range of height adjustment vary.

Evaluate the forces needed to adjust and move non-powered stretcher chairs before purchase to minimize caregiver injury risk.

Figure 5.39 illustrates examples of portable chairs that do not convert to a stretcher but do have various motorized adjustments to support optimal patient positioning.



Figure 5.38 Example of a Portable Stretcher Chair.

Source: ARJO/Seating Matters



Figure 5.39 Example of a Portable Multi- Positional Chair that has Motorized Options to Support Optimal Patient Positioning.

Source: Seating Matters

Compatibility of SPHM Technology and Electric Profiling Beds, Stretchers, Exam Tables and Stretcher Chairs

The following are usability and safety factors to consider (*not all inclusive*) when evaluating the compatibility of SPHM technology with electric profiling beds, stretchers, exam tables, and stretcher chairs. Refer to **Tool 5a** for more information.

Overhead lifts

- Is there enough space above and around a bed or other surface to raise or lower the hanger bar and move the patient while keeping the lift strap in a vertical position i.e., without pulling the hanger bar at an angle?

Consider access to the patient with bed attachments that may be used such as 4-post frame trapeze systems, and orthopedic traction systems.

Overhead lifts, mobile floor-based lifts, and sit-to-stand devices

- Can the device surface be lowered enough to ensure the patient clears the surface when using any sling type and in varied body postures e.g., upright, reclined, or supine positions?

Evaluate the effect of the bed overlay or mattress on vertical clearance and any adjustments that may be feasible e.g., deflation mode on an air mattress.

- Are shorter patients able to place feet onto the floor when getting out of bed, stretchers or off an exam table etc?
- Does the bed overlay or mattress to be used impact bed height in the lowest position?
- Can a sit-to-stand lift or aid be used safely if a patient cannot place their feet on the device floor plate?
- Can floor-based lifts and sit-to-stand devices fit under a bed or stretcher at its lowest setting? Consider the location of steering wheels and motors that may be mounted under the center of bed or stretcher frame that may prevent access to the patient.
- Do side rails when lowered hinder access to the patient when using floor-based lifts and/or prevent a bed being lowered to a minimum height?
- Can floor-based lifts and sit-to-stand devices fit under or around exam tables?
- If a bed or stretcher chair converts to a seat or to a standing position can SPHM technology be positioned for safe use? For example, can a sit-to-stand device be used safely when mobilizing a patient from a bed that is converted to a seated position.
- Can side rails (beds, stretchers, and chairs) be lowered sufficiently to:
 - So that transfer surfaces are even when using friction reducing devices to perform lateral transfers?
 - Allow overhead lifts to clear the rails when transferring a patient who is in a seated or supine position?

Compatibility of SPHM Technology and Electric Profiling Beds, Stretchers, Exam Tables and Stretcher Chairs

- When lowered, do side rails create a gap between another transfer surface, and a slider board would be needed as a bridge if performing a lateral transfer using a friction reducing sheet?
- When rails are lowered can a patient comfortably sit at the edge of the surface without contact from their thighs with the rails which may hinder ease of mobility?

User trials of all SPHM technology discussed here are recommended to ensure that they can be safely used with the support surface being evaluated and employee training requirements can be determined.

Table 5.11 *Compatibility of SPHM Technology and Beds, Stretchers, Exam Tables and Stretcher Chairs.*

Selected Ergonomics Hygiene Equipment

Bathing a patient in bed typically requires caregivers to spend most of the task in forward bent, twisted, and prolonged static postures (Knibbe & Knibbe, 2016). As discussed in **Section 1**, awkward postures and static loading of the spine increase the risk of WMSDs.

A variety of bathing/showering/toileting devices are available that minimize these risk factors when performing patient hygiene tasks and enhance patient dignity, comfort and facilitate self-care. These devices are discussed below.

As with other wheeled lift equipment, mobile hygiene equipment should be easy to push and maneuver when loaded and must fit into the space intended for use. Floor surfaces should be non-carpeted and even, and thresholds should be flush to reduce physical exertion needed when moving hygiene equipment.

Electric powered shower trolleys and chairs will need a *storage area* that is easily accessible by caregivers with electrical outlet for charging per manufacturer's instructions.

Cleaning and maintenance should be in accordance with manufacturer's instructions. Routine castor/wheel maintenance is recommended.

Space requirements for use of Shower chairs and trolleys are provided in the resources listed in **Table 5.6**.

Refer to **Appendix C** for more information about how much ergonomics hygiene equipment is recommended.

Shower Trolley

Shower trolleys are designed with a full-body basin to support a patient in a supine position (**Figure 5.40**). To facilitate neutral working posture for caregivers, trolleys should have power height adjustment, and/or rail designs that allow staff to work close to the patient. Some models have power tilt adjustment and power head elevation.

Safe Patient Handling and Mobility – Section 5

Show trolleys can be used for other patient care tasks such as burn care, wound debridement, and decontamination. In some cases, a trolley has sufficient height adjustment to meet ADA requirements as a portable changing table.

Weight capacity is 300-1000 lbs. with varying dimensions.

As with beds, stretchers and other treatment surfaces, ensure that

- Overhead and floor-based lifts can be used with a trolley to safely perform patient transfers to and from a bed to the trolley e.g., sufficient vertical or lift clearance and clearance under a trolley for floor-based lifts.
- Some trolleys support the use of non-powered, non-rigid friction reducing devices for patient transfers. Ensure that the transfer surfaces can be adjusted to the same height as a trolley with a minimal gap to avoid needing a bridging device.
- Range of height adjustment accommodates use safe of SPHM technology used for patient transfers and allows caregivers to work using neutral postures.
- Forces required to push and maneuver a trolley when loaded are acceptable (see above).
- Sufficient clearance in the workspace that the trolley is to be used so that caregivers can use neutral postures when performing hygiene tasks.



Figure 5.40 Example of a Powered Adjustable Shower Trolley.

Source: TR Equipment

Shower Chairs

Ergonomic shower chairs allow patients to shower while seated, enabling caregivers to maintain neutral postures using power-assisted height and seat tilt adjustments (**Figure 5.41**). Patient safety and comfort features should include padded features that facilitate postural support and maintain skin integrity, and adjustable armrests, a security belt and locking castors.

Range of height adjustment accommodates use safe of SPHM technology used for patient transfers and allows caregivers to work using neutral postures.

Weight capacity is typically 300-440 lbs. with varying dimensions. However, there are some larger shower/commode chairs with capacity to 700 lbs.



Figure 5.41 Examples of a Portable Multi-Positional Ergonomic Shower Chair.

Source: TR Equipment

Assistive Toilet Seats

Toilet assist devices have powered standing/lowering features that can assist a caregiver in transferring a patient on/off a commode or toilet. The raising motion and adjustable armrests can maximize independence and provide greater stability for patients who have difficulty standing from low toilets. (VA, 2021).

Some toilet lifts can be moved from room-to-room and bedside to bathroom for use over the toilet or as a powered bedside commode. A GFCI outlet near the toilet and/or a battery charger are needed.

Weight capacity 300-750 lbs. with varying dimensions.



Figure 5.42 Example of a Height Adjustable Bath Lift.

Source: TR Equipment

Bathtub Lifts

Some floor lifts are designed specifically for use with bathtubs. These lifts may be fixed in place with a swivel seat that moves over a bathtub or mobile. ISO 10535:2021 addresses the specific design and testing requirements for these lifts (**Figure 5.42**).

Ensure mobile bath lifts are compatible with bathtubs to be used and allow safe use of SPHM technology for patient transfers.

As with all portable floor-based patient lifts and assistive devices, improper use, lack of maintenance, and/or insufficient caregiver training may increase the risk of device instability or tipping.

Administrative Controls

The following information outlines an SPHM mobility assessment protocol that can be used to create an individualized SPHM care plan and choose technology that addresses patient mobility requirements, while maintaining safety for patients and caregivers during handling and mobility procedures.

Topics discussed:

- How to determine a patient's SPHM needs
- SPHM mobility assessment and decision-making tools
- Why is standardized SPHM mobility assessment protocol needed?
- Common SPHM mobility assessment and screening tools
- When is a SPHM mobility assessment conducted?
- Who should conduct a SPHM mobility assessment?
- Documenting and communicating a patients' SPHM needs
- Developing an SPHM mobility assessment protocol

The following tools provide information about work practice controls that support the SPHM mobility assessment protocol:

- **Tool 5e** offers guidance on performing a point-of-care pre-mobility safety check prior to initiating any patient handling or mobility activity.
- **Tool 5f** describes ergonomic best practices that can reduce caregiver exposure to risk factors for WMSDs when performing patient handling and mobility tasks and enhance safety for patients.

The SPHM mobility assessment protocol described is *not* all inclusive. Please refer to additional resources and references provided in this section and in **Section 10**.

How to Determine a Patient's SPHM Needs

A structured and systematic approach is needed to identify risks, establish goals, and determine the necessary resources and controls to effectively mitigate risk for both caregivers and patients during high-risk patient handling and mobility activities.

This is achieved through a standardized SPHM mobility assessment protocol that considers the activities summarized in **Figure 5.43**.

The assessment process seeks to balance risks associated with patient handling and mobility tasks and the needs of the patient and the resources available.

Evidence supports that SPHM mobility assessment protocols or decision-making tools are an essential component of a successful multifaceted SPHM program (ANA, 2021; Matz, et al., 2019; Thomas and Thomas, 2014; VHA, 2016). Thomas and Thomas (2014) indicated that in SPHM programs without a mobility assessment protocol, caregivers are less likely to use SPHM technology due to the absence of mobility principles to guide them (Thomas and Thomas, 2014).

Safe Patient Handling and Mobility – Section 5

A standardized SPHM mobility assessment protocol serves as a critical component within a comprehensive and holistic approach to patient care that considers each patient's physical, emotional, intellectual, and social needs alongside medical treatment and rehabilitation or mobility objectives to ensure that all aspects of care are integrated and mutually supportive.

Active engagement and collaboration with patients and their families regarding the use of SPHM technology and associated work practices is essential for meeting these diverse needs. At the same time, the protocol should facilitate the safety of both caregivers and patients during SPHM activities, balancing the wellbeing and autonomy of the patient with the practical requirements of safe handling and mobilization (Matz et al., 2019; Smith et al., 2023).

The ANA Safe Patient Handling and Mobility: Interprofessional National Standards Across the Continuum Standard 6 states that “The employer and healthcare workers partner to adapt the plan of care to meet the safe patient handling and mobility (SPHM) needs of individual healthcare consumers and specify appropriate SPHM technology and methods” (ANA, 2021).

The following information detailing an SPHM mobility assessment protocol contains the elements outlined in Standard 6 of the ANA SPHM standards.

SPHM Mobility Assessment and Decision-Making Tools

SPHM ergonomic algorithms and guidelines

Evidence-based SPHM ergonomic algorithms and guidelines have been developed that define the SPHM technology recommended to safely mobilize a patient when performing high-risk patient handling and mobility tasks based on the cognitive and physical characteristics and clinical needs of each patient (Matz et al., 2019).

The Veterans Health Administration (VHA) created these decision-making guidelines in 2001 following comprehensive research and testing among diverse patient populations. These guidelines have subsequently been revised to reflect more recent advances in Safe Patient Handling and Mobility (SPHM).

For each task to be performed the caregiver follows a systematic process and answers a series of questions to determine if the patient is cooperative and capable of physically assisting such as, determining their weight bearing capacity for tasks that require a transfer between bed and chair or chair to exam table; or their ability to reposition themselves independently in bed or on a support surface.

The algorithms also incorporate guidance for patients of size and ergonomic work practices for each task to be performed.

These resources are targeted for use by persons directly involved with patient handling, movement, and mobility, such as registered nurses, licensed practical nurses, nursing assistants, physical and occupational therapists, radiology technicians, and patient care technicians (VA, 2016).

Besides the VA algorithms, the National Association of Orthopaedic Nurses (NAON) and the Association of periOperative Registered Nurses (AORN) have developed SPHM ergonomic algorithms that address high-risk patient handling tasks within their respective specialties.

Safe Patient Handling and Mobility – Section 5

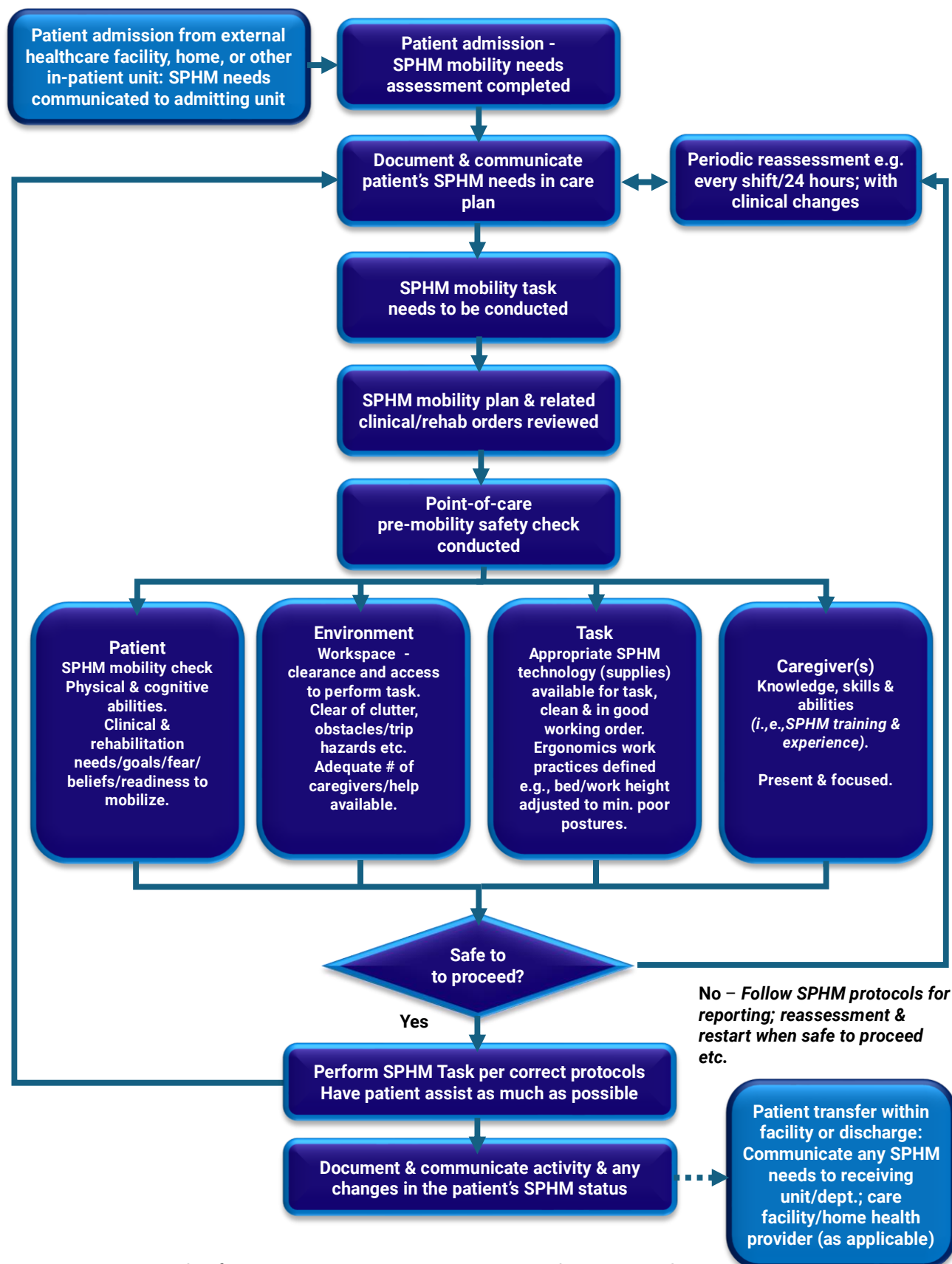


Figure 5.43 Example of an SPHM Patient Assessment Protocol in a Hospital Setting.

Safe Patient Handling and Mobility – Section 5

These ergonomic algorithms provide guidance for caregivers to determine the most appropriate SPHM equipment and technique for a specific patient handling task that will reduce the risk of caregiver and patient injury. They provide a basis for effective knowledge transfer and consistent decision making for patient handling techniques and equipment needs (Matz, 2019).

Refer to **Table 5.13** for the list of the VA SPHM algorithms for high-risk tasks and links to resources.

These algorithms can be adapted to reflect the choice of SPHM technology available for specific patient handling tasks at your facility. They can also be used to inform SPHM training content.

SPHM mobility assessment tools

However, the algorithms and associated guidelines do not provide guidance on how to determine an individual patient's mobility level on admission, when reevaluation of a patient's mobility is needed due to changes in clinical status and treatment, or in *real-time* prior to performing a handling and mobility task to ensure a mobilization task can be completed safely (Boynton et al., 2014).

A standardized SPHM mobility assessment tool that is designed to identify an individual patient's ability to mobilize prior to performing a patient handling and mobility task is also an essential element of a SPHM mobility assessment protocol (Matz et al., 2019).

The use of a SPHM mobility assessment tool allows caregivers to evaluate an individual patient's physical, cognitive, clinical, and rehabilitative needs that impact mobility and other patient handling and care needs (ANA, 2021).

SPHM mobility assessment tools allow a caregiver to evaluate a patient's cognitive and physical abilities as the patient completes a variety of physical tasks that progress sequentially from supine to sitting to standing to ambulation. During each task the patient's strength, coordination, balance, tolerance, and ability to follow directions are assessed. The assessment is stopped if the patient appears unsafe or cannot meet requirements for the next level of physical activity and a standardized mobility score or level is then assigned to the mobility level that the patient is able to achieve.

This score indicates the amount of assistance required for a mobility related task and helps determine the selection of appropriate SPHM technology to ensure safe mobilization.

For example, a patient who cannot assist or offer very limited assistance to mobilize would be defined as dependent or have a mobility level score of 1 (on some mobility tools). SPHM technology such as powered overhead or floor-based lifts, and friction reducing devices would be used to perform SPHM tasks together with a plan to use technology to facilitate improved mobility status as feasible. A patient who can stand and ambulate safely without supervision may be categorized as independent or have mobility level score of 4 (dependent on the assessment tool used).

Table 5.12 provides examples of cognitive and physical functional abilities that are typically evaluated using a SPHM mobility assessment tool.

Figure 5.44 provides examples of SPHM technology that can be used to assist and progress a patient's mobility based on their physical abilities.

The outcome of the assessment, which indicates the patient's dependency level or score together with other mobility related needs, is included in the patient's care plan and communicated to caregivers (ANA, 2021).

Safe Patient Handling and Mobility – Section 5

SPHM Technology Mobility Continuum Examples of SPHM technology that can be used to assist and progress patient mobility



Figure 5.44 SPHM Technology Mobility Continuum.

For more information about the SPHM technology pictured here, patient mobility applications, and vendor sources, please refer to **Section 5 Engineering Controls**.

Common Elements of SPHM Mobility Assessment Tools

SPHM mobility assessment tools vary in how a patient's ability to mobilize is assessed. The activities listed below are commonly used to determine a patient's ability to mobilize and guide the choice of appropriate SPHM technology.

Refer to resources listed in **Table 5.13** for more detailed information.

The patient can:

- Participate in the mobility assessment - understands direction, cooperates, and follow simple commands
- Perform the following physical functional tasks with no/minimal physical assistance. *(Minimal assistance can include use of verbal and light-touch cues. During standing and ambulation tasks assistive aides such as a cane, or walker may be used as appropriate).*

Assess patient in-bed

- Boost up in bed
- Roll onto at least one side and maintain side lying position

Assess patient at edge of bed or treatment surface, chair etc

- Move from lying to sitting on the edge of the bed (or exam table/stretchers). *Can use side rails to assist*
- Maintain an upright sitting position on the side of a bed (or sitting forward on a chair/other seated surface)
- Bring one arm across midline to reach to shake hands with the caregiver – repeat with the other arm. *Note this step may be performed before a patient moves to the edge of the bed e.g., in the BMAT 2.0*

Standing readiness

- Straighten one leg/extend knee and point and flex foot dorsiflexion/plantar flexion at least 3 times and repeat with the other leg
- With feet on floor, shift weight forward (*with care*) and lift buttocks off surface and stand

Standing balance: Static

- Stand unassisted with balance

Standing balance: Dynamic

- Step or march in place using small steps
- Step from one foot to another forward and back and side to side

Ambulation

- Walk independently or with supervision, e.g., if high fall-risk

Source: Boynton et al, 2020; Enos, 2020; Melillo et al., 2022; Smith et al, 2023; VHA, 2016.

Table 5.12 Common Elements of SPHM Mobility Assessment Tool.

Why is a Standardized SPHM Mobility Assessment Protocol Needed?

Conducting a SPHM mobility assessment takes the guesswork and uncertainty out of determining how a patient should be mobilized safely thus reducing the risk of patient and caregiver harm during high-risk patient handling and mobility activities (Boynton et al., 2014).

It helps caregivers to choose the most appropriate SPHM technology and practices based on a patient's *real-time* mobility status and needs, and to determine if a patient's SPHM mobilization plan has changed.

Implementing a standardized assessment tool and process can help to drive consistent use of SPHM technology and ergonomic practices within a facility or across an organization.

Conducting a SPHM mobility assessment or screening prior to performing a patient handling and mobility task is essential.

A patient's physical or cognitive abilities can change frequently e.g., within a shift and from shift to shift, which affects their capacity to mobilize. This is particularly applicable in an acute care environment.

For example,

- A patient who uses a powered or non-powered sit-to-stand lift or aid to be transferred from bed to the toilet or commode during the day may need a higher level of assistance during the night, such as use of an overhead or floor-based lift and especially if they are at a higher risk for falls.
- A patient who can transfer from bed to chair with a walker and caregiver supervision may not be able to return to bed the same way after sitting in the chair for a period of time due to fatigue and pain.

Changes in mobility status may be due to an increased level of fatigue and/or pain, side effects of medication, and changes in medical status that may have altered their balance, ability to bear weight and/or ability to follow instructions.

Therefore, reliance on a patient's mobility level or score from a previous assessment —such as those made by a physical therapist or a patient's nurse on the prior shift or earlier within a shift, *may not* consistently reflect the patient's current ability to mobilize.

A patient's (and or their family member's) perception about their ability to mobilize e.g., ability to support their weight during a standing transfer from chair to bed, is not always reliable especially when the factors previously noted are present.

Assessment of a patient's mobility *prior* to any activity is also critical to prevent patient injury from falls and staff injury from manually supporting a patient during a controlled descent when trying to prevent a fall. The use of SPHM technology to mobilize patients has been shown to reduce the risk for patient falls and facilitate safe early mobility (**Refer to Table 5.15**).

Gabel et al., 2023, demonstrated that when staff used a validated SPHM mobility assessment tool prior to mobilizing patients as part of an early mobility program, patient falls were reduced (Gabele et al., 2023).

Standardized mobility assessment protocols can facilitate communication and collaboration between nursing, medical and rehabilitation staff, and enable nurse-led routine patient mobilization thus reducing reliance on rehabilitation staff as the primary enabler of patient mobilization.

In recent years, nursing has increasingly viewed patient mobility as the responsibility of rehabilitation professionals (Pavon et al., 2024; Wyatt & Arnold, 2020).

Safe Patient Handling and Mobility – Section 5

Delaying patient mobility until rehabilitation staff have conducted a thorough assessment after a patient's admission or restricting mobility activities to those performed solely by therapists to improve standing, transferring, and ambulation, may hinder patient recovery by delaying and limiting necessary mobility-related interventions.

Having nurses assess patients' mobility needs upon admission and during their stay, facilitates timely and appropriate referrals to rehabilitation for complex patients and reducing referrals for routine mobility tasks that nursing staff can perform (Jones et al., 2020; Boynton 2024). For example, nursing staff can implement mobility orders such as assisting patients to mobilize three times daily according to their SPHM mobility level or score, utilizing the appropriate SPHM technology.

As Jones, et al., noted, physical (PT) and occupational therapists (OT) are skilled professionals, however, it is important to consider efficiency of resources in today's changing health care economy (Jones et al., 2020).

Standardized SPHM mobility assessment protocols can assist nurses to successfully lead patient mobility efforts as part of a multidisciplinary focus on early progressive mobility that is integrated in daily clinical routines (Jones et al., 2020; Wyatt et la., 2020).

It is important to note that not every patient has or develops a new functional deficit during hospitalization that requires physical or occupational therapy intervention. Additionally, not all patients will see a PT during their stay or will only see rehabilitation on day of discharge (Boynton, 2024).

Nurses are responsible for assessing patients' mobility requirements and implementing a mobility plan as part of standard care during recovery.

The critical role of SPHM in Early Mobility programs is discussed in **Table 5.15**.

Common SPHM mobility assessment and screening tools

The more commonly used and validated SPHM mobility assessment and screening tools to evaluate a patient's real-time mobility status and SPHM needs are listed in **Table 5.13** and include:

- The Bedside Mobility Tool (BMAT) 2.0



Quick Tip

There are numerous tools to assess a patient's ability to mobilize such as, The Timed Up and Go Test, Functional Independence Measure or FIM, Dionne's Egress Test, Hendrick II and Morse Fall Scales, and the John Hopkins Activity Measure for Post-Acute Care (AM-PAC®) 6-Clicks score.

However, these tools do not consider the use of SPHM technology to safely move and mobilize a patient such as guidance for caregivers when selecting the right technology to safely stand and ambulate the patient as a part of toileting, strengthening, and ambulation activities.

In its 'Fall Prevention in Hospitals Training Program', the Agency for Healthcare Research and Quality (AHRQ) emphasizes that safe patient handling is a critical component of universal fall precautions and is especially important for patients who require assistance with transfers. If staff members lack training in safe patient handling, a patient could fall, or staff could be injured because appropriate assistive equipment was not used (AHRQ, 2024).

Incorporating fall risk assessment into SPHM patient mobility assessment protocols and the evaluation of individual patients' SPHM needs can be an effective approach to facilitating safe early mobilization. However, fall risk assessments are not an adequate substitute for a dedicated SPHM mobility assessment tool.

Safe Patient Handling and Mobility – Section 5

- The Veterans Administration (VA) Mobility Screening and Solutions Tool (VA MSST)
- The John Hopkins Safe Patient Handling Mobility (JH-SPHM) Guide (with AM-PAC® 6-Clicks tool)

When choosing an SPHM mobility assessment tool, review the related literature (**Refer to Table 5.13**) to evaluate the differences between the tools listed above such as how a patient's mobility status is determined and SPHM technology recommended. This will assist you to determine if one of the tools is suitable for use as part of your SPHM mobility assessment protocols and if additional cognitive and physical evaluation activities should be incorporated. For example, in an intensive care setting the M.O.V.E. (Myocardial Stability, Oxygenation Adequate, Vasopressor Minimal, Engages to Voice) screening protocol could be performed before conducting an SPHM mobility assessment to determine an ICU patients' readiness for early mobility. *Also refer to developing an SPHM mobility assessment protocol on page 5.116.*

Additionally, it may also be necessary to use other risk assessment tools in conjunction with an SPHM mobility screening tool such as fall, violence and/or pressure injury risk assessments tools depending on the patient's clinical needs and safety related needs of caregivers. Information from these assessments can be incorporated into the patient risk profile and considered when developing the safe patient handling and mobility plan.

It should be noted that SPHM mobility assessment tools and SPHM ergonomic algorithms should guide decision making when determining the safest way to mobilize a patient but *not* replace professional judgment needed to ensure the safety of both patients and caregivers.

SPHM Mobility Assessment and Decision-Making Tools

SPHM Clinical Algorithms and Guidelines

- **The Veterans Health Administration (VHA) SPHM algorithms 2014:**
 - Algorithm 1. Transfer to/from seated positions: bed to chair, chair to chair, chair to exam table
 - Algorithm 2. Lateral transfer to/from supine positions: bed, stretcher, gurney, procedure table
 - Algorithm 3. Repositioning in bed
 - Algorithm 4. Reposition in chair: wheelchair, dependency chair, or other chair
 - Algorithm 5. Transport in bed/stretcher/wheelchair
 - Algorithm 6. Toileting
 - Algorithm 7. Showering and bathing
 - Algorithm 8. Floor/fall recovery
 - Algorithm 9. Transfer between vehicle and wheelchair, powered wheelchair, or stretcher
 - Algorithm 10. Ambulation
 - Algorithm 11. Patient handling task requiring lifting of extremities
 - Algorithm 12. Bariatric patient handling task requiring access to abdominal area
 - Algorithm 13. Bariatric patient handling task requiring access to perineal area

Algorithms can be accessed via an IOS or Android app <https://mobile.va.gov/app/safe-patient-handling#> or from <https://www.scribd.com/document/477540667/VHA-Safe-Patient-Handling-algorithms>

SPHM Mobility Assessment and Decision-Making Tools

Information about use of the algorithms can be found in:

- Safe Patient Handling and Mobility Guidebook. VHA Center for Engineering & Occupational Safety and Health (CEOSH) St. Louis, Missouri. January 2016.
https://www.stryker.com/content/dam/stryker/education-and-training/focusrn/resources/caregiver-safety/implementation-tools/VA%20SPHM_PDF.pdf
- Bariatric Safe Patient Handling and Mobility Guidebook: A Resource Guide for Care of Persons of Size. Center for Engineering & Occupational Safety and Health (CEOSH). Veterans Affairs. 2015 Rev. 2025. <https://www.asphp.org/wp-content/uploads/2011/05/Baraiatrice-SPHM-guidebook-care-of-Person-of-Size.pdf>
- **The National Association of Orthopaedic Nurses (NAON) algorithms** specific to the lifting and mobilization of Orthopedic patients
<https://www.orthonurse.org/Portals/0/Docs/Publications/Position%20Statements/NAON%20Safe%20Patient%20Handling%20and%20Mobility%20Algorithms%20for%20the%20Adult%20Orthopaedic%20Patient.pdf?ver=rueoatTtX342xARJCn9kJw%3d%3d>
- **The Association of periOperative Registered Nurses (AORN) ergonomic tools and/or algorithms specific to the high-risk patient handling tasks in the Perioperative environment.** These tools also contain ergonomic guidelines for pushing and pulling wheeled equipment and for tasks requiring static holding such as holding a limb for pre-surgical preparation. Subscription required /free to AORN members <https://www.aorn.org/article/2024-updates-to-aorn-guideline-for-safe-patient-handling-and-movement>

SPHM algorithm pocket reference(2019). https://www.aorn.org/docs/default-source/aorn/toolkits/safe-patient-handling/safe-patient-handling-pocket-reference-guide.pdf?sfvrsn=36a9944f_0

SPHM Mobility Assessment Tools

- **The Bedside Mobility Assessment Tool (BMAT)** is a validated assessment tool and has become widely used in the US hospitals over the past decade. The BMAT is a nurse-driven bedside assessment that evaluates the patient's current mobility level by asking the patient to complete four sequential functional tasks. If a task cannot be completed, the patient is assigned a mobility level. Each level from 1(dependent) to 4 (independent) suggests SPHM technology required for safe lifting, transferring, and mobilizing patients (Turner et al, 2020).
Boynton, T., Kumpar, D., & VanGilder, C. (2020). The bedside mobility assessment tool 2.0. Am Nurse J, 15, 18-22. <https://www.myamericannurse.com/the-bedside-mobility-assessment-tool-2-0/>

The bedside mobility assessment tool 2.0. Fig-A-210673-EN-r2_BMAT-2.0-Stair-Step-Chart_Presentation https://www.myamericannurse.com/wp-content/uploads/2020/07/Fig-A-210673-EN-r2_BMAT-2.0-Stair-Step-Chart_Presentation-LR2-Copy-1-2.pdf

SPHM Mobility Assessment and Decision-Making Tools

Hillrom | Bedside Mobility Assessment Tool 2.0 | Instruction Video.

<https://www.youtube.com/watch?v=HyFnWmCsJ24>

The BMAT tool is copyrighted. For further information on the BMAT, its fee-free licensing agreement, or training in its use, visit www.hillrom.com

- **The Veterans Administration (VA) Mobility Screening and Solutions Tool (VA MSST)** is a validated screening and decision support tool for caregivers in VA acute and community-based facilities to evaluate a patient or resident SPHM mobility needs. The VA MSST uses a pictorial decision flowchart to assist caregivers to evaluate a patient's ability to mobilize through a series of functional tasks to determine a patient's mobility level and like the BMAT, then matches the patient's mobility status with the best device available. The tool is for use by multiple disciplines, providing evidence-based practice clinical decision support related to the use of SPHM equipment, and which is appropriate across multiple health care settings. (Melillo et al., 2022).

Melillo, C., Rugs, D., Toyinbo, P., Barrett, B., Chavez, M., Cowan, L., ... & Sullivan, S. C. (2022). Reliability and validity of the Veterans Administration Mobility Screening and Solutions Tool. *BMC Health Services Research*, 22(1), 1323.

<https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-022-08745-1>

- **The John Hopkins Safe Patient Handling Mobility(JH-SPHM) Guide** “provides recommendations for the appropriate choice of safe patient handling equipment to meet the daily mobility goal (JH-HLM) while considering patients functional capacity as measured by AM-PAC® Inpatient Basic Mobility 6-Clicks scores”. Source: Physical Medicine and Rehabilitation. Activity and Mobility Promotion (JH-AMP). Common Mobility Language Guide and Toolkit. The John Hopkins Activity and Mobility Promotion Toolkit is copyrighted but can be accessed from: <https://www.hopkinsmedicine.org/physical-medicine-rehabilitation/education-training/amp/toolkit>

McLaughlin, K. H., Friedman, M., Hoyer, E. H., Kudchadkar, S., Flanagan, E., Klein, L., ... & Young, D. (2023). The Johns Hopkins Activity and Mobility Promotion Program: a framework to increase activity and mobility among hospitalized patients. *Journal of nursing care quality*, 38(2), 164-170.

https://journals.lww.com/jncqjournal/fulltext/2023/04000/The_Johns_Hopkins_Activity_and_Mobility_Promotion.12.aspx?context=FeaturedArticles&collectionId=5

Kumble, S., McLaughlin, K. H., Funk, K., Dekany, S., Ludwig, D., Farley, H., ... & JH-AMP Group. (2024). Development of a New Tool to Combine the Promotion of Patient Mobility with Safe Patient Handling Equipment: The Johns Hopkins Safe Patient Handling Mobility (JH-SPHM) Guide. *Workplace Health & Safety*, 72(11), 503-513.

Linger, M. R., Warren, M., Knecht, J., Verheijde, J., Tyler, B., & Tompkins, J. (2021). Clinical instruments for bedside functional assessment: Convergent validity among the AM-PAC '6-Clicks' and BMAT. *Journal of Clinical Nursing*, 30(13-14), 2048-2056.

Table 5.13 SPHM Mobility Assessment and Decision-Making Tools.

When is a SPHM Mobility Assessment Conducted?

An SPHM mobility assessment should be completed, documented, and communicated to caregivers:

- When a patient is admitted to a health care facility
- When transferred from one patient care unit to another
- Once during a shift¹
- When there is a change in the patient's clinical condition and/or treatment(s)
- When the patient's mobility level or score has changed, e.g., the point-of-care SPHM mobility assessment or screening indicates that the patient's assigned mobility status and SPHM needs have changed
- When there has been an incident or injury involving a patient²
- Before every patient handling and/or mobility task (i.e., at point of care) to ensure that mobility status has not changed. *Refer to 'Why is a Standardized SPHM Mobility Assessment Protocol Needed?' on page 5.104.*

1. The frequency of reassessment is typically determined by the multidisciplinary team who develop the SPHM mobility protocols (**Refer to page 5.116**) and varies according to the care setting. In care settings such as residential care or assisted living facilities, where the clinical status of residents or clients tends to remain stable, reassessment may be scheduled less frequently, for example monthly. Clients with dementia for example, in residential memory care settings will need more frequent assessment of cognitive and physical abilities.

However, even when a resident's or client's clinical status may be relatively constant, it is still recommended that caregivers conduct a quick mobility screening prior to completing a handling or mobility task to ensure caregiver and client safety.

2. Healthcare organizations should monitor patient injuries associated with patient handling and mobility (ANA, 2021).

As the general population in the US is growing and aging with increasing comorbidities, more health services are transitioning to outpatient and home care environments to relieve some of the burden of overcrowding in hospitals (AHA, 2024; Jones & Dolsten, 2024). Long-term care facilities are providing services to residents with more complex health needs due to this trend.

This indicates an increasing need for the use of SPHM technology and assessment protocols to ensure the safety of clients and caregivers in non-hospital settings.

For example, in an out-patient setting a patient who arrives in wheelchair and can stand a pivot transfer with supervision to a procedure/exam table may not be able to mobilize in the same way following treatment or a procedure due to fatigue and/or effects of treatment etc.

Consequently, caregivers in these settings should perform a mobility assessment or screening prior to assisting patients who may be unable to mobilize independently to reduce the risk of patient falls and caregiver injury.

Safe Patient Handling and Mobility – Section 5

A SPHM mobility assessment or screening protocol should be part of a multi-faceted SPHM program that is tailored to meet the needs of each outpatient setting or facility and includes the use of SPHM technology and protocols to address patient mobility needs.

Who Should Conduct an SPHM Mobility Assessment?

All caregivers who are responsible for handling and mobilizing patients should receive training and be capable of assessing a patient's mobility status within the scope of their professional license or registration.

In Standard 6 of the ANA SPHM standards, the following is stated: "The organization will support the delegation or assignment of SPHM tasks and activities in a manner consistent with its state's practice act or other legislation governing licensure" and that the "healthcare worker will ensure that delegation or assignment of SPHM tasks is completed in a manner consistent with state professional practice acts or other applicable laws or regulations" (ANA, 2021).

The initial SPHM mobility assessment together with development of the SPHM mobility plan for individual patients, is usually completed by a Registered Nurse (RN) such as the admitting nurse, in the acute care setting. Reassessment of the patients' mobility needs and updating the patient's care plan is completed by a patient's nurse. SPHM mobility assessment and care planning can be integrated with other nursing activities such as fall risk and skin assessment.

Input from a variety of health care provider disciplines is often required when planning SPHM mobility needs in patient populations with special or more complex SPHM needs such as patients of size.

In non-hospital settings assessment and reassessment may be completed by a Registered Nurse, Physical or Occupational Therapist, depending on the care setting and their licensing regulations.

As previously discussed in several health care settings, a patient's ability to mobilize may change frequently and/or a caregiver may not have access to reliable information about a patient's ability to mobilize. Therefore, it is essential that all caregivers, including Unlicensed Assistive Personnel (UAP) such as certified and non-certified nursing aides, medical assistants, and imaging technologists who are responsible for patient handling tasks, always conduct a SPHM mobility screening or check prior to performing patient handling and mobility tasks. This enables the caregiver to confirm if they can safely perform the mobilization activity as directed in the patient's SPHM mobility care plan.

There should be a standardized decision-making protocol for a UAP to follow if they determine that a patient cannot mobilize safely as stated in their SPHM mobility care plan. For example, if a patient's mobility status has changed, request the patient's nurse reassess the patient's mobility level and determine SPHM technology needs before completing the mobility task.

If it is not possible for the RN (or other knowledgeable licensed caregiver such as a nurse who is a unit based-SPHM champion) to reassess the patient immediately, caregivers should use the safest and more conservative method to mobilize the patient. For example, transferring a patient with an overhead or powered floor lift instead of the normally used powered sit-to-stand device, if they are appropriately trained to use the SPHM technology needed.

The patient's nurse should be notified immediately about any changes in mobility status to ensure that a re-evaluation can take place, be documented in the patient's care plan and communicated to other caregivers.

Safe Patient Handling and Mobility – Section 5

Caregivers should have the assurance that they may voice concerns and receive support from management and colleagues when choosing not to perform patient handling and mobility tasks they consider potentially unsafe for either the patient or themselves.

Defining SPHM Mobility Assessment and Screening

Patient assessment is a core part of the RN's professional scope of practice that requires clinical reasoning, nursing judgement, and critical decision-making (Ernstmeyer & Christman, 2024). For this reason, RNs cannot delegate tasks involving assessment activities to UAP and must follow rules allowed for delegation to UAP under an RN's state licensing board scope of practice. Likewise, UAP under the supervision of a registered nurse or a licensed practical/vocational nurse, are responsible for accepting the delegation, seeking clarification of, and affirming expectations, performing the task correctly and timely communicating results to the nurse.

Within the framework of SPHM mobility assessment protocols described in this section, screenings refer to the process by which non-licensed caregivers identify changes in a patient's mobility status prior to initiating any patient handling tasks as outlined in the patient's SPHM care plan. UAP may use the same SPHM mobility assessment tool that nurses use to assess a patient's mobility level. However, for UAPs the tool is just a screening or check and cannot be used to reassign a patients' mobility level or score and change their SPHM care plan.

Should there be any changes or concerns regarding the patient's ability to mobilize, established procedures must guide caregivers on appropriate actions. For example, if the caregiver is a UAP seeking a reassessment by a qualified nurse (Boynton, 2024).

For both screening and assessment, regulatory bodies, liability, and scope of practice must be considered when deciding who is qualified and allowed to perform a test.

Ultimately allowing UAP to perform a SPHM mobility screening is a facility decision based on state-level licensing and scope of practice laws.

For more information:

American Nurses Association. (2012). ANA's principles for delegation by registered nurses to unlicensed assistive personnel. *Silver Spring, MD: Author.*

<https://www.nursingworld.org/globalassets/docs/ana/ethics/principlesofdelegation.pdf>

Barrow JM, Sharma S. Five Rights of Nursing Delegation. [Updated 2023 Jul 24]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from:

<https://www.ncbi.nlm.nih.gov/books/NBK519519/>

Ernstmeyer, K., & Christman, E. (Eds.). (2024). Nursing management and professional concepts (2nd ed., Chapter 3, Delegation and Supervision). Chippewa Valley Technical College.

<https://www.ncbi.nlm.nih.gov/books/NBK610432/>

The National Council of State Boards of Nursing (NCSBN) National Guidelines for Nursing Delegation 4/29/2019 https://www.ncsbn.org/public-files/NGND-PosPaper_06.pdf

Documenting and Communicating a Patients' SPHM Needs

A process for documenting a patient's SPHM needs should be established that is both easy to complete and provides clear communication with all staff involved in patient handling and mobility activities.

The patient's mobility status, SPHM needs and all related information should be documented in the patient's care plan i.e., in the Electronic Health Record. In a hospital setting, this is usually completed by the nurse who assessed the patient after each SPHM mobility assessment is conducted.

Rehabilitation staff and UAP, such as certified nursing aids, should have designated areas in the SPHM care plan to communicate information related to a patient's SPHM needs for example, following completion of physical therapy, or handling and mobility activities.

Documentation of the SPHM care plan should be easy to find in the patients' chart. Information should be accessible to *all* caregivers who are responsible for caring for the patient, e.g., for review before performing SPHM activities.

There should be a method in the patient's chart to alert staff of any updates to an individual patient's SPHM mobility plan including changes in mobility status or required SPHM technology for handling and mobilization activities.

If your SPHM program is aligned with or will be integrated with fall prevention and/or early mobility initiatives, consider developing a custom real-time dashboard that presents SPHM mobility levels, fall risk assessment, and early mobility activities completed by nursing and rehabilitation staff for each patient. Turner et al., describes that this method of displaying patient mobility related data in one location "is used throughout the shift to check real-time progress during caregiver handoff to report needs for fall interventions and mobility, and by leaders while rounding on patients. Physical therapy staff also uses it to verify fall risk needs and to review mobility progress throughout the shift for each patient " (Turner et al, 2021).

Factors to consider when developing an individualized SPHM care plan are *listed in Table 5.14*.

Communicating a patient's SPHM needs

In addition to providing information about a patient's SPHM mobility needs in their chart, it is important to use other methods to communicate a patient's mobility status and SPHM needs. This is especially important in an acute care environment where a patient's mobility status can change frequently.

Some caregivers may not have time to access a patient's chart before mobilizing them, such as those who may be called into a patient room to help urgently, or those receiving an inpatient in diagnostic areas (VHA, 2016).

General information such as SPHM ergonomic algorithms and SPHM mobility assessment protocols could be posted on a SPHM program resource page a facility's intranet platform, in patient rooms or break rooms and/or laminated and attached to SPHM technology as feasible (Matz et al., 2019).

The following are examples of how a patient's specific SPHM mobility needs can be communicated to caregivers and other employees.

- **Shift change handoff**

A patient's mobility status and SPHM needs should be communicated between staff during shift

Safe Patient Handling and Mobility – Section 5

change handoff to ensure that all staff who may assist to mobilize the patient on the next shift are informed.

Due to the increase in patient-related violence in health care settings across the US, it is advisable to communicate information regarding a patient's potential risk for aggression or violence, whether verbal or physical. This information can influence decisions about when and how to mobilize the patient and determine the appropriate number of caregivers needed.

- **In a patient room**

SPHM mobility needs may also be communicated via white boards in patient rooms and signage on room doors. Some hospitals have a designated whiteboard in patient rooms for posting HIPPA compliant SPHM information, including mobility status, SPHM technology used, and specific notes about patient needs.

- **Safety huddles**

A patient's SPHM mobility needs and required changes to their mobility plan can be reviewed in routine unit- based safety huddles (**Section 9**) or during post-incident safety huddles (**Section 7**).

- **Between departments**

A process to communicate a patient's SPHM needs when they are transported and receive care in other departments such as imaging and perioperative care is also needed. For example, a patients' mobility level and SPHM technology needs are included in a 'Ticket to Ride' or electronic treatment order and transportation request systems.

- **Admission and Discharge**

Incorporate patient mobility status and SPHM needs into admission and discharge protocols.

For patients admitted from nursing homes or skilled nursing facilities, identify their mobility methods and any equipment or assistive devices used prior to admission. If SPHM technology was previously utilized, note the specific type and the style of slings or other components involved.

Assisting discharge planning staff to communicate a patient's SPHM needs to a receiving facility such as a nursing home or home health provider as part of a comprehensive discharge plan, is important to facilitate safety for both the patient and the new caregivers.

- **Patient communications**

Patients and families should be informed about the SPHM program's purpose, the SPHM technology that may be used to mobilize a patient during their stay, and the reasons for its use.



Quick Tip

Tips for facilitating caregiver use of SPHM mobility assessment and screening protocols.

- **Develop or choose a standardized mobility assessment tool that is easy to understand and quick to use .**
- **Pilot test the SPHM mobility assessment tool, documentation and communication processes and get caregiver input.**
- **Integrate the mobility assessment protocol into SPHM competency-based training including hands-on training/practice case studies using the chosen assessment tool.**
- **Ensure that the SPHM mobility plan is easy to find in patient care chart and use multiple methods of communicating a patient's SPHM mobility needs.**
- **Have SPHM unit-based champion or mobility coaching support across different shifts**

Safe Patient Handling and Mobility – Section 5

Whenever possible the patient (and family as appropriate), should be involved in the development of their SPHM mobility plan. Explaining the purpose of a mobility assessment, as well as how SPHM technology works and its potential benefits in helping patients reach their mobility goals can support collaboration between patients and families and caregivers. This approach may contribute to reducing risks for both patients and caregivers during handling and mobility activities.

A protocol for addressing patient and/or family refusal to use SPHM technology should be developed during program implementation planning (**Section 7**).

Protocols for documenting and communicating a patient's SPHM mobility needs should be regularly reviewed during periodic evaluation of the SPHM program to ensure relevance and effectiveness (**Section 8**).

Factors to Consider When Developing an Individualized SPHM Care Plan

Developing an individualized SPHM care plan entails a comprehensive assessment and evaluation of several factors that influence a patient's capacity for mobility and guide the selection of appropriate SPHM technology. Findings should be documented within the patient's care plan.

Factors that should be considered and incorporated into a patient's SPHM care plan, as needed include:

- The patient's height, weight, and torso width and girth or body circumference at widest point and consideration of overall body habitus, to guide choice of appropriate capacity SPHM technology, sizing of slings, beds, chairs, hygiene equipment etc.
*Refer to **Table 5.10** and **Tool 5b** for key measurements when fitting a sling.*
- The patient's current and past medical history
- Diagnosis/prognosis/care requirements, for example, rehabilitation or palliative
- How a patient mobilized before admission e.g., if admitted from a nursing home, what type of SPHM technology or other assistive mobility aids were used
- History of falls/Falls risk status
- History of violence e.g., history of verbal and/or physical violence when receiving medical care prior to admission or during the current admission(s). If applicable the assessed level of risk for violence (via validated screening tools such as the Brøset Violence Checklist (BVC), Dynamic Appraisal of Situational Aggression (DASA) etc.)
- Medication
- Medical orders related to activity restrictions such as bed rest or bilateral "non-weight bearing" orders

Conditions that may affect how handling and mobility tasks can be performed e.g.

- Level of Pain/discomfort
- Fractures, joint mobility restrictions

Factors to Consider When Developing an Individualized SPHM Care Plan

- Orthopedic considerations e.g., post-operative hip, knee, or shoulder replacement
- Recent surgery e.g., cardiac surgery with sternal precautions
- Unstable spine
- Paralysis/Paresis
- Muscle spasm, contractures
- Respiratory/cardiac compromise
- Amputation of upper or lower limbs
- Severe Osteoporosis
- Postural hypotension
- Sensory deficits related to sight, hearing, and/or touch.
- Skin integrity e.g., sensitive skin; pressure injuries, wounds, surgical dressings, stomas, severe edema etc
- Medical devices attached to a patient (e.g., intravenous line, catheters, feeding tube, chest tube, tracheotomy; monitors, orthopedic supports such as Halo brace, Thoraco-Lumbo-Sacral-Orthosis (TLSO) brace, traction of extremities).

Information that should be included in a patient's SPHM care plan

An individualized SPHM care plan should include relevant information from the above assessment and specify required SPHM technology and methods and expected mobility outcomes or goals.

- The patient's level of assistance needed to complete patient handling and mobility tasks e.g., a description or score based on the SPHM mobility assessment/screening tool used.
- Specific information on cognitive or physical limitations that could affect safe use of SPHM technology and practices as needed for caregiver awareness related to:
 - Communication level and ability, language, and comprehension.
 - Cognitive status such as ability to follow simple commands, be cooperative, and assist during the task on a consistent basis
 - Physical abilities related to upper and lower body strengths, coordination, and ability to bear weight
- The SPHM technology (type and weight capacity) that should be used to mobilize the patient for each high-risk patient handling and mobility task to be performed including information about the type and size of patient sling and any specific instructions for use e.g. sling loop length required to achieve desired patient position in a sling, padding needed for comfort etc. (as applicable)

Factors to Consider When Developing an Individualized SPHM Care Plan

- Any specific instructions related to use of SPHM technology and clinical contraindications, for example related to mobilization of patient with spinal injury fractures, wounds, use of certain styles of slings etc, and needs for patients of size.
- Document the clinical reasoning for a SPHM technique or technology selection. This clarifies decisions for caregivers and future practitioners, especially in complex cases, allowing appropriate review and understanding.
- A patient's actual versus perceived ability to support their weight during the transfer (if relevant).
- Any patient preferences regarding mobilization activities to ensure their comfort and safety. This includes noting what matters and motivates the patient and family and how this affects a patient's ability to participate in handling and mobility activities.
- The plan of care to promote the patient's independence or return to baseline as appropriate. (ANA, 2021).

Table 5.14 *Factors to Consider When Developing an Individualized SPHM Mobility Care Plan.*

Developing an SPHM Mobility Assessment Protocol

The importance of planning and implementing a sustainable SPHM program using a multidisciplinary collaborative approach has been highlighted throughout this toolkit.

Interprofessional collaboration and communication are crucial in the development and implementation of a standardized SPHM mobility assessment, documentation, and communication protocol.

Disciplines and groups involved in developing an SPHM mobility assessment protocol in an acute care setting should include:

- The SPHM manager/coordinator
- Rehabilitation/physical and occupational therapy
- Intensive/critical care staff including physicians
- Respiratory therapy
- Specialty care providers such as orthopedics, pediatrics, behavioral health, and bariatrics
- Nurse Informaticist/Information Technology
- Representatives (manager and caregivers) from units with pilot SPHM program

Developing SPHM mobility assessment protocols takes time as disciplines such as nursing and therapy determine the best approach to integrate SPHM protocols with existing early mobility and rehabilitation/therapy protocols.

Safe Patient Handling and Mobility – Section 5

As a result, development of SPHM mobility assessment protocols should start *early* in the program solution development phase (**Section 4**), as they are integral to the choice of SPHM technology to be purchased, and how and when technology will be used, and development of SPHM training content.

It is important to acknowledge that varying mobility related terminology and differing professional perspectives and goals can influence the success of SPHM programs (Waltrip, 2019).

Providing education to the team who will develop the SPHM mobility assessment protocols is essential. They should understand the need for and evidence-based benefits of implementing a specific standardized SPHM protocol for caregiver *and* patient safety, in comparison to using other available mobility-related and fall assessment tools. It is important that PTs and OTs know that an SPHM mobility assessment is not a substitute for the specific rehabilitation assessment tools and processes they use. Instead, an SPHM mobility assessment protocol can assist their patients to achieve rehabilitation goals while reducing the risk of injuries to therapists.

Identification of any existing methods to assess, document and communicate patient mobility needs between disciplines such as nursing, physical and occupational therapy should have been completed during program planning hazard identification and assessment activities (**Section 3**).

Information collected during those activities should also include staff perception of common barriers to patient mobilization. For example, nursing staff do not feel it is safe to mobilize a patient within 24 hours of admission unless a physical therapy (PT) assessment is completed however, a PT consult may not occur within that time frame delaying early mobility activities. Therapists may express hesitation about using SPHM technology, as they view it primarily for passive transfers and may not recognize its potential to support safe mobility and facilitate rehabilitation activities.

Key elements and activities to consider when developing an SPHM mobility protocol.

The information in this section and the resources in **Section 10** can be used to support the development process.

- Define the purpose of the SPHM mobility protocols and how they are to be used or integrated with other patient care assessments and initiatives (falls, skin, early mobility, etc.), and with rehabilitation practices.
- Select the SPHM ergonomic algorithms that will be used (and customized as needed) to guide general decision making about use of SPHM technology and practices.
- Select a SPHM mobility assessment tool that to evaluate patient mobility and identify the safest way to handle and mobilize patients using SPHM technology.
- Identify SPHM mobility protocols for patient population with special SPHM needs e.g., patients of size.

Determine:

- Who will complete initial and ongoing SPHM mobility assessments and develop the SPHM mobility care plan? Define the specific roles of caregivers within the SPHM assessment protocols with consideration of state licensing laws for healthcare professionals.
- When will assessments be completed?

Safe Patient Handling and Mobility – Section 5

- How a patient's SPHM mobility needs will be communicated to all caregivers. Consider integration into the electronic health record; communication between caregivers in a unit; communication to staff on other units; admission and discharge communications etc.
- How and when a patient's SPHM mobility plan is updated/revised.
- The decision-making protocols needed to address unexpected changes in a patient's mobility status or unplanned situations that may hinder safe mobilization activities e.g., when caregivers, including UAP conduct a mobility screening just prior to mobilizing a patient.
- Consider developing a protocol to provide guidance for experienced rehabilitation specialists and nurses when they may need to develop customized approaches for unique SPHM needs and situations. Any customized SPHM solution should follow a thorough clinical and risk assessment, ensuring person-centered and balanced decision-making. The solution and rationale must be documented and communicated. Proper training is required for those caregivers implementing these solutions. All applicable regulatory requirements and manufacturer guidelines must be followed (Smith et al, 2023).
- How patients and their families will be involved in developing the patient's SPHM mobility plan and protocols for patient and/or family refusal to allow use of SPHM technology.
- How and when the SPHM mobility assessment protocol is to be implemented. It is advisable to conduct a pilot to evaluate the usability and effectiveness of the SPHM mobility assessment tool, documentation, and communication methods, and to solicit staff feedback.
- How and when will the SPHM mobility assessment protocol be monitored for compliance and evaluated for effectiveness? Note the use of the SPHM mobility assessment tool by caregivers can be evaluated during periodic SPHM audits and employee SPHM program surveys (**Refer to Section 8 and Tools 8b & c**).

The Role of SPHM in Early Mobility Programs

The effects of immobility have long been recognized, dating back to Florence Nightingale's 1898 Notes on Nursing (Hallmark et al., 2015). Since then, the complications associated with immobility, such as reduced quality of life and higher mortality rates, have been thoroughly documented.

Numerous research studies have identified the necessity of implementing early mobility programs, particularly for patients admitted to Intensive Care Units (ICU), to address the cascade of physiological changes that may occur within the first 24 hours of immobility and reduce related hospital-acquired complications (Kielich et al., 2025; Wyatt et al., 2020).



Source: ARJO

Documented benefits of early mobility programs include reduced length of stay and readmissions rates; decreased fall rates, venous thromboembolism pressure injuries, pneumonia, incidence and duration of delirium, improved functional status at discharge, psychological well-being and reduced mortality and cost of care (Dayton et al., 2023; Nydahl et al., 2023; Wyatt et al., 2020).

Early mobility programs aim to restore patients to their baseline level of functional activity. These programs employ structured, sequential interventions that are initiated at the patient's current mobility level and are tailored to progressively increase the patient's ability to achieve their established mobility goals (Vollman, 2010).

Mobilization activities range from head of bed elevation, range-of-motion exercises, and repositioning in bed to transferring a patient to and from a bed to a chair and ambulation (Ernstmeyer & Christman, 2021).

However, there are reported barriers to early mobility activities such as ambulation of patients. These include lack of resources such as time, staffing, and equipment, and nurses' perception of risk to the patients, e.g., risk of patient fall, or risk of injury to themselves especially if they must mobilize the patient out of bed (Wyatt et al., 2020).

Patients who are more physically challenging to mobilize, e.g., are immobile with high body weight and mass, and/or who are confused and agitated, may not be moved as frequently as needed if manual handling is required (ASPHP, 2023).

As discussed in **Section 1, Table 1.2**, ambulation of patients is a frequently reported missed nursing care task. Although there are many reasons why missed nurse care occurs, missed nursing care is associated with a higher incident of patient falls (Hessels, et al, 2019).

Conversely, the increasing emphasis on the early and frequent patient mobilization to mitigate serious complications associated with immobility and reduce associated hospital acquired harms such as falls, may also increase the physical job demands for nurses, nursing aides, and rehabilitation professionals.



Source: ARJO



Source: Stock Image

The Role of SPHM in Early Mobility Programs

This is particularly evident when mobilization activities such as pivot transfers and ambulation are performed manually rather than with the assistance of SPHM technologies such as powered patient lifts and sit-to-stand devices. These considerations are especially significant for patients who have weight-bearing precautions (ASPHP, 2023).

The Centers for Medicare & Medicaid Services (CMS) does not reimburse patient falls that occur in hospitals. As a result, King et al., observed that nurses faced intense pressure to achieve their institution's 'zero falls' target. However, nurses did not mobilize their patients due to the risk of a fall (King et al., 2018).

It should be noted that patient falls were identified as the most frequently reported sentinel event in the Joint Commission's annual reviews of Sentinel Event data for 2021, 2022, 2023, and 2024 (Twenter, 2025; TJC, 2025).

Ultimately, mobility activities will be avoided if patient and caregivers do not feel safe.

To effectively address this issue, it is essential that SPHM mobility assessment protocols and SPHM technology are utilized to ensure the safety of patients and caregivers during mobility-related tasks.

There are numerous ways that SPHM technology together with ergonomic work practices can facilitate active patient participation in physical rehabilitation to support early, safe, and progressive mobility. Refer to **Section 5 Engineering Controls** for more information.

Although there is need for more research to demonstrate the impact of specific SPHM related interventions on early mobility, it appears that the use of SPHM technology plays a key role in facilitating mobilization of patients and reducing patient harms such as falls and pressure injuries especially when integrating into early mobility programs (Bassett et al., 2012; Dang et al., 2022; Dickinson et al 2018; Gibson, 2017; Kayser et al., 2020; Turner et al., 2021; Wyatt et al., 2020).



Source: Guldmann



Source: Guldmann

Refer to **Section 9** for more information about integrating SPHM into early mobility programs.

It is also important to note that evidence supports the use of SPHM technology can increase patients' participation in their therapeutic activities and does not have a negative impact on functional independence measure (FIM) mobility scores (Darragh et al., 2012; Arnold et al., 2011; Campo et al., 2013; Darragh et al., 2013; Darragh et al., 2014; Mcilvane et al., 2011; Rockefeller, 2008).

Both the American Physical Therapy Association (APTA) and The American Occupational Therapy Association (AOTA) support physical therapists (PT), physical therapist assistants, and occupational therapy (OT) practitioners employing the concepts of safe patient handling and mobility while providing services (APTA, 2019; AOTA, 2021).

The Role of SPHM in Early Mobility Programs

As PT and OT professionals play a critical role in early mobility programs, it is important that they are knowledgeable about how SPHM technology can be used to actively engage patients in rehabilitation tasks rather than viewing it as only useful for passive patient transfers.

Over the past decade there has been an increasing emphasis on addressing the serious complications from immobility in hospitalized older adults aged 65 and above.

The Centers for Medicare & Medicaid Services (CMS) 2025 Inpatient Prospective Payment System (IPPS) rule includes the Age-Friendly Hospital Structural Measure, a mandatory quality measure for hospitals with patients aged 65 and older. The aim of this measure is to have hospitals focus on the unique needs of older adults and deliver personalized care with the goal of improving overall outcomes and reducing the risks associated with hospitalization.



Source: Baxter



Source:
Savaria/Handicare



Source:
Savaria/Handicare

As discussed in **Section 1 page 1-33**, SPHM plays a key role in meeting the requirements of Domain 3 of the measure for Frailty Screening and Intervention.

In non-hospital settings, SPHM mobility assessment protocols and technology can also be used to reduce the risks associated with immobility by improving or maintaining a resident or client's functional mobility status and promoting independence.

During clinical deterioration, SPHM technology and practices can allow caregivers to maintain patient dignity and comfort.

Case studies in long-term care have reported that residents experience an increase in physical functioning and activity level, lower levels of depression, improved urinary continence, lower fall risk, and higher levels of alertness during the day after SPHM programs were implemented (AIHA, 2024; Gucer et al., 2013).



Source: HumanFit

More information about SPHM and early mobility programs can be found in **Section 10**.

The use of SPHM technology and practices to facilitate early, safe, and progressive mobility and reduce fall risk further supports the critical value of an SPHM program to a healthcare organization.

Table 5.15. The Role of SPHM in Early Mobility Programs.

Section Summary



Hazard Control and Prevention – SPHM Solutions

This Section provides information about primary Engineering and Administrative Controls that can be used to mitigate the hazards and risks associated with manual patient handling tasks while enhancing patient safety.

Engineering controls isolate workers from hazards and aim to minimize caregiver injuries. SPHM technology—such as powered lifts ceiling or overhead-mounted lifts, and friction-reducing devices—reduces biomechanical strain during patient handling. Powered equipment is generally more effective than non-powered aids like sliding sheets. While SPHM technology is essential, its use relies on a strong safety culture and a comprehensive program to prevent WMSDs.

Detail information is provided about commonly used SPHM technology together with applicable safety regulations and standards.

Administrative controls support safe SPHM technology use by modifying work practices to limit hazard exposure. This section reviews mobility assessment protocols for planning care and selecting appropriate SPHM technologies to promote a patient's independence or return to baseline mobility as applicable. The critical role of SPHM in early and progressive mobility programs to promote preservation of patient functional status and improve clinical outcomes is also discussed.

The following tools provide information about work practice controls that support the SPHM mobility assessment protocol:

- **Tool 5e** offers guidance on performing a point-of-care pre-mobility safety check prior to initiating any patient handling or mobility activity.
- **Tool 5f** describes ergonomic best practices that can reduce caregiver exposure to risk factors for WMSDs when performing patient handling and mobility tasks and enhance safety for patients.

Additional administrative controls discussed elsewhere in this toolkit include:

- Unit-based SPHM champions/peer coaches to encourage proper SPHM technology use and ergonomic practices (**Section 4**)
- Actively enforced written policies and procedures (**Section 4**)
- Role-specific education and training programs promoting caregiver use of SPHM technology and ergonomics work practices (**Sections 4 & 6**)

Refer to Section 10 for additional resources and references

Appendix A

Published Research on the Benefits of Overhead Lifts in Hospital Specialty Departments and in Non-Hospital Settings

A majority of research related to the use and benefits of overhead lifts has been conducted in patient care units within hospitals. However, there is some evidence that overhead lifts are effective in reducing caregiver injuries in long term care (Miller et al., 2006; Chhokar et al., 2005; Alamgir, 2008).

The following is a summary of published research or information about the use of overhead lifts in *specialty departments* within the acute care environment and within other non-hospital environments.

Overhead Lifts in OR and Imaging

Thomas-Olson et. al., reported that a hospital in Canada installed overhead lifts in Operating Room (OR) suites during construction of a new acute care hospital. Findings collected on the staff familiarity, usage, and perception of the overhead lifts in the OR were positive and showed that the lifts were used to complete key patient handling tasks (Thomas-Olson et al., 2015).

There are some reports that overhead lifts have reduced caregiver injuries related to lateral supine and seated transfers in imaging areas such as Computer Tomography (CT) and General Radiography (Rose, 2009; Smith, 2017; Kling & West, 2015).

Overhead Lifts and Pediatrics

The implementation of SPHM programs and the use of SPHM equipment in pediatric settings are relatively recent developments.

However, there are a few published reports that overhead lifts and other SPHM devices are being used successfully to promote pediatric patient mobility and reduce caregiver injuries in the hospital and home care setting (Motacki & Motacki, 2009; Haglund et al., 2010; Alexander & Johnson, 2011).

This author has observed overhead lifts being used in a pediatric ICU to facilitate repositioning tasks, including turning ventilated patients between supine and prone positions, and in medical and surgical units for in-bed repositioning; seated transfers and ambulation. They were especially useful when managing non-and partially mobile pediatric patients who required additional support due to their size.

Overhead Lifts and Rehabilitation

In both in-patient and out-patient *rehabilitation* settings, research indicates that SPHM technology, including overhead lifts, can be used by therapists to assist with rehabilitation activities, early ambulation, suspended balance, strengthening, and gait training, step climbing, limb exercises, and pool therapy while preserving and promoting patient recovery, and therapist safety (Arnold et al., 2011; Campo et al., 2013; Darragh et al., 2013; Darragh et al., 2014; Gershon et al., 2008; Halbert et al., 2013; McIlvaine et al., 2011; Perlow, 2016).

Overhead lift technology allows therapists to use their hands for therapeutic touch, tactile cues, or other manual treatment techniques instead of struggling to hold the patient's body weight during treatment sessions (Latvala and Masterman, 2020). Using an overhead lift with a sling to support a patient allows therapists to better observe a patient's response since they are not in such close proximity.

Safe Patient Handling and Mobility – Section 5

Overhead Lifts and Outpatient settings

The Americans with Disabilities Act Access to Medical Care for Individuals with Mobility Disabilities Standard (ADA, 2010), requires medical and dental clinics to have lift equipment available to assist patients with mobility disabilities with transferring to and from a wheelchair to an exam table or treatment surface.

However, research indicates that the prevalence of overhead lifts and other lift equipment in the outpatient clinic setting is low partially due to practice administrators' and physicians' lack of knowledge and benefit of SPHM equipment to promote patient access to treatment (Yeung, 2015, Pharr, 2013).

Overhead Lifts and Home Care

Installing overhead lifts in home care environments can be especially challenging due to the physical design and construction of a home and the availability of lift installation personnel for a non-commercial environment.

In the US, fiscal challenges that also limit availability of overhead lifts in the home care environment include limited reimbursement and choice of lift equipment offered by Medicare for home care clients (Jackson 2017). Overhead lifts may be approved by Medicare as Durable Medical Equipment (DME), but because of their cost and other factors, the approval process can be more arduous than the more frequently approved mechanical hydraulic floor lift. Additionally, community providers may not realize that they can prescribe an overhead lift via DME or may not be aware of the benefits of overhead lifts.

Thus, many home care patients or their families, must pay directly for overhead lift systems if they want and need the functionality that overhead lift systems provide.

Home health care is one of the fastest growing industries in the US and musculoskeletal injuries are a leading cause of injuries to home health workers in the US (AIHA, 2021; Howard & Adams, 2016). Therefore, it is important that the health and safety of the labor force that is needed to meet community-based health care needs of an ageing population are preserved. The use of overhead lifts in the home care setting could play a role in reducing caregiver injury and facilitate patient independence.

A handful of studies related to overhead lift use in the home care setting in the US, Canada and Europe indicate that home health care workers perceive overhead lifts as reducing musculoskeletal pain and injury and are accepted as safe and comfortable by the recipients of home health services (Capewell, 2011; Marlow et al., 2005; Knibbe & Knibbe, 2007; Yassi, 2008). ***Refer to Section 10 for more information related to SPHM in Home Care Settings.***

Appendix B

Periodic Inspection and Maintenance of Overhead Lifts, Floor-Based Lifts and Sit-To-Stand Technology

Preventative maintenance and inspection of SPHM technology is a critical component of an SPHM program. The availability of well-maintained SPHM technology helps facilitate safe use of SPHM technology by caregivers and protects patients from harm. ***Sling inspection that includes ISO 10535 requirements is detailed on page 5-66.***

The following information is summarized from the sources listed at the end of this Appendix. It *does not* replace the manufacturer's preventative maintenance and inspection instructions for SPHM technology.

SPHM technology manufacturers should provide instructions for the routine maintenance, calibration (as needed), and repair of their lifts, and how to access replacement parts.

Information needed to verify whether a lift is properly installed and can be operated correctly and safely (inspection), and maintenance and calibration frequency should also be provided.

Only qualified and properly trained personnel familiar with the lift's/lift system's design, use, and maintenance should perform maintenance and inspections. The SPHM technology manufacturer may offer a fee-based inspection and maintenance service and/or provide training for health care facility's maintenance/engineering staff so that they can complete inspection and maintenance work.

Follow the manufacturer's guidelines for lift inspections and maintenance. Annual inspection of critical parts is recommended.

The health care facility/organization who owns the SPHM technology are responsible for inspection and maintenance of lifts (and slings). They should keep records of all inspection and maintenance activities.

Each lift should be identified in records by its serial number.

The records of all inspections and maintenance activities should include the inspector or technician's signature along with the date of the next required inspection or relevant notes and reported to the owner of the lift technology.

Labels on lifts and rail systems must clearly display the scheduled date (minimum month/year) of the next inspection or maintenance. Additionally, the label should state the name of the company, facility, or organization that conducted the most recent inspection and maintenance.

Inspection

A lift should be inspected visually and/or physically where applicable for the following:

- Visible irregularities and defects
- The presence and the legibility of the product information label
- Welds and corrosion
- Physical inspection and verification of fasteners, including those used to secure a stationary lift to a wall, floor, or ceiling
- Pivot and hinge points
- The operation of turntables, transition gates, and dynamic coupling

Safe Patient Handling and Mobility – Section 5

- Electrical installation
- Wheels of the portable floor-based lifts and sit-to-stand devices
- Hydraulic system if applicable
- Tracks on overhead lift systems
- That the instructions for use and/or the user's operating instructions are present or accessible

Inspection of *mobile or portable lifts* should include a full lifting cycle with *maximum load* of the lift.

For stationary lifts such as *overhead lifts*, the inspection should include a lifting cycle of a minimum of 500 mm or 19.69 inches. This should be performed at the top of the lifting range, using extensions if needed for safety. Inspection should include a test with the maximum load of the lift through the entire rail system.

Inspection of fastening systems of stationary lifts/overhead lifts

Inspect all rail system fastenings, including:

- Ensuring that all brackets and connection points are tightened to the recommended torque and
- All connection points and brackets to the rail system are secured using the specified torque values.

If the above inspection process is not possible, perform a load test according to maximum load of the rail system on crucial places/points and record results in the logbook. This includes:

- Deflection before load test
- Deflection with maximum load
- Deflection after load test.

Alternatively:

- Perform a static load test with 1.5 X maximum load (not full lifting cycle) of the rail system on crucial places/points, e.g., rail connections, rail ends etc., for a period of 20 minutes minimum.

After maintenance or inspection, clearly mark the lift and rail system as approved or not approved.

If the outcome is 'not approved', remove the lift and rail system (as applicable) from service.

*Other considerations about who and how inspection and maintenance of patient lifts and other SPHM technology are listed in **Tool 5a**.*

References

The American Association for Safe Patient Handling and Movement. *Healthcare Recipient Sling and Lift Hanger Bar Compatibility Guidelines*. First Published April 2016. <https://asphp.org/wp-content/uploads/2011/05/AASPHM-Sling-Hanger-Bar-Guidelines-2016.pdf>

Enos, L. (2018) "The Role of Ceiling Lifts in a Safe Patient Handling and Mobility Programs." *International Journal of Safe Patient Handling and Movement*, 8(1):25-45.

ISO 10535:2021(en) Assistive products – Hoists for the transfer of persons – Requirements and test methods. <https://www.iso.org/obp/ui/#iso:std:iso:10535:ed-3:v2:en:sec:foreword>

The Veterans Health Administration (2016). VHA Corrective and Preventive Maintenance Checklist for Ceiling Mounted Patient Lifts Rev 2.1.

<https://www.publichealth.va.gov/docs/employeehealth/PreventiveMaintenance.pdf>

Appendix C

How Much SPHM Technology Do You Need?

Section 7 details considerations when selecting, purchasing, and installing SPHM technology including the importance of a collaborative approach when making decisions about the type and quantity of SPHM technology needed for a successful program.

Information gathered from hazard identification and assessment activities described in **Section 3** will provide information to help you determine the quantity of SPHM technology needed. This includes insight gained from employee perception surveys and interviews; manager surveys of units/department characteristics and site visit activities.

Factors to consider include:

- The number of beds on a patient care unit and number of single and double rooms
- Patient characteristics and variability e.g., medical (typical diagnoses), surgical (type), orthopedic, neurological, behavioral health, pediatrics, patients of size, etc.
- % Dependent (Total assist); Semi-Dependent (partial assist/weight bearing); Supervised and Independent patients requiring mobilization daily and in a worst-case scenario
- Patient Census (daily average; peak load; range)
- The number, frequency and average and range of length of stay of patients of size e.g., over 300 lbs. and over 500-600 lbs. This can help determine how many higher capacity lifts may be needed.
- The SPHM tasks that need to be performed in the care area and frequency of occurrence e.g., repositioning in bed; transfers to a stretcher or chair; early ambulation etc.
- Future changes to patient characteristics and/or census
- Future changes to unit/dept. design
- Staff mix and numbers per shift
- Existing equipment: functionality and use, etc
- Viability of and access to storage
- Evaluation of unit and patient room layout and physical attributes
- Structural feasibility of installing overhead lifts
- Staff perception of high-risk patient tasks

*Also refer to determining the number of slings required for patient lifts on **page 5-64**.*

*The quantity of overhead lifts needed is discussed on **page 5-27** and related resources are provided in **Table 5.6** Overhead Lift Configuration, Design, and Installation*

The 2021 Veterans Administration (VA) *Safe Patient Handling and Mobility Design Criteria Requirements* provide the following information about quantity of SPHM technology needed.

Safe Patient Handling and Mobility – Section 5

Number of Floor-Based Lifts per Clinical Unit/Area

The number of floor-based lifts needed per area is dependent on the overhead lift coverage and percentage of dependent patients or who require extensive assistance.

- 1) If all patient bedrooms on a floor, comprised of multiple Inpatient Units, are covered by overhead lifts, one floor-based lift should be adequate for the floor, depending on the units' proximity to one another.
- 2) For Units without 100% coverage (over all beds), there should be one lift for every 8-10 patients that are not covered by the overhead lifts.
- 3) In a Clinical Area, such as Primary Care or Imaging, the number of floor-based lifts is dependent on the proximity of areas to one another and the physical size of the area. Provide a minimum of one lift within a quick, easy walk to lift a fallen patient per Primary Care or Imaging room.

Number of Sit-to-Stand Assist Devices per Inpatient Nursing Unit

- 1) Provide at least one Powered Standing Assist Device on a Unit. Additional devices may be required based on percentage of patients who require partial.
- 2) In a Clinical Area, such as Primary Care or Imaging, the number is dependent on the proximity of areas to one another, the needs of the population, and the physical size of the area.

Number of Non-Powered Standing Aids per Clinical Unit/Area

- 1) Dependent on percentage of patients who require partial assistance.
- 2) Provide at least one Non-Powered Standing Assist Device on a Unit if a powered unit is not provided.
- 3) In a Clinical Area, such as Primary Care or Imaging, the number is dependent on the proximity of areas to one another and the physical size of the area.

Number of Air Assist Lateral Transfer Devices (AALTD) per Clinical Unit/Area

- 1) Surgical Suites: provide one mattress per operatory with 2 or more motors in Surgical Suite.
- 2) Emergency Department: provide one mattress per 1 – 2 stretchers with 2 or more motors in ED.
- 3) Number on Inpatient Units are dependent on frequency of moving patients in and out of Unit ('road trips'), the frequency of positioning patients with AALTPDs, and whether deflated mattresses are left under patients for ease in positioning.
- 4) Use of single-use AALTPD mattresses will increase the number required.

Number of Air Assist Lateral Lifting Devices (AALD) per Clinical Unit/Area

- 1) Provide one AALD for Emergency Departments;
- 2) Provide one AALD for Mental Health/Geri Psych Units;
- 3) Provide one AALD for each floor;
- 4) An AALD should be accessible for Diagnostics, treatment rooms, procedure rooms, Ambulatory Care, etc.

Safe Patient Handling and Mobility – Section 5

Number of Friction Reducing Devices per Clinical Unit/Area

- 1) Number required dependent on the specific needs of the clinical unit/area.

Number of Seated Slide Boards per Clinical Unit/Area

- 1) Number required dependent on the specific needs of the clinical unit/area. Most often used in Spinal Cord Units and Inpatient Rehabilitation Units, Inpatient, and Long-Term Care.

Number of Ergonomic Bathing, Showering, and Hygiene Assistive Devices per Clinical Unit/Area

- 1) Number required dependent on the specific needs of the clinical unit/area.
- 2) Provide at least one ergonomic shower trolley and/or ergonomic shower chair at each communal bathing/shower room, depending on the room design and size.
- 3) In Long Term Care or other patient areas, provide an ergonomic shower chair and/or shower trolley if patient room shower/bathing rooms are large enough, and if appropriate for patient.
- 4) In Spinal Cord Units provide an ergonomic shower trolley in patient room bathing rooms if the room can accommodate the equipment size.
- 5) In specific Clinical Units provide a powered toilet lift in each bath/toilet room.

Number of Motorized Patient Transport Units per Clinical Unit/Area

- 1) Number required is dependent on patient characteristics, thus needs of Clinical Unit/Area, and available storage space

Source: Safe Patient Handling and Mobility Design Criteria August 2021.

<https://www.cfm.va.gov/til/etc/dcSPHM.pdf>

The Facility Guidelines Institutes Patient Handling and Movement Assessments (PHAMA) 2019, provides additional useful recommendations for Floor-Based Lift Coverage by Patient Care Area in **Appendix J**. <https://www.fgiguilines.org/wp-content/uploads/2022/10/Patient-Handling-and-Mobility-Assessments.pdf>

Appendix D

Cleaning and Disinfecting SPHM Technology

The following provides guidance about cleaning and disinfecting of SPHM technology and slings. Also refer to Sling Laundry and Cleaning on **page 5-62**. *This information does not replace the manufacturer's cleaning and disinfecting instructions for SPHM technology.*

Cleaning, disinfecting¹ and laundering instructions for SPHM technology including lifts, slings, and accessories—differ by manufacturer.

A healthcare organization may use chemical disinfectants to clean medical devices that are not recommended or approved by a SPHM technology manufacturer for use with their product.

If manufacturers' cleaning instructions for their SPHM technology are not followed, then the expected lifetime of the product may be reduced, and the warranty may be voided.

So, it is essential for healthcare organization's infection prevention and control (IPC) and SPHM teams to collaborate with manufacturers to identify approved cleaning procedures for their technology and understand the risks of not following recommended protocols. They should also work together to select appropriate SPHM technology and protocols for patients in isolation to prevent disease transmission.

SPHM technology manufacturers should be able to provide a list of EPA-registered disinfectants for use against common pathogens that can be used to disinfect their device(s).

SPHM technology (hard surface) e.g., powered lifts, non-powered mobility aids, and slider boards

Some SPHM technology consists of a variety of hard structural components (e.g., plastic, aluminum, etc.), and sometimes soft components such as fabric straps, and foam padding.

The type of chemical disinfectants that can be safely used to clean a SPHM device will depend on the type of component materials present e.g., cleaning agents containing phenol or chlorine (sodium hypochlorite) can damage the aluminum, rubber, and the plastic materials, as well as create discoloration on painted and plastic surfaces.

Prolonged exposure to alcohol-based cleaners may disrupt adhesives, damage seals, cause certain plastics to swell and harden, which could make them more brittle and prone to breakage (Rutala & Weber, D., 2008).

How effectively an SPHM device can be cleaned will also depend on the design of features such buckles, Velcro type connectors, clips and fasteners, foam padding, etc. if present. The healthcare organization's IPC team should review use of and cleaning methods for such features.

Overhead lifts and some floor lifts have a flexible lift strap system that connects the lift motor to the hanger bar. Repeated use of some chemicals such as chlorine bleach can damage and weaken the lift strap, creating the risk of breakage especially when placed under load i.e., when lifting a patient.

When cleaning a flexible lift strap, it is important to fully lower the hanger bar to get access to the whole lift strap and avoid soaking the strap when wiping it down. After cleaning, the strap should be allowed to dry completely before raising the hanger bar to avoid potential damage to the strap and/or to the lift mechanism if stored with moisture present.

Safe Patient Handling and Mobility – Section 5

Overhead lift units and lift handsets, unless specified by the manufacturer, are not waterproof, so liquids should not be allowed to get inside of these components to avoid damaging the lift and creating the risk of user injury.

Some SPHM devices may have an anti-microbial coating on certain components e.g., lift straps. The manufacturer should be able to provide information about the coating material use and its effectiveness to reduce transmission of harmful pathogens, and if there are chemical disinfectants that would degrade the coating over time.

Before cleaning powered lift systems follow the manufacturer's instructions to deactivate the power supply before cleaning and disinfection e.g., unplug an electric floor lift from mains (AC power source).

Castors or wheels on floor based SPHM technology should be free from dirt and hair.

Visual safety inspection of SPHM technology before each use and routine periodic maintenance is important to detect deterioration or damage to lift system components and ensure the technology will function safely and reliably.

SPHM Slings, friction reducing devices and other soft accessories e.g., transfer belts

General principles for handling these devices after use (Chinn, R. Y., & Schulster, L. 2003).

- Wear appropriate Personal Protective Equipment (PPE)
- Remove a device slowly and minimize agitation such as shaking to avoid airborne dispersal of pathogens and contamination of air, surfaces, and persons
- To minimize further airborne dispersal, stuffing the device in a trash or soiled laundry or linen bag as appropriate, and pushing the bag down to tie or secure it for removal, should be avoided
- Hold contaminated devices away from the body (uniform)
- Never share devices between patients unless cleaned per the organization's IPC policy

Single patient use devices e.g., slings, air assist mats and plastic friction reducing sheets

Single patient use (SPUs) or disposable accessories such as slings, can be used with patients in isolation however, it is not always necessary to do so. For example, for patients with Covid-19 as with bed linens, washable slings can be used if they are laundered per CDC guidelines. There is no recommendation for laundering linens etc. that are actually or potentially contaminated with SARS-CoV-2, separately from other washable items.

Washable devices e.g., slings, air assist mats and nylon or fabric slide sheets

To destroy microorganisms, the CDC states that 'a temperature of at least 160°F (71°C) for a minimum of 25 minutes is commonly recommended for hot-water washing. The use of chlorine bleach assures an 'extra margin of safety.' Dryer temperatures and cycle times are dictated by the materials in the fabrics. Synthetic fibers (i.e., polyester, and polyester blends) which are often used for manufacture of slings and require shorter times and lower temperatures to avoid deterioration of the fabric after repeated high temperature drying. Detailed recommendations for laundry including the use of oxygen-based bleach of healthcare bedding, clothing and other textiles can be found in the 2003 CDC Guidelines for Environmental Infection Control in Health-Care Facilities (Updated July 2019).

<https://www.cdc.gov/infection-control/hcp/environmental-control/index.html>

Safe Patient Handling and Mobility – Section 5

Wipeable devices e.g., slings, air assist mats, transfer belts, and slide sheets

It is important to check that all parts of a wipeable SPHM device are made of materials that can be wiped clean. For example, a sit-to-stand sling may have fabric straps and belt component. The device manufacturer should be able to provide documentation that the device is fully wipeable together with a list of EPA-registered disinfectants that can be used to clean their product.

Wipeable products with heat-sealed or welded seams may be wiped more effectively than those with stitched seams where needle holes can be potential entry point for pathogenic microorganisms.

Ensure a standardized process for how to effectively clean wipeable products is implemented. The process should consider the surface space needed to spread or lay out the product for cleaning if applicable; how to clean all sides of the product without re-contaminating a cleaned surface; and what should happen to the product if it is very soiled and cannot effectively be wiped clean.

For reusable and wipeable slings, slide sheets etc., manufacturers usually recommend an initial wash and dry or wipe down as appropriate, *before* placing into first use after purchase.

For some devices such as, reusable air assist mats, disposable covers are recommended to minimize device contamination.

Lastly, every time before using slings, friction-reducing devices, and other soft accessories, it is critical that *inspection* occurs to detect any damage, and if damage is found, the device is removed from service immediately.

A critical component of an effective IPC program is employee training and reinforcement in the use of proper IPC protocols. Providing simple pictorial and highly visible job aids that show employees how to clean & inspect SPHM technology, together with rounding on units and in-person coaching e.g., using unit-based SPHM champions, may increase compliance with IPC processes. Providing an adequate and easily accessible supply of cleaning supplies and PPE will also facilitate compliance.

1. **Cleaning** refers to the *removal* of pathogenic microorganisms or ‘germs,’ dirt, and impurities from surfaces and objects. Cleaning with water, soap (or a neutral detergent) and some form of mechanical action (brushing or scrubbing) does not kill germs, but by removing them, it lowers their numbers and the risk of spreading infection and can increase the effectiveness chemical products used for disinfection. Cleaning is an essential first step in any disinfection process.

Disinfecting refers to using chemicals, for example, EPA-registered disinfectants or thermal methods, to kill many or all pathogenic microorganisms, except bacterial spores, on surfaces and objects. This process does not necessarily clean dirty surfaces or remove germs, but by killing germs on a surface *after* cleaning, it can further lower the risk of spreading infection.

The disinfectant *concentration* and *contact time* are also critical for effective surface disinfection.

Disinfection is less lethal than sterilization which can render an object free (to a very low probability) of all forms of viable microorganisms.

Contact time (or dwell time): This is the time required for a disinfectant to be in direct contact with the surface or item to be disinfected e.g. a surface must remain visibly wet and untouched with disinfectant or a sanitizer for 10 minutes to allow the chemical to kill the microorganisms on that surface. For surface disinfection, this period is framed by the application to the surface until

Safe Patient Handling and Mobility – Section 5

complete drying has occurred. Contact time *varies* between disinfectants and maybe different for different viruses and other microorganisms.

References

Rutala, W. A., & Weber, D. J. (2008). Guideline for disinfection and sterilization in healthcare facilities, 2008. Update: June 2024. Centers for Disease Control. <https://www.cdc.gov/infection-control/media/pdfs/guideline-disinfection-h.pdf>

Chinn, R. Y., & Sehulster, L. (2003). Guidelines for environmental infection control in health-care facilities; recommendations of CDC and Healthcare Infection Control Practices Advisory Committee (HICPAC). Updated: July 2019. <https://www.cdc.gov/infection-control/hcp/environmental-control/index.html>

Other Resources

The Association for Professionals in Infection Control and Epidemiology (APIC) <https://apic.org/>

The Environmental Protection Agency (EPA). EPA-registered disinfectants, including links to lists of products registered against common pathogens like SARS-CoV-2 (CoVID-19) or Norovirus. <https://www.epa.gov/pesticide-registration/selected-epa-registered-disinfectants>

The Joint Commission. Infection Prevention and Control Resources. The Joint Commission. <https://www.jointcommission.org/resources/patient-safety-topics/infection-prevention-and-control/>

Stewart E., & Smith R. (2017). Guidelines for the Selection and Use of Surface Disinfectants in Healthcare. American Industrial Hygiene Association (AIHA) https://online-ams.aiha.org/amsssa/ecssashop.show_product_detail?p_mode=detail&p_product_serno=1278

Appendix E

Regulations and Standards Related to Design and Installation of SPHM Technology

The following guide provides information on regulations and standards related to SPHM technology; it is not comprehensive. Collaborate with your facility's Clinical Technology/Engineering Services, Facilities Maintenance, Design and Construction departments to ensure SPHM technology purchased and installed meets all required federal, state, and local standards for health care settings.

U.S. Food and Drug Administration (FDA)

SPHM technology are considered medical devices in the U.S., and as such are regulated by the U.S Food and Drug Administration (FDA). The FDA classifies medical devices based on the level of risk or potential harm they pose to patients.

- **Class I:** Devices with low risk, such as bandages and elastic bandages.
- **Class II:** Devices with moderate risk, such as powered wheelchairs and infusion pumps.
- **Class III:** Devices with the highest risk, such as life-sustaining devices like pacemakers and other implants.

Manufacturers of medical devices must meet certain FDA requirements that vary according to the device's risk classification before a device can be made available for use. Class 1 devices are subject to the lowest level of regulatory control.

Most SPHM technology including non-AC powered patient lifts i.e., floor-based lifts, sit-to-stand lifts, and overhead lifts are considered *Class 1 devices*.

Powered patient transfer devices such as air assist mats and AC powered patient lifts are considered *Class 2 devices*.

In some cases, Class 1 devices such as overhead lifts are designated as a Class 2 device when the FDA recalls a specific model and the device poses a moderate risk of injury or an adverse event occurring.

The classification of SPHM technology can be checked via the FDA Product Classification database <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPCD/classification.cfm>

Recalls of SPHM technology can be checked via the FDA's Medical Device Recall Database <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfres/res.cfm>

Look for press releases, product updates, and other information about recalls on the SPHM technology *manufacturer's* website.

More information about FDA regulation of medical devices can be found in the Code of Federal Regulations Title 21 Food and Drugs; Chapter I Food and Drug Administration, Department of Health and Human Services; Subchapter H Medical devices. <https://www.ecfr.gov/current/title-21/chapter-I/subchapter-H>

Safe Patient Handling and Mobility – Section 5

FDA reporting requirements for medical device-related adverse events.

Manufacturers of medical devices such as SPHM technology are required to report to the FDA when they learn that any of their devices may have caused or contributed to a death or serious injury.

A “**device user facility**” must report a suspected medical device-related *death* to both the FDA and the manufacturer. User facilities must report a medical device-related *serious injury* to the manufacturer, or to the FDA if the medical device manufacturer is unknown.

Although a user facility is not required to report a device malfunction, they can voluntarily inform the FDA of such product problems through [MedWatch](#), the FDA’s Safety Information and Adverse Event Reporting Program. Healthcare professionals within a user facility should familiarize themselves with their institution’s procedures for reporting adverse events to the FDA.

A “device user facility” is a hospital, ambulatory surgical facility, nursing home, outpatient diagnostic facility, or outpatient treatment facility, which is not a physician’s office

For more information go to: Medical Device Reporting (MDR): How to Report Medical Device Problems. <https://www.fda.gov/medical-devices/medical-device-safety/medical-device-reporting-mdr-how-report-medical-device-problems>

The Manufacturer and User Facility Device Experience or MAUDE database houses medical device reports of adverse events submitted to the FDA.

You can search this database to review if issues with SPHM technology from a specific manufacturer have been reported.

You can access the MAUDE database at

<https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/search.cfm>

You can learn more about the MAUDE database at <http://fda.gov/medical-devices/mandatory-reporting-requirements-manufacturers-importers-and-device-user-facilities/about-manufacturer-and-user-facility-device-experience-maude-database>

International Organization for Standardization (ISO) 10535:2021

Manufacturers of powered mobile and stationary patient lifts and slings worldwide are expected to meet the requirements of the International Organization for Standardization (ISO) 10535:2021 ‘*Assistive products - Hoists for the transfer of persons - Requirements and test methods*’ when designing, manufacturing, and selling patient lifts and slings. <https://www.iso.org/obp/ui/#iso:std:iso:10535:ed-3:v2:en:sec:foreword>

This globally recognized standard details the design, testing, and other safety requirements that manufacturers of patient lifts and slings should adhere to before their products are made available for use in any healthcare or home/community environment. Recommendations for periodic maintenance and criteria to facilitate sling and lift compatibility and safe use are also provided.

ISO 10535:2021 applies to portable floor-based lifts and sit-to-stand lifts and aids and overhead lifts together with lift slings, which are fixed on ceilings, walls, floor-based support systems or gantries, and lifts mounted in or on another product.

ISO 10535 is recognized as the voluntary consensus standard for medical products by the FDA thus, to be able to distribute or sell their SPHM products in the US, manufacturers should at a minimum meet the requirements of this ISO standard (ANA, 2021; FDA, 2024).

Safe Patient Handling and Mobility – Section 5

ISO 10535:2021 also lists other ISO standards that should be met when designing and manufacturing patient lift devices.

Health care facilities are encouraged to obtain a copy of ISO 10535:2021 and ask patient lift vendors to demonstrate compliance with this and any other applicable standards required during the SPHM technology selection process.

Electrical Standards and Fire Standards

Manufacturers of powered lift technology also have to ensure a lift and its charging system are safe and in compliance with electrical standards such as ANSI/AAMI ES60601-1:2005/A2:2021 Medical electrical equipment - Part 1: General requirements for basic safety and essential performance that is adapted for specific U.S. regulatory requirements from the International Electromagnetic Commission IEC 60601-1 series.

National Fire Protection Association (NFPA) standards for electrical equipment in healthcare facilities (NFPA 99 and 70) also must be met. Other standards and building codes such as NFPA 13 standard for the installation of sprinkler systems may also apply when installing overhead track systems.

The above standards also apply to all other types of electrically powered SPHM technology such as air assist blowers.

Some states, such as Oregon, have additional regulations related to the testing and labeling of medical electrical equipment.

The Americans with Disabilities Act

The ‘**Americans with Disabilities Act**: Access To Medical Care For Individuals With Mobility Disabilities *Standard* (2010) – Use of patient lifting equipment in clinics’ (ADA, 2010), states that that lift equipment such as overhead and floor-based lifts, be available to improve access to treatment for patients who need assistance with transfers e.g., to and from a wheelchair and exam table or treatment surface.

For more information see ‘Access to Medical Care for Individuals with Mobility Disabilities Last updated: June 26, 2020’ at <https://www.ada.gov/resources/medical-care-mobility/> and the Code of Federal Regulations Title 36 Chapter XI Part 1195 – Standards for Accessible Medical Diagnostic Equipment. <https://www.ecfr.gov/current/title-36/chapter-XI/part-1195>

Facility Guidelines Institute (FGI) Guidelines

The **Facility Guidelines Institute (FGI) Guidelines** (<https://fgiguideelines.org/>) are used for planning, designing, and constructing healthcare facilities such as hospitals, outpatient clinics, and residential care facilities. They are primarily used by state and federal agencies to regulate new construction and major renovations of these facilities, ensuring safe and efficient patient care through minimum space, infection control, and design requirements.

43 states have adopted some edition of the FGI Guidelines for use in their regulation of the licensing or construction of health care and residential care facilities with some states adopting specific editions or allowing for equivalency

From 2018 on, the FGI Guidelines include specific design requirements for patients of size including the use of overhead lifts to facilitate care (FGI, 2023).

Safe Patient Handling and Mobility – Section 5

The importance of incorporating SPHM into facility design and construction standards and associated standards is discussed further in **Section 9**.

Centers for Medicare & Medicaid Services (CMS) Durable Medical Equipment (DME) Quality Standards

Suppliers of DME must meet the CMS durable medical equipment, prosthetics, orthotics, and supplies (DMEPOS) quality standards effective August 12, 2024, for accreditation and Medicare billing. These standards include the requirement that DME be appropriate for home use and that suppliers follow manufacturer guidelines for structural safety. <https://www.cms.gov/Research-Statistics-Data-and-Systems/Monitoring-Programs/Medicare-FFS-Compliance-Programs/Downloads/Final-DMEPOS-Quality-Standards-Eff-01-09-2018.pdf>

DMEPOS Quality Standards <https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/DMEPOSQuality/DMEPOSQualBooklet-905709.html>

Appendix F

Sling and Lift Compatibility: A Brief Summary

The following is a summary of considerations related to sling and lift compatibility.

Background

In 2012, the FDA released a list of best practices related to the safe use of slings and lifts which includes the following statement:

“Users of patient lifts should: Match the sling to the specific lift and the weight of the patient. A sling must be approved for use by the patient lift manufacturer. No sling is suitable for use with all patient lifts.” (FDA, 2018). To date, this statement remains unchanged.

This statement *does not* mandate that a sling and lift must be purchased from the same manufacturer. However, it has caused a lot of confusion for purchasers of lifts and slings who may be told that this is not the case (AASPHM, 2016). There is *no* regulation or standard in the US that states a healthcare organization *must* purchase lifts and slings from the same manufacturer.

Relevant Standards

As indicated in **Appendix E**, patient lifts and slings are classified as medical devices in the United States and are regulated by the Food and Drug Administration (FDA). Manufacturers of patient lifts and slings are required to meet, at a minimum, the standards set by ISO 10535:2021, which is recognized by the FDA as a consensus standard (FDA, 2025).

Safety requirements related to the design and testing of slings and information that must be supplied by the manufacturer to the user of the slings, to facilitate the safe combination and use of lifts/hanger bars and slings, have been greatly enhanced in ISO 10535:2021.

The International Standards Organization (ISO) 10535:2021 Assistive products - Hoists for the transfer of persons-Requirements and test methods states the following about Sling and Hanger Bar Compatibility:

Clause 4.3 Requirements for body-support units (i.e., slings).*

“The manufacturer of the sling shall indicate which lift(s) and hanger bar(s) (e.g. hanger bar with 2, 3, 4 or more attachment points) it is compatible with, and which type of connection means, e.g. loop, clip or other, in order to ensure a safe combination.

The method by which the sling can be adjusted or removed shall be clearly stated in the accompanying operating instructions.

Any organization that purchases patient lifts and slings shall make sure that the combination(s) is/are safe either by requiring compatibility documentation for the combination(s) from the manufacturer(s) or by performing compatibility testing themselves, hereby transferring the responsibility for a safe combination to the organization. NOTE Further information can be found in Annex C.”

Annex C further addresses compatibility of patient lifts, hanger bars and slings and the specific information manufacturers of slings and lifts are requested to provide to users or prescribers. Checklists for safe use, inspection, and attachment of a sling to a lift for prescribers and operators of lifts are also provided in order to reduce foreseeable misuse (ISO, 2021).

Safe Patient Handling and Mobility – Section 5

Note: of ISO 10535:2021 Section 8 Non-rigid slings and Section 9 Rigid slings - Specific requirements and test methods, describes additional requirements for sling manufacturers.

*ISO terminology for patient lift, sling and hanger bar has been changed to reflect terms used in the US.

Challenges in mandating use of a sling and lift from the same manufacturer

- In the US - Some manufacturers only make and sell slings
- Some non-US lift manufacturers only sell overhead lifts in the US but not slings
- Manufacturers do not always have slings needed to meet clinical needs
- Slings typically have a 1-year warranty

Other factors to consider

- 3rd party manufacturing by sling vendors for lift manufacturers
- Purchasing groups that buy slings based on ability to lower cost
- Other medical device 'systems' have components from different manufacturers e.g., Intravenous pump, lines, cannula, and solution container

Adverse events associated with hanger bars and slings

The ISO standard was revised by an interdisciplinary group of experts representing the national standards institutes from numerous countries worldwide.

The group conducted extensive research when updating the standards. This included review of existing medical device safety and risk standards; peer reviewed articles and guidelines related to sling and lift safety and compatibility; and mandatory reports made to the FDA related to lifts and slings via the Manufacturer and User Facility Device Experience (MAUDE) database and to other medical device regulatory entities in Australia, New Zealand, Canada, and the United Kingdom.

The following are examples of common issues noted in reports of adverse events from several countries related to the use of patient lift hanger bars and slings that ended in patient harm primarily due to a fall from a lift:

- Failure to attach the sling correctly to a hanger bar
- Wrong size or type of sling was used e.g., a sling that was too large for the patient or provided inadequate support
- Wrong configuration of sling attachments connected to a hanger bar that resulted in the wrong position of the patient
- Sling unit loop or clip connection means was broken, damaged, or worn
- Sling material and seams damaged or worn
- Sling was incompatible with lift hanger bar, e.g., clip connections attached to hanger bar designed for loop connections and vice versa

Note: These events occurred with a variety of slings styles both washable and disposable and many brands of slings.

Safe Patient Handling and Mobility – Section 5

The cause of the above issues can be broadly categorized as follows:

- Lack of, or poor sling inspection e.g., prior to first use, periodically, and before each use by a caregiver
- Variable laundry processes i.e., washable slings are not laundered to manufacturers requirements
- Lack of periodic hanger bar inspection and maintenance
- Inadequate education and training of caregivers related to correct choice of sling for the patient's physical and clinical needs; for the lift/hanger bar to be used; and safe use of slings
- Lack of standardization of lifts and slings within a facility

Summary

As cited by the FDA there are many factors that must be considered when choosing the correct sling for a patient, the type of lift it is to be used with and the safe use of a sling and lift (FDA, 2018; FDA 2014)

There is no guarantee that purchasing a sling and lift from the same manufacturer will prevent the adverse events listed above.

Ensuring the safe use of patient lifts and slings and specifically sling and hanger bar compatibility requires that healthcare organizations implement an evidence-based Safe Patient Handling and Mobility program that includes a sling inspection system and laundry management, patient assessment and risk protocols, caregiver training, and periodic lift inspection and maintenance.

It is the healthcare organization in which patient lifts and slings are used that is ultimately responsible for the appropriate choice, safe use and maintenance of patient lifts and slings to prevent harm to patients and caregivers.

References

The American Association for Safe Patient Handling and Movement. *Healthcare Recipient Sling and Lift Hanger Bar Compatibility Guidelines*. First Published April 2016. Retrieved from: <https://asphp.org/wp-content/uploads/2011/05/AASPHM-Sling-Hanger-Bar-Guidelines-2016.pdf>

ISO 10535:2021(en) Assistive products – Hoists for the transfer of persons – Requirements and test methods. <https://www.iso.org/obp/ui/#iso:std:iso:10535:ed-3:v2:en:sec:foreword>

U.S. Department of Health and Human Services Food and Drug Administration's (FDA). (2012. Last updated 2018). *Medical Devices - General Hospital Devices and Supplies: Patient Lifts*. Retrieved from: <https://www.fda.gov/medical-devices/general-hospital-devices-and-supplies/patient-lifts>

U.S. Department of Health and Human Services Food and Drug Administration's (FDA). Recognized Consensus Standards. Page Last Updated: 07/28/2025. Retrieved from: <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfstandards/search.cfm>

U.S. Department of Health and Human Services Food and Drug Administration's (FDA). *Patient Lifts Safety Guide* (2014). Retrieved from: <https://www.fda.gov/media/88149/download>

Appendix G

Sling Labels

Sling labels should provide the user with the necessary information for proper selection and safe use.

Therefore, it is important that sling labels are designed to meet Human Factors standards and guidelines to ensure that they are legible and meaningful to the caregiver or ‘user-friendly.’ More information on application of Human Factors to the design of medical devices and device labeling can be found at the FDA Human Factors and Medical Devices. <https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/human-factors-and-medical-devices>

ISO standard 10535:2021 currently requires that the following information should be included on a label that is permanently fixed to the sling:

1. The size of the sling i.e., the maximum load in lbs./kgs.
2. A warning/attention mark which will refer the caregiver to the instructions for use of the lift and/or sling
3. Marking to indicate *if* the sling is designed only to be used on one dedicated type of hanger bar
4. Marking to indicate how the sling is to be cleaned and/or disinfected. A symbol can be used to indicate this information. Symbols used should comply with ISO 3758 Textiles – Care labelling code using symbols.
2. A unique device identifier (UDI) that includes both device and production identifiers (such as expiration date and lot or serial number). The FDA requires this to adequately identify medical devices through their distribution and use (FDA, 2022).
3. The sling manufacturer’s name or logo, or registered trade name, website, address, telephone, and country of origin and, in addition, name and address of the supplier if different from the manufacturer.
4. Lot or batch and/or serial number. Serial number is preferred for traceability and inspection records.
5. Year and month of manufacture

Although the ISO standard states that some of the following information can be included in the manufacturer’s instructions for use if it cannot be placed on the sling label, it is strongly recommended this be included on the sling label as feasible, to reduce the risk of user error.

- Definition of the model or type of sling.
- The health care setting where the sling can be used e.g., intensive care and/or general patient care use in acute care, long term and home care, and outpatient settings and directions for use. A symbol for and/or written description of intended use, directions for use (icons/text) or indication to refer to the manufacturer instructions for use.
- The method of lifting, particularly the position of the patient in the sling e.g., sitting, sitting/recumbent or recumbent, and any other important information regarding choice of type, design, and application method such as sling dimensions.

Safe Patient Handling and Mobility – Section 5

- A symbol and description of the hanger bar and a 2, 3, 4, 6 and/or 8-point bar that the sling is to be used with, and the type of hanger bar connection point that is compatible for the sling (e.g., a loop or key/clip).
- Contraindications for use e.g., if a sling is unsuitable for a patient(s) with a specific clinical condition(s).
- A warning not to use a damaged or badly worn sling.
- A warning that indicates if a sling is not intended to be laundered. This symbol should be used (ISO7000-3123).
- A warning that indicates if a non-washable sling has been laundered and must not be used.
- A place to indicate 'Date of First Use.'



Other information that should be provided by the manufacturer:

Details about:

- The materials used in the manufacture of the sling including information about flammability
- The method by which a sling can be connected to, adjusted or removed from a hanger bar
- A warning to the user of the lift and sling that a risk assessment must be carried out to ensure that the correct size, type, and shape of sling is being used for the patient/client.

A note about lift and sling compatibility should also be provided (**Refer to Appendix F**).

Overall requirements related to labeling slings:

- All warnings used as risk control must be clearly labelled.
- Symbols for use in the labelling of medical products must be in accordance with ISO 15223-1:2021

Information provided on sling labels such as text and symbols should be easy to read and meaningful for the user population.

The use of well-designed icons can assist to convey some of the information above and facilitate comprehension for users who may not read or understand English well. They can also help conserve space on a sling label.

Information provided on labels of washable/wipeable slings should also be colorfast and not fade through repeated laundering or cleaning.

Other information to be included in instructions for use if it cannot be provided on the sling label (AASPHM, 2016):

- Expected lifetime of the product and inspection recommendations
- Technical specifications of a sling i.e., dimensions and maximum load
- Sufficient drawings/illustrations to show the key dimensions
- How to get assistance from the manufacturer

Safe Patient Handling and Mobility – Section 5

Figure A illustrates an example of a Sling label with essential information to aid correct selection and use of a washable sling.

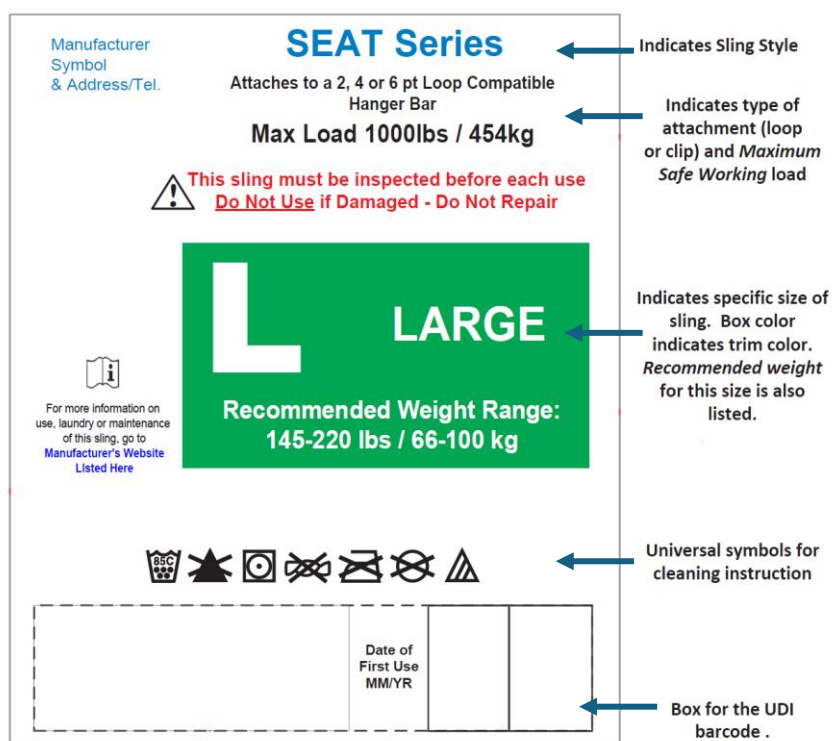


Figure A. Example of a Sling Label with Essential Information to Aid Correct Selection and use of a Washable Sling.

References

The American Association for Safe Patient Handling and Movement. *Healthcare Recipient Sling and Lift Hanger Bar Compatibility Guidelines*. First Published April 2016. Retrieved from: <https://asphp.org/wp-content/uploads/2011/05/AASPHM-Sling-Hanger-Bar-Guidelines-2016.pdf>

ISO 10535:2021(en) Assistive products – Hoists for the transfer of persons – Requirements and test methods. <https://www.iso.org/obp/ui/#iso:std:iso:10535:ed-3:v2:en:sec:foreword>

U.S. Department of Health and Human Services Food and Drug Administration's (FDA). Unique Device Identification System (UDI System) Current as of 07/22/2022. Retrieved from <https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/unique-device-identification-system-udi-system>

Safe Patient Handling and Mobility – Section 5

References and Resources Used in this Section

- Abdul Halim, N. S. S., Ripin, Z. M., & Ridzwan, M. I. Z. (2023). Effects of patient transfer devices on the risk of work-related musculoskeletal disorders: a systematic review. *International Journal of Occupational Safety and Ergonomics*, 29(2), 494-514.
- Able News. (2011, June). Able News, 21(1). Library of Congress. Retrieved September 26, 2025, from https://tile.loc.gov/storage-services/master/gdc/qdceserialspublic/20/21/21/06/20/_2/01/10/6/2021210620_201106/2021210620_201106.pdf
- ACC6075 Moving and Handling People Guidelines 2012. Accident Compensation Corporation New Zealand. <https://www.acc.co.nz/assets/provider/acc6075-moving-and-handling-people-guidelines.pdf>
- Agency for Healthcare Research and Quality. Preventing Pressure Ulcers in Hospitals. Content last reviewed February 2024. Rockville, MD. <https://www.ahrq.gov/patient-safety/settings/hospital/resource/pressureulcer/tool/index.html>
- Agency for Healthcare Research and Quality. (Content last reviewed February 2024.). Preventing falls in hospitals. Rockville, MD. <https://archive.ahrq.gov/patient-safety/settings/hospital/fall-prevention/toolkit/index.html>
- Agency for Healthcare Research and Quality. (2017, March). Early mobility. Rockville, MD. <https://www.ahrq.gov/hai/tools/mvp/technical-bundles-early-mobility.html>
- Alamgir, H., Li, O.W., Gorman, E., Fast, C., Yo, S., & Kidd, C. (2009). Evaluation of ceiling lifts in the health care setting, patient outcomes and perceptions. *AAOHN J.* 2009;57(9):374-381.
- Alamgir, H., Li, O.W., Yu, S., Gorman, E., Fast, C., & Kidd, C. (2009). Evaluation of ceiling lifts: Transfer time, patient comfort and staff perceptions. *Injury*, 40(9), 987-92.
- Alamgir, H., Yu, S., Fast, C., Hennessy, S., Kidd, C., & Yassi, A. (2008). Efficiency of overhead ceiling lifts in reducing musculoskeletal injury among carers working in long-term care institutions. *Injury*, 39(5), 570-577.
- Alexander P., & Johnson, C. (2011). *Manual Handling of Children: Professional Series, Volume 2*. National Back Exchange.
- Alexander, P. (2008). Slings and things: The importance of assessment. *International Journal of Therapy and Rehabilitation*, 15(1), 44-49.
- American Association for Safe Patient Handling and Movement (April 2016). Healthcare Recipient Sling and Hanger Bar Compatibility Guidelines. <https://asph.org/wp-content/uploads/2011/05/AASPHM-Sling-Hanger-Bar-Guidelines-2016.pdf>
- American Industrial Hygiene Association (AIHA). "Safe Patient Handling and Mobility (SPHM) A Process to Protect Health Care Workers and Recipients" A White Paper by the American Industrial Hygiene Association (AIHA), the Association of Safe Patient Handling Professionals (ASPHP), and the American Nurses Association (ANA), Inc. Falls Church, VA. November 2024. Accessed Jan 2, 2025. <https://www.aiha.org/education/white-papers/safe-patient-handling-and-mobility-sphm-a-process-to-protect-health-care-workers-and-recipients>
- American Nurses Association (2021). Safe Patient Handling and Mobility Interprofessional Standards Across the Care Continuum 2nd edition. American Nurses Association; 2021. Silver Springs, MD.
- Amini Pay, N., Sommerich, C.M., Lavender, S.A. (2021). Assessment of alternative methods for informal caregivers to perform patient repositioning tasks. *Appl. Ergon.* 93.
- Anyan, W., Faraklas, I., Morris, S., & Cochran, A. (2013). Overhead lift systems reduce back injuries among burn care providers. *Journal of Burn Care & Research*, 34(6), 586-590.
- Arnold M, Radawiec S, Campo M, Wright LR. (2011). Changes in functional independence measure ratings associated with a safe patient handling and movement program. *Rehabil Nurs.* 36(4):138-144.
- Arnold, M. (2025). The continuing gait belt debate: updates and recommendations for their role in SPHM. *Int J SPHM* March 2025 Vol 15, No 1, 18-27.
- Aslam, I., Davis, S. A., Feldman, S. R., & Martin, W. E. (2015). A review of patient lifting interventions to reduce health care worker injuries. *Workplace health & safety*, 63(6), 267-275.

Safe Patient Handling and Mobility – Section 5

Association of Safe Patient Handling Professionals, Inc. (2023). Safe Patient Handling and Mobility (SPHM) Education in Health Care Student Curriculum (White Paper). Warrendale, PA. www.ASPHP.org

Ballarat Health Services. (2013). Prescriber manual for transfers, hoists and slings: A manual devised by the SWEP Clinical Advisory Team to assist SWEP registered prescribers. VIC, Australia. https://swep.bhs.org.au/files/113/Transfer_Manual.pdf

Banks, J. J., Zhou, J., Riehle, C. O., & Wiggermann, N. E. (2024). Biomechanical stresses on healthcare workers during manual patient bed-to-chair transfers. *International Journal of Industrial Ergonomics*, 101, 103584.

Baptiste, A., Cleerey, M. M., Matz, M., & Evitt, C. P. (2008). Proper sling selection and application while using patient lifts. *Rehabilitation Nursing*, 33(1), 22-32.

Baptiste-McKinney A., & Halvorson, B. (2018). The use of friction reducing devices in a safe patient handling and mobility program. *Int Journal SPHM Vol 8* (3) 132-141

Bartnik LM, Rice MS. (2013). Comparison of caregiver forces required for sliding a patient up in bed using an array of slide sheets. *Workplace Health and Safety*. 61(9): 393-400.

Bassett, R. D., Vollman, K. M., Brandwene, L., & Murray, T. (2012). Integrating a multidisciplinary mobility programme into intensive care practice (IMMPTP): a multicentre collaborative. *Intensive and Critical Care Nursing*, 28(2), 88-97.

Boynton, T. (2024). The Bedside Mobility Assessment Tool (BMAT) embedded in the new Mobility Screening and Solutions Tool (MSST): addressing inaccuracies. *BMC Health Services Research*, 24(1), 1164.

Boynton, T., Kelly, L., & Perez, A. (2014). Implementing a mobility assessment tool for nurses. *Am Nurse Today*, 9(9), 13-16.

Boynton, T., Kumpar, D., & VanGilder, C. (2020). The bedside mobility assessment tool 2.0. *Am Nurse J*, 15, 18-22. <https://www.myamericannurse.com/the-bedside-mobility-assessment-tool-2-0/>

Brienza, D., Deppisch, M., Gillespie, C., Goldberg, M., Guccio, P., Jordan, R., ... & Thurman, K. (2015). Do Lift Slings Significantly Change the Efficacy of Therapeutic Support Surfaces? A National Pressure Ulcer Advisory Panel White Paper. https://cdn.ymaws.com/npiap.com/resource/resmgr/white_papers/1a_npuap-lift-sling-white-p.pdf

Callison MC, Nussbaum MA. (2012). Identification of physically demanding patient handling tasks in an acute care hospital. *International Journal of Industrial Ergonomics*. 42(3): 261-267.

Campo, M., Shiyko, M. P., Margulis, H., & Darragh, A. R. (2013). Effect of a safe patient handling program on rehabilitation outcomes. *Archives of Physical Medicine and Rehabilitation*, 94(1), 17–22.

Capewell, R. A. (2011). Evaluation of a toolkit for safe patient handling in the home care setting. *American Journal of Safe Patient Handling & Mobility*, 1(1), 22–29.

Chhokar, R., Engst, C., Miller, A., Robinson, D., Tate, R. B., & Yassi, A. (2005). The three-year economic benefits of a ceiling lift intervention aimed to reduce healthcare worker injuries. *Applied Ergonomics*, 36(2), 223–229.

Clark, M., Phillips, L., & Knibbe, H. J. J. (2015). Lifting and transfer devices: A bridge between safe patient handling and pressure ulcer prevention. *American Journal of Safe Patient Handling & Mobility*, 5(4), 154–160.

Collins, J. W., Nelson, A., & Sublet. (2006). Safe lifting and movement of nursing home residents (DHHS [NIOSH] Publication No. 2006-117). Cincinnati, OH: National Institute for Occupational Safety and Health.

Crane, B., Wininger, M., Strydom, E., & Hulse, J. (2015). The effects of sitting on a mechanical lift sling on interface seat pressure. *Topics in Geriatric Rehabilitation*, 31(1), 67–73.

Curran, J., & Fray, M. (2019). An efficiency evaluation of different hoisting devices to complete three frequent patient transfers.

Dalin Eriksson, K., Welmer, A. K., Sandberg, L., & Boström, A. M. (2025). Older adults' perspectives on physical activity during hospitalization: a qualitative interview study. *BMC geriatrics*, 25(1), 688.

Dang, T., Roberts, D., Murray, A., & Wiggermann, N. (2022). A return-on-investment model using clinical and economic data related to safe patient handling and mobility programs in the ICU. *International Journal of Industrial Ergonomics*, 92, 103372.

Daniell, N., Merrett, S., & Paul, G. (2014). Effectiveness of powered hospital bed movers for reducing physiological strain and back muscle activation. *Applied Ergonomics*, 45(4), 849-856.

Safe Patient Handling and Mobility – Section 5

- Darragh, A. R., Campo, M. A., Frost, L., Miller, M., Pentico, M., & Margulis, H. (2013). Safe-patient-handling equipment in therapy practice: Implications for rehabilitation. *American Journal of Occupational Therapy*, 67(1), 45-53.
- Darragh, A. R., Campo, M., & King, P. (2012). Work-related activities associated with injury in occupational and physical therapists. *Work*, 42(3), 373–384.
- Darragh, A. R., Shiyko, M., Margulis, H., & Campo, M. (2014). Effects of a safe patient handling and mobility program on patient self-care outcomes. *American Journal of Occupational Therapy*, 68(5), 589–596.
- De Vito, G., Meroni, R., Riva, M. A., Mauri, R., Giunco, F., Conti, S., & Cesana, G. C. (2011). EMG and forces during maneuvering of ceiling-based and floor-based patient transfer devices. *Giornale Italiano di Medicina del Lavoro ed Ergonomia*, 33, 230–234.
- Dennerlein, J. T., O'day, E. T., Mulloy, D. F., Somerville, J., Stoddard, A. M., Kenwood, C., ... & Hashimoto, D. (2016). Lifting and exertion injuries decrease after implementation of an integrated hospital-wide safe patient handling and mobilization program. *Occup Environ Med*, oemed-2015.
- Deter, L. L., Kiely, D. K., & White-Chu, E. F. (2013). A descriptive view of the impact of an air-assisted device on pressure ulcer prevention and healing. *Journal Name*, 3(4).
- Dijkstra, F., Van Der Sluis, G., Jager-Wittenaar, H., Hempenius, L., Hobbelen, J. S. M., & Finnema, E. (2022). Facilitators and barriers to enhancing physical activity in older patients during acute hospital stay: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 19(1), 99.
- Disabled Living Foundation (DLF). (2019). Choosing a hoist and slings for lifting people (Factsheet). <https://livingmadeeasy.org.uk/dlf-factsheets/Choosing%20a%20hoist%20and%20slings%20for%20lifting%20people>
- DuBose, J. (2014). Developing a sling management system: learn about key decisions for this segment of an SPHM program. *American Nurse Today*, 9(9), S23-S23.
- Dutta, T., Holliday, P. J., Gorski, S. M., Baharvandy, M. S., & Fernie, G. R. (2011). The effects of caregiver experience on low back loads during floor and overhead lift maneuvering activities. *International Journal of Industrial Ergonomics*, 41(6), 653-660.
- Dutta, T., Holliday, P. J., Gorski, S. M., Baharvandy, M. S., & Fernie, G. R. (2012). A biomechanical assessment of floor and overhead lifts using one or two caregivers for patient transfers. *Applied ergonomics*, 43(3), 521-531.
- Edupuganti, K., & Price, C. (2013). Repositioning slings: The effects on skin pressure, pH, and temperature. *American Journal of Safe Patient Handling and Movement*, 3(2), 48-54.
- Elnitsky, C. A., Lind, J. D., Rugs, D., & Powell-Cope, G. (2014). Implications for patient safety in the use of safe patient handling equipment: A national survey. *International Journal of Nursing Studies*, 51(12), 1624-1633.
- Elnitsky, C. A., Powell-Cope, G., Besterman-Dahan, K. L., Rugs, D., & Ullrich, P. M. (2015). Implementation of safe patient handling in the US Veterans health system: A qualitative study of internal facilitators' perceptions. *Worldviews on Evidence-Based Nursing*, 12(4), 208-216.
- Engst, C., Chhokar, R., Miller, A., Tate, R. B., & Yassi, A. (2005). Effectiveness of overhead lifting devices in reducing the risk of injury to care staff in extended care facilities. *Ergonomics*, 48(2), 187–199.
- Enos L. (2018). Checklist for choosing and purchasing slings. *Int J SPHM*. 2018;8(4):171-181.
- Enos L. (2013). Safe patient handling and patient safety: Identifying the current evidence base and gaps in research. *Am J SPHM*. 3(3):94-102.
- Enos, L., & Hess, J. (2011, Portland, OR). Implementing a sustainable safe patient/patient handling program: The Oregon Facility of Choice Program. Presentation made at the Oregon Governors Occupational Safety and Health Conference.
- Enos, L. (2020, San Diego, CA). The role of a SPHM assessment tool to facilitate early and safe mobility: A case study. Presentation made at the ASPHP Conference.
- Enos, L. (2018). The Role of Ceiling Lifts in Safe Patient Handling and Mobility Programs. *International Journal of Safe Patient Handling and Movement*, 8(1):25-45.
- Enos, L. (2019). A Comprehensive Review of Patient Slings. *International Journal of Safe Patient Handling and Movement*, 9(1):15-36.
- Enos, L. (2022). Sling and Lift Compatibility: A Brief Summary. *Int J SPHM* 12(4):117-119.

Safe Patient Handling and Mobility – Section 5

- Ernstmeyer, K., & Christman, E. (Eds.). (2021). Nursing Fundamentals [Internet]. Eau Claire, WI: Chippewa Valley Technical College. Open Resources for Nursing (Open RN). PMID: 37196137.
<https://pubmed.ncbi.nlm.nih.gov/37196137/>
- Fagerström, V., & Tamminen-Peter, L. (2010). Ergonomics and usability of patient lifts in elderly care. *Hoitotiede*, 22(2), 118–128.
- Fernandes, T. (2007). Suitable moving and handling equipment: A guide. *International Journal of Therapy and Rehabilitation*, 14(4), 187–192.
- Fray, M., & Davis, K. G. (2024). Effectiveness of safe patient handling equipment and techniques: A review of biomechanical studies. *Human Factors*, 66(10), 2283-2322.
- Fray, M., Hignett, S., Reece, A., Ali, S., & Ingram, L. (2019). An evaluation of sit to stand devices for use in rehabilitation. In *Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018) Volume VII: Ergonomics in Design, Design for All, Activity Theories for Work Analysis and Design, Affective Design 20* (pp. 774-783). Springer International Publishing.
- Gabele, D., Mendez, S., & Giuliano, K. K. (2023). Early and progressive mobility in a community hospital: A new interdisciplinary safe patient handling and mobility model. *Nursing Management*, 54(3), 22-27.
- Gallagher, A. (2017). The manual handling revolution: How health professionals can achieve creative solutions for people with disabilities and their caregivers. Risk Managed Australia Pty Ltd.
- Gallagher, S. (2015). A practical guide to bariatric safe patient handling and mobility: Improving safety and quality for the patient of size. Sarasota, FL: Visioning Publishers LLC.
- Garg, A., & Kapellusch, J. M. (2012). Long-term efficacy of an ergonomics program that includes patient-handling devices on reducing musculoskeletal injuries to nursing personnel. *Human factors*, 54(4), 608-625.
- Gibson C. (2015). Choosing a sling for your hoist. National Back Exchange Leaflet 003. January 2015.
- Gibson K, Costa B, Sampson A. (2017). Linking worker health and safety with patient outcomes. WorkSafe Victoria (WSV). The Institute of Safety, Compensation and Recovery Research (ISCRR).
http://www.iscrr.com.au/_data/assets/pdf_file/0006/1321719/Evidence-Review_Linking-worker-health-and-safety-with-patient-outcomes.pdf
- Goh, C. H., Muslimah, Y., Ng, S. C., Subramanian, P., & Tan, M. P. (2014). The use of the self-standing turning transfer device to perform bed-to-chair transfers reduces physical stress among caregivers of older patients in a middle-income developing country. *Frontiers in medicine*, 1, 32.
- Greenhalgh, M., Blaauw, E. R., Crytzer, T., Deepak, N., Grindle, G. G., Koontz, A. M., & Cooper, R. A. (2023). Comparison of trunk mechanics and spatiotemporal outcomes in caregivers using a robotic assisted transfer device and a mobile floor lift. *The Journal of Spinal Cord Medicine*, 46(1), 45-52.
- Gucer, P. W., Gaitens, J., Oliver, J. M., & McDiarmid, M. A. (2013). Sit-stand mechanical lifts in long-term care and resident quality indicators. *Journal of Occupational and Environmental Medicine*, 55(1), 36–44.
- Haglund, K., Kyle, J., & Finkelstein, M. (2010). Pediatric safe patient handling. *Journal of pediatric nursing*, 25(2), 98-107.
- Halbert, J., Pearce, R., Burgess, T., & Zock, R. (2013). Advantages of using ceiling mounted lifts in acute stroke rehabilitation. *Journal of Acute Care Physical Therapy*, 4(2), 73–83.
- Hallmark, B., Mehan, P., & Shores, L. (2015). Ergonomics: safe patient handling and mobility. *Nursing Clinics*, 50(1), 153-166.
- Health and Safety Executive (2012). Getting to grips with hoisting people. Health Services Information Sheet No. 3 (2012) <http://www.hse.gov.uk/pubns/hsis3.pdf>.
- Health and Safety Executive (ND). Moving and handling in health and social care
<https://www.hse.gov.uk/healthservices/moving-handling/moving-handling-equipment.htm>
- Hessels, A. J., Paliwal, M., Weaver, S. H., Siddiqui, D., & Wurmser, T. A. (2019). Impact of patient safety culture on missed nursing care and adverse patient events. *Journal of nursing care quality*, 34(4), 287-294.

Safe Patient Handling and Mobility – Section 5

Hook, M., Dailey, M. S., Singh, M., Schneuker, D., Mitchell, L., Milligan, K., ... & Kelly, L. (2024). Comprehensive Mobility Evaluation Tool (CMET): Confirming validity, reliability, and benefits for guiding nurse-led mobility. *Medsurg Nursing*, 33(6), 277-292.

Houghton, R., Cowdell, F., Fry, D., & Dyson, J. (2024). Implementation and impact of a lifting cushion for care home residents who have fallen. *International Journal of Older People Nursing*, 19(6), e12664.

Howard, N. L., & Adams, D. (2012). In-home care services: an examination of the Washington state workers' compensation claims data, 2012–2016. <https://journals.sagepub.com/doi/abs/10.1177/10848223221076491>

Humrickhouse, R., & Knibbe, H. J. (2016). The Importance of Safe Patient Handling to Create a Culture of Safety: An Evidential Review. *The Ergonomics Open Journal*, 9(1).

Hwang, J., Ari, H., Matoo, M., Chen, J., & Kim, J. H. (2019, November). Effects of patient turning devices on muscular demands of caregivers. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 63, No. 1, pp. 1069-1072). Sage CA: Los Angeles, CA: SAGE Publications

International Organization for Standardization. (2021). ISO 10535:2021(en) Assistive products — Hoists for the transfer of persons — Requirements and test methods. <https://www.iso.org/obp/ui/#iso:std:iso:10535:ed-3:v2:en>

International Organization for Standardization. (2012). ISO/TR 12296:2012 Ergonomics—Manual handling of people in the healthcare sector. Geneva, Switzerland: ISO www.iso.org

Joseph, A., & Fritz, L. (2006). Ceiling lifts reduce patient-handling injuries. *Healthcare Design*, 6(1), 10-13.

Jones, R. A., Merkle, S., Ruvalcaba, L., Ashton, P., Bailey, C., & Lopez, M. (2020). Nurse-led mobility program: driving a culture of early mobilization in medical-surgical nursing. *Journal of nursing care quality*, 35(1), 20-26.

Jung, Y.M. & Bridge, C. (2009). The Effectiveness of Ceiling Hoists in Transferring People with Disabilities. Sydney: Home Modification Information Clearinghouse, University of New South Wales.

<http://www.homemods.info/Download.ashx?File=0dea3ea1221a81c25de3d9714f7c1e>

Kayser, S. A., Wiggermann, N. E., & Kumpar, D. (2020). Factors associated with safe patient handling practice in acute care and its relationship with patient mobilization: A cross-sectional study. *International Journal of Nursing Studies*, 104, 103508.

Kielich, R., Jaworski, T., Boynton, T., & Hopewell, N. (2025, June). Who handles the handling? A look at the need for a full-time dedicated Safe Patient Handling and Mobility Coordinator. *American Nurse Journal*.

<https://www.myamericannurse.com/who-handles-the-handling/>

King, B., Pecanac, K., Krupp, A., Liebrecht, D., & Mahoney, J. (2018). Impact of fall prevention on nurses and care of fall risk patients. *Gerontologist*, 58(2), 331–340.

Kling M & West N (2015). Radiology and safe patient handling. *Am J SPHM* Vol 5(4) 148-153

Knibbe JJ, Knibbe NE, Heitink EBL. (2016). Evaluating different methods of showering and washing patients: assessing ergonomic, time, and quality aspects, *Am J SPHM*, 6,2, 49-64.

Knibbe JJ, Knibbe NE. (2012). Static load in the nursing profession; the silent killer? *Work*;41 Suppl 1:5637-8.

Knibbe N., and Knibbe H. (2007). *Ergonomic Challenges in Home Care*. Presented at the 5th Annual Safe Patient Handling and Movement Conference, March 2007, Tampa, FL.

Koppelaar E, Knibbe HJ, Miedema HS, Burdorf A. (2012). The influence of ergonomic devices on mechanical load during patient handling activities in nursing homes. *Ann Occup Hyg* 56(6): 708-18.

Koppelaar, E., Knibbe, J. J., Miedema, H. S., & Burdorf, A. (2013). The influence of individual and organizational factors on nurses' behavior to use lifting devices in healthcare. *Applied ergonomics*, 44(4), 532-537.

Kotowski SE, Davis KG, Wiggermann N, Williamson R. (2013). Quantification of patient migration in bed: catalyst to improve hospital bed design to reduce shear and friction forces and nurses' injuries. *Human Factors*. 55(1): 36-47.

Kotowski, S. E., Davis, K. G., & Marras, W. S. (2022). Patient handling through moving of the beds and stretchers. *International Journal of Industrial Ergonomics*, 87, 103252.

Kucera, K. L., Schoenfisch, A. L., McIlvaine, J., Becherer, L., James, T., Yeung, Y. L., ... & Lipscomb, H. J. (2019). Factors associated with lift equipment use during patient lifts and transfers by hospital nurses and nursing care assistants: A prospective observational cohort study. *International journal of nursing studies*, 91, 35-46.

Safe Patient Handling and Mobility – Section 5

- Kumble, S., McLaughlin, K. H., Funk, K., Dekany, S., Ludwig, D., Farley, H., ... & JH-AMP Group. (2024). Development of a New Tool to Combine the Promotion of Patient Mobility with Safe Patient Handling Equipment: The Johns Hopkins Safe Patient Handling Mobility (JH-SPHM) Guide. *Workplace Health & Safety*, 72(11), 503-513.
- Lachance, C. C., Korall, A. M., Russell, C. M., Feldman, F., Robinovitch, S. N., & Mackey, D. C. (2016). External hand forces exerted by long-term care staff to push floor-based lifts: effects of flooring system and resident weight. *Human factors*, 58(6), 927-943.
- Larson RE, Murtagh EM, Rice MS. (2018). Forces involved when sliding a patient up in bed. *Work*. 59(3): 439-448.
- Latvala, S., & Masterman, R. (2020). The evolution of the ceiling lift. A glimpse at how a single device has redefined caregiver safety and patient care. *Int J SPHM Vol 10*(3) 91-97.
- Lee, S. J., & Rempel, D. (2020). Comparison of lift use, perceptions, and musculoskeletal symptoms between ceiling lifts and floor-based lifts in patient handling. *Applied Ergonomics*, 82, 102954.
- Lee, S. J., & Lee, J. H. (2017). Safe patient handling behaviors and lift use among hospital nurses: A cross-sectional study. *International journal of nursing studies*, 74, 53-60.
- Lee, S.J., Faucett, J., Gillen, M., Krause, N., Landry, L., 2010. Factors associated with safe patient handling behaviors among critical care nurses. *Am. J. Ind. Med.* 53 (9), 886–897.
- Lininger, M. R., Warren, M., Knecht, J., Verheijde, J., Tyler, B., & Tompkins, J. (2021). Clinical instruments for bedside functional assessment: Convergent validity among the AM-PAC '6-Clicks' and BMAT. *Journal of Clinical Nursing*, 30(13-14), 2048-2056.
- Lloyd JD, Baptiste A. (2006). Friction-reducing devices for lateral patient transfers: a biomechanical evaluation. *AAOHN J.* 54(3):113-119.
- Lloyd, JD, (2010). Biomechanical Evaluation of Pressure Distribution During Extended Use of HoverMatt® Technology; October 26th, 2010.
- Marras, W. S., Knapik, G. G., & Ferguson, S. (2009). Lumbar spine forces during maneuvering of ceiling-based and floor-based patient transfer devices. *Ergonomics*, 52(3), 384–397.
- Massachusetts Nurses Association 2021. Safe Patient Handling and Mobility Toolkit. <https://www.massnurses.org/files/file/SPH-Toolkit.pdf>
- Matz M, Celona J, Martin M, et al. *Patient Handling and Mobility Assessments (PHAMA)*. 2nd ed. The Facility Guidelines Institute; 2019. <https://www.fgiguilines.org/wp-content/uploads/2022/10/Patient-Handling-and-Mobility-Assessments.pdf>
- Mayeda-Letourneau, J. (2014). Safe Patient Handling and Movement: A Literature Review. *Rehabilitation Nursing*, 39, 123–129
- McCoskey KL. (2007). Ergonomics and Patient Handling. *AAOHN Journal*, 2007, 55(11): 454–62.
- McIlvaine J, Anderson J, & Harwood K. (2011). Integrating patient handling equipment into physical therapy activities in a rehabilitation setting: A case series. *Am J SPHM*. 1(3):16-22.
- McLaughlin KH, Friedman M, Hoyer EH, Kudchadkar S, Flanagan E, Klein L, Daley K, Lavezza A, Schechter N, Young D; (2023). JH-AMP Group. The Johns Hopkins Activity and Mobility Promotion Program: A Framework to Increase Activity and Mobility Among Hospitalized Patients. *J Nurs Care Qual.* Apr-Jun 01;38(2):164-170.
- Mechan P, and Wright LR. (2015). A history of safe patient handling and mobility technology. *Am J SPHM*. 5(3):87-103,106-107.
- Mechan, P. (2014). Challenging the myth that it takes too long to use safe patient handling and mobility technology: A task time investigation. *American Journal of Safe Patient Handling & Movement*, 4, 46–51.
- Melillo, C., Rugs, D., Toyinbo, P., Barrett, B., Chavez, M., Cowan, L., ... & Sullivan, S. C. (2022). Reliability and validity of the Veterans Administration Mobility Screening and Solutions Tool. *BMC Health Services Research*, 22(1), 1323. <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-022-08745-1>
- Miller, A., Engst, C., Tate, R. B., & Yassi, A. (2006). Evaluation of the effectiveness of portable ceiling lifts in a new long-term care facility. *Applied Ergonomics*, 37(3), 377–385.
- Monaghan, H. (2018). The role of mobile floor-based lifts in a safe patient handling and mobility program. *Int Journal SPHM*. Volume 8 (2) 91-99

Safe Patient Handling and Mobility – Section 5

- Monaghan, H. (2022). Providing dignified bathing for the bariatric patient – SPHM program integration. *Int Journal SPHM* 12 (Published February 19, 2023).
- Monaghan, H. (2011). Safe Patient Handling Equipment Challenges in Inpatient Psychiatric Units: Design Recommendations and Potential Solutions. Report for VISN 8 VHA.
- Motacki, K., & Motacki, L. M. (2009). Safe patient handling and movement in a pediatric setting. *Pediatric nursing*, 35(4), 221.
- Muir, M., & Archer-Heese, G. (2009). Essentials of a bariatric patient handling program. *OJIN: The Online Journal of Issues in Nursing*, 14(1), 5.
- Muona, A., Vartiainen, P., Karjalainen, P. A., & Räsänen, K. (2022). Forces required in repositioning a patient in bed using regular sheet and slide film. *International Journal of Industrial Ergonomics*, 90, 103302.
- Murray, E., & Monaghan, H. (2012). Safe patient handling & movement: Sling safety. *American Journal of Safe Patient Handling & Movement*, 2(3), S1–S14.
- Nagavarapu, S., Lavender, S. A., & Marras, W. S. (2017). Spine loading during the application and removal of lifting slings: The effects of patient weight, bed height and work method. *Ergonomics*, 60(5), 636–648. [URL]
- National Health Service (NHS). (2015). Patient safety alert: Stage one: Warning. Risk of death and serious harm by falling from hoists. England. <https://www.england.nhs.uk/2015/10/psa-falling-from-hoists/>
- National Institute on Aging. (2020, November 30). Maintaining mobility and preventing disability are key to living independently as we age. <https://www.nia.nih.gov/news/maintaining-mobility-and-preventing-disability-are-key-living-independently-we-age>
- National Pressure Injury Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers/Injuries: Quick Reference Guide. The International Guideline: Fourth Edition. Emily Haesler (Ed.). 2025. <https://internationalguideline.com>
- Nelson K, Mechan P, Cabral N, McDonald T, Cyr L. (2014). Comparative surface analysis of patient care slings and interface pressure and temperature. *Column* 26(2):16-21.
- Nelson, A. Matz M, Chen F, Siddharthan K, Lloyd J, Fragala G (2006). Development and Evaluation of a Multifaceted Ergonomics Program to Prevent Injuries Associated with Patient Handling Tasks. *International Journal of Nursing Studies*, 43(6):717–733.
- Nelson, A., Motacki, M. K., & Menzel, N. N. (2009). *The illustrated guide to safe patient handling and movement*. Springer Publishing Company.
- Nightingale Hammerson, A1 Risk Solutions, & Care England. (2024). Are two people always required for moving and handling? <https://nightingalehammerson.org/wp-content/uploads/2024/10/Single-Handed-Care.pdf>
- Nydahl, P., Jeitziner, M. M., Vater, V., Sivarajah, S., Howroyd, F., McWilliams, D., & Osterbrink, J. (2023). Early mobilisation for prevention and treatment of delirium in critically ill patients: Systematic review and meta-analysis. *Intensive and Critical Care Nursing*, 74, 103334.
- Occupational Safety and Health Agency (OSHA) Guidelines for Nursing Homes: Ergonomics for the Prevention of Musculoskeletal Disorders. OSHA Publication 3182, (2003, Revised March 2009). https://www.osha.gov/sites/default/files/publications/final_nh_guidelines.pdf
- Occupational Health & Safety Agency for Healthcare in BC (2006). A Literature Review: Ceiling Lifts as an Intervention to Reduce the Risk of Patient Handling Injuries. Vancouver, BC. https://switchbc.ca/wp-content/uploads/2024/07/ReportCeilingLiftsasanInterventiontoReducetheRisk_OHSAH-Archive.pdf
- Oregon Live. (2021, October 3). Firefighters say they're swamped by calls for routine care from senior homes, setting off political battle. OregonLive.com. <https://www.oregonlive.com/business/2021/10/firefighters-say-theyre-swamped-by-calls-for-routine-care-from-senior-homes-setting-off-one-sided-political-battle.html>
- Pavon JM, Fish LJ, Colón-Emeric CS, Hall KS, Morey MC, Pastva AM, Hastings SN (2021). Towards "mobility is medicine": Socioecological factors and hospital mobility in older adults. *J Am Geriatr Soc*.69(7):1846-1855. doi: 10.1111/jgs.17109. Epub 2021 Mar 23. PMID: 33755991; PMCID: PMC8273111.
- Perlow, E., Tunney, N., & Lucado, A. (2016). Integrating safe patient handling into physical therapist education: reducing the incidence of physical therapist injury and improving patient outcomes. *Journal of Physical Therapy Education*, 30(2), 32-37.

Safe Patient Handling and Mobility – Section 5

- Pharr, J. R. (2013). Accessible Medical Equipment for Patients with Disabilities in Primary Care Clinics: Why is it Lacking? *Disability and Health Journal*, 6(2), 124-132.
http://digitalscholarship.unlv.edu/env_occ_health_fac_articles/60
- Piccenna, L., Lannin, N. A., Scott, K., Bragge, P., & Gruen, R. (2017). Guidance for community-based caregivers in assisting people with moderate to severe traumatic brain injury with transfers and manual handling: evidence and key stakeholder perspectives. *Health & social care in the community*, 25(2), 458-465.
- Pompeii LA et al. (2009). Musculoskeletal injuries resulting from patient handling tasks among hospital workers. *AmJ Ind Med*, 52(7): p. 571-8
- Poole Wilson T, Davis KG, Kotowski SE, Daraiseh N. (2015). Quantification of patient and equipment handling for nurses through direct observation and subjective perceptions. *Advances in Nursing*. doi.org/10.1155/2015/928538
- Powell-Cope, G., Toyinbo, P., Patel, N., Rugs, D., Elnitsky, C., Hahm, B., ... & Hodgson, M. (2014). Effects of a national safe patient handling program on nursing injury incidence rates. *Journal of Nursing Administration*, 44(10), 525-534.
- Przybysz, L., & Levin, P. F. (2017). Initial Results of an Evidence-Based Safe Patient Handling and Mobility Program to Decrease Hospital Worker Injuries. *Workplace health & safety*, 65(2), 83-88.
- Quatman, C. E., Mondor, M., Halweg, J., & Switzer, J. A. (2018). Ten years of EMS fall calls in a community: an opportunity for injury prevention strategies. *Geriatric orthopaedic surgery & rehabilitation*, 9, 2151459318783453
- Riccoboni, J. B., Monnet, T., Eon, A., Lacouture, P., Gazeau, J. P., & Campone, M. (2021). Biomechanical comparison between manual and motorless device assisted patient handling: sitting to and from standing position. *Applied Ergonomics*, 90, 103284.
- Rice, M. S., Woolley, S. M., & Waters, T. R. (2009). Comparison of required operating forces between floor-based and overhead-mounted patient lifting devices. *Ergonomics*, 52(1), 112-120.
- Rockefeller, K. (2008). Using technology to promote safe patient handling and rehabilitation. *Rehabilitation Nursing*, 33(1), 5–11.
- Risør, B. W., Casper, S. D., Andersen, L. L., & Sørensen, J. (2017). A multi-component patient-handling intervention improves attitudes and behaviors for safe patient handling and reduces aggression experienced by nursing staff: A controlled before-after study. *Applied ergonomics*, 60, 74-82.
- Ronald, L. A., Yassi, A., Spiegel, J., Tate, R. B., Tait, D., & Mozel, M. R. (2002). Effectiveness of installing overhead ceiling lifts: Reducing musculoskeletal injuries in an extended care hospital unit. *AAOHN journal*, 50(3), 120-127.
- Rose., R. (2009). Implementing a Safe Patient Handling Program in the Radiology World. Presentation made at the 2009 Health Care Ergonomics Conference, Portland, OR
- Santaguida et al (2005). Comparison of cumulative low back loads of caregivers when transferring patients using overhead and floor mechanical lifting devices. *Clinical Biomechanics*, 20(9), 906-916.
- Schoenfisch, A. L., Myers, D. J., Pompeii, L. A., & Lipscomb, H. J. (2011). Implementation and adoption of mechanical patient lift equipment in the hospital setting: the importance of organizational and cultural factors. *American journal of industrial medicine*, 54(12), 946-954.
- Siddharthan K., Nelson A., Tiesman, H., & Chen, F. (2006). Cost effectiveness of a multi-faceted program for safe patient handling. *Advances in Patient Safety*, 3, 347-58.
- Silva, T. J., Jerussalmy, C. S., Farfel, J. M., Curiati, J. A., & Jacob-Filho, W. (2009). Predictors of in-hospital mortality among older patients. *Clinics (Sao Paulo)*, 64(7), 613–618.
- Silverwood, S., & Haddock, M. (2006). Reduction of musculoskeletal injuries in intensive care nurses using ceiling-mounted patient lifts. *Dynamics*, 17, 19-21.
- Slaughter, S. E., et al. (2015). Mobility of vulnerable elders study: Effect of the sit-to-stand activity on mobility, function, and quality of life. *JAMDA: Journal of Post Acute and Long-Term Care Medicine*, 16, 138.e1–143.
- Smith, J., Simpson, P., & Fray, M.(Eds) (2023). HOP7: The guide to handling of people. Person-centered practice
<https://backcare.org.uk/hop7m/hop-purchase/>
- Smith, W. R. T. (2017, September 14–15). Bariatric patients need to use the imaging department too [Conference presentation]. 2nd National Bariatric Safe Patient Handling and Mobility (SPHM) Conference, Austin, TX.

Safe Patient Handling and Mobility – Section 5

Stevens, L., Rees, S., Lamb, K. V., & Dalsing, D. (2013). Creating a culture of safety for safe patient handling. *Orthopaedic Nursing*, 32(3), 155-164.

Sturman-Floyd, M. (2011). Reducing the incidence and risk of pressure sores, manual handling loading and carer costs using “in-bed” systems. MSF Manual Handling and Back Care/Norfolk County Council.

<https://www.directhealthcaregroup.com/app/uploads/Sturman-Floyd-2011-Reducing-the-incidence-of-pressure-ulcers-manual-handling-loading-and-carer-costs-using-in-bed-systems.pdf>

Tang, K., Diaz, J., Lui, O., Proulx, L., Galle, E., & Packham, T. (2020). Do active assist transfer devices improve transfer safety for patients and caregivers in hospital and community settings? A scoping review. *Disability and Rehabilitation: Assistive Technology*, 15(6), 614-624.

Tang, R., Holland, M., Milbauer, M., Olson, E., Skora, J., Kapellusch, J. M., & Garg, A. (2018). Biomechanical evaluations of bed-to-wheelchair transfer: Gait belt versus walking belt. *Workplace Health & Safety*, 66(8), 384-392.

Tang, R., Poklar, M., Domke, H., Moore, S., Kapellusch, J., & Garg, A. (2017). Sit-to-stand lift: Effects of lifted height on weight borne and upper extremity strength requirements. *Research in nursing & health*, 40(1), 9-14.

The American Occupational Therapy Association. (2022, July 30). POLICY E.14 Subject: Safe Patient Handling and Mobility. RA Motion 11/21. <https://www.aota.org/-/media/corporate/files/aboutaota/officialdocs/policies/policy-e14-20211115.pdf>

The American Physical Therapy Association. (2019). Physical Therapist and Physical Therapist Assistants in Safe Patient Handling and Mobility. HOD P06-19-24-10. APTA's position statement on safe patient handling and mobility. <https://www.apta.org/apta-and-you/leadership-and-governance/policies/pt-and-pta-safe-patient-handling>

The Joint Commission (2025) Sentinel event data. Annual review 2024.

https://digitalassets.jointcommission.org/api/public/content/eac7511986c0442a9c1ae04b1aa02cc0?v=ad34daa0&_gl=1*1669m3*_gcl_au*MTQ1MTc5NzA1NS4xNzU1NjlxNzEz*_ga*NTc3NjMwODIwLjE3Mjk4NjA2MDUu*_ga_K31T0BHP4T*cze3NTgyOTEwNjQkbzE1NiRnMCR0MTc1ODI5MTA2NCRqNjAkBd

Theou, O., Soon, Z., Filek, S., Brims, M., Leach-Macleod, K., Binsted, G., Jakobi, J. (2011). Changing the sheets: a new system to reduce strain during patient repositioning. *Nurs. Res.* 60, 302–308.

Thomas, D.R., Thomas, Y.L. (2014). Interventions to reduce injuries when transferring patients: a critical appraisal of reviews and a realist synthesis. *Int. J. Nurs. Stud.* 51, 1381e1394.

Thomas-Olson, L., Gee, M., Harrison, D., & Helal, N. (2015). Evaluating the use of ceiling lifts in the operating room/Evaluation de l'utilisation de leve-personnes fixes au plafond en salle d'operation. *ORNAC journal*, 33(1), 13-22.

Tiesman, H. M., Nelson, A. L., Charney, W., Siddharthan, K., & Fragala, G. (2003). Effectiveness of a ceiling-mounted patient lift system in reducing occupational injuries in long term care. *Journal of Healthcare Safety*, 1(1), 34-40.

Turner, R., Agarwal, N., Agarwal, S., Best, L., & Noble, J. (2021). Bringing life to a systemwide early mobility clinical practice: Part 2. *International Journal of Safe Patient Handling and Mobility*, 11(1), 190–198.

Turner, R., Agarwal, N., Agarwal, S., & Best, L. (2021). Bringing life to a systemwide early mobility clinical practice: Part 1. *International Journal of Safe Patient Handling and Mobility*, 10(4), 126–133.

Twenter, P. (2025, September 19). 11 most common sentinel events in 2024: Joint Commission. Becker Review.

https://www.beckershospitalreview.com/quality/patient-safety-outcomes/11-most-common-sentinel-events-in-2024-joint-commission/#:~:text=The%2011%20most%20frequently%20reported%20sentinel%20events,3%25%20*%20Severe%20maternal%20morbidity%20%E2%80%94%202%25

U.S. Department of Health and Human Services, Food and Drug Administration. (2018, August 22). Patient lifts. General Hospital Devices and Supplies. <https://www.fda.gov/medical-devices/general-hospital-devices-and-supplies/patient-lifts>

U.S. Department of Health and Human Services, Food and Drug Administration. (2014). Patient lifts safety guide. Kwikpoint@ <https://www.fda.gov/media/88149/download>

U.S. Department of Justice, Civil Rights Division. (2020, June 26). Access to medical care for individuals with mobility disabilities. <https://www.ada.gov/resources/medical-care-mobility/>

U.S. Department of Justice, Civil Rights Division, & Department of Health and Human Services, Office for Civil Rights. (2010). Americans with Disabilities (ADA) access to medical care for individuals with mobility disabilities—Use of

Safe Patient Handling and Mobility – Section 5

SPH equipment in clinics.

<https://www.hhs.gov/sites/default/files/ocr/civilrights/understanding/disability/adamobilityimpairmentsguidance.pdf>

U.S. Department of Veterans Affairs. (2021, August 1). Safe Patient Handling and Mobility Design Criteria.

<https://www.publichealth.va.gov/employeehealth/patient-handling/>

U.S. Department of Veterans Affairs, Center for Engineering & Occupational Safety and Health (CEOSH). (2015, rev. 2025). Bariatric safe patient handling and mobility guidebook: A resource guide for care of persons of size.

<https://www.asphp.org/wp-content/uploads/2011/05/Baraiatrice-SPHM-guidebook-care-of-Person-of-Size.pdf>

U.S. Department of Veterans Affairs, Center for Engineering & Occupational Safety and Health (CEOSH). (Jan 2016). Safe Patient Handling and Mobility Guidebook. St. Louis, Missouri.

https://www.stryker.com/content/dam/stryker/education-and-training/focusrn/resources/caregiver-safety/implementation-tools/VA%20SPHM_PDF.pdf

U.S. Department of Veterans Affairs, Veteran's Health Administration. Safe patient handling and mobility (SPHM) solutions everywhere for everyone. <https://www.publichealth.va.gov/docs/employeehealth/SPHM-Solutions-Everywhere-for-Everyone.pdf>

Van Dyck E, et al. The comparative effects of hoist sling fabrics on gluteal interface pressure in healthy individuals. *Am J SPHM*. 2016;6(1):25-32.

van Dijk-Huisman, H. C., Raeven-Eijkenboom, P. H., Magdelijns, F. J., Sieben, J. M., de Bie, R. A., & Lenssen, A. F. (2022). Barriers and enablers to physical activity behaviour in older adults during hospital stay: a qualitative study guided by the theoretical domains framework. *BMC geriatrics*, 22(1), 314.

Venema DM, Skinner AM, Nailon R, Conley D, High R, Jones KJ. (2019). Patient and system factors associated with unassisted and injurious falls in hospitals: An observational study. *BMC Geriatr*. 19(1):348

Vieira, E.R. & Miller, L. (2008). Facing the challenge of patient transfers: Using ceiling lifts in healthcare facilities. *Health Environments Research & Design Journal*, 2(1), 6-16.

Vinstrup, J., Jakobsen, M. D., Madeleine, P., & Andersen, L. L. (2020). Biomechanical load during patient transfer with assistive devices: Cross-sectional study. *Ergonomics*, 63(9), 1164-1174.

Vollman, K. M. (2010). Introduction to progressive mobility. *Critical care nurse*, 30(2), S3-S5.

Vollman, K. M., Correll-Yoder, N., & Giuliano, K. K. (2024). Early and progressive mobility in the ICU: A balanced approach to improve outcomes for both patients and staff. *Journal of Nursing Care Quality*, 39(1), 7–9.

Washington Post. (2024, May 3). Senior homes refuse to pick up fallen residents, dial 911. 'Why are they calling us?' The Washington Post. <https://www.washingtonpost.com/business/2024/05/03/assisted-living-homes-senior-falls-911/>

Waters, T. R., Dick, R., Lowe, B., Werren, D., & Parsons, K. (2012). Ergonomic assessment of floor-based and overhead lifts. *American Journal of Safe Patient Handling & Movement*, 2(4), 119-133.

Webb, J., Twiste, M., Walton, L. A., & Hogg, P. (2018). The impact of hoist sling fabrics on interface pressure whilst sitting in healthy volunteers and wheelchair users: A comparative study. *Journal of tissue viability*, 27(2), 90-94.

Weinel, D. (2008). Successful Implementation of Ceiling-Mounted Lift Systems. *Rehabilitation Nursing*, 33(2), 63-66.

Weiner, C., Kalichman, L., Ribak, J., & Alperovitch-Najenson, D. (2017). Repositioning a passive patient in bed: Choosing an ergonomically advantageous assistive device. *Applied ergonomics*, 60, 22-29.

Weston, E. B., Khan, S. N., & Marras, W. S. (2017). Wheelchair pushing and turning: lumbar spine and shoulder loads and recommended limits. *Ergonomics*, 60(12), 1754-1765.

Wiggermann, N. (2017). Effect of a powered drive on pushing and pulling forces when transporting bariatric hospital beds. *Applied Ergonomics*, 58, 59-65.

Wiggermann, N., Francis, R., & Solomon, A. (2024). Individual and organizational factors associated with injury history and patient handling behaviors: Results from a nationwide survey of healthcare workers. *Applied Ergonomics*, 118, 104251.

Wiggermann, N., Zhou, J., and McGann, N. (2021). Effect of repositioning aids and patient weight on biomechanical stresses when repositioning patients in bed. *Human Factors*, 63(4), 565-577.

Safe Patient Handling and Mobility – Section 5

Wyatt, S., Meacci, K., & Arnold, M. (2020). Integrating safe patient handling and early mobility: Combining quality initiatives. *Journal of Nursing Care Quality*, 35(2), 130–134.

Xu, J., Wang, S., Zhang, Q., Yao, Y., & Yu, J. (2025). Effectiveness of nurse-led early mobility protocols on the outcomes of critical care patients: A systematic review and meta-analysis. *Nurs Open*, 12(5), e70206.

Yassi, A., (2008). Development and evaluation of models for a home care ceiling lift program in BC. Worksafe BC/College of Interdisciplinary Studies, University of British Columbia.

Yeung, Y. (2015). Increase access to healthcare services with safe patient handling and mobility equipment. *American Journal of Safe Patient Handling & Mobility*, 5(4), 104–147.

Safe Patient Handling and Mobility Education and Training

Contents

Safe Patient Handling and Mobility Education and Training.....	1
Introduction	1
Elements of Effective SPHM Education and Training Programs – The Evidence Base	3
Elements of Effective SPHM Education and Training Programs – A Summary	6
Developing an SPHM Training Program	8
Introduction	8
Steps to Developing a SPHM Training Program.....	8
<i>Figure 6.1 SPHM Education & Training Development Cycle</i>	8
1. Meet with Leadership	9
2. Conduct a Training Program Needs Assessment.....	10
Who needs to be trained?	10
What are the overall SPHM training objectives and specific competencies needed by each stakeholder group and how they will be measured?.....	10
<i>Table 6.1 Summary SPHM Training Needs by Stakeholder Group.</i>	12
Identifying competencies required by caregivers who will use SPHM technology	12
<i>Table 6.2 Defining Knowledge, Skills, and Abilities (KSAs)</i>	14
<i>Table 6.3 Hierarchical Task Analysis (HTA)</i>	16
Developing SPHM training objectives.....	16
<i>Table 6.4 The Stages of Proficiency as Related to the Development of SPHM Skills and Abilities.</i>	19
Assessing competency	20
<i>Table 6.5 Methods to Verify Competence.</i>	22
3. Develop the SPHM Training Plan.....	22
How will training be delivered?	22
Online learning/computer-based training (CBT)/E-learning module	22
Simulation and experiential learning	23
Virtual Reality and Augmented Reality technologies and SPHM Training	24
Who will conduct the training?	25
How long should a SPHM training class be?.....	29
When and how often is SPHM training required?	30
Where should SPHM training be conducted?	31
4. Secure Leadership Approval of the SPHM Training Plan	31
5. Design the SPHM Training Curriculum and Materials	32
<i>Table 6.6 Example of Core Components of SPHM Training for Caregivers.</i>	34
Making SPHM training meaningful.....	35
6. Implement the SPHM Training Plan.....	36
Do you need to pilot the training?	36

Safe Patient Handling and Mobility – Section 6

General logistics of implementing an SPHM training plan	36
How will training be scheduled and communicated to stakeholders?	37
What documentation and recordkeeping should be completed?	38
7. Evaluate the SPHM Training program.....	39
Sustaining SPHM Training Competencies or 'Making Training Stick'	40
Maintaining competency and safety in a unit or department where SPHM technology is used occasionally	41
Section Summary	42
Appendix A Creating Learning Objectives for SPHM Training.....	43
Appendix B Learning Style.....	45
Appendix C Principles of Adult Education.....	48
Appendix D Characteristics of Sound Training Programs – OSHA.....	50
References and Resources Used in this Section	51

Safe Patient Handling and Mobility Education and Training

Introduction

As discussed in **Section 4**, an effective SPHM education and training program is an essential component of a successful SPHM program.

Caregivers must know when and how to use SPHM technology safely along with ergonomic work practices to reduce the risk of injury to themselves and their patients when performing lifting and mobilization tasks. Refer to *'Why is SPHM Education and Training so Important?'* below.

Training also supports professional growth by developing caregiver knowledge and skills and encourages them to take personal responsibility for safety in the workplace (ACC, 2012; Smith, 2013).

However, as discussed in **Section 1**, training alone is *not effective* in addressing risks for work-related musculoskeletal disorders (WMSDs) or workplace hazards in general. SPHM education and training programs are only effective if integrated into a comprehensive SPHM program.

Training as part of a comprehensive SPHM program helps employers meet OSHA requirements to address known hazards in the workplace (per the General Duty clause) and to meet requirements of state SPHM laws if applicable. SPHM training is a core standard in the American Nurses Association (ANA) *Safe Patient Handling and Mobility: Interprofessional National Standards* i.e., Standard 5 which states that 'A system for education, training, and maintaining competence is established' (ANA, 2021).

However, training programs that are poorly designed and delivered and fail to facilitate transfer of knowledge and skills to the workplace, can lead to loss of financial and human resource investment, user error, loss of efficiency and harm to caregivers and their patients (Casey et al., 2021).

This Section outlines an approach to designing, delivering, and evaluating effective SPHM education and training programs, based on published research, established best practices, and this author's experience in providing ergonomics and SPHM training to both health care and non-health care workers over the past 30 years.

Detailed discussion about effective education and training of adults is beyond the scope of this toolkit so links to additional resources are provided throughout this Section.

Tools that Support Content in this Section

6a. Education and training plan

6b. Training budget plan

6c. Sample SPHM competencies

Why is SPHM Education and Training So Important?

As reviewed in **Section 5**, in the US, most SPHM technology is classified and regulated as either Class 1 or 2 medical devices by the Food and Drug Administration (FDA).

Caregivers are required to receive appropriate training, including demonstrating competency in the safe use of medical devices such as intravenous pumps, before using them to ensure patient safety.

Why is SPHM Education and Training So Important?

SPHM education and training should be viewed and supported with equal importance to reduce the risk of harm to patients when being lifted and mobilized with SPHM technology.

A review of adverse events from 2004–2015 reported to the FDA and documented in the Manufacturer and User Facility Device Experience Database (MAUDE), indicated that insufficient *training and competency* in use of patient lift technology appeared to be a leading cause of adverse events (AASPHM, 2016).

Themes related to inadequate training included the following:

- Lack of sling inspection prior to use
- Incorrect sling size used
- Incorrect application of slings on patients and consideration of patients' specific clinical needs
- Not adjusting slings for stability prior to transfer
- Choice of sling that was incompatible with a lift hanger bar
- Incorrect attachment of slings to lift hanger bars
- Lack of patient assessment and resulting incorrect choice of equipment for the patient handling task
- Floor based lifts tipping over
- Users not knowing how to operate the emergency stop or lower controls on lifts
- Using lift equipment that is broken

A review of medical device related adverse reports from Canada and the United Kingdom, found similar themes related to lack of or poor quality of training (AASPHM 2016, Perez et al., 2012).

Refer to **Section 5** for more information about patient lifts and slings compatibility and safety.

Elements of Effective SPHM Education and Training Programs – The Evidence Base

Evidence-based recommendations about what should be included in SPHM education and training programs, how and when to deliver the content, and the effectiveness of these programs varies. This is because SPHM programs must be customized based on a healthcare organization's patient population, handling and mobility tasks performed, SPHM technology used, the physical work environment, budget, and available training resources.

Thus, determining the design of delivery methods for training programs to support effective SPHM programs can be complex. There is not a universal approach to SPHM training or standardized method for teaching SPHM and ensuring caregiver competency in SPHM technology and practices (Perez et al., 2012; Thomas & Thomas, 2014).

As discussed in **Section 1**, over 30 years of research and reviews of training interventions to reduce the risk of WMSDs have concluded that:

1. Body mechanics training by itself does not prevent or reduce back pain and other WMSDs associated with manual patient handling (Martimo, et al., 2008; Matz et al., 2019; Warming et al., 2008).

Evidence-based body mechanics training is important in an SPHM program, but only in the context of teaching caregivers to use SPHM technology using neutral postures and minimizing loads on their musculoskeletal system. For example, raising the bed to a safe work height, and not reaching past mid-line of the patient or bed when placing a lift sling on a patient to minimize excessive bending and reaching. *Refer to Section 5 for more information on ergonomics best work practices.*

2. Training on SPHM principles and how to use SPHM technology is not effective in reducing injuries unless as part of a multifaceted SPHM program (Alamgir, H., et al., 2011; Hignett and Crumpton 2007; Kanaskie & Synder, 2018; Krill, et al., 2012; Martimo et al., 2008; Richardson et al., 2018; Stevens et al, 2013; Warming et al, 2008).

SPHM training alone does not guarantee that caregivers will use SPHM technology and ergonomics work practices i.e., successful transfer to practice (Hignett & Crumpton, 2007; Clarke 2013).

To be effective SPHM training should take place within an SPHM program that is supported by:

- Leadership including unit/department managers i.e., leaders foster a culture of safety for caregivers and patients that creates a safe environment that enables learning with a non-punitive approach
- Peers including other health care providers such as physical therapists and physicians
- Engagement of caregivers as part of the effort to prepare them for the change in practice required
- Well-designed policies and procedures
- Ongoing budget allocations for the purchase of equipment and training together with easy accessibility to appropriate SPHM technology

Safe Patient Handling and Mobility – Section 6

- Worksite coaching and mentoring support from SPHM champions or peer leaders to facilitate the transfer of training from classroom to the workplace

Refer to **Section 1** more information about the Element of Successful SPHM programs.

A limited number of studies have evaluated specific SPHM training methods and their outcomes. Some of these studies have included detailed descriptions of the intervention's key features such as details of the training provided e.g., duration of training, hands-on training involving trainee practice etc (Thomas & Thomas, 2014).

A three-year longitudinal study identified three aspects of training that were *significantly* related to decreased incidence of WMSDs. These aspects are competency assessment, peer leader training, and incorporation of SPHM into new employee orientation (Powell-Cope et al., 2014).

Wiggerman et al., found that 'annual training, particularly hands on training, increased the likelihood of reporting SPHM equipment use' (Wiggerman et al., 2024).

Training caregivers in the use of SPHM technology *only* during SPHM program implementation or new hire orientation, does not ensure that SPHM technology will always be used correctly over time.

Evidence suggests that periodic SPHM training together with ongoing reinforcement and support at the workplace such as the use of unit-based champions or peer leaders, is necessary for skills acquired during SPHM training to be retained and for the use of SPHM technology to become habitual and a standard practice in patient care (Nelson & Baptiste, 2006; Daily, 2014; Stevens et al., 2013; Lee et al., 2018; Thomas & Thomas, 2014; Theis & Finkelstein, 2014).

Interprofessional peer-led training can enhance knowledge, skills, teamwork, communication, and collaboration among disciplines, which is crucial for improving patient outcomes (ASPHP, 2023).

This approach to training can promote collaborative behaviors between professionals such as nursing and therapists that assist patients to achieve mobilization goals using SPHM while reducing injury risk to caregivers (Hernandez et al., 2021; Mink et al., 2021; Oosterom et al., 2019).

Theis and Finkelstein estimated a 'cost benefit of \$3.71 for every dollar invested in retraining when estimating the impact of ongoing SPHM training in maintaining a reduction in staff injuries' (Theis and Finkelstein, 2014).

Periodic retraining or refresher training is also necessary so that caregivers can stay up to date with changes in SPHM best practices and within the SPHM program as it matures to meet changing health care delivery needs e.g., a changing patient population and/or services provided.

Defining Education and Training

The terms '*education and training*' are often used interchangeably, but there are differences between the two.

Education is defined as “the knowledge and development resulting from the process of being educated” (Merriam-Webster, ND).

Training is the process of learning the skills that you need for a particular job or activity (Cambridge Dictionary, ND).

In the context of this Toolkit, SPHM education and training applies to all activities that provide the knowledge and skills that are needed by stakeholders who are involved with or impacted by the SPHM program (as defined when developing your *Communications Plan Tool 4d* and *Education Plan Tool 6a*).

SPHM education and training should be stratified to meet the varied needs of each stakeholder group. 'One size doesn't fit all.'

SPHM education and training requires stakeholders to understand:

- Why is a SPHM program needed
- SPHM program and policy information relevant to their work environment and practice (i.e., knowledge)
- The specific skills needed to perform job tasks related to their role in the SPHM program e.g.,
 - Caregivers who will use SPHM technology need to know how to assess a patient's lifting and mobilization needs and to safely operate technology such as powered lifts.
 - EVS staff/housekeepers must know how to clean SPHM technology.
 - Facilities maintenance staff should know how to maintain and repair SPHM technology.

A SPHM education and training program should provide knowledge and skills that enable critical thinking that is essential for problem-based learning and competency.

If designed and implemented well, the SPHM education and training program should enable caregivers to achieve a desired level of competence when using SPHM technology and protocols etc.

Achieving and assessing competency in SPHM is discussed later in this Section.

Elements of Effective SPHM Education and Training Programs – A Summary

The ANA American Nurses Association (ANA) *Safe Patient Handling and Mobility: Interprofessional National Standards* Standard 5. 'Establish a System for Education, Training, and Maintaining Competence' outlines the core elements of an effective SPHM education and training program.

Note: The Safe Patient Handling and Mobility Education and Training program will be referred to as 'SPHM training' for the remainder of this section.

The following elements of an effective SPHM training program are adapted from the ANA SPHM standards, other published SPHM program guidelines, and literature (ACC, 2012; Clarke 2013; Daily 2014; Skoglund-Öhman 2011; Smith et al., 2023).

They provide the framework for SPHM education and training programs, aiming to facilitate the contents of a well-designed and delivered program to ensure effective transfer of training to practice settings.

SPHM training is:

1. Provided to all stakeholders who will be impacted by the SPHM program e.g., (Refer to **Tool 6a**)
 - Senior management/leaders
 - Unit/department directors and managers/supervisors
 - SPHM project coordinator
 - SPHM committee (other worker and patient safety committees as applicable)
 - SPHM instructors/trainers
 - All employees who perform patient handling tasks and will use SPHM technology and processes
 - SPHM unit champions or peer coaches
 - Lift teams if applicable
 - Physicians/hospitalists/nurse practitioners/physician assistants etc.
 - Employees in other professional services e.g., respiratory therapy, wound and ostomy, infection control, patient care coordinators, risk management, employee health, human resources etc.
 - Ancillary support workers such as, linen services, environmental services, facilities maintenance
 - Purchasing groups
 - Design and construction/architects/interior designers
 - Community health providers such as emergency medical technicians and paramedics; case managers/social workers, and community providers etc., who are involved in patient admission and discharge/placement in the community
 - Vendor partners
 - Students and schools of education
 - Patients and their families

Safe Patient Handling and Mobility – Section 6

2. Customized to the care setting (patient population, care tasks, physical setting, etc) and role of a stakeholder within the SPHM program e.g., nurses and nursing aides, rehab professionals, support service workers etc.
3. Based on injury risk/needs assessment and the specific SPHM technology that will be available to caregivers in their specific work area.
4. Designed and delivered to be person-centered, both for the patient being moved and for each trainee.
5. Designed and delivered to meet the needs of adult learners across diverse cultural, linguistic, clinical, and non-clinical backgrounds, and considering their experience levels with SPHM technology and practices (from novice to expert). *Refer to Appendices A-D.*
6. Developed with clear, measurable goals that address the needs of each stakeholder group. *Refer to 'Developing an SPHM Training Program' on page 6-8.*
7. Interactive and includes the same types of SPHM technology that caregivers will use when providing patient care. Simulation or point-of-care training is preferred.
8. Designed and delivered so that caregivers will *demonstrate* competence in problem solving skills to determine the most appropriate SPHM techniques to use and safe use of SPHM technology and best work practices.
9. Provided:
 - At orientation upon hire or when transferring to a new unit or department or job task (if SPHM technology and skills needed are different to those learned on a prior unit/department)
 - Annually
 - When new competencies/work practices or technology solutions are introduced
 - As requested by a caregiver(s)
 - As a non-punitive corrective action following patient handling-related near miss occurrences, and incidents that occur with or without injury to a caregiver
10. Conducted during scheduled work hours (all shifts) and with sufficient staffing coverage to facilitate caregiver participation in training.
11. Conducted *immediately* prior to having access to SPHM technology so that loss of confidence and competency by new users of SPHM technology is minimized.
12. Supported by worksite coaching and access to job aids etc., which facilitate the transfer of training, including competency and efficiency in using SPHM problem-solving skills and technology.
13. Measured and monitored for effectiveness and adapted/improved as needed on an ongoing basis.
14. Customized and provided to patients and their families.

Lastly, if perceived as enjoyable, caregivers should view SPHM training as a valued part of their job role rather than a chore to merely fulfill a duty of employment.

It is the responsibility of caregivers to actively participate in SPHM training to maintain competence and to serve as a role model for safe behavior.

Developing an SPHM Training Program

Introduction

As with any comprehensive patient or employee safety program, planning and maintaining an SPHM training program can be complex and time consuming and require ongoing commitment by leadership and all stakeholders at all levels of the organization (Lee, 2018; Monaghan, 2019).

Using a team approach to develop the SPHM training program will facilitate the identification, development, implementation, and evaluation of training objectives and content. This team should include the SPHM program coordinator/manager and the SPHM committee, senior leaders and the managers, and unit champions or peer leaders of units/departments where SPHM is to be implemented. Additionally, partnering with your clinical education department and your SPHM technology vendors early in the training development process can help the SPHM coordinator and committee to facilitate program development and implementation.

Working with a clinical educator who is experienced at developing and delivering training at your facility will help determine a program that is compatible with the organization's training processes and budgetary practices. Request assistance from Information Technology (IT) for computer-based SPHM education, as well as for online training registration, attendance tracking, and report development.

A draft *SPHM Education and Training plan* (**Tool 6a**) was completed during development of the SPHM program plan (**Refer to Section 4**). The SPHM training plan cannot be finalized until SPHM technology is selected, at which point specific caregiver competencies and procedures can be determined.

Section 10 provides more SPHM training resources, in addition to the tools and information provided in this Section.

Steps to Developing a SPHM Training Program

Addressing SPHM training needs within an SPHM program should be an ongoing improvement process.

Figure 6.1 shows the cycle of steps for developing, implementing, and evaluating an SPHM training program. The dotted lines represent alternative sequences after evaluating the initial SPHM training. It may not always be necessary to seek leadership approval or conduct a needs assessment when updating the training plan.



Figure 6.1 SPHM Education & Training Development Cycle.

Summary of the Steps and Key Questions to Consider when Developing a SPHM Training Program

Each of the following steps is discussed in the remainder of this Section.

- 1. Meet with leadership to secure initial commitment for the training program**
- 2. Conduct an SPHM training program needs assessment**
 - Who needs to be trained?
 - What are the overall SPHM training objectives and specific competencies needed by each stakeholder group and how they will be measured?
- 3. Develop the SPHM training plan**
 - How will SPHM training be delivered?
 - Who will conduct the SPHM training?
 - How long should a SPHM training class be?
 - When and how often is SPHM training needed?
 - Where should SPHM training be conducted?
- 4. Secure leadership approval of the SPHM training plan**
- 5. Design the SPHM training curriculum and materials**
- 6. Implement the SPHM Training Plan**
 - Do you need to pilot the SPHM training?
 - How will SPHM training be scheduled and communicated to stakeholders?
 - What documentation and recordkeeping should be completed?
- 7. Evaluate the SPHM Training program**

1. Meet with Leadership

Discuss potential SPHM training needs with leadership and secure initial commitment for the training program *before* assessing SPHM training needs and developing a plan and budget.

You may have already discussed potential training needs when presenting the draft SPHM program plan to leadership (**Section 4**) and have some idea of any budgetary and resource limitations that exist.

Leadership must understand how initial and *ongoing* investment in SPHM education and training is critical to success of the program and plays a role in promoting a culture of safety.(Enos et al., 2016; Gallagher et al., 2018).

Safe Patient Handling and Mobility – Section 6

Discuss and obtain approval for the process that will be used to develop the SPHM training plan and budget. The plan, resource and budgetary needs will be presented to leadership for approval *prior* to detailed development and delivery of training curriculum.

It is important to understand leadership's expectations and budgetary constraints, including limits on in-person training duration, which affect SPHM education and training delivery.

Understand the expected cost-justification level when requesting budget and resources for the SPHM training program. Determine if a detailed line-item cost estimate is necessary or if a broader estimate for a specific number of classes is acceptable (Enos et al., 2016; Smith, 2013).

SPHM training programs often require cost-justification as part of the overall SPHM program budget plan at the start of the program and subsequently on an annual basis.

Tool 6b provides an example of budgetary costs and resources required to implement and evaluate the SPHM training program.

2. Conduct a Training Program Needs Assessment

Developing and cost-justifying an effective SPHM training program requires clearly defining the gaps between current and desired performance, skills, and knowledge of the stakeholders within the SPHM program. **Tool 6a** offers a sample SPHM Education and Training Plan can be used as template when developing your plan. It provides a list of SPHM stakeholders with examples of typical SPHM training content required for each stakeholder group.

Who needs to be trained?

Use your SPHM Communications plan (**Refer to Section 4**) and **Tool 6a** to assist you identify groups of stakeholders who should receive SPHM education and training.

What are the overall SPHM training objectives and specific competencies needed by each stakeholder group and how they will be measured?

Determine the scope of SPHM training needed for each stakeholder group identified. A summary of training needs for each stakeholder group is listed in **Table 6.1**. (**Refer to Tool 6a for details**)

Defining training objectives and competencies for stakeholders who will *not* use SPHM technology for patient handling require less detailed assessment than those for caregivers who do.

Information gathered from hazard identification activities, policy development, and vendor requirements for SPHM technology maintenance, and foundational information about SPHM, can be used to create training content for stakeholders who are not directly involved in using SPHM technology.

Summary of SPHM Training Needs by Stakeholder Group

- **Senior management/leaders** play a critical role in supporting a culture of SPHM and providing ongoing resources to support the SPHM program. They need to understand the cost-benefits of the program as related to employee and patient safety and how the program contributes to the organization's mission, patient safety, and business goals.
- **Nurse managers and other unit/department managers and supervisors** play a critical role in supporting a culture of SPHM within their unit and understand how an organization's care delivery goals need to be met. Managers need to understand the significant role they play in program success and how SPHM can positively impact them, their staff, and patients, together with knowledge of the SPHM technology on their unit, and SPHM policy and relevant protocols.
- **Caregivers involved in lifting and mobilizing patients** such as nurses, nursing aides, physical and occupational therapists, radiology technicians, lift teams, must understand and be able to apply the fundamental principles of SPHM. This includes the safe use of the available SPHM technology and best work practices that are customized to the patient handling tasks they perform.
- **SPHM program coordinators, instructors, peer leaders, champions, and clinical experts** require not only basic SPHM training for caregivers, but also instruction in effective adult teaching methods, staff behavior change strategies, and updates on patient handling techniques and technology to effectively guide caregivers.
- **Medical staff** should be trained so they understand how SPHM can be used to facilitate improved patient care and outcomes such as, the use of SPHM technology to promote safe, early mobility, or for safe proning of ventilated patients. They may also lead efforts to mobilize a patient, so they must know how to protect themselves and others from harm
- **Emergency medical technicians and paramedics** must know SPHM technology and protocols for patient transfers to and from a health care facility.
- **Employees who assist with admissions** and finding beds for patients within a hospital will need to know where to best place patients who need SPHM assistance e.g., non-mobile patients of size are placed in a room with a ceiling lift that accommodates the patient's weight and is located on a unit where staff are trained to care for this patient population.
- **Employees who assist discharge/placement** of patients in the community may need to explain and reassure patients and their families about the benefits of SPHM and how to facilitate use of SPHM technology in community settings.
- **Other professional services and support employees** need to understand how SPHM program activities are related to their work and their role within the SPHM program e.g., environmental services/housekeeping, linen services/logistics, clinical technology, and facilities maintenance.
- **Patients and their families** receive education about why and what SPHM technology and protocols may be used to mobilize them during their stay.

Summary of SPHM Training Needs by Stakeholder Group

- **Students and schools of education** need to know about SPHM technology and protocols that students and faculty may be exposed to during clinical rotations and their involvement in using them. It may be feasible to partner with a school to provide more in-depth SPHM training to students prior to their clinical rotation such as hands-on use of SPHM technology and patient mobility assessment.
- **Purchasing groups and facility design and construction groups/architects** need to understand the importance of partnering with an organization's SPHM program manager or coordinator and committee when considering purchase of SPHM technology and when integrating SPHM into facility renovation and new building.
- **Vendor partners** need to understand an organization's SPHM policy and procedures.

(ACC, 2012; Matz, 2019; Monaghan, 2011)

Table 6.1 Summary SPHM Training Needs by Stakeholder Group.

Identifying competencies required by caregivers who will use SPHM technology

SPHM training needs assessment includes evaluation of patient handling tasks and identifying the necessary knowledge, skills, and abilities (KSAs) caregivers need to use SPHM technology and work practices. Refer to **Table 6.2** for more information about KSAs.

Determining KSAs required allows you to:

- Identify competencies that caregivers need to safely perform SPHM tasks and to develop specific, measurable actions that demonstrate the achievement of those competencies (i.e., the behavioral training objectives)
- Determine training content and delivery methods that will enable caregivers to attain the required competencies, and
- Facilitate evaluation of the transfer of training from the classroom to the work environment where patient handling tasks are being performed

For example, developing *skills-based* content requires that specific protocols be defined for each lifting and mobilization task that will be performed using SPHM technology.

These include defining:

- How SPHM technology will be used to complete patient handling and mobility tasks
- What psychomotor skills are needed to safely perform each task
- What problem-solving skills i.e., critical thinking, decision-making, communication skills, etc., are needed to safely perform each task
- Ergonomics and safety-related best practices required to reduce biomechanical risk factors and ensure caregiver and patient safety, and optimize efficiency when using SPHM technology

Defining Knowledge, Skills, and Abilities (KSAs)

Knowledge, Skills, and Abilities (KSAs), or competencies, are the attributes required to perform a job task(s) or to effectively perform duties of a specific job.

Knowledge refers to the factual and procedural information a person acquires through educational experience, which, if applied, makes adequate job performance possible.

Knowledge is the theoretical or practical understanding of a conceptual subject. It consists of concepts as well as the understanding and application of information. Knowledge is the foundation on which abilities and skills are built. It can be obtained from reading reference materials, attending a training class, or direct experience.

However, possession of knowledge does not ensure that it will be used for example:

- A nurse may understand what an SPHM mobility assessment is, when to perform an assessment, and the steps required to complete the assessment, but have no experience applying it prior to mobilizing a patient.
- A nursing aide may have knowledge of when to use and how to use powered floor lift from a training video but lack hands-on experience with it.

Skills refer to the capability to perform job tasks with a required level of proficiency and competence needed.

Skill is the result of repeatedly applying knowledge or ability, i.e., a learned behavior. Knowledge is a prerequisite to achieving a skill(s) i.e., you must have knowledge about a task before you attempt to perform it.

Most skills refer to psychomotor type activities required to meet the performance standard needed to complete a job task (s). Thus, they can be observed and measured to determine quantity (e.g., time) and quality (e.g., precision) of performance.

Skills can fall into different categories such as technical skills, interpersonal communication, organizational skills, analytical skills, and presentation skills. Skills can be further developed through training and/or hands-on experience. An example of technical and analytical skills is:

- A nurse who can determine when to use a powered floor lift with sling to transfer a dependent patient, can choose the correct sling for the patient and task and is able to use the lift to perform the transfer safely.

Ability usually refers to cognitive and/or physical capabilities necessary to perform an observable activity such as a specific job task or function. It is also defined as demonstrable capacity to apply several knowledge and skills simultaneously to complete a task or perform an observable behavior. Abilities may also relate to personal and social attributes such as talent and emotional intelligence which tend to be innate or acquired without formal instructions.

A skill is a *learned behavior* that can be taught, tested, and measured; however, abilities are a broad term for human capacity that are harder to teach, test, or measure. For example, the ability to use

Defining Knowledge, Skills, and Abilities (KSAs)

critical thinking and problem solving when assessing and determining how best to handle or mobilize a patient with a complex medical diagnosis such as safely proning a patient on extracorporeal membrane oxygenation (ECMO) using SPHM technology.

(Enos et al., 2016; Goldstein, 1993; Marzano, 2010).

Table 6.2 *Defining Knowledge, Skills, and Abilities (KSAs)*

There are various methods that can be used to identify the skills-based protocols that caregivers need to safely use SPHM technology in their specific work setting.

These include:

1. Observation of patient handling tasks performed and
2. Ergonomics task analysis of patient handling tasks performed
3. Caregiver interviews and surveys (including review of any previous SPHM training evaluations/surveys)
4. How existing SPHM technology is being used
5. A review of records related to SPHM training that has already been conducted. This includes current patient handling training content, delivery and evaluation methods and related data.
6. Working with SPHM technology vendors to identify core competency-based skills needed to safely use their products in specific work settings etc.
7. Determining how SPHM technology will be used in a specific work environment during the process of evaluating and choosing SPHM technology (**Refer to Sections 5 & 7**).

Activities 1-4 were conducted during the worksite assessment activities to identify hazards and assess risks associated with patient handling tasks in SPHM program planning (**Refer to Section 3**).

If required KSAs for specific patient handling tasks are not fully defined from the above activities, further observation and assessment of patient handling tasks and caregiver interviews may be needed.

Vendors of the SPHM technology selected for the program can help determine essential skills caregivers need to safely use their products with specific patient populations and patient handling tasks.

Hierarchical Task Analysis (HTA) is a useful process that can be used to determine KSAs required to complete tasks and inform training content. HTA is a systematic approach to breaking down complex tasks into a hierarchy of subtasks, identifying the specific knowledge, skills, and abilities needed at each level.

Conducting a HTA can also help to facilitate ergonomics evaluation of patient handling tasks (if conducted) during the *risk assessment* phase of SPHM program planning (**Refer to Section 3**). It is also a process that can be used to identify the essential physical functions which are important for effective hiring decisions and for preventing or managing occupational injuries (**Refer to Section 7**).

Safe Patient Handling and Mobility – Section 6

Table 6.3 summarizes the use of Hierarchical Task Analysis (HTA) to determine KSAs for specific patient handling tasks.

Hierarchical Task Analysis (HTA)
Hierarchical task analysis (HTA) is a systematic method that can be used to evaluate patient mobilization tasks and identify the overall goal of each task (e.g., safely move a patient from a bed to chair); all the subtasks and their relationship to the overall goal of the task; and the conditions under which they should be carried out to achieve that goal. <i>The framework of Hierarchical Task Analysis</i> An HTA describes an activity in terms of its specific goals, subgoals, operations, and plans. HTA allows for construction of an in-depth list of goals or tasks associated with a specific process and the development of a comprehensive task description. In addition, this approach can be used to identify physical risk factors that may contribute to worker injury and cognitive requirements of a task to develop solutions to mitigate injury risk and worker error. Besides helping develop job descriptions, safety analysis, and error prediction, HTA also supports the design of training content and job aids, assessment of workload assessment, and procedure and interface, design, and evaluation. <i>Steps taken to complete HTA</i> 1. Define the task to be analyzed and the purpose of the task analysis. 2. Collect data with a focus on the relationship or interface between technology, machine (and patient in health care) and employee interaction, decision making, and task constraints. 3. Determine the overall goal of the task. 4. Determine task subgoals; these subgoals should comprise the tasks necessary to accomplish the overall goal. 5. Perform subgoal decomposition until an appropriate operation is reached, which specifies the action that needs to be done to accomplish the goal. 6. Develop plan analysis. After describing all subgoals and operations, add the plans. Plans explain how a goal should be accomplished. These may be in the format "do A, then do B, then do C" or "do A or do B and do C." Example of overall steps identified to complete a patient lift or mobilization task: 1. Identify the patient and the need for a specific lift or mobilization task. 2. Check activity order, weight bearing, or other clinical restrictions. 3. Assess the patient as to condition, pain level, and level of assistance needed to complete the task. 4. Get assistance from other staff as appropriate. 5. Gather SPHM technology and supplies needed.

Hierarchical Task Analysis (HTA)

6. Prepare the work environment.
7. Communicate with the patient.
8. Communicate with assisting staff.
9. Perform the lift or mobilization task.
10. Reassess the patient.
11. Return the environment to its original status.
12. Clean SPHM technology and return to storage

Note that each of the above steps will have a subset of steps that are required to be completed

The HTA process provides a detailed, operationally defined set of activities and when they are needed to be completed for an individual patient lifting and mobility task. The same task is assessed with various patients and caregivers to observe variation in the patient's clinical needs and staff work practices.

HTA analysis of a patient handling tasks would also consider variables such as the patient's physical and cognitive status and clinical needs, the design of the physical workspace and furniture, and the task to be performed in context of the caregiver's knowledge, skills, and abilities required to perform the work (Enos et al., 2016).

Table 6.3 Hierarchical Task Analysis (HTA).

Developing SPHM training objectives

Once the desired SPHM-related KSAs and desired competencies are identified, measurable behavioral learning objectives can be defined i.e., the specific knowledge and behaviors that learners are supposed to demonstrate after completing SPHM training. Detailed content of the SPHM education and training program can then be determined for each stakeholder group to ensure that learning objectives and desired skills or competencies are achieved through training activities.

SPHM competency needs can change over time as caregivers move to other units or departments and/or new SPHM technology and practices are introduced, so a periodic review of SPHM-related KSAs and competencies required by the various stakeholder groups should be part of the overall periodic evaluation of the SPHM training program.

Examples of behavioral learning objectives for SPHM training and related competencies can be found in **Tool 6c**.

Blooms taxonomy is commonly used to guide the development of learning objectives.

Bloom's Taxonomy is a hierarchical framework that classifies educational learning objectives into levels of complexity, typically organized within three domains: cognitive, affective, and psychomotor. All three domains apply to learning about SPHM and acquiring skills related to the use of SPHM technology

Safe Patient Handling and Mobility – Section 6

(Wikipedia, 2025; Mehan, 2016). **Appendix A** discusses the use of Bloom’s taxonomy when creating learning objectives for SPHM training.

Merriam Webster defines competence as ‘the quality or state of having sufficient knowledge, judgment, skill, or strength (as for a particular duty or in a particular respect)’ (Merriam Webster ND).

There are several models of competence, and they generally focus around 4 areas:

1. *Unconscious competence*: Being unaware of your lack of skill and lack of ability. “You don’t know what you don’t know.”
2. *Conscious incompetence*: Being aware of the skill but not yet proficient. “You do know that you don’t know.”
3. *Conscious competence*: You are able to use the skill but only with effort. “You know how to do something with conscious involvement.”
4. *Unconscious competence*: Performing the skill becomes automatic. “You know how to do something through unconscious habit.”

(Source: Wikipedia 2025)

SPHM training objectives should be designed to meet learners’ stage of competence and consider that learners transition through these stages at different speeds.

There are several models of competence. The following are 2 of the most common used in nursing practice and both can be used to inform development of SPHM training programs and evaluating competence.

1. *The Wright Model of Competency*

In this model, caregivers are at the center of the competency process and together with leadership should select competencies, define verification methods, and validate colleagues’ competencies. To facilitate a culture of success competencies should be designed to support the organizational mission as well as providing support to the employees to ensure their success (Shanks, 2019; Durkin 2019).

Wright identified 11 methods to verify competence emphasizing that employing two or three of these methods per competency can contribute to a culture of empowerment within an organization (Wright, 2005). The eleven verification methods are tests, return demonstrations, evidence of daily work, case studies, exemplars, peer review, self-assessment, discussion groups, presentations, mock events or surveys, and quality monitors (Gentry, 2022).

2. *Benner's Stages of Clinical Competence*

In the acquisition and development of a skill, a nurse passes through five levels of proficiency: novice, advanced beginner, competent, proficient, and expert (Benner, 1983).

Table 6.4 describes stages of proficiency as related to the development of SPHM skills and abilities. This information is based on Benner’s novice to expert model and is adapted from ‘Novice to Expert’ by Benner (Eustance, 2020).

Safe Patient Handling and Mobility – Section 6

Stage ¹	Definition	Potential strategies for skills and knowledge acquisition ²
Novice	The learner has had no previous experience, making them struggle to decide which tasks are most relevant to accomplish. “Show me how” stage. Has little or no knowledge or experience of SPHM.	Teach simple, objective concepts/attributes that are easily identified. Structured training and programmatic curricula are appropriate methods.
Advanced beginner	The learner has enough real-world situations that the recurrent component is easily identified when it is related to rules and guidelines. <i>Related to SPHM:</i> Knows how to use SPHM technology but is not confident in their ability to apply use it with different patients. Not comfortable to use it on their own without supervision or working with a co-worker who is more proficient in using SPHM technology and determining patient handling needs and solutions.	Increase assistance and support in setting priorities to clients’ needs by providing guidelines for recognizing patterns.
Competent	The learner has been on the job for two or three years and is able to see actions in terms of goals or plans and works in an efficient and organized manner. Will still need more practice and are at the “help me do it better” stage. <i>Related to SPHM:</i> Is comfortable using the most commonly used/available SPHM technology to perform routine patient handling and mobility tasks on a daily basis. Would need help with more complex patients or situations or new equipment.	Offer in-service education or opportunities.
Proficient	The learner performs by using pieces of evidence (i.e., maxims) that provide directions to see a situation as a whole. <i>Related to SPHM:</i> Confident in ability to understand and use SPHM technology in a variety of situations and contexts, including complex patient situations.	Use case studies to stimulate critical thinking, especially in situations with principles or rules that are contradictory. Applies skills in more complex environments and is considered experienced. “Point me in the direction of more

Safe Patient Handling and Mobility – Section 6

Stage ¹	Definition	Potential strategies for skills and knowledge acquisition ²
	Can support SPHM training, education and mentorship of co-workers and new staff. Can be a leader for a SPHM program and assist management to facilitate program sustainability.	resources to further challenge me and improve my skills” stage.
Expert	The learner grasps the situation and understands what needs to be accomplished beyond rules, guidelines, and maxims. <i>Related to SPHM:</i> - Is able to problem solve any patient handling and mobility-related challenge using a variety of SPHM technology and best work practices. - Can teach SPHM principles and competencies to all other SPHM program stakeholders - Can establish and manage all aspects of a SPHM program	Provide opportunities for experts to share their skills and knowledge and their analytical abilities to solve new situations. Come up with new and better ways to do the job and teach others. Experts can create the learning activities in a collaborative, problem-solving way. Types of experiences to promote learning at the stage include unique learning opportunities and interactive activities, personalized activities, and collaboration.

¹ The time required to reach each stage related to SPHM proficiency varies based on factors such as the variety of available SPHM technology and frequency of use, and the presence of work site coaching and other support at the unit or department level.

² Consider learning styles and generational learning styles (**Refer to Appendix B**)

Table 6.4 The Stages of Proficiency as Related to the Development of SPHM Skills and Abilities.

Source: Adapted from Nursology.net. This work is licensed under a Creative Commons Attribution-Non-Commercial-Share Alike 4.0 International License. <https://nursology.net/nurse-theories/from-novice-to-expert/>

SPHM and Engaging Generation Z are discussed in **Section 9 page 9-11**.

Safe Patient Handling and Mobility – Section 6

Assessing competency

Competency is assessed to determine if the trainee has learned a specific set of desired SPHM skills i.e., to identify gaps in competency and determine if further training is needed to reinforce and support the learner.

Assessing competency informs the design of SPHM education and training so that it meets the competency level of the learner. This is especially important when providing refresher SPHM training to caregivers who are experienced in using SPHM technology. Trainee engagement in learning is more challenging when training does not provide caregivers with progressive SPHM skill development or problem solving that is specific to their patient's care needs.

For example, teaching nurses how to use a ceiling lift and flat repositioning sling to boost and turn non-mobile patients would be a fundamental SPHM skill that is taught and reinforced with nurses who have never or infrequently used this type of SPHM technology. However, for nurses who perform this task as part of their daily patient care routine, it would be more appropriate for their skill level to teach them how to address more complex or challenging patient handling tasks such as turning a patient from a supine to a prone position using a ceiling lift and repositioning sling, and/or progressive ambulation of a ventilated patient using a ceiling lift or other SPHM technology etc.

Measuring competencies should occur during and at the end of a SPHM training class, and on a periodic basis at point of care to evaluate if classroom skills are applied in daily tasks.

Gaining proficiency in using SPHM technology and best practices typically requires more than a single training session, particularly for caregivers who have never used SPHM technology.

Caregivers usually need more than one training session to become proficient with SPHM technology and practices and especially if they have never used SPHM technology. Coaching and regular use of SPHM technology at the point of care help reinforce and improve these skills. Providing this type of support keeps caregivers engaged in the SPHM program, helps generate ideas to enhance SPHM practices, and identify further needs, thus the program's sustainability.

SPHM-related competencies learned should lead to a change in behavior i.e., from high-risk manual patient handling to safe patient handling, thus contributing to creating and maintaining a culture of employee and patient safety (Gallagher et al., 2018).

Competency assessment is crucial in identifying barriers to the utilization of competencies, addressing non-compliance, and enhancing the overall effectiveness of the Safe Patient Handling and Mobility (SPHM) education and training program.

Maintaining SPHM competency is discussed in '*Sustaining SPHM Training Competencies*' on **page 6-40**.

Generally, the simplest types of competency assessment have lower levels of validity in predicting the actual use of appropriate moving and handling techniques in work settings (ACC, 2012).

The American Association for Colleges of Nursing (AACN) states that Competency-Based Education (CBE) is not:

- A checklist of tasks
- A one-and-done experience or demonstration
- Isolated in one sphere of care or context
- Demonstrated solely on an objective test

Safe Patient Handling and Mobility – Section 6

They state that one of the basic principles of CBE is that desired outcomes are ‘visibly demonstrated and assessed over time by multiple methods and multiple assessors.’ This is similar to the approach Wright recommends when assessing competency (AACN, 2023).

Assessing SPHM competencies over time helps identify and develop problem-solving skills applicable in real-world scenarios where various influencing factors such as patient conditions, work environment, and work design and culture, influence when and how a patient is to be moved.

Competence can be verified through various approaches, depending on the skill to be assessed (**Refer to Table 6.5**). For example, evaluating a caregiver’s ability to choose and use the correct SPHM technology for a specific patient handling task versus assessing the required skills of a SPHM peer leader/coach to be able to train other caregivers. The methods used may also depend on the resources and time available to conduct assessments.

Piloting the SPHM training program before full implementation helps ensure the competencies are appropriate and activities to measure them are effective. Piloting the SPHM training program is discussed in ‘Implement of the Training Plan’ on **page 6-36**.

The training plan should also include a process to address the consequences if learners do not achieve competency in one or more SPHM skills being taught.

Methods of Competency Assessment to Evaluated SPHM KSAs		
Type of assessment	Validity	Resources needed
A checklist of tasks completed during training.	Low validity	Easy to conduct. Checklists are available that can be adapted.
Written tests covering knowledge about SPHM.	Low to moderate validity.	Relatively easy to conduct, especially if used in computer-based training with a system that can score the test and produce reports for training evaluation purposes. Evaluates knowledge not skills and abilities.
Case study approach i.e., test requiring selection of appropriate techniques based on multiple written scenarios to promote problem solving.	Low to moderate validity.	Practical if used in computer-based training with a system to capture and report data. Can be incorporated into in-person training sessions but dependent on time available and size of class.
Return demonstration of specific techniques for assessment purposes i.e., has the trainee understood what has been taught	Moderate to high validity.	Requires assessment protocol and additional time to conduct assessments with individual trainees during in-person training sessions.

Safe Patient Handling and Mobility – Section 6

Methods of Competency Assessment to Evaluated SPHM KSAs		
Type of assessment	Validity	Resources needed
and are they able to apply their knowledge in practice? Can be integrated with a case study approach.		Trainees must feel comfortable if this is conducted in a group. Could also be conducted at the worksite. Evaluates a desired set of skills.
Observation of moving and handling tasks on a unit or in the work setting.	High validity.	Considerable time and resources needed to carry out observation. Could be conducted by peer coaches/SPHM champions. Evaluates a desired set of skills and abilities.
Simulations of Real-Life Events May be targeted for a specific SPHM skill/SPHM technology e.g., fall recovery; extraction of a patient from a vehicle; or part of a larger mandatory mock-drill event such as mock codes with patient fall recovery.	High validity.	Considerable time and resources needed to carry out observation.

Table 6.5 *Methods to Verify Competence. Source: ACC, 2012 & Monaghan, 2020.*

3. Develop the SPHM Training Plan

How will training be delivered?

Online learning/computer-based training (CBT)/E-learning module

There is some evidence to support that self-paced well-designed computer-based training (CBT) learning can provide caregivers foundational knowledge about SPHM and the use of SPHM technology effectively if an interactive component is incorporated and the content reflects the caregiver's work environment and technology available. Incorporating practice exercises, video-material, repetition, and feedback appear to be associated with improved learning outcomes (ASPHP 2023; Vaona et al., 2018).

CBT can include demonstrating SPHM technology use together with procedures such as assessing a patient's mobility status and introducing information on the importance of SPHM along with SPHM program, policies, and procedures.

Safe Patient Handling and Mobility – Section 6

Using CBT *prior* to SPHM in-person hands-on skills training to introduce SPHM concepts and benefits helps prepare caregivers for the change in practice from manually moving patients to using SPHM technology.

The benefit of E-learning is that it is a less expensive way (vs. instructor-led training) to provide ‘training’ to large groups of HCWs and can be accessed at any time. The information provided is consistent for all learners as there is no instructor variation.

CBT training, if designed well, may also be the preferred method to deliver education about the SPHM program to stakeholder groups that do not perform patient handling tasks.

Tool 6a provides training resources that provide web-based foundational SPHM information and training that can be freely accessed.

Simulation and experiential learning

Appropriate and *safe* use of SPHM technology requires caregivers to use psychomotor and critical thinking skills. These competencies are best attained through well-designed in-person, hands-on, competency-based training as opposed to solely relying on computer-based methods.

As related to SPHM training, the American Nurses Association’s (ANA) Inter-Professional Standards for Safe Patient Handling and Mobility (2021), Standard 5.1.4. states *“Provide appropriate SPHM technology for education and training. Interactive education and training will be conducted using the same types of SPHM technology used for healthcare consumer care within the organization. Simulation or point-of-care training is preferred.”*

Research supports that high fidelity hands-on simulation training is an effective method to teach healthcare students and caregivers tasks that require psychomotor skills and can improve knowledge acquisition, self-efficacy, satisfaction, confidence, and critical thinking skills (ASPHP, 2023). Simulation in SPHM allows for experiential learning within a controlled and safe environment versus learning to use SPHM technology at the bedside with a patient.

Interactive hands-on competency-based training with relevant case scenarios and problem-solving, and reflective practice where trainees discuss challenges and create solutions, is associated with increased compliance with SPHM technology and practices (ACC, 2012; Monaghan, 2019; Wanless, 2017; Perez, 2016). Refer to ‘*Reflective Practice*’ on **page 6-24**.

Problem solving includes conducting risk assessments to determine how to safely mobilize patients according to their physical and cognitive abilities and clinical needs and developing appropriate care plans.

Role play, in which a trainee plays the role of a patient during SPHM training, allows caregivers to gain insight into the patient’s experience when being mobilized with, and without equipment, and to understand the importance of providing a patient with a sense of control and dignity when being moved etc. This can also facilitate discussion and provide insight into how to use SPHM technology with patients who are cognitively impaired such as those with dementia.

Trainees should conduct a return demonstration on the use of SPHM technology while incorporating proper body mechanics and safety precautions as part of a competency assessment process.

A single hands-on simulation session may not adequately assess a caregiver’s SPHM skills due to time constraints, class sizes, and varying levels of trainee experience.

Safe Patient Handling and Mobility – Section 6

This challenge can be addressed by having SPHM unit champions/coaches or other SPHM trainers to check-in regularly with caregivers at the worksite and conduct 'just-in-time' refresher training as needed to ensure skills are transferred into practice. Refer to 'Assessing Competency' on **page 6-20**.

Reflective Practice

Reflective practice is commonly used in health care as a tool to help employees to reflect on their experiences and learn from them with the goal of improving the way they work or the quality of care they give to people.

This practice can be applied within SPHM training to allow caregivers to evaluate an experience or event in a structured way to recognize that learning has occurred, and to identify future development needs.

For example, when having learners discuss a patient handling related task that was performed manually such as lifting a patient from the floor following a fall, or that was performed with SPHM technology, but that did not go as planned. The trainer (or SPHM coach/champion) guides learners to:

- Describe the experience
- Describe how they feel and what they think about the experience
- Evaluate the experience, both good and bad
- Analyze to make sense of the situation
- Identify what they have learned and what they could have done differently
- Define an action plan for how they would deal with similar situations in the future, or general changes they might find appropriate.

This type of activity can be conducted within a SPHM training session, in safety huddles and when coaching individual caregivers (Monaghan, 2020).

There are several models of reflective practice. Links to information about models more commonly used in nursing are listed below.

- Reflection Toolkit – University of Edinburgh <https://www.ed.ac.uk/reflection>
- Reflective practice - Clinical Excellence Commission (CEC), New South Wales, Australia <https://www.cec.health.nsw.gov.au/improve-quality/teamwork-culture-pcc/teamwork/reflective-practice>

Virtual Reality and Augmented Reality technologies and SPHM Training

The use of virtual reality and augmented reality technologies to deliver workplace safety training is growing.

Virtual reality (VR) is a simulated experience that employs 3D near-eye displays and pose tracking to give the user an immersive feel of a virtual world (Wikipedia, 2024).

Safe Patient Handling and Mobility – Section 6

Augmented reality (AR) is an interactive experience that combines the real world and computer-generated 3D content. The content can span multiple sensory modalities, including visual, auditory, haptic, somatosensory, and olfactory (Wikipedia, 2024).

Limited research has been conducted comparing the benefits of VR safety training to that of conventional methods. However, recent findings have shown the benefits of VR safety training often outweigh those of conventional training methods (Kaplan et al., 2024).

The cost of VR simulation training for SPHM may be too high for many health care organizations and SPHM programs at the current time, however, consider working with a local college that offers computer science degree programs to see if there is interest in partnering to have students assist to develop a VR SPHM training program.

Northwell Health in New York State has developed VR SPHM training and is currently studying its effectiveness. You can view the program information at <https://northwellworkforcesafety.com/virtual-reality-training/>

Summary

Overall, there are a variety of teaching techniques that can be used to effectively educate and train caregivers about SPHM. SPHM training that is multi-modal in nature and designed to consider adult and generational learning styles appears to be most successful (ASPHP, 2023; Roy, et al., 2020).

A ‘blended’ training approach that includes e-learning, a hands-on component, and follow-up on-the-job training with their peer leaders or SPHM coaches/champions also appears to be *cost-effective* (Knibbe et al., 2012).

Who will conduct the training?

The responsibility for conducting in-person SPHM training is determined based on the resources and expertise available within a healthcare organization.

In smaller health care facilities, the SPHM program manager or coordinator may have the expertise to be the primary trainer. In larger facilities, there may be a dedicated role for SPHM trainer(s) and/or a train the trainer approach is used. This involves having an individual(s) from a unit/department trained to teach their co-workers and to provide SPHM coaching at the point of care such as SPHM unit champions/coaches. Refer to **Tool 4g** for more information about SPHM champions or coaches.

The use of a train-the-trainer model may also reduce training costs and expedite employee training.

If you do not have the in-house expertise to conduct SPHM training, especially when starting a program, it will be necessary to use external resources. SPHM technology vendors can usually provide some degree of SPHM training support for SPHM programs, but the quantity and quality of training is variable. Refer to ‘*Considerations when Choosing External SPHM Trainers*’ below.

Staff who may conduct SPHM training include nurses, physical therapists, occupational therapists, radiologists, surgical technicians, nursing aides, and lift team members (if applicable). Typically, the job designation of the trainer is dependent on the unit/department they work in e.g., radiology technicians would be trainers in Imaging departments. Ideally, trainers should also work on various shifts worked on their unit/department.

Considerations when Choosing External SPHM Trainers

If you do not have the in-house resources with expertise to conduct SPHM training and cannot use a Train the Trainer approach, then the following external resources may be able to assist you:

- The vendor (s) who are providing the SPHM technology
- Private training companies/consultants
- Your worker's compensation insurance carrier (they may also know of other resources)

When using vendors or external consultants make sure, they:

- Are provided with a thorough orientation to the SPHM program, policies, procedures, training objectives and documentation of required training content.
- Can offer classes that are customized to incorporate an organization's SPHM policy and procedures e.g., SPHM patient assessment protocols, and requirements of any SPHM state law. Additionally, class content is designed to address the patient handling tasks to be performed to meet the clinical needs of the patient population on a specific unit/department.

When evaluating the suitability of external training providers, consider the following:

- The professional qualification and experience of the trainer(s). Vendor trainers with no clinical background/professional healthcare license such as a nursing or physical therapy license, *may not* be able to teach patient mobility screening or assessment to caregivers and/or customize training to the clinical needs of a specific patient population.

If this is the case, plan to address gaps in training content. For instance, partner a non-clinician vendor trainer with an SPHM trainer who is a clinician from the healthcare organization.

- If you must train caregivers to use SPHM technology from different manufacturers, then you may need more than one vendor trainer. Check that vendors from different manufacturers will provide training together in the same class.
- Previous relevant experience in offering SPHM training.
- The cost of training and a statement of work (SOW) clearly defines training expectations, objectives, when training is to be offered e.g., on all shifts, and for which employee groups/units/departments, etc, and the length of training to be offered. SPHM vendors typically include training programs with the cost of purchasing their technology.
- Is there adequate time allowed for 'hands-on' practice for trainees.
- If and how they evaluate the training classes. For example, how will specific competencies be evaluated e.g., return demonstration using a check list, case studies etc. Review their documentation process and evaluation tools.
- Can they provide SPHM technology for training classes (if needed).
- What ongoing support and resources are provided as part of the training package.

Safe Patient Handling and Mobility – Section 6

Considerations when Choosing External SPHM Trainers

- Contact and talk to at least two previous clients of the training providers to get feedback about the effectiveness of the training they received.
- Lastly, evaluate the cost of future SPHM training if conducted by paid consultants/vendors versus the cost of a full or part-time SPHM trainer(s) to the organization for the program.

(ACC, 2012, Monaghan, 2011).

State licensing regulations are an important factor when selecting trainers; for example, nurses may delegate duties to certified nursing aides (CNAs), who typically are not permitted to perform patient assessments. Assigning CNAs to instruct nurses on performing SPHM mobility assessment could fall outside the permissible activities defined by their licensure.

Having a *team of trainers* rather than relying on one person to conduct SPHM training helps address training coverage needed if a trainer is absent etc., avoiding the need to cancel or postpone classes which can be costly for the organization. Costs may result when class cancellations disrupt staffing schedules, especially if additional staff have been arranged to cover patient care while caregivers participate in SPHM training.

Employees may still be owed compensation if a training class is cancelled within hours of its start time, depending on applicable labor contracts.

Trainers from diverse professions can help other trainers understand how SPHM impacts practice for a variety of professionals such as therapists, nurses, and aides. This can help trainers address specific practice-related questions when teaching staff and demonstrate understanding of different practice roles.

A team of trainers can also support each other when encountering resistance from other staff and reduce the isolation they may experience (ACC, 2012).

SPHM trainers need a deeper level of knowledge and skills beyond core SPHM training. In addition to being competent to teach other caregivers how to use SPHM technology and address a variety of clinical situations, SPHM trainers need to understand how adults prefer to learn and be able facilitate learning using a variety of different approaches. Adult learning styles are discussed in '*Design the SPHM Training Curriculum and Materials*' on **page 6-32** and in **Appendices B and C**. An example of the training content for an SPHM Train-the-Trainer workshop is provided below.

The resources available for training SPHM trainers will determine the size of the training team, the training workshop duration, whether experts are needed, and the training venue needed. Training session length depends on the topics to be covered and the level of detail.

Staff selected to be trainers should be supported by being given the time to be trained and to deliver training to other caregivers and other employees.

Trainers should receive periodic refresher training and additional training if new SPHM technology and/or processes are introduced. Regular communication and support of the trainers is important, so that they do not feel isolated and they can provide feedback and brainstorm ideas to improve SPHM training as the program is implemented and matures.

Example of the Training Content for an SPHM Train-the-Trainer Workshop

Educating trainers in a series of workshops may be more effective from a learning and scheduling perspective. Evidence supports that teaching models that emphasize repetition and spaced-out sessions support increase in memory recall and retention while minimizing the loss of knowledge that occurs with one-time learning (Smolen et al., 2016).

Content overall

- Theory – foundational education about SPHM (what and why), ergonomics, risk assessment and address patient handling hazards.
- The organization's SPHM program approach and associated policies and procedures, and applicable state legislation.
- The content of the SPHM program that trainers will be teaching
- Evaluating the effectiveness of training sessions.
- Equipment – competency with the selection and use of SPHM technology (including slings) for patients with a variety of medical and physical conditions and ability to provide related instruction.
- Competency with SPHM assessment and communication protocols and ergonomics best work practices.
- Practice – specific techniques and patient handling tasks, such as enabling early mobilization from bed to chair with and without SPHM technology, addressing care and sensitivity for patients of size, with cognitive impairment etc.
- Adult education theory – learning how to design and deliver education to adults.
- Teaching and presentation skills for delivering training sessions.
- How to coach staff and provide feedback and how to address patient and staff related barriers/resistance to using SPHM technology.
- Where to get assistance if they are unable to answer specific clinical-related questions during a training session e.g., mobilizing a complex patient in a specific clinical setting such as an ICU.

Additional content is added if trainers are also going to be unit SPHM champions or coaches.

Trainers should deliver training on a regular basis to ensure they stay up to date with the content and remain comfortable delivering the training. Trainers should have access to ongoing professional development and current information regarding SPHM, including attendance at relevant conferences or webinars.

There should be a plan for ongoing recruitment and replacement of trainers if they leave the position and a plan for onboarding new trainers and retaining existing trainers, so that training schedules are not disrupted.

Safe Patient Handling and Mobility – Section 6

How long should a SPHM training class be?

Determining the length of training classes/sessions and capacity for each session that will facilitate maximum learning is dependent on the:

- Type and variety of SPHM technology and patient handling competencies to be taught
- Number of trainers available, i.e., having more than one trainer allows for larger numbers of trainees to be divided into groups and rotate through training stations
- Size and design of the location available for training
- Training time and budget that leadership has approved

The ratio of trainees per trainer is also dependent on several factors such as trainer experience and skill set; the level of SPHM knowledge and skills of trainees; and training time and scheduling allowed by management.

In some countries with SPHM legislation, a recommended ratio is 1 trainer to 6 trainees (ACC, 2012). This ratio is seen as the minimum required to provide sufficient practical instruction to trainees during technique demonstrations, trainee practice, and trainer feedback (ACC, 2012).

Based on this author's personal experience, a 1-hour training session is *not enough* to teach 6–10 caregivers how to use SPHM equipment such as ceiling lifts with various slings and an air assist device, while also allowing time to demonstrate competency.

If SPHM training is to be conducted as part of a skills competency day or fair, ensure that there is sufficient time to review the required SPHM competencies for each trainee e.g., 20 minutes at a task station may only be sufficient to *demonstrate* a SPHM technique to trainees. A Skills Fair may require attendees to review several clinical skills, so ensuring effectiveness (i.e., retention of information) of SPHM training methods is important.

If trainees are to be trained in many different types of SPHM technology and slings, consider that they may become overwhelmed and confused especially if this is their first SPHM training class. If this is the case, it will be especially important to provide after-training support and coaching to ensure correct use of the technology etc.

As previously discussed, trainees could complete an online (CBT) interactive education module prior to class that includes foundational SPHM information, information about the SPHM, program policy procedures and introduction to SPHM assessment protocols and technology used at the facility. This approach can help address existing attitudes and beliefs about patient lifting and mobilization practices before hands-on training.

If designed well, CBT should engage and motivate trainees to learn how to use SPHM technology in a subsequent hands-on training class. Content in hands-on classes can then be focused on reinforcement and application of important SPHM principles and use of SPHM technology etc.

Ultimately the length of training sessions is a balance between the time needed to teach and assess competency in a training session and the training time allowed by leadership.

If training resources are limited, consider integrating additional health and safety topics such as key elements of workplace violence prevention, hand hygiene, and infection control into SPHM training.

Safe Patient Handling and Mobility – Section 6

When and how often is SPHM training required?

For each stakeholder group identify when SPHM education and training is required e.g., at program implementation, and then periodically; for new hires; when SPHM processes/procedures are changed; or new processes implemented; and when employees are transferred to a new unit that have different training requirements (*Refer to Tool 6a*).

The ANA SPHM standards and most SPHM training related literature and SPHM state regulations recommend that SPHM training occur annually.

However, it may be valuable to review the need for annual competency based hands-on SPHM training dependent on:

- How much SPHM coaching or peer support is available for caregivers in their unit/department and how effective coaching is in promoting the appropriate use of SPHM technology. If caregivers receive daily coaching and SPHM audits show proper use of technology and adherence to protocols, refresher training may be needed less frequently, such as every two years.
- The time allowed for refresher training vs. the quality of the training. For example, if only an hour is approved for training due to budget and staffing constraints, can essential skills be reviewed and new skills be learned (if applicable) effectively in this time frame? Would it be more effective to offer SPHM refresher training for 2 hours every 2 years?

Determine if training will be mandatory for each stakeholder group identified and identify a process to address employee non-compliance with mandatory training policy.

If SPHM training is not mandatory, caregivers are more likely to share improper techniques, shortcuts, and incorrect procedures, leading to unsafe patient handling.

This can be especially challenging when newly hired caregivers who have attended SPHM training may face resistance from existing staff who may be untrained or not competent in use of SPHM technology. New hires may be less likely to ‘rock the boat’ and unsafe SPHM practices are perpetuated.



Quick Tip

Coding SPHM incident and injury data to reflect the patient handling task being performed at the time of an incident helps with SPHM program planning, evaluation, and informs training content (*Refer to Section 2*).

However, recording an employee’s date of SPHM training (e.g., initial and refresher training) with incident data enables the evaluation of the period between SPHM training and the occurrence of patient handling-related incidents. This information can guide decisions regarding the frequency of SPHM refresher training.

For instance, if data indicates that the number or rates of patient handling incidents consistently increase 2 or more years after employees received SPHM training, you may decide to schedule to schedule refresher training every 2 years (depending on the requirements of state SPHM regulation).

Tracking training data alongside incident data also allows you to identify if an employee received SPHM training prior to a patient handling incident or if they were supposed to attend training but did not.

Safe Patient Handling and Mobility – Section 6

Where should SPHM training be conducted?

Ideally, a dedicated training space should be provided for the SPHM program that will allow simulation of all patient handling tasks with the full range of SPHM technology and slings being used at your organization and reflect the typical practice setting. If the specific types of equipment needed are not available, contact your SPHM technology suppliers to see if they will loan or rent equipment for training.

It may be necessary to conduct some training in a patient care area where specialized medical equipment is used with SPHM technology to facilitate transfer of training e.g., certain diagnostic imaging and perioperative areas with specialized procedure tables.

If a dedicated training room is not available, an alternative is to conduct training in an empty patient room. This requires coordination with bed-control/scheduling and the ability to notify staff of the training location at short notice.

If your facility is a teaching hospital, it may be feasible to partner with a health care student training facility to use their training space e.g., schools of nursing.

Another approach is to create a temporary 'mock-up' of a patient room or work location within a designated training space by putting tape on the floor to indicate room dimensions and then placing furniture and SPHM technology within that space.

If a training location is not easily accessed by trainees, provide clear instructions, maps and the contact information of the trainer(s) or person who can help them if they have challenges getting to the location etc. Highlight the need to plan for travel time and to arrive on time for class.

4. Secure Leadership Approval of the SPHM Training Plan

Before detailed development and delivery of SPHM training curriculum, you need to secure the training budget, resources and scheduling preferences required to meet your SPHM program training needs.

Prior to presenting the proposed SPHM training plan to leadership for approval, make sure to identify potential barriers to implementing the plan and approaches to address them. For example, the cost of using external trainers, and/or the time for employees to attend training, including cost to provide extra staffing coverage.

You should have identified some of these barriers during the Gap Analysis assessment and when developing the SPHM program plan (**Refer to Sections 3 and 4**).

Determine the required budget to implement and sustain the SPHM training program (per earlier guidance from leadership). **Tool 6b** provides a sample budget.

When meeting with leadership to present the plan and budgetary needs, make sure the following plan elements are discussed:

- Background – introduction to SPHM training and why it is needed including evidence based, training requirements per state SPHM law, and consequences if training is not conducted or not conducted well etc.
- Overall goals and expected outcomes of the training program
- If SPHM training is to be mandatory for each stakeholder group
- How the SPHM is to be stratified by stakeholder group

Safe Patient Handling and Mobility – Section 6

- Overview of content and rationale for why and how training is to be delivered e.g., E-learning and in-person competency-based training, and how competencies and objectives will be measured
- Length of training time needed with rationale
- How many staff are to be trained
- Who will conduct the training; training for trainers; proposed use of external trainers and related costs
- Venue for training and equipment needs
- Plans for piloting in-person training
- Proposed training schedule i.e., when should training be delivered to each stakeholder group
- Ongoing training needs to support the SPHM program
- Proposed budget for the initial SPHM training and ongoing training needs

Identify internal resources that will help with implementation of the plan such as, using clinical educators who could be trained to provide SPHM training to caregivers; existing online training registration and tracking systems; existing computer-based safety training systems; the ability to offer continuing education units (CEUs) for nursing staff etc. Implementing the plan is discussed on **page 6-36**.

Information gathered in your education and training plan (**Tool 6a**) can help guide content for the meeting.

5. Design the SPHM Training Curriculum and Materials

Once management has approved the SPHM training plan and budget, the detailed training curriculum and training materials can be developed, and the training delivered and evaluated.

As previously discussed, SPHM training must be customized to suit the needs of a variety of stakeholders and reflect the SPHM activities performed in their unit/department.

A structured lesson plan should be created for each type of SPHM training to be conducted e.g., for units/departments implementing a new SPHM program; new hire and refresher courses, unit-based SPHM champions; and specific stakeholder groups like physical therapists or transporters.

Lessons plans should include:

- Details of foundational SPHM content and relevant program, policies, and procedural information
- Content such as specific patient handling tasks and the SPHM technology to be used to complete these tasks
- The time allocated for each session and topic within a session
- The method to be used to deliver content e.g., computer-based learning, in-person demonstration and supervised practice
- The method(s) to evaluate trainee competence such as return demonstration
- Resources required for all training activities e.g., SPHM technology, beds, chairs, internet access, instructional materials etc.

Safe Patient Handling and Mobility – Section 6

Table 6.6 provides an example of core components of SPHM education and training for caregivers who will use SPHM technology.

Example of Core Components of SPHM Training for Caregivers who will use SPHM Technology
<u>Theory (knowledge base)</u> Foundational information about SPHM for example: • The scope of manual handling injuries • Injury data nationally, locally (state injury data if available) and within the organization including, injury rates by units/departments, types of injuries and cause by patient handling task • The cost of manual handling injuries to caregivers, patients, and health care organizations • Applicable state laws and standards e.g., the ANA interprofessional SPHM standards • Why manual patient handling is dangerous for caregivers and patients including biomechanics of the spine, development of WMSDs and hazard identification • The SPHM program efforts at your organization including the mission statement and goals; overall process to achieve goals; relevant policies of the organization; roles and responsibilities of stakeholders; and how to get assistance; reporting patient handling-related safety issues; and how to suggest process improvements. • Injury and incident reporting process and importance of early reporting of WMSDs • Definition of SPHM and the benefits of SPHM to caregiver, patients and health care organizations including how SPHM facilitates patient care including safe early mobilization and falls and violence prevention etc. Include examples of SPHM technology and techniques used at your organization. • Core ergonomics principles as applied to use of SPHM technology and work practices to reduce awkward postures and forceful exertion. • Risk assessment of patient handling tasks and core concepts of problem-solving including the use of patient mobility assessment and communication protocols to mitigate risk to caregivers and patients. Note: Applying and practicing SPHM assessment and mobility checks should be included in hands-on competency training. • Change management. Information about what changes will be required and why e.g., expectations about the use of mobility assessment protocols and SPHM technology. Encourage open dialogue and address employee concerns – this should continue in the skills training session. <u>Practical (Psychomotor) skills include:</u> • Completing SPHM patient mobility assessments

Example of Core Components of SPHM Training for Caregivers who will use SPHM Technology
• Applying ergonomics principles during SPHM tasks e.g., raising a bed/stretchers to minimize back flexion and not reaching past midline of a patient/surface. • Applicable infection control protocols for cleaning technology after use; laundry protocols; disposal of single patient use items etc. • Safety and functional operation of SPHM technology including application and use of patient lift slings, storage and servicing/problem solving if technology is not functioning and/or missing. • Patient handling and mobility tasks as applicable to trainee needs and as determined by patient physical, cognitive abilities and clinical needs and SPHM technology available e.g., ○ Repositioning in bed such as turning, boosting, holding in a side lying position, and proning (if applicable) ○ Lateral supine transfers e.g., bed to stretcher ○ Seated transfers e.g., to/from bed to chair for non-weight bearing patients ○ Sit to stand transfers to/from 2 surfaces for patients who can partially bear weight ○ Ambulation ○ Limb holding e.g., during wound care ○ Toileting and bathing ○ Fall recovery ○ Emergency situations e.g., seizure/ cardiac arrest • SPHM for specific patient populations e.g., spinal trauma patients; patients of size; patients with cognitive impairment such as dementia, pediatric patients etc. • Problem-solving activities, such as case studies based on scenarios relevant to patient populations that the trainees care for. • Addressing patient, family, and caregiver refusal to use SPHM technology

Table 6.6 Example of Core Components of SPHM Training for Caregivers.

When designing SPHM training to facilitate effective learning it is essential to understand the learning abilities of the trainees, their preferred learning style, and generational differences in the ways that adults learn. Educational, language, culture, terminology, literacy levels of the target audience must also be considered in the delivery of the training and in handout and other instructional materials.

Appendices B-D provides more information about learning style and differences in how generations learn; the principles of adult learning theory; and characteristics of sound training programs .

Safe Patient Handling and Mobility – Section 6

Additional resources about adult learning theory and successful SPHM training programs are listed in **Section 10**.

Where feasible, SPHM training should be customized to the trainee's clinical specialty and work setting. For example, teaching critical care nurses the basic use of a ceiling lift with a repositioning sling *without* providing specific skills and scenarios that apply to their typical patients such as those on ventilators or attached to multiple devices, is unlikely to facilitate use (or safe use) of the lift equipment.

Making SPHM training meaningful

When designing SPHM training curriculum, it is essential to understand what is important to each stakeholder group so that you can successfully engage them in training activities and facilitate learning.

For many caregivers, the primary concern will be how can SPHM improve patient care and make their jobs easier or 'what's in it for me and my patient'? Ensuring this need is answered is important to reduce resistance to change.

Anecdotally, this author has observed caregivers are more motivated to use SPHM technology and ergonomic work practices when they:

- Directly observe improvement in patient outcomes such as achieving patient mobilization goals in a shift.
- Can complete required nursing care tasks that might have otherwise been missed within a shift, especially with patients who have complex medical needs and patients of size and
- Can perform patient handling and care tasks with less staff e.g., in some cases be able to reposition a patient in bed on their own using overhead lift technology. This is especially important when staffing is limited but the use of SPHM technology allows a nurse to still be able to complete patient care tasks independently.
- Feel less fatigued at the end of a shift.

*The benefits of SPHM for patients and caregivers are described in **Section 1**.*

Having trainees role play as a patient who is lifted, repositioned and mobilized using SPHM technology during a class, can help them relate to a patient's perspective including their fears, potential loss of dignity and loss of control during patient handling tasks, and how they can address these fears when using SPHM technology.

Real-time recognition during training or coaching caregivers, along with positive feedback on task performance, greatly enhances engagement in SPHM and facilitates learning. It also boosts their satisfaction and sense of purpose in their work.

Training and coaching should never be perceived as punitive e.g., calling out mistakes in a negative way in front of a group of peers.

Appendix D summarizes the characteristics of sound training programs.

6. Implement the SPHM Training Plan

Do you need to pilot the training?

When starting a SPHM program it is a good idea to pilot initial SPHM training so that design and delivery of the content including time needed, can be evaluated and adjusted as needed.

For SPHM programs with limited training resources, it is a more manageable approach than implementing training on a large scale e.g., for many units/departments and hundreds of caregivers.

If you are piloting the SPHM program on one or more high priority units/departments before facility wide implementation, you could pilot the SPHM training with a group of caregivers from a pilot unit/department.

Conducting a training pilot allows new SPHM trainers to learn how to run training classes, trial their presentations on a real audience, receive feedback on their teaching and identify problems (ACC, 2012). An experienced trainer should be present to observe and facilitate as needed. Trainers can be evaluated by how well they engage their audience and facilitate effective hands-on practice to ensure trainees achieve the desired SPHM-related competencies.

Debriefing immediately after the training session(s) and providing feedback to trainers helps them to improve teaching styles and work on timing and collaboration as a team. Any additional SPHM training for the trainers can also be identified.

Attendee evaluation data from a pilot training program can also assist to adjust training content and determine and help justify the length of time needed for SPHM training classes. Lessons learned can then be incorporated into the SPHM training plan before fully implementing the training program in other areas.

General logistics of implementing an SPHM training plan

The following is a list of activities that should be addressed when implementing an SPHM training program.

- How will employees register for classes; how will attendance be tracked and communication with managers be managed?
- How will you communicate the SPHM program training requirements (including if training is mandatory), advertise classes to employees and how will they register to attend classes?
- Where will the training be conducted? Does the space have to be scheduled in advance for current and future classes?
- What training space and materials, including audiovisual, computer equipment if applicable, handout materials, SPHM technology and furniture needed etc., will be needed, and who will address these needs?
- Who will conduct the training?
- Who will provide the attendance certificates to trainees who complete the training?
- Where and how will training records be kept, and for how long?

Safe Patient Handling and Mobility – Section 6

- If Continuing Education hours (CEs) are offered how will trainees complete the evaluation and receive a receipt for CEs?
- What is the procedure if an employee fails to meet competency goals in training?
- What is the procedure if an employee does not attend training as scheduled?

If you developed a 'brand' for your SPHM program and communications, make sure to incorporate that into your training materials and related advertisements.

How will training be scheduled and communicated to stakeholders?

The SPHM training development team, along with unit/department managers, must decide how to facilitate caregivers and other employees' attendance at training.

Training should be offered on all shifts to facilitate attendance and staff scheduling.

For SPHM training to be effective caregivers need to be free from distractions. If they must leave their shift to attend, they may be preoccupied by what they need to do when they get back or last-minute changes to staffing and patient status, will make it difficult for them to leave their workplace (Monaghan, 2019).

Caregivers and other employees who attend training after the end of a shift may be too fatigued to learn effectively and, in some states, nurses staffing laws may not allow work over 12 hours. Offering paid training for employees to attend on their day off is an alternative model.

Labor contracts may also state when and how activities such as training must be offered.

The timing of the training is important, and units/organizations must plan for coverage of individuals participating in training and accommodate casual employees and those who work a limited set schedule (e.g., evenings only or certain days of the week). Trainers' schedules must also be considered as well as other training being delivered by the organization during the same time period.

Train caregivers on SPHM technology that will be *immediately* available for them to use after attending training. New users of SPHM technology may revert to manual handling techniques if they cannot use it soon after training, due to loss of confidence and competency.

New users of SPHM technology often take longer to handle patients than experienced users, so they may use manual handling techniques because they find it quicker due to lack of practice with SPHM technology (Mechan, 2014).



Quick Tip

Training of temporary or contract caregivers such as nurses can be challenging. They often have many other policy and procedural training requirements to complete within a short period of time at the start of their contract. In addition, they may only be working at a facility for a few days, weeks or months.

The SPHM training development team and SPHM committee, together with management, should define the role of temporary caregivers in using SPHM technology e.g., usage is only permitted with another employee who is trained to use the SPHM technology available in their unit/department. If training is to be offered to temporary caregivers, a cost-effective way to deliver effective training should be determined.

Safe Patient Handling and Mobility – Section 6

Including SPHM training for new hires during their orientation can prepare staff to effectively reduce injury risks and provide safer patient care. However, new hires often have other safety training requirements to complete during orientation, so it is essential to assess how well they will retain SPHM information and skills considering the volume of information they need to learn in a potentially short timeframe.

Therefore, providing on-unit/department SPHM support for new staff e.g., coaching by SPHM unit champions and the provision of easily accessible SPHM instructional aids will be key to facilitating caregiver competence and confidence in using SPHM technology and practices.

Work with unit/department managers and clinical educators to determine the best way to orientate and facilitate the use of SPHM technology for new staff and staff who transfer from work areas with no SPHM technology.

If a unit has a preceptor program for new hires, ensure that preceptors are up-to-date with SPHM competencies to teach correct skills and behaviors.

Newly hired staff and especially those new to health care are unlikely to speak up if they see incorrect, poor, or no SPHM techniques being used because they want to 'fit' into the team.

All the above considerations have budgetary implications that must be considered.

Scheduling SPHM training requires robust administrative support including a system for class registration and tracking attendance etc.

Ensure management communicates with staff if training is mandatory and consequences for non-attendance.

What documentation and recordkeeping should be completed?

Documenting SPHM training activities and attendance is crucial for evaluation of the SPHM program and training activities.

Specific documentation requirements may be required by state SPHM regulations, but in general the following should be kept:

- Lists of employees who have attended training, their job designation (e.g., RN, CNA etc) unit/department and shift together with type and length of SPHM training, date and time of the training, instructor/trainer name and affiliation
- List of employees who did not attend scheduled training and recorded notification to managers of 'no-shows'
- Competency check-off records including the name of the trainer or SPHM coach who conducted the evaluation
- Follow-up training activities if a trainee did not achieve competency in one or more SPHM related skills
- Training program documents, such as training schedules; topics covered in training; handout materials; certificates of completion; and information about continuing education hours offered (if applicable)
- Participant evaluations of SPHM training sessions

Safe Patient Handling and Mobility – Section 6

- SPHM training schedules

A system should exist to track when an employee's training, such as refresher courses, is due. It notifies healthcare workers and their managers and follows up on non-attendance.

Determine who will keep and have access to the records of training and audits and who will develop reports about the SPHM training metrics for the SPHM committee and leadership.

7. Evaluate the SPHM Training program

Determining the effectiveness of specific SPHM training activities and the program overall is part of an ongoing improvement process to ensure the program is effective in meeting program goals and the learning needs of the SPHM stakeholders.

The SPHM training development team together with the SPHM committee should determine SPHM training goals and metrics as part of the needs assessment. They can then work with SPHM coaches/peer leaders and trainers to collect program evaluation data.

Evaluating the training program can be achieved through:

- Having trainees complete an evaluation at the end of a training session to determine if the session met stated objectives
- Periodic audits of SPHM practices at the point of care to evaluate the extent to which training is transferred to the worksite (**Refer to Section 8 and Tool 8c**).
- A review of trainer debriefing notes
- Questions about the effectiveness and relevance of SPHM training that are included in annual or periodic SPHM staff and manager surveys (**Refer to Section 8 and Tool 8b**).
- Patient handling related incident and injury data and associated data from root cause analysis, after action reviews, and safety huddles (**Refer to Section 7**).
- Reviewing competency documentation
- Tracking numbers of employees by unit and shift who attended training and non-attendance rates
- Reviewing the process to implement the training program

Refer to **Section 8** for more information about program evaluations measures.

Periodically review and update your SPHM education and training plan and curriculum content based on feedback from the evaluation methods above to ensure that training is delivered effectively to maximize engagement and effectiveness, and to justify ongoing training budget needs. Stay informed about best practices related to SPHM education and training.

Sustaining SPHM Training Competencies or ‘Making Training Stick’

A well designed and delivered SPHM training program that includes the elements described in this Section, can help caregivers apply knowledge and skills from the classroom, enabling them to incorporate SPHM technology and best practices into their daily work routines.

However, as previously noted, it is critical that following SPHM training, coaching is offered to reinforce the skills acquired and that other instructional resources should be readily accessible to staff as needed. This approach will assist in fostering the cultural change required for SPHM to reduce caregiver and patient harms and become an accepted standard of patient care.

Examples of instructional resources include:

- An online (intranet based) SPHM toolkit that includes instructional materials for operating SPHM technology; training videos; job aids; policy and procedures etc.
- Written decision-making guides such as algorithms that define SPHM protocols for specific patient handling tasks and assist caregivers in identifying the appropriate patient handling technology to address patient needs (**Refer to Section 5**).
- Online training videos that are easily accessible and are available 24 hours a day. For example, the use of QR codes on SPHM job aids that can be used to quickly access brief training videos (e.g., 1-2 minutes or less) via a smart phone.
- SPHM technology vendors usually offer instructional videos. You may link to these if external website access is allowed, or request vendors to provide videos for your facility's intranet.
- Videos that are produced internally. This allows you to customize content to reflect a specific work setting, SPHM program technology and protocols etc.
- Pictorial job aids e.g., 1-page in length, which can be laminated (for cleaning purposes) and attached to SPHM technology with a QR link to brief training videos.

Work with your Information Technology department to determine if there are limitations to accessing videos within a unit such as at nurses' workstations e.g., use of audio controls when viewing a training video.

SPHM practices can be reinforced during safety huddles, safety rounding, and staff meetings.

Consider providing unit/department managers with a brief list of key SPHM talking points related to an SPHM topic that they can discuss during staff huddles.



Quick Tip

Conducting just-in-time SPHM training on a patient care unit/department

If just-in-time SPHM training is conducted on a patient care unit or department e.g. training on a new SPHM device or conducting training for a specific clinical scenario, coordinate with management and charge nurses to ensure that staff can attend training i.e. there are enough staff to cover patient care and communicate where and when the training will be conducted prior to and during the training.

If training can be and is to be conducted with a patient, then plan this activity carefully with the unit manager to ensure you follow relevant organizational policy related to patient privacy and permission

Safe Patient Handling and Mobility – Section 6

Maintaining competency and safety in a unit or department where SPHM technology is used occasionally

For example. A powered floor lift is used every few weeks in an outpatient clinic setting.

Some clinic staff may have previous experience in using a similar powered-floor lift on a frequent basis, so are confident about using it occasionally after attending SPHM training. Some staff may attend training and have never or rarely used a floor lift.

However, due to the variation in the design and application of slings and the operation of floor lifts (**Refer to Section 5**), ensuring staff competency when a lift is used infrequently is more challenging.

Potential Solutions that assist caregivers to maintain competency related to use of SPHM technology include:

- Provide job training/picture aid on the equipment together with a QR code link to a brief training video.
- Have staff conduct brief practice sessions using SPHM technology available such as a floor lift and sling every week or so, e.g. practice for 10-15 mins during a scheduled staff meeting.
- Review use of the SPHM technology available at huddles at the start of a shift.
- Designate a specific group of users of SPHM technology for the clinic/work area e.g., 2-3 staff per shift who are the 'go-to' users of the floor lift and ensure they practice applying slings and performing transfers regularly. This approach can be challenging if there is frequent staff turnover.

In a patient clinic setting, understanding a patient's SPHM needs, such as the method of transfer from wheelchair to exam table and the required sling style and size if a lift is used *prior* to arrival, enables staff to plan for the transfer and arrange assistance. For example, scheduling help with the transfer from the SPHM program clinical expert or staff from another clinic who are more experienced in using the clinic lift.

As discussed in **Section 5**, health care providers in clinic settings must ensure that the requirements of the 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design are met. This includes having accessible exam, treatment, and procedure rooms available, as well as the availability of patient lifts for wheelchair to/from exam table transfers. Thus, having a plan to ensure there are caregivers who are competent and readily available to use patient lifts is necessary to meet this ADA regulation. *For more information got to* <https://adata.org/factsheet/accessible-medical-diagnostic-equipment>.



Did You Know?

In January 2023, the US Department of Justice (DOJ) filed a proposed consent decree with a large chain of eye care providers to resolve its lawsuit alleging that the eye care practices discriminated against patients with disabilities requiring assistance transferring from wheelchairs to surgical tables which is a violation of the Americans with Disabilities Act (ADA). As a result of this action, the eye care providers must train staff on the new policy requirements and on safe transfer techniques (including the use of patient lifts) and pay \$950,000 to patients and prospective patients who were harmed by its policies and a civil penalty of \$50,000 (DOJ, 2023).

<https://www.justice.gov/crt/case/us-v-barnet-dulaney-perkins-eye-center-pc>

Section Summary



Safe Patient Handling and Mobility (SPHM) Education and Training

This Section summarizes an approach to designing, delivering, and evaluating effective SPHM education and training programs, based on published research and best practices, together with this author's experience in providing ergonomics and SPHM training to health care and non-health care workers for over 30 years.

Casey et al., states that effective safety training requires workers to be engaged emotionally, mentally, and physically. This engagement leads to new knowledge and skills, improved attitudes, and better safety behaviors. To enable engagement, trainers should apply adult learning principles, ensure training relevance, and tailor it to job and individual needs. After training, ensure concepts are embedded and aligned with existing systems and routines to promote transfer of training (Casey et al., 2021).

This section discusses how to develop an SPHM training program that is effective in providing

- Caregivers with the knowledge and skills they need to be able to know when and how to use SPHM technology and ergonomics best work practices to safely complete patient handling tasks and
- Other SPHM stakeholders will the knowledge and tools to facilitate SPHM program success.

A systematic continuous improvement model for developing an SPHM Training Program is discussed and includes the following steps:

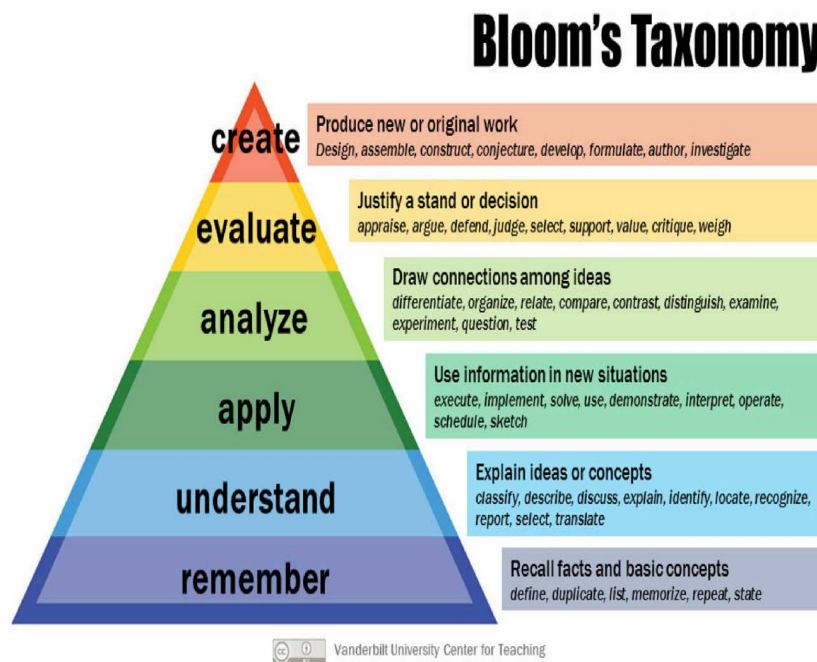
1. Meet with leadership to secure initial commitment for the training program
2. Conduct an SPHM training program needs assessment
3. Develop the SPHM training plan
4. Secure leadership approval of the SPHM training plan
5. Design the SPHM training curriculum and materials
6. Implement the SPHM Training Plan
7. Evaluate the SPHM Training program

*Additional references and resources related to this Section are listed in **Section 10**.*

Appendix A

Creating Learning Objectives for SPHM Training

Bloom's taxonomy is a set of three hierarchical models used for classification of educational learning objectives into levels of complexity and specificity. The three lists cover the learning objectives in cognitive (didactic, data, information), affective (behavior, attitudes, beliefs) and psychomotor (physical skills, motor activity, patterns of activity) domains. All three domains apply to learning about SPHM and acquiring skills related to use of SPHM technology (Wikipedia, 2025; Mechan, 2016).



Cognitive: "What" is it that I need to learn? What knowledge is needed? What are the facts, and the components to be learned? What do I need to know to be successful?

Affective: "Why" do I want to, or should I learn something new. What is the value of the new knowledge or skill? What is the importance to my life?

Psychomotor: "How" do I apply the knowledge? What do I do with my hands and my body? If the task includes materials or things, how do I actually do it? (Arnold & Buchanan, 2022)

The cognitive domain list has been the primary focus of most traditional education and is frequently used to structure curriculum learning objectives, assessments and activities based on hierarchy of cognitive development that students achieve as a result of learning activities.

The affective domain relates to how meaningful education and training activities are to the learner. If training is seen as meaningful and useful to the learner, then the change that is desired because of training is more likely to occur, i.e., use of SPHM technology and practices as a standard of patient care.

All three domains must be considered when developing SPHM-related education and training objectives and competencies, however, the psychomotor domain of learning is the primary and most important as related to safe use of SPHM technology and ergonomics work practices and ultimately the success of the SPHM program. (Mechan, 2016).

Creating Learning Objectives for SPHM Training

Resources for more information about Bloom's taxonomy:

- Bloom's Taxonomy. Wikipedia. https://en.wikipedia.org/wiki/Bloom%27s_taxonomy
- Bloom's Taxonomy. Vanderbilt University. <https://cft.vanderbilt.edu/wp-content/uploads/sites/59/BloomsTaxonomy-mary-forehand.pdf>
- The Center for Innovative Teaching and Learning (CITL) at Northern Illinois University <https://www.niu.edu/citl/resources/guides/instructional-guide/blooms-taxonomy.shtml#:~:text=Original%20and%20Revised%20Taxonomies,practices%20of%20the%2021st%20century.>

There are other models for learning that propose a more holistic and non-linear or hierarchical approach to learning that are also worth considering when developing training curriculum such as Fink's taxonomy of significant learning.

- Fink's taxonomy of significant learning, what it is and how to use it in teaching. Teaching Commons, York University https://www.yorku.ca/teachingcommons/wp-content/uploads/sites/38/2023/11/Food_for_Thought-16-Finks-Taxonomy-of-Significant-Learning.pdf
- Intentional College Teaching. Fink's Taxonomy of Significant Learning <https://intentionalcollegeteaching.org/finks-taxonomy-of-significant-learning/>
- Fink, L. D. (2013). Creating significant learning experiences, revised and updated: An integrated approach to designing college courses. Jossey-Bass.

Appendix B

Learning Style

One commonly recognized model of learning is VAK which proposed that there are 3 general types of learners: visual learners, auditory learners, and kinesthetic learners (Wikipedia, 2025).

- Visual learners prefer to see or visualize what they are learning e.g., they absorb and retain information better when it is presented in, for example, pictures, diagrams, and charts. Video and demonstration may be more effective methods to deliver SPHM training for these learners with the key being to help create a mental visualization for the learner
- Auditory learners prefer listening to what is being presented. He or she responds best to voices, for example, in a lecture or group discussion, having instructions read to them or spoken to them as they work out a task. Hearing their own voice repeating something back to a tutor or trainer is also helpful.
- Kinesthetic learners prefer a physical experience when they can touch, feel, and experience the tasks being learned e.g., hands-on simulation training and role play.

In reality, research shows that multimodal approach that incorporates all three of these styles can be a more effective teaching strategy (Perez, 2016).

Generational Learning Style

The health care workforce consists of individuals from 4 different generations. Each generation has a preferred learning style although these are not defined by specific date but are defined more by life experiences and events that shaped behaviors and perceptions (Perez, 2016).

Generation	Learning Style & SPHM
Baby Boomers (1946-1964)	• Enjoy face-to-face and verbal instruction e.g. In-person group training with case studies; lecture, detailed handouts and taking notes • Enjoy sharing experiences within groups • Engage through case studies • Utilize traditional resources like books, manuals, and PowerPoint • Enjoy sharing experiences within groups • May make good SPHM champions due to experience and affinity for teamwork, discussions, and mentoring suggest this as a logical choice

Safe Patient Handling and Mobility – Section 6

Generation	Learning Style & SPHM
Generation X (1965-1980)	• Prefer hands-on learning activities, games • Enjoy interactive learning sessions e.g., Interactive computer based SPHM training; self-paced learning; uses detailed study guides • Like blended learning methods including online and classroom content • Comfortable with technology • Like practical reality-based/visual learning in less formal environment e.g., a skills fair prefers straightforward information and likely select learning in the easiest and fastest way possible
Millennials (Generation Y) (1981-1996)	• Enjoy integration of technology in learning environment • Visually literate; more comfortable with graphics and infographics • Learn by doing • Gravitate toward projects where they feel they make an impact • Enjoy collaborative projects and group activities e.g., simulation with feedback • Prefer a structured environment and expect learning to be fun.
Generation Z (1997 -2012)	• Enjoy integration of technology in learning environment • Dislike lectures; prefer microlearning such as podcasts, blogs, and short informational content delivery • Prefer to learn online and read on mobile devices • Like self-paced learning • Prefer active learning methods such as role play • View instructor as a facilitator, not necessarily as an authority • Comfortable with using technology and social media in learning activities • Benefits from a “meddler-in-the-middle” approach, where instructors work alongside learners helping them navigate through information and modeling that it is okay to make mistakes.

Source: Monaghan, 2019; Moore et al, 2021; Tussing, et al., 2024

Safe Patient Handling and Mobility – Section 6

Related Resources

More G et al., (2021) Generational learning preferences American Nurse Journal. 16(12),33-36.

<https://www.myamericannurse.com/wp-content/uploads/2021/12/an12-Generational-learning-1201.pdf>

Hart, S. (2017). Today's learners and educators: Bridging the generational gaps. Teaching and Learning in Nursing, 12(4), 253-257. [https://childrenswi.org/-/media/chwlibrary/files/medical-](https://childrenswi.org/-/media/chwlibrary/files/medical-professionals/careers/students/nursing-students/preceptors/bridgingthegenerationalgaps.pdf)

[professionals/careers/students/nursing-students/preceptors/bridgingthegenerationalgaps.pdf](https://childrenswi.org/-/media/chwlibrary/files/medical-professionals/careers/students/nursing-students/preceptors/bridgingthegenerationalgaps.pdf)

Tussing, T. E., Chipps, E., & Tornwall, J. (2024). Generational Differences in the Nursing Workforce:

Strategies for Nurse Leaders. Nurse Leader. [https://www.nurseleader.com/article/S1541-4612\(24\)00047-8/pdf](https://www.nurseleader.com/article/S1541-4612(24)00047-8/pdf)

Teaching Across Generations. Govenor's States University. https://www.govst.edu/ctl/teaching-pedagogical-resources/teaching_across_generations/

A Guide to Leading the Multigenerational Workforce https://onlinemba.unc.edu/wp-content/uploads/sites/10/2021/05/Final_Multigenerational_Workforce_Guide_Optimized_Trial.pdf

Appendix C

Principles of Adult Education

Most students who attend safety and health training sessions are adults who already possess the knowledge, skills, and abilities to work in their current occupations. The objective of safety and health training is to provide additional knowledge, skills, and attitudes to assist workers in recognizing and taking action to correct hazards in their current work environments.

The following are the basic principles of how adults learn, which are directly applicable to safety and health training programs:

- **Adults are voluntary learners:** Most adults learn because they want to. They learn best when they have decided they need to learn for a particular reason.
- **Adults learn needed information quickly:** Adults need to see that the subject matter and the methods are relevant to their lives and to what they want to learn. They have a right to know why the information is important to them.
- **Adults come with a good deal of life experience that needs to be acknowledged:** They should be encouraged to share their experiences and knowledge.
- **Adults need to be treated with respect:** They resent an instructor who talks down to them or ignores their ideas and concerns.
- **Adults learn more when they participate in the learning process:** Adults need to be involved and actively participate in class.
- **Adults learn best by doing:** Adults need to “try-on” and practice what they are learning. They will retain more information when they use and practice their knowledge and skills in class.
- **Adults need to know where they are heading:** Learners need “route maps” with clear objectives. Each new piece of information needs to build logically on the last.
- **Adults learn best when new information is reinforced and repeated:** Adults need to hear things more than once. They need time to master new knowledge, skills, and attitudes. They need to have this mastery reinforced at every opportunity.
- **Adults learn better when information is presented in different ways:** They will learn better when an instructor uses a variety of teaching techniques.
- Three kinds of “learning exchanges” should be used during training:
 - **Participant-to-Participant:** “Participant-to-participant” learning exchange recognizes that participants can learn from one another’s experiences. Participant-to-participant exchanges should be a key feature of the training.
 - **Participant-to-Facilitator:** Facilitators can learn as much from training sessions as participants do. On many subjects, a group of participants may have more extensive knowledge and experience in certain areas than a facilitator.

Principles of Adult Education

- **Facilitator-to-Participant:** Classroom learning needs structure. A facilitator's role is to guide discussions, encourage participation, draw out and/or add information as needed, and highlight key issues and points.

Source: Best Practices for the Development, Delivery, and Evaluation of Susan Harwood Training Grants OSHA 3686-09 2010. <https://www.osha.gov/harwoodgrants/best-practices#7>

The following resources provide more information about the principles of adult:

- 8 Types of Learning Styles | The Definitive Guide. March 7, 2024. Bay Atlantic University <https://bau.edu/blog/types-of-learning-styles/>
- 10 Simple Principles of Adult Learning. Western Governors University <https://www.wgu.edu/blog/adult-learning-theories-principles2004.html>
- TEAL Center Fact Sheet No. 11: Adult Learning Theories Adult Learning Theory 2011. The Literacy Information and Communication System (LINCS) https://lincs.ed.gov/sites/default/files/11_%20TEAL_Adult_Learning_Theory.pdf

Appendix D

Characteristics of Sound Training Programs – OSHA

A general review of training “best practices” reveals four characteristics that sound training programs have in common. The best training programs are accurate, credible, clear, and practical.

1. **Accurate.** Training materials should be prepared by qualified individuals, updated as needed, and facilitated by appropriately qualified and experienced individuals employing appropriate training techniques and methods.
2. **Credible.** Training facilitators should have a general safety and health background or be a subject matter expert in a health or safety-related field. They should also have experience training adults or experience working with the target population. Practical experience in the field of safety and health as well as experience in training facilitation contribute to a higher degree of facilitator credibility.
3. **Clear.** Training programs must not only be accurate and believable, but they must also be clear and understandable to the participant. If the material is only understandable to someone with a college education or someone who understands the jargon, then the program falls short of meeting workers’ needs.
 - Training materials should be written in the language and grammar of the everyday speech of the participants. Training developers should ensure that readability and language choices match the intended audience.
 - If an employee does not speak or comprehend English, instruction must be provided in a language that the employee can understand. Similarly, if the employee’s vocabulary is limited or there is evidence of low literacy among participants, the training must account for this limitation. Remember that workers may be fluent in a language other than English, or they may have low literacy in both English and their primary language. Training needs to be adjusted to accommodate all the factors that are present.
4. **Practical.** Training programs should present information, ideas, and skills that participants see as directly useful in their working lives.
 - Successful transfer of learning occurs when the participant can see how information presented in a training session can be applied in the workplace.

Source:

‘Best Practices for the Development, Delivery, and Evaluation of Susan Harwood Training’ Grants’
<https://www.osha.gov/dte/sharwood/best-practices.html>

Resource for Development and Delivery of Training to Workers. OSHA 3824-05R 2021. U.S. Department of Labor Occupational Safety and Health Administration
<https://www.osha.gov/sites/default/files/publications/osh3824.pdf>

Safe Patient Handling and Mobility – Section 6

References and Resources Used in this Section

- Accident Compensation Corporation. (2012). ACC6075 moving and handling people guidelines. Accident Compensation Corporation New Zealand. <https://www.acc.co.nz/assets/provider/acc6075-moving-and-handling-people-guidelines.pdf>
- Alamgir, H., Yu, S., & Gorman, E. (2011). Peer coaching and mentoring: A new model of educational intervention for safe patient handling in health care. *American Journal of Industrial Medicine*, 54(8), 609–617.
- American Association of Colleges of Nursing. (2023). Guiding principles for competency-based education and assessment. <https://www.aacnnursing.org/Portals/0/PDFs/Essentials/Guiding-Principles-for-CBE-Assessment.pdf>
- American Association of Colleges of Nursing. (n.d.). What is competency-based education? <https://www.aacnnursing.org/essentials/tool-kit/competency-based-education>
- Arnold, M., & Buchanan, T. (2022, January). Innovation and strategies for SPHM training. Presented for ASPHP webinar.
- Association of Safe Patient Handling Professionals, Inc. (2023, March). Safe patient handling and mobility (SPHM) education in health care student curriculum: A white paper. Warrendale, PA: Author. <https://asphp.org/wp-content/uploads/2023/03/SPHM-Curriculum-White-Paper-March-2023.pdf>
- Augmented reality. (2025, May 23). In Wikipedia. https://en.wikipedia.org/wiki/Augmented_reality
- Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Benner, P. (1983). *From novice to expert: Excellence and power in clinical nursing practice* (pp. 13–34). Menlo Park, CA: Addison-Wesley.
- Benner, P. (1984). *Novice to expert: Excellence and power in clinical nursing practice*. Menlo Park, CA: Addison-Wesley.
- Bloom's taxonomy. (n.d.). In Wikipedia. Retrieved from https://en.wikipedia.org/wiki/Bloom%27s_taxonomy
- Boucaut, R., & Howson, D. (2018). Teaching safe patient handling skills using a peer approach. *Radiologic Technology*, 90, 20–30.
- Casey, T., Turner, N., Hu, X., & Bancroft, K. (2021). Making safety training stickier: A richer model of safety training engagement and transfer. *Journal of safety research*, 78, 303-313.
- Clarke, N. (2013). Transfer of training: The missing link in training and the quality of adult social care. *Health & Social Care in the Community*, 21, 15–25.
- Competence. (n.d.). In Merriam-Webster. <https://www.merriam-webster.com/dictionary/competence>
- Corfman, T., & Beck, D. (2019). Case study of creativity in asynchronous online discussions. *International Journal of Educational Technology in Higher Education*, 16, 22. <https://doi.org/10.1186/s41239-019-0150-5>
- Daily, M. K. (2014). Evaluation of a continued safe patient and handling program (Doctoral dissertation, University of Massachusetts Amherst).
- Daily, M. K. (2014). Evaluation of a continued safe patient and handling program (Doctoral dissertation, University of Massachusetts Amherst) <https://scholarworks.umass.edu/entities/publication/a01f18eb-de23-43c8-83c0-00bb8a4f4b53>
- Donaldson, N. E., Rutledge, D. N., & Ashley, J. (2004). Outcomes of adoption: Measuring evidence uptake by individuals and organizations. *Worldviews on Evidence-Based Nursing*, 1(Suppl 1), S41–S51.
- Durkin, G. J. (2019). Implementation and evaluation of Wright's competency model. *J Nurses Prof Dev.*, 35(6), 305–316.
- Educational aims and objectives. (2025, May 26). In Wikipedia. https://en.wikipedia.org/wiki/Educational_aims_and_objectives
- El Hussein, M. T., & Hirst, S. P. (2023). High-fidelity simulation's impact on clinical reasoning and patient safety: A scoping review. *Journal of Nursing Regulation*, 13(4), 54–65. [https://www.journalofnursingregulation.com/article/S2155-8256\(23\)00028-5/fulltext](https://www.journalofnursingregulation.com/article/S2155-8256(23)00028-5/fulltext)

Safe Patient Handling and Mobility – Section 6

- Eljiz, K., Greenfield, D., Hogden, A., et al. (2020). Improving knowledge translation for increased engagement and impact in healthcare. *BMJ Open Quality*, 9, e000983.
- Enos, L., Eldredge, D., & Rockefeller, K. (2016). Safe patient handling training programs—Measuring transfer of training: A case study. *American Journal of Safe Patient Handling and Movement*, 6(3), 120-129.
- Eustace, R. (2020, August 21). From novice to expert. In P. Benner (Author), *Nursing.net*.
<https://nursology.net/nurse-theories/from-novice-to-expert/>
- Fink, L. D. (2023). Taxonomy of significant learning. York University. https://www.yorku.ca/teachingcommons/wp-content/uploads/sites/38/2023/11/Food_for_Thought-16-Finks-Taxonomy-of-Significant-Learning.pdf
- Fogstad, L., & Christiansen, B. (2011). Moving the boundaries: Peer learning between nursing and physiotherapy students. *Nordic Journal of Nursing Research*, 31 (3), 25–29.
- Four stages of competence. Source: Wikipedia DATE https://en.wikipedia.org/wiki/Four_stages_of_competence. This page was last edited on 23 May 2025, at 13:32 (UTC).
- Fritz, E. A., & Wagner, J. A. R. (2024). Revitalizing and Sustaining a System-Wide Competency Model. *Journal for Nurses in Professional Development*, 40(5), 262-265.
- Gallagher, A., Hares, K., & Wright, D. (2018). International round table discussion: Training and competency in safe patient handling. *International Journal of Safe Patient Handling and Mobility*, 8 (3), 142–152. Visioning Publishers LLC.
- Generational Differences in the Workplace [Infographic] 2024. Purdue University Global.
<https://www.purdueglobal.edu/education-partnerships/generational-workforce-differences-infographic/>
- Gentry, I. (2022). Evidence-based best practice for nursing skills competency assessment: A policy development project for standard work utilizing the Donna Wright competency model (Doctoral project, University of St Augustine for Health Sciences). SOAR @ USA: Student Scholarly Projects Collection.
<https://doi.org/10.46409/sr.USVK9446>
- Goldstein, I. L. (1993). *Training in organizations: Needs assessment, development, and evaluation*. Thomson Brooks/Cole Publishing Co.
- Healthcare Recipient Sling and Hanger Bar Compatibility Guidelines. (April 2016). American Association for Safe Patient Handling and Movement. <https://asph.org/wp-content/uploads/2011/05/AASPHM-Sling-Hanger-Bar-Guidelines-2016.pdf>
- Hernandez, J. M., Munyan, K., Thompson, K., Wilson, C., Arena, S., & Noack, D. (2021). Interprofessional education safe patient handling and mobility workshop for persons of size. *International Journal of Safe Patient Handling & Mobility*, 11 (1), 6–15.
- Hignett, S., & Crumpton, E. (2007). Competency-based training for patient handling. *Applied Ergonomics*, 38(1), 7–17.
- Hogan, D. A. M., Greiner, B.A., & O'Sullivan, L. (2014). The effect of manual handling training on transferring knowledge, employee's behaviour, change and subsequent reduction of work-related musculoskeletal disorders: A systematic review. *Ergonomics*, 5, 93–107. <https://doi.org/10.1080/00140139.2013.862307>
- Waldman, E. (2021, August 31). How to manage a multi-generational team. *Harvard Business Review*.
<https://hbr.org/2021/08/how-to-manage-a-multi-generational-team>
- Jacobs, R., Beyer, E., & Carter, K. (2017). Interprofessional simulation education designed to teach occupational therapy and nursing students complex patient transfers. *Journal of Interprofessional Education & Practice*, 6, 67–70.
<https://doi.org/10.1016/j.xjep.2016.12.002>
- Kanaskie, M. L., & Snyder, C. (2018). Nurses and nursing assistants' decision-making regarding use of safe patient handling and mobility technology: A qualitative study. *Applied Nursing Research*, 39, 141–147.
- Kaplan, A. D., Cruik, J., Endsley, M., Beers, S. M., Sawyer, B. D., & Hancock, P. A. (2021). The effects of virtual reality, augmented reality, and mixed reality as training enhancement methods: A meta-analysis. *Human Factors*, 63(4), 706–726.
- Knibbe, H., Knibb, N. E., & Klassen, A. (2012). Ergo Coaches: Peer leaders promoting ergonomic changes—Exploring their profile and effect. *One Time Download*, 2(3), 93–99.

Safe Patient Handling and Mobility – Section 6

- Knibbe, J. J., Knibbe, N. E., & Waaijer, E. (2012). Flying through the hospital: Efficiency and safety of an ergonomic solution. *Work*, 41(Supplement 1), 5642–5643.
- Krill, C., Staffileno, B. A., & Raven, C. (2012). Empowering staff nurses to use research to change practice for safe patient handling. *Nursing Outlook*, 60(3), 157–162.
- Learning styles. (2025, May 23). In Wikipedia. https://en.wikipedia.org/wiki/Learning_styles
- Lee, C., Knight, S. W., Smith, S. L., Nagle, D. J., & DeVries, L. (2018). Safe patient handling and mobility: Development and implementation of a large-scale education program. *Critical Care Nursing Quarterly*, 41(3), 253–263.
- Lewis, L. S., Rebesch, L. M., & Hunt, E. (2022). Nursing education practice update 2022: Competency-based education in nursing. *SAGE Open Nursing*, 8, 23779608221140774.
- Lorio, A., Florman, T., Gore, J., Housley, S., & Nelson, M. (2016). Power of peer-assisted learning: An interdisciplinary mobility laboratory experience. *Journal of Nursing Education*, 55 (2), 83–86.
- Martimo, K. P., Verbeek, J., Karppinen, J., Furlan, A. D., Takala, E. P., Kuijter, P. P. F., & Viikari-Juntura, E. (2008). Effect of training and lifting equipment for preventing back pain in lifting and handling: Systematic review. *BMJ*, 336(7641), 429–431.
- Martin, F., Sun, T., & Westine, C. D. (2020). A systematic review of research on online teaching and learning from 2009 to 2018. *Computers & Education*, 159, 104009.
- Marzano, R. J. (2010). *Designing & teaching learning goals & objectives*. Solution Tree Press.
- Matz, M., Celona, J., Martin, M., McCoskey, K., & Nelson, G. G. (2019). Patient handling and mobility assessments (2nd ed.). https://www.fgiguideguidelines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf
- Mechan, P. (2014). Challenging the myth that it takes too long to use safe patient handling and mobility technology: A task time investigation. *American Journal of Safe Patient Handling & Movement*, 4, 46–51.
- Mechan, P. (2016). Recommendations for teaching and learning skills with SPHM technology. *American Journal of Safe Patient Handling & Mobility*, 6(3), 104–108. Copyright © 2016 Visioning Publishers LLC.
- Merriam-Webster. (n.d.). Education. <https://www.merriam-webster.com/dictionary/education#:~:text=%3A%20the%20knowledge%20and%20development%20resulting,teaching%20and%20learning%20in%20schools>
- Merriam-Webster. (n.d.). ND competencies. https://en.wikipedia.org/wiki/Four_stages_of_competence
- Mink, J., Mitzkat, A., Krug, K., Mihaljevic, A., Trierweiler-Hauke, B., Götsch, B., ... & Mahler, C. (2021). Impact of an interprofessional training ward on interprofessional competencies—a quantitative longitudinal study. *Journal of Interprofessional Care*, 35(5), 751–759.
- Monaghan, H. (2011). Selecting effective training and education strategies as part of a safe patient handling and movement program. *American Journal of Safe Patient Handling and Movement*, 1(4), 17–21.
- Monaghan, H. M. (2019). Making safe patient handling and mobility training effective. Part 1: What to teach, where and when to teach it, and how to teach it. *International Journal of Safe Patient Handling & Mobility*, 9, 143–148.
- Monaghan, H. M. (2020). Making safe patient handling and mobility training effective. Part 2: Assessing competent practice. *International Journal of Safe Patient Handling & Mobility*, 10, 37–41.
- Moore, G., Parker, S., & Baksh, L. (2021). Generational learning preferences: Target patient teaching to match generational and individual needs. *American Nurse Journal*, 16(12), 33–37. <https://www.myamericannurse.com/wp-content/uploads/2021/12/an12-Generational-learning-1201.pdf>
- Nelson, A., & Baptiste, A. S. (2006). Evidence-based practices for safe patient handling and movement. *Orthopaedic Nursing*, 25(6), 366–379.
- Nelson, A., Motacki, M. K., & Menzel, N. N. (2009). *The illustrated guide to safe patient handling and movement*. Springer Publishing Company.
- Noble, N. L., & Sweeney, N. L. (2018). Barriers to the use of assistive devices in patient handling. *Workplace Health & Safety*, 66, 41–48. <https://doi.org/10.1016/j.xjep.2016.12.002>

Safe Patient Handling and Mobility – Section 6

- Norris, M. W., Spicer, K., & Byrd, T. (2019). Virtual reality: the new pathway for effective safety training. *Professional Safety*, 64(06), 36-39.
- Nursing Theory. (n.d.). From novice to expert. <https://nursing-theory.org/theories-and-models/from-novice-to-expert.php>
- O'Donnell, J. M. (2009). Development of an optimal patient transfer task set and simulation-based intervention to reduce musculoskeletal injury in healthcare workers. Ann Arbor, University of Pittsburgh. 3417439: 146-n/a
- O'Donnell, J. M., Goode Jr, J. S., Henker, R., Kelsey, S., Bircher, N. G., Peele, P., ... & Sutton-Tyrrell, K. (2011). Effect of a simulation educational intervention on knowledge, attitude, and patient transfer skills: from the simulation laboratory to the clinical setting. *Simulation in Healthcare*, 6(2), 84-93.
- O'Donnell, J. M., Goode Jr, J. S., Henker, R. A., Kelsey, S., Bircher, N., Peele, P., ... & Sutton-Tyrrell, K. (2012). An ergonomic protocol for patient transfer that can be successfully taught using simulation methods. *Clinical Simulation in Nursing*, 8(1), e3-e14.
- Oosterom, N., Floren, L. C., Ten Cate, O., & Westerveld, H. E. (2019). A review of interprofessional training wards: Enhancing student learning and patient outcomes. *Medical Teacher*, 41(5), 547–554.
- Patocka, C., Pandya, A., Brennan, E., Lacroix, L., Anderson, I., Ganshorn, H., & Hall, A. K. (2024). The impact of just-in-time simulation training for healthcare professionals on learning and performance outcomes: a systematic review. *Simulation in Healthcare*, 19(1S), S32-S40.
- Perez, A. (2016). An evidence-based approach to safe patient handling and mobility education. *International Journal of Safe Patient Handling & Mobility*, 6, 113–119.
- Perez, A., Rendahl, T., Murray, E., & Monaghan, H. (2012). Safe patient handling & movement: Equipment safety. *American Journal of Patient Handling and Movement*, 2(4, Supplement), S1–S17.
- Powell-Cope, G., Pippins, K. M., & Young, H. M. (2017). Teaching family caregivers to assist safely with mobility. *American Journal of Nursing*, 117(12), 49–53. <https://doi.org/10.1097/01.NAJ.0000527485.94115.7e>
- Powell-Cope, G., Toyinbo, P., Patel, N., & others. (2014). Effects of a national safe patient handling program on nursing injury incidence rates. *Journal of Nursing Administration*, 44(10), 525–534.
- Reid, S. A., & Mirka, G. A. (2007). Learning curve analysis of a patient lift-assist device. *Applied ergonomics*, 38(6), 765-771.
- Richardson, A., McNoe, B., Derrett, S., & Harcombe, H. (2018). Interventions to prevent and reduce the impact of musculoskeletal injuries among nurses: A systematic review. *International Journal of Nursing Studies*, 82, 58–67.
- Roberts, T. (2020). Simulation to teach safe patient handling and mobility for home caregivers. *Home Health Care Management & Practice*, 32, 206–210. <https://doi.org/10.1177/1084822320925801>
- Rolando, J., Wijekumar, K., & Barnes, R. (2018). VR training software: Research shows strong results for learners. *Professional Safety*, 63(12), 35-38.
- Roy, A., Joseph, Y., & Bannan, K. (2020). Role of structured safe patient handling training for new-hire nursing staff on reducing musculoskeletal injuries, staff empowerment, and knowledge translation. *International Journal of Safe Patient Handling and Mobility*, 10(4), 121–125.
- Schroth, L. A., St Pierre, E. J., & Hody, B. J. (2023). Are my workers competent in EHS? Competency-based training to improve learning. *Professional Safety*, 68(12), 30-37.
- Shanks, S. L. (2019). Wright's competency model and quality and safety competencies (Doctoral dissertation, Walden University). <https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=7946&context=dissertations>
- Shorey, S., Chan, V., Rajendran, P., & Ang, E. (2021). Learning styles, preferences and needs of generation Z healthcare students: Scoping review. *Nurse education in practice*, 57, 103247.
- Simulation-based Experiential Learning Faculty Toolkit. (2021). Queens University. <https://www.queensu.ca/experientiallearninghub/faculty/simulation-based-el-faculty-toolkit>
- Skoglund-Öhman, I., & Kjellberg, K. (2011). Factors that influence the use of safe patient transfer technique in home care service. *International Journal of Occupational Safety and Ergonomics*, 17 (4), 433–444.
- Smith, J. (2013). HOP6 The guide to handling of people: A systems approach. Backcare, Teddington, UK.

Safe Patient Handling and Mobility – Section 6

- Smith, J., Simpson, P., & Fray, M. (2023). HOP7: The guide to handling of people. Person-centered practice. Backcare.
- Smolen, P., Zhang, Y., & Byrne, J. H. (2016). The right time to learn: Mechanisms and optimization of spaced learning. *Nature Reviews Neuroscience*, 17(2), 77–88.
- Spaulding, E. M., Marvel, F. A., Jacob, E., Rahman, A., Hansen, B. R., Hanyok, L. A., & Han, H. R. (2021). Interprofessional education and collaboration among healthcare students and professionals: A systematic review and call for action. *Journal of Interprofessional Care*, 35(4), 612–621.
- Stevens, L., Rees, S., Lamb, K. V., & Dalsing, D. (2013). Creating a culture of safety for safe patient handling. *Orthopedic Nursing*, 32, 155–164.
- Montgomery College. (n.d.). Teaching Multiple Generations. https://www.montgomerycollege.edu/_documents/offices/elite/teaching-multiple-generations.pdf
- Theis, J. L., & Finkelstein, M. J. (2014). Long-term effects of safe patient handling program on staff injuries. *Rehabilitation Nursing Journal*, 39(1), 26–35.
- Thomas, D. R., & Thomas, Y. L. (2014). Interventions to reduce injuries when transferring patients: A critical appraisal of reviews and a realist synthesis. *International Journal of Nursing Studies*, 51(10), 1381–1394.
- Training. (n.d.). In Cambridge Dictionary. https://dictionary.cambridge.org/us/dictionary/english/training#google_vignette
- Tussing, T. E., Chipps, E., & Tornwall, J. (2024). Generational differences in the nursing workforce: Strategies for nurse leaders. *Nurse Leader*, 22(5), 602–608.
- UAMS Health. (n.d.). Benner's stages of clinical competence. <https://uamshealth.com/nurses/wp-content/uploads/sites/19/2023/01/Benners-Stages-of-Clinical-Competence.pdf>
- University of North Texas. (n.d.). Knowledge, skills, & abilities (KSA) bank. https://hr.untsystem.edu/sites/default/files/ksa_bank_06012022.pdf
- Vaona, S. A., Banzi, R., Kwag, K. H., Rigon, G., Cereda, D., Pecoraro, V., ... & Moja, L. (2018). E-learning for health professionals. *Cochrane Database of Systematic Reviews*, 2018(1). <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD011736.pub2/full>
- Virtual reality. (2025, May 23). In Wikipedia. https://en.wikipedia.org/wiki/Virtual_reality
- Wanless, S. (2017). Applying theories of health behavior and change to moving and handling practice. *International Journal of Safe Patient Handling & Mobility (Healthcare Training)*, 7(3), 105–109.
- Ward, B. (2020). Case study: VR at Vanderbilt. *Patient Safety Monitor Journal*, 21(9).
- Warming, S., Ebbelhøj, N. E., Wiese, N., Larsen, L. H., Duckert, J., and Tønnesen, H. (2008). Little effect of transfer technique instruction and physical fitness training in reducing low back pain among nurses: A cluster randomized intervention study. *Ergonomics*, 51, 1530–1548.
- Wensing, M., & Grol, R. (2019). Knowledge translation in health: How implementation science could contribute more. *BMC Medicine*, 17, 88. <https://pubmed.ncbi.nlm.nih.gov/31064388/>
- Western New York Council on Occupational Safety and Health. (2016). Safe patient handling workgroup report to the Commissioner of Health. New York State Department of Health. https://www.health.ny.gov/statistics/safe_patient_handling/docs/sph_report.pdf
- Wiggermann, N., Francis, R., & Solomon, A. (2024). Individual and organizational factors associated with injury history and patient handling behaviors: Results from a nationwide survey of healthcare workers. *Applied Ergonomics*, 118, 104251.
- Wright, D. K. (2005). The ultimate guide to competency assessment in health care (3rd ed.). Creative Health Care Management.
- Wright, D. K. (2021). The ultimate guide to competency assessment in health care (4th ed.). Creative Health Care Management.

SPHM Program Implementation

Contents

SPHM Program Implementation	1
Summary of SPHM Program Activities Completed So Far (Sections 1-6)	1
Step 13. Implement the SPHM program	2
Managing Implementation of the SPHM Program Plan and Related Activities	2
Planning for implementation	2
Considerations when implementing the program	3
Pilot Testing the SPHM Program.....	4
Considerations when choosing a pilot program	4
Considerations when planning and conducting a pilot program	5
<i>Figure 7.1 Example of SPHM Implementation Program on a Pilot Unit/Department.</i>	6
<i>Table 7.1 SPHM Technology and Essential Standard Operating Procedures.</i>	8
Other Program Activities that may be Conducted Concurrently with Pilot program Initiatives	9
<i>Table 7.2 SPHM Policy and Procedures for Specific Patient Populations and Patient Handling Tasks.</i>	11
Selecting, Purchasing, and Installing SPHM Technology	12
SPHM equipment evaluation process.....	13
Considerations when choosing SPHM technology	13
Overall considerations when evaluating SPHM technology	13
Key factors that influence SPHM technology selection in care settings.....	14
Planning for evaluation of SPHM technology	17
Incident Reporting, Response and Management	19
Incident and Near Miss Reporting and Investigation Systems	19
Facilitating the reporting of incidents and near misses related to patient handling activities	20
Incident and Near Miss Investigation	21
After Action Reviews.....	21
Safety Huddles	22
Injury Management of WMSDs and Return to Work Programs	23
Managing Change and Making it Stick	24
<i>Figure 7.2 Integrating SPHM into a Health Care Organization's Culture.</i>	28
Section Summary	29
References and Resources Used in this Section	30

SPHM Program Implementation

Summary of SPHM Program Activities Completed So Far (Sections 1-6)

At this point in the development or enhancement of your SPHM program, the following activities should have been completed:

- Defined the need for a program or program enhancement.
- Built the foundation for the successful program implementation and maintenance including ensuring support from senior leadership and key stakeholders.
- Identified program goals, assessed, and prioritized specific hazards, risks, and program needs.
- Identified strategies to address hazards, risks, and program needs based on regulatory requirements, the ANA SPHM standards, and published evidence including best practices, etc.
- Developed an SPHM policy including mechanisms to address accountability.
- Have begun the process of transitioning from a culture of manual patient handling to SPHM.

Tools that Support Content in this Section

7a. Sample program implementation plan

7b. SPHM budget template

7c. Equipment trial evaluation survey

7d. Tips for Root Cause Analysis of WMSDs

You have also developed an SPHM program plan that details strategies for each program activity that is to be implemented including:

- The roles and responsibilities of stakeholders i.e., committee and others who will implement the plan.
- Prioritization of implementation activities based on severity and importance of the hazards and risks to be addressed.
- Program design and activities e.g., use a pilot approach on one or more units/departments
- Resources needed and available for implementation, and ongoing support of solutions and new processes. These include a draft budget, which will be submitted for approval by leadership after SPHM technology trials are completed and required personnel and time, etc.
- Implementation timelines for each program activity.
- Strategies to evaluate, monitor, adapt the program as needed, together with documentation of solutions and processes implemented (**Section 8**).
- Communication strategies for engaging stakeholder groups and sharing progress of program implementation and outcomes.
- Plans for sustaining the SPHM program. (**Section 9**)
- SPHM education and training plans to help employees learn new practices. *These will be finalized after SPHM technology is chosen.*

Safe Patient Handling and Mobility – Section 7

- Strategies to address barriers and facilitators that consider the organization's culture and readiness to change and thus enable program implementation.

Step 13

Implement the SPHM program

Managing Implementation of the SPHM Program Plan and Related Activities

Planning for implementation

Once your SPHM program plan is complete and approved by leadership, you can move forward with implementing the tactical elements of the plan.

As mentioned in **Section 4**, it is necessary to trial and select SPHM technology for high-priority units and departments that have been selected to start the program and then finalize the budget for technology and training *before* implementing other program elements (*Refer to Selecting, Purchasing, and Installing SPHM Technology on page 7-12*).

Other program components that will need to be finalized before program implementation on target units/departs include:

- Any physical infrastructure changes that may be needed to accommodate SPHM technology such as ceiling/overhead lifts
- SPHM patient mobility assessment protocols (*Refer to Section 5*)
- Standard operating procedures for storage, cleaning, supply, and maintenance of SPHM technology (**Table 7.1**) and
- Finalizing unit SPHM champion and employee training plans (*Refer to Section 6*).

Implementation strategies can differ based on whether a new program is implemented or an existing program is to be enhanced.

Typically, the program coordinator together with the SPHM committee are responsible for program implementation. However, program implementation also requires planning with all stakeholders, including individuals and departments that will be responsible for various program activities, including those in pilot units or departments. *Pilot testing the SPHM program is discussed on page 7-4.*

Ensure that stakeholders understand their role, the deliverables they are responsible for, and timelines for completion.

Program implementation will only be successful with the support of leadership, middle management, and support service departments.

The SPHM program champion plays a vital role in facilitating implementation activities. The SPHM coordinator, committee and others who are implementing the program can cite champion leadership as evidence of a commitment to cultural change when facing barriers.

Safe Patient Handling and Mobility – Section 7

Considerations when implementing the program

- Apply a continuous performance improvement approach when implementing the SPHM program so that strategies to address emerging issues can be adapted based on feedback and results.
- Regularly monitor progress (including the use of budgetary expenses) toward your objectives and respond quickly to information or data that indicates implementation activities are not going as planned. Identify and address the need for any additional resources that are required as implementation occurs.
- Review if strategies used to implement program elements are working. Lessons learned will facilitate roll-out of the program to other units/departments in the future.
- Review the need for subcommittees/work groups to meet frequently when developing specific program elements such as SPHM patient mobility assessment protocols, and SPHM policy and procedures for specific patient populations and patient handling tasks. Developing these program elements requires frequent meetings to meet program implementation timelines. More frequent meetings of the SPHM committee may also be needed to maintain momentum during program implementation.
- Ensure that work overload is avoided for employees who take on new responsibilities during the implementation process.
- Do not forget to communicate proposed and actual changes in program implementation activities to stakeholders including leadership and solicit their input as appropriate.
- The SPHM program coordinator and SPHM committee should periodically *step back* from reviewing the details of implementing specific activities to view the big picture perspective when monitoring program progress. It is easy to get sidetracked or stuck spending a majority of committee time on implementing one activity.



Quick Tip

Successful implementation of any safety program takes time and can be facilitated by applying principles of project management. Find out if your organization, e.g., from Quality or Safety departments, uses any specific project management processes, tools, or templates.

Use project management software if available or adapt project planning tools provided in this toolkit.

- **AHRQ Project Planning and Management**
<https://healthit.ahrq.gov/health-it-tools-and-resources/evaluation-resources/workflow-assessment-health-it-toolkit/all-workflow-tools/project>
- **IHI Project Planning Form**
<https://www.ihl.org/resources/tools/project-planning-form>
- **IHI Quality Improvement Essentials Toolkit**
<https://www.ihl.org/resources/tools/quality-improvement-essentials-toolkit>

Additional resources are provided in *Section 10*

Additionally, when choosing *how* to implement solutions that require a change in behaviors or practice in health care, a combination of various approaches is more effective (RNAO, 2012).

Safe Patient Handling and Mobility – Section 7

- Strategies to address barriers when implementing the SPHM program should have been defined during program planning activities (**Sections 2-4**). However, stakeholders implementing the program should still be prepared to promptly address unexpected resistance to change that may occur during implementation. Unit/department managers should have responsibility for communicating concerns to the SPHM program coordinator and committee and lead efforts to address them.

Managing Change is discussed on **page 7-24**. More information about addressing common barriers and resistance to change when implementing an SPHM program is provided in **Section 1**.

Pilot Testing the SPHM Program

Conducting a pilot test allows you to:

- Evaluate SPHM technology solutions and related program processes to identify areas for improvement prior to expanding the program to additional units or departments.
- Consider how chosen SPHM technology and processes work or *fit* with existing care delivery procedures and processes, the physical environment, and work culture, etc.
- Identify if there are any unintended consequences of SPHM related interventions e.g., a technology solution and/or process had a negative impact on patient care or created other safety issues.
- Evaluate how well the proposed intervention(s) will meet desired objectives e.g., to what degree is the risk of caregiver injuries related to patient handling activities reduced and/or controlled; are early mobility programs goals met etc.
- Prevent waste of resources such as money and time.
- Encourage greater employee “buy-in” by soliciting feedback about the intervention thus providing a foundation for culture change and successor of the intervention.
- Minimize disruption of work processes on a large scale within a facility.

Considerations when choosing a pilot program

Pilot unit(s) and/or department(s) should have been identified during program planning and a draft plan for implementing a pilot program discussed when determining initial program implementation activities (**Refer to Section 3**).

Pilot units/departments are typically the areas experiencing high injury rates associated with patient handling where the effects of the SPHM pilot will be easily visible.

However, to increase the likelihood of program success consider the following factors when choosing a pilot location:

- Leadership and staff must be enthusiastic and committed to participating in the project. Consider units/departments where caregivers are more likely to embrace the opportunity for improvement and adopt new processes more easily. Implementing new initiatives in units/departments with high staff turnover and/or with a manager who is new to the area and who is also to the management role, can be more challenging and time-consuming.

Safe Patient Handling and Mobility – Section 7

- Use lessons learned from other recent efforts to pilot and implement new programs at your facility. This information together with data from the SPHM employee surveys and interviews and the site visits will help to confirm if a pilot location is suitable.
- SPHM unit-champions or coaches have been identified who will be able to provide caregivers support and coaching that will be key during pilot program implementation (**Refer to Tool 4g**). Unit champions are specially qualified to support and coach caregivers during the pilot program. Champions may have been identified during program planning activities. If not, identify them early in pilot program planning activities.

If SPHM unit champions are not included in the program plan, consider alternative methods for providing on-unit, just-in-time SPHM clinical support for staff during pilot implementation.
- Avoid conducting a pilot test in a work area where other new projects are being implemented that may strain resources and staff time to participate in your pilot.

Considerations when planning and conducting a pilot program

- Team members from the pilot unit/department should collaborate with the SPHM project coordinator and committee to plan and implement the pilot, ensuring representation from all caregiver roles, employees on the unit, and shifts.
- Provide training/instruction as needed to stakeholders involved in the pilot program before planning begins e.g., managers and supervisors as well as the unit/department pilot implementation team need education about principles of SPHM, the facility SPHM program plan and SPHM policy etc.
- Identify the steps needed to prepare for the pilot program. **Refer to Figure 7.1. Tool 7a provides a sample implementation plan.**
- Establish a pilot timeframe long enough to ensure integration into operations and enable the collection and analysis of impact data.¹

The pilot should be completed within the timeframe unless unforeseen issues arise. When pilot programs are poorly planned and implemented, organizations can get *stuck* in the pilot phase of new initiatives without successfully implementing them on a larger scale.

- Determine how you will evaluate the pilot activities (SPHM technology and processes), i.e., what data will you need to determine whether your interventions are making a difference? (**Refer to Sections 4 and 8**)

Injury and cost data collected in the program planning phase together with survey and onsite assessment data will provide the pre-implementation baseline data for measurement of the pilot.

- Determine the best communication methods for all stakeholders involved. The SPHM communications plan should be used to facilitate this process.
- Communicate the pilot implementation plan to all stakeholders involved and address any concerns.

Safe Patient Handling and Mobility – Section 7

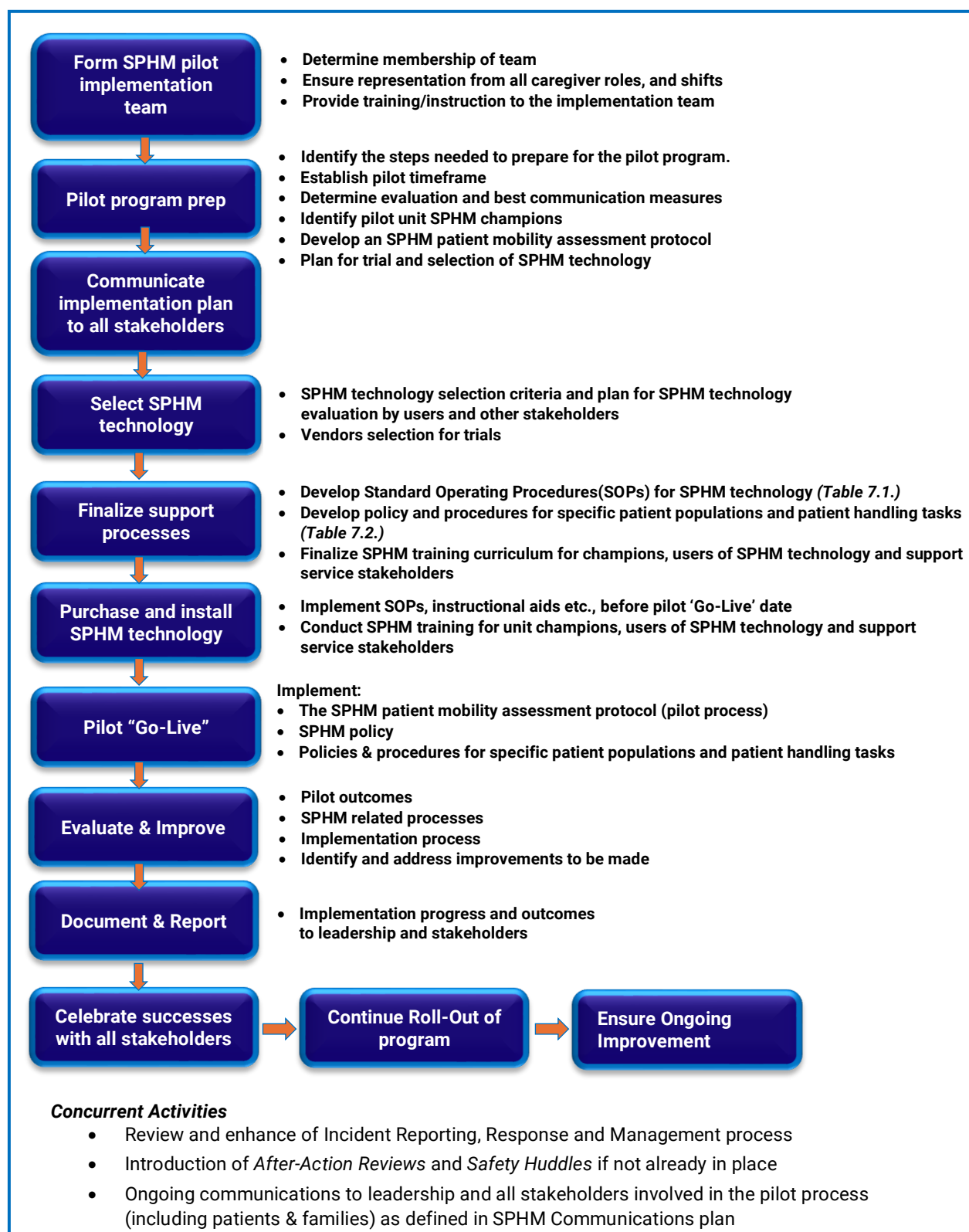


Figure 7.1 Example of SPHM Implementation Program on a Pilot Unit/Department.

Safe Patient Handling and Mobility – Section 7

Considerations when planning and conducting a pilot program *continued*.

- Identify unit SPHM unit champions or coaches if not yet done.
- Plan for trial and selection of SPHM technology (*Refer to page 7-12*)
- Develop other key SPHM processes, policies, and procedures. These include:
 - A SPHM patient mobility assessment protocol (*Refer to Section 5*)
 - Standard operating procedures for SPHM technology (*Refer to Table 7.1*) and
 - SPHM policy and procedures for specific patient populations and patient handling tasks (*Refer to Table 7.2*)
- After choosing, purchasing, and installing SPHM technology and implementing SOPs, provide training for unit-based champions, caregivers, and relevant support service staff as outlined in your SPHM education plan (*Tool 6a*). Ensure training occurs when the technology is ready to use to support retention of caregiver SPHM skills
- Use employee surveys, interviews, and observations (if appropriate) to solicit feedback during and after implementation of the pilot program. Make sure to talk to and observe employees on all shifts including weekends and nights to ensure the inclusion of all staff. Find out what is working well and what is not, and why, and capture ideas that employees have to improve processes etc.
- Maintain documentation of all activities and outcomes.
- Evaluate outcome data such as the percentage changes in the number, rate, and cost of WMSDs associated with patient handling; employee survey responses; and observed and/or quantified (through ergonomics analysis) changes in WMSD risk before and after pilot implementation (*Refer to Section 8 for more information about evaluating SPHM activities*).
- Evaluate all SPHM-related processes implemented during the pilot and the process used to implement the pilot program. This involves evaluating each step of a process to make sure it is necessary, functional, and effective (*Refer to Section 3 for information about conducting observations of patient handling tasks and Section 6 Hierarchical Task Analysis*).
- Ensure solution(s) did not cause new problems.
- Make necessary changes to interventions based on program evaluation data
- Report outcomes to leadership and stakeholders involved in the pilot program.
- Once the pilot initiative is completed and approval is gained to continue implementation of the program on other units/departments:
 - Have staff from the pilot area share their experience and lessons learned with other units. This will help to engage other employees and get them ready and hopefully excited about implementing the SPHM program in their work area.
 - Continue to assess outcomes on the pilot units/departments e.g., at three, then six months and then annually following implementation
 - Providing visible ongoing support for pilot units/departments after implementation is critical to ensure SPHM becomes a standard of care and caregivers do not fall back to using manual handling techniques.

Safe Patient Handling and Mobility – Section 7

- In addition to monitoring the predetermined SPHM program metrics (injury data, employee surveys etc.), periodically checking in with managers and employees to assess and adjust program processes as needed, is essential for sustaining culture change and engagement in the program.
1. *WMSDs associated with patient handling are not typically caused by a one-time event but develop over time due exposure to a combination of primarily physical risk factors (**Refer to Section 1**). Therefore, significant reductions in WMSDs may take months or longer beyond the pilot program's end. This should be considered when evaluating the pilot program and discussing results to leadership and other stakeholders including caregivers from pilot unit(s)/department(s).*

SPHM Technology and Standard Operating Procedures (SOPs)

Once SPHM technology is selected and approved for purchase, SOPs must be developed and implemented before SPHM technology is to be used by caregivers. Manufacturers' instructions and recommendations for use and maintenance of technology must be followed. However, individual facilities/organizations will need to develop their own guidelines and SOPs to address the following:

- SPHM technology cleaning and infection prevention
- Use of SPHM technology in isolation rooms
- Sling management protocols i.e., laundering and/or disposal, inspection, tracking, storage, distribution, and infection prevention
- Equipment preventive maintenance and repair. Process to report and replace non-functioning technology
- Distribution of SPHM technology e.g., par stocking and ordering systems, when technology is needed immediately
- Disposal (when and how) of single-use items such as friction reducing devices (FRDs) such as slippery sheets and air assist mats
- Disposal of SPHM technology if non-repairable or at end-of-life cycle.
- Wound and ostomy approval of lift slings and/or friction reducing devices including air assist mats that may be left under patients (if recommended by the manufacturer) in bed and/or during surgical and/or diagnostic procedures etc.
- Signage for storage areas such as the type and size of slings together with cleaning/laundry/disposal and replacement ordering instructions

Table 7.1 *SPHM Technology and Essential Standard Operating Procedures.*

Other Program Activities that may be Conducted Concurrently with Pilot program Initiatives

There are additional program implementation and management activities that should continue during and after the implementation of SPHM technology and elements in pilot units or departments.

These include:

- Securing leadership and stakeholder support to continue implementing the program following evaluation of the pilot program(s). Developing an implementation plan that refines SPHM procedures and training based on lessons learned from the pilot program(s) and outcome data.
- Evaluation of Incident Reporting, Response and Management processes and improvement as needed (**Refer to page 7-19**).
- Ongoing communications to leadership and all stakeholders (including patients & families) as defined in SPHM Communications plan.
- Implementation of the SPHM policy facility wide i.e., determining when and how the policy should be implemented with guidance from leadership. For example, roll-out may be in stages as SPHM is implemented in specific areas.
- Ensuring (with management assistance) that the SPHM policy, expectations, and roles related to the SPHM program are clearly communicated (and posted) to all stakeholders including temporary employees and patients and their families . Facility managers and workers must understand the policy's purpose and its daily impact on care management. Strategies to address non-compliance must also be clearly outlined and communicated.
- Implementation of *education and training* activities as detailed in your SPHM Education and Training plan.
- Reviewing SPHM committee membership once SPHM technology is chosen. Consider:
 - Inviting the technology vendors to be regular or 'ad-hoc' members of the committee and adding
 - Representation from the organization's patient and family advisory group to advise with development of patient education materials, early mobility protocols using SPHM technology, and future program implementation and evaluation.
- Reviewing and modifying the SPHM committee's function, structure, and membership as necessary after establishing the SPHM program.
- Evaluation and reporting program outcomes and implementation progress.
- Providing periodic updates (as agreed to previously) and formal measurement of program outcomes and processes to the leadership group.
- Providing periodic updates to all other stakeholders as identified in your SPHM Program Communications Plan. Communicate program goals, implementation activities and progress using visual aids such as dashboards, which are posted for easy access by stakeholders. Frequent communication fosters leadership and stakeholder engagement, builds trust, provides insights, and boosts participation. Communicate with and address concerns of any key stakeholders who are not participating.

Safe Patient Handling and Mobility – Section 7

- Documenting progress of program implementation and process improvements or changes you have made to the implementation plan. Note, which implementation strategies were effective, and not effective, and overall lessons learned, to aid with future program management.

SPHM Policy and Procedures for Specific Patient Populations and Patient Handling Scenarios

The SPHM program policy has been drafted and approved. However, other policies and procedures will be needed to address the SPHM needs for specific patient populations and patient handling scenarios.

These should have been identified during SPHM program planning activities, but some may be identified as the program is being implemented. Develop these policies and procedures as SPHM technology is being chosen so they can be incorporated into the final SPHM training curriculum as needed. Technology vendors and medical providers together with other caregivers who have expertise with a specific patient population should help with this activity. Legal and risk management departments may also need to be consulted e.g., when developing policy to address patient/family refusal to use SPHM technology.

If policies already exist, review them for effectiveness and update them as needed.

Examples of patient-specific SPHM policies needed include:

- Patients of size (bariatric patients)
- Patients with behavioral health challenges and those with cognitive disorders/impairment such as dementia, delirium etc.
- Trauma patients, especially those with spinal injuries
- Labor and delivery/post-partum
- Patients requiring periodic turning to/from supine to prone e.g., those on ECMO
- Perioperative patients ¹
- Orthopedic patients ¹
- Pediatric patients

Other Policies that should be developed and implemented include:

- An SPHM patient mobility assessment protocol including required communication processes e.g., documentation in the EHR; standardized shift-change reporting; in-room communications (**Refer to Section 5**).
- Patient and/or family refusal to use SPHM technology.
- Patients who want to use their own SPHM technology such as a floor lift and/or sling. This is applicable in care settings where patients do not own the SPHM technology.

Safe Patient Handling and Mobility – Section 7

SPHM Policy and Procedures for Specific Patient Populations and Patient Handling Scenarios

- A caregiver's right to refuse to lift or handle a patient due to concerns about patient and/or the caregivers' safety and the right not to be subject to disciplinary action by the hospital or any of its managers or employees.
 - Fall recovery
 - Vehicle extraction e.g., outside an Emergency Department
 - The use of SPHM technology in a medical emergency/life threatening situation e.g., a non-mobile patient suffers a cardiac arrest while on a commode or in bedside chair in a room with an overhead lift; or a patient in bed having a seizure.
 - Evacuation of patients in case of emergency, e.g., fire
 - Early safe progressive mobilization protocols (**Refer to Section 5**).
 - In outpatient settings – advanced preparation protocols for patients who need SPHM technology to transfer to/from wheelchair (or stretcher) to exam/procedure table. For example, knowing a patient's ability to mobilize and their need for assistive devices/SPHM technology. Having SPHM technology and staff resources available before the patient arrives for their clinic visit. Addressing how or if, non-mobile patients will be assisted to/from their vehicles.
 - Additionally, a process to education patients and their families should be developed if not already completed when developing the SPHM Communications plan (**Refer to Section 4**).
 - Related resources and reference materials are provided in **Section 10**.
- ¹. The AORN and NAON SPHM handling algorithms can be used as a guide when developing policies and procedures for the perioperative and orthopedic patient populations, respectively. **Refer to Resources for Developing Solutions in Section 4 page 4-2.**

Table 7.2 SPHM Policy and Procedures for Specific Patient Populations and Patient Handling Tasks.

Selecting, Purchasing, and Installing SPHM Technology

The SPHM technology needed to address patient handling related risks was identified through hazard identification and risk assessment activities (**Refer to Section 3**).

However, review and trial of the technology is needed before final selection is made to ensure technology meets the needs of patients and caregivers and integrates with the design of the facility and workflow.

Develop a clear set of criteria that will be used to evaluate and select SPHM technology to facilitate caregiver acceptance and use of SPHM technology (**page 7-13**).

If ceiling/overhead lifts are to be selected for specific units/departments, it is advisable to ensure that infrastructure will support installation of lift(s) *before* asking stakeholders to evaluate them. This may also be completed during the problem-solving phase of program planning. Work with your design and construction and/or building engineering depts to determine how to complete this evaluation and if you will need to involve ceiling lift vendors for assistance.

At this stage, it is important to involve your organization's procurement department (if not consulted during SPHM solution development) to identify and select potential vendors for the specific types of technology selected.

The Procurement department can help you navigate the process for purchasing medical devices including requirements to meet group purchasing organization (GPOs) plans. It is important to understand any potential limitations related to SPHM technology vendor selection due to GPO agreements.

Procurement can provide information about vendors from whom the organization may have previously purchased SPHM technology, the organization's request for proposals (RFP) process, and/or if any agreements exist regarding preferred vendors for this equipment.

Ensure that Procurement staff are aware of the potential consequences to patient care if they purchase SPHM technology without consulting with the SPHM coordinator and committee. For instance, buying lift slings that are not compatible with overhead or floor-based lifts, or air assist mats that are incompatible with existing air assist mat motors or blowers. (**Refer to Section 5 for more information**).

They must ensure SPHM technology meets selection criteria developed by the SPHM committee and understand that purchase decisions are based on more than just cost or group purchasing agreements.

Providing SPHM education to Procurement staff before selecting SPHM technology and periodically after program implementation can assist in addressing these concerns.



Quick Tip

Remember having SPHM technology available and providing SPHM training does not always ensure technology and ergonomics work practices will be adopted.

Evidence supports that adoption is more likely when:

- **There is enough technology that is readily accessible**
Technology is user friendly
- **Technology meets the physical, cognitive, and clinical needs of the patient population; the tasks to be performed; workspaces; and the knowledge and skills of the caregivers**
- **Well-defined and communicated processes exist for storage, cleaning, maintaining, and inspecting technology and replacing equipment and components based on their lifespan**

Safe Patient Handling and Mobility – Section 7

SPHM equipment evaluation process

Involving users when evaluating and selecting SPHM technology is essential. This includes the caregivers and unit/department managers who will use SPHM technology and other stakeholders who are impacted by the SPHM program and play a critical support role in ensuring the successful implementation and use of SPHM technology. These stakeholders include SPHM technology vendors, architects, space planners, interior designers, facilities engineering, maintenance, and biomedical staff, logistics, infection prevention and control, wound and ostomy, and environmental services.

A collaborative approach is emphasized throughout program planning and implementation activities.

It allows for the implementation of SPHM technology and processes from a systems perspective. This perspective considers the health care delivery system as a whole and the interrelationship of all its elements versus addressing isolated patient handling issues (Matz et al., 2019).

It is also important that your SPHM program and technology choices will accommodate the future needs of the organization, such as a changing patient population, staffing levels and mix and service delivery, and building design changes, to ensure maximum return on investment.

Considerations when choosing SPHM technology

Evaluation criteria may vary depending on the type of technology to be reviewed and its application.

The following information provides a summary of factors to consider when choosing SPHM technology.

However, **Section 5** provides more detailed information including:

- The types of SPHM technology, the patient handling tasks they are used for, the ability to lower biomechanical risk for users, and associated advantages and disadvantages with use
- Space requirements for use and storage of SPHM technology
- Guidance on selecting rooms for overhead/ceiling installation and installation guidelines
- Cleaning and infection control
- Wound and ostomy considerations
- Regulatory requirements for medical devices

Tool 5a 'SPHM Technology Purchasing Checklist' provides further information that can be used to guide the selection, purchase, installation, and maintenance of SPHM technology and working with vendors.

Guidance on determining the appropriate quantity of SPHM technology required is detailed in **Section 5**.

Table 7.1 provides a summary of essential standard operating procedures required for chosen SPHM technology

Overall considerations when evaluating SPHM technology

- Effectiveness of the device/system – does it fulfill the work-related needs and functions of the caregiver using it (or needs of the user) and clinical goals?

Safe Patient Handling and Mobility – Section 7

- Integration with other medical devices, clinical systems, and physical layouts in various departments if the equipment is used in multiple care and diagnostic areas. Consider the impact of the equipment within the work system 'upstream' and 'downstream' from the point of use.
- Efficiency of use
- Comfort related to the operator's use of the devices
- Acceptance by intended users of the device
- Potential safety or ergonomics related hazards or risk of error during use. Identify the potential for misuse of the device by the user and ensure new hazards are not created
- Needs related to support processes/systems., e.g., training, maintenance, infection control, etc.

Key factors that influence SPHM technology selection in care settings

- Technology meets regulations and standards for design and use of medical devices e.g., ISO 10535:2021/FDA consensus standard; state and local regulations such as electrical codes for electrical/battery operated devices.
- If the manufacturer's instructions for use, care, and maintenance can be followed to avoid creating safety risks and invalidating warranties e.g., laundry/cleaning requirements for slings and for technology.
- Equipment reliability. This may vary between manufacturers or device models. Past performance information may be available from other users and recall information that can be accessed from the FDA (***Refer to 'Quick Tip' below***).
- Fiscal feasibility that considers the cost of SPHM technology and supplies such as patient lift slings, installation, and maintenance. ***Refer to Tool 7b for information about factors to include in the SPHM technology equipment budget.***
- The patient handling tasks to be addressed e.g., repositioning in bed; lateral transfer from bed to stretcher, vertical transfer to/from bed to chair, bathing, wound care, fall recovery, early ambulation, and rehabilitation tasks etc.
- The proportion of patients who are considered Bariatric, for example those over 300 lbs. and those over 600 lbs. This can help determine how many higher capacity lifts and slings may be needed. ***Refer to Section 5 for more information about SPHM technology needs for patients of size.***
- The physical structure and design of the patient care area where a lift(s) is needed including:
 - Sufficient space/clearance to use technology as intended in rooms and work areas where patient handling tasks will be performed e.g., rooms, doorways, bathrooms, hallways etc.
 - Evaluate how overhead lifts and floor-based technology function with existing equipment e.g., performance under beds, around chairs, and lift clearance when loaded, which can be affected by bed height and mattress dimensions. For overhead lifts consider vertical clearance related to ceiling height for vertical clearance, overhead track and lift hanger bar dimensions and lift accessories like scales.

Safe Patient Handling and Mobility – Section 7

- Obstacles that could hinder safe use of floor-based technology floor coverings, thresholds, ramps, etc.
- Sufficient structural support and functional room coverage for overhead lift tracks e.g., impact of light fixtures, cabinetry, HVAC systems, fire sprinklers etc.
- Convenient storage location i.e., close to point of use, with sufficient space for users to access equipment with minimal effort and electrical outlets for charging powered floor-based technology.
- A conveniently located central storage area(s) with 24/7 access for technology that may be used occasionally and shared between units/departments e.g., an air-assist device used to raise a patient from the floor following a fall and specialized equipment for patients of size etc.
- Environmental considerations such as areas with high humidity, temperature extremes such as a bathroom or pool area.
- Accommodation for transfers between vehicles and facility transport devices e.g., outside Emergency Departments; clinics etc.
- Ease of charging of powered overhead and floor-based systems lifts.
- Easy to clean and comply with infection control requirements.
- Maintenance requirements and costs; anticipated life cycle and product disposal.
- Supply logistics.
- Aesthetics of equipment installation e.g., ceiling lifts and support track.



Quick Tip

Before purchasing SPHM technology, it is imperative to review each product being considered for product recalls and/or safety alerts that have not been resolved. This can be discovered by contacting the product's primary manufacturer and searching for any safety alerts, recalls, and advisories in the:

- FDA Recalls, Market Withdrawals, & Safety Alerts.
www.fda.gov/Safety/Recalls/default.htm
- FDA – Manufacturer and User Facility Device Experience Database (MAUDE)
<https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/search.cfm>
- The Medical Product Safety Network (MedSun)
<https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/Medsun/searchreport.cfm>
- Consumer Product Safety Commission
www.recalls.gov

- **User considerations**

- Technology incorporates basic ergonomics design principles. The device should accommodate a majority of the *user* population's physical, perceptual, and cognitive capabilities to ensure safe, efficient use, patient comfort, and minimize operator errors (**Refer to Tool 5a**). For example, operation or use of technology does not require forceful exertion and/or extreme awkward postures.

Safe Patient Handling and Mobility – Section 7

- The ability of technology to reduce the magnitude of risk factors for WMSDS. For example, using a ceiling lift with flat repositioning sling reduces the force exerted by caregivers to boost a patient in bed more than a friction-reducing slippery sheet.

- **Patient considerations**

Patient characteristics that should be considered include:

- Medical condition or diagnoses (physical & cognitive) e.g., surgical (type), orthopedic, neurological, trauma, cognitive deficits e.g., dementia, behavioral health conditions, brain injury etc.
- Mobility status i.e., the functional mobility level of the patient which includes their ability to sit unsupported, bear weight, and standing balance.
- Level of postural support required in a sling (e.g., support needs for the head and trunk or asymmetrical body position and the likelihood of unpredictable movement, spasm, or pain during the process; amputees - arm/leg).
- Demographics groups such as adult, pediatric, bariatrics and associated body habitus (weight, torso width and girth, height and body shape or weight distribution) etc.
- Sensory deficits or disturbance.
- Dignity and comfort when using technology. It should not cause or intensify pain for the patient, or contribute to skin damage etc.
- Attachments to the patient (e.g., intravenous line, catheters, feeding tube, chest tube, tracheotomy; monitors, orthopedic supports such as Halo brace, Thoraco-Lumbo- Sacral- Orthosis (TLSO) brace, traction of extremities).

- **Other considerations**

- Functionality/versatility. Can one type of SPHM technology allow caregivers to perform multiple patient handling tasks? Multifunction technology can save money, space, and time.
- Successful use of SPHM technology in units or departments with similar profiles (*in an existing SPHM program*).
- Future changes to patient characteristics and/or census.
- Future changes to unit/dept. design.
- Staffing ratios, mix, and variance.

Standardizing SPHM Technology

SPHM technology and especially patient lift slings vary in design and operation or application between manufacturers.

Where feasible it is recommended that SPHM technology is standardized within a facility or health care system, i.e., having similar lifts that provide the same or similar functions. For example, installing one model of ceiling lift with one style/configuration of hanger bar for daily use. Slings should also be standardized by function, sizing, and manufacturer.

Key benefits of standardizing SPHM technology include:

- Reduced risk of user error and potential patient harm from user uncertainty in sling selection and lift or device use.
- Reduced training time and increased staff confidence. Standardizing equipment simplifies training processes as staff only need to learn and operate a limited range of equipment types. This consistency leads to greater staff confidence in using the equipment correctly, reducing errors and improving overall efficiency.
- Increased staff compliance. By using consistent equipment and procedures, staff may be more likely to perform patient handling tasks using SPHM technology thus reducing their risk of injury and improving patient outcomes.
- Streamlined maintenance and lower costs. Using a consistent set of SPHM technology simplifies maintenance procedures and spare parts management, potentially leading to lower maintenance costs and minimizing technology downtime.
- Improved materials management. Standardizing SPHM technology facilitates better materials management by reducing the complexity and inventory of different types of equipment and supplies.
- Enhanced operational efficiency. Standardization improves work processes, allowing for smoother and more efficient patient handling and mobility within the facility.

Safety-related considerations when using SPHM technology components from different manufacturers e.g., lifts and slings, are discussed in **Section 5**.

Planning for evaluation of SPHM technology

Once you have a list of the types of SPHM technology you have determined will address patient handling needs and selection criteria are developed, then collaborate with your procurement team to determine the technology vendors who will be invited to bring their product to the facility for trial and user evaluation.

Factors to consider when choosing vendors to participate in trials are listed **Tool 5a**.

Once vendors are selected you may choose to have them demonstrate their technology at your facility to a small group including the SPHM program coordinator, SPHM committee members including ad-hoc

Safe Patient Handling and Mobility – Section 7

members such as facilities maintenance, biomed, infection control etc., and managers and SPHM unit champions (if any) of pilot unit/departments.

This allows you to determine what SPHM technology caregivers and other stakeholders will assess and discard devices that do not meet patient handling needs based on your evaluation criteria.

User evaluation of SPHM technology requires careful planning to ensure that key stakeholders are involved across all shifts, trials are designed to ensure technology is evaluated meets selection criteria, and sufficient data is captured for purchasing decisions. Trials should be long enough to accomplish these goals.

There are a variety of methods to conduct user evaluations such as equipment fairs or *play-days* or trials of specific technology in the area where equipment will be used. Equipment fairs allow stakeholders to use the technology, be a 'patient,' and talk to the vendors.

Some facilities may allow trial of a specific type of SPHM technology (with vendor oversight) to be tested with patients by caregivers who are experienced in the use of SPHM technology and are appropriately trained. Consult your program champion and risk management department on the feasibility of this approach.

If you are evaluating technology that is already used in the facility, then the trial period may be shorter. Trials are conducted to confirm that the existing technology is appropriate for the patient handling task(s) and fits with other equipment and room layout.

When evaluating ceiling lift systems some vendors will offer to install a lift in a patient room for trial. Evaluate the feasibility and cost of this option.

Alternatively, ceiling lift vendors may be able to demonstrate lifts use using freestanding gantry systems during an equipment fair (as they do at industry trade shows).

It is important to obtain references from the vendor of other facilities who have purchased this equipment. This is key if a trial period for specific SPHM technology is not possible. Contact should be made with these facilities to obtain their feedback, discuss any concerns, and observe the equipment at their site.

Once SPHM technology is selected and all costs determined then the SPHM technology purchase and training budget can be presented to leadership for final approval (**Refer to Tool 7b**).



Quick Tip

It is important to notify managers and caregivers participating in SPHM technology trials if their selected technology cannot be purchased and provide the reasons for this decision.

Occasionally despite the best implementation planning and intentions, this can occur for unplanned reasons.

Develop a contingency plan for this scenario, including procedures for selecting alternate SPHM technology. Engage caregivers to reduce the risk of resistance due to feelings of being unheard or unvalued.

Incident Reporting, Response and Management

Incident and Near Miss Reporting and Investigation Systems

Comprehensive incident reporting and investigation systems are a vital component of successful SPHM programs.

When completing hazard identification activities such as Gap Analysis and employee surveys, you should have identified any culture and/or process related factors that hinder early reporting of patient handling related incidents and effective incident investigation.

The SPHM project coordinator and committee should work in conjunction with the employee health and safety departments as well as human resources to determine how the SPHM program activities can assist in promoting early reporting of MSD symptoms, injuries, incidents, and near misses related to patient handling activities.

Underreporting of workplace injuries and illness by employees is prevalent in healthcare. *Underreporting of work-related musculoskeletal disorders (WMSDs) and patient handling injuries in health care is discussed in Section 1.*

Due to the cumulative nature of most WMSDs caused by manual patient handling activities, symptoms of MSDs increase gradually over time. Together with the many physical, psychosocial and organizational risk factors that contribute to WMSDs, it can be challenging to determine a specific event or patient handling task responsible for an MSDs-related injury.

Therefore, it is vital that there is an effective system to encourage early reporting of MSD symptoms such as discomfort and fatigue together with a robust process for investigating the root cause of patient handling related incidents and near misses.

Early reporting of MSD Symptoms can accelerate the job assessment and improvement process, helping to prevent or reduce the progression of symptoms, the development of serious injuries and likelihood of disability, and subsequent lost-time claims and associated costs (OSHA ND).

This information helps direct SPHM program activities as well as to guide healthcare providers in making return-to-work and light-duty work decisions. *Refer to Injury Management of WMSDs on page 7-23.*

Additionally, a robust process for investigating the root cause of WMSDs using a systems approach is critical to inform prevention activities.



Did You Know?

A study by The National Council on Compensation Insurance (NCCI) demonstrates that workers' compensation claims reported after seven days are significantly more expensive compared to those reported within the first 24 hours. Delayed reporting frequently leads to:

- Greater medical severity
- More frequent attorney involvement
- Longer periods of lost work time
- Fewer opportunities for modified-duty assignments

Source: NCCI, 2015

Safe Patient Handling and Mobility – Section 7

Facilitating the reporting of incidents and near misses related to patient handling activities¹

The following are processes that can facilitate early reporting of WMSDs:

- All employees and temporary/contract staff are aware of the incident reporting system and the expectation and importance of prompt reporting of incidents and near misses including early reporting of MSDs.
- All employees are supported by leadership, management and their peers in reporting safety issues/concerns related to patient handling.
- Incident and near miss reporting systems must be user friendly to facilitate reporting i.e.,
 - Easy and quick to access e.g., through visible QR codes posted in work areas, 1-click access on the organization's intranet platform etc.
 - Quick to complete but designed to capture enough data to inform initial investigation activities e.g.,
 - The location, time, shift, and date of the incident
 - Part of the body affected symptoms and their onset
 - The task being performed such as boosting a patient in bed
 - The number of caregivers performing the task
 - Patient factors (e.g., level of dependency/ability to assist; patient of size, combative behavior etc.)
 - Availability of appropriate SPHM technology and if it was operable
 - If SPHM technology was used according to policy and procedures
 - Whether an SPHM patient mobility assessment was performed



Did You Know?

OSHA's final rule to improve tracking of workplace injuries and illnesses states:

1. **An employer's procedure for reporting work-related injuries and illnesses must be reasonable and must not deter or discourage employees from reporting**
2. **Employers must inform employees of their right to report work-related injuries and illnesses free from retaliation**
3. **An employer may not retaliate against employees for reporting work-related injuries or illnesses**

OSHA, 2023.

<https://www.osha.gov/recordkeeping/final-rule>

OSHA Injury and Illness Recordkeeping and Reporting Requirements can be found at

<https://www.osha.gov/recordkeeping>

Coding of patient handling injuries to identify trends related to causes is reviewed in **Section 2** and **Tool 2d**.

- Prompt acknowledgement to the employee filing the report, that the incident or near miss report has been received and investigation and report back to the reporter of the incident will occur within a specified timeframe.

Safe Patient Handling and Mobility – Section 7

- Informing the incident reporter of the investigation results. This shows that their reports help improve the system and prevent future issues, demonstrating the organization's commitment to employee wellbeing.
1. A **near-miss event** is a patient-handling incident that could have resulted in harm to the caregiver and/or patient but did not, either by chance or through timely intervention. Reports of near misses can be used to identify actions and process or systems failures that may prevent similar occurrences and uncover opportunities for improvement.

Incident and Near Miss Investigation

Having a plan to investigate and assist staff in learning when an injury or near miss occurs is an important element of the incident response and management process.

Incidents and near miss reports should be investigated as soon as possible to determine the system cause of incidents and identify solutions.

Investigation of employee injuries should be viewed with the same importance and thoroughness as investigation of adverse patient safety related events. Processes used to investigate patient safety incidents can also be applied to the investigation of occupational injuries and illnesses.

Root cause analysis (RCA) is a method used to identify the factors that caused an incident. The aim of RCA is to identify work system failures that led to the incident, and implement changes to prevent recurrence, rather than blaming individuals involved.

RCA is usually applied to solve recurring problems, significant incidents, or when a deeper understanding of the cause of an incident is needed. RCA focuses on interventions that have a long-term impact rather than relying on quick fixes (WHO, 2019).

RCA should be conducted by employees or personnel who are competent in RCA techniques and incident investigation processes.

Tool 7d provides a sample of the RCA process used to investigate a patient handling related incident.

After Action Reviews

Unit managers and other employees such as SPHM champions together with the SPHM coordinator should be engaged in post-event incidents and near-miss analysis. Using 'After Action Reviews' (AAR) is a way to achieve this goal.

An AAR is a structured qualitative review of actions taken to respond to a specific event such as a patient handling incident as a means of identifying best practices, lessons, and gaps in response. It relies primarily on the personal experience and perceptions of individuals involved in the response to assess what worked and what did not, why, and how to improve (WHO 2019).

In contrast to RCA, AARs focus on a broader review that analyzes both successes and failures of an event or project, looking for lessons to apply in the future thereby facilitating the process of knowledge transfer. AARs should be conducted immediately after an event or incident, allowing participants to reflect on the experience while it is still fresh in their minds.

As with RCA, AAR is not focused on assigning blame but is a forward-looking process that focuses on learning and improvement.

Safe Patient Handling and Mobility – Section 7

AARs are used in various fields, including military operations, project management, and public health. They have also been adopted by the Veterans Health Administration (VHA) as back injury prevention programs have been deployed throughout their system (AOHP, 2020).

Key questions include:

- What was supposed to happen?
- What was expected to happen?
- What actually occurred?
- What went well and why?
- What did not go well and why?
- What can be improved to avoid the same outcome in the future and how?

Leading a productive AAR usually requires a facilitator to keep the discussion on track towards agreed objectives, to ensure that all voices are heard, and to ensure that key themes are analyzed sufficiently to identify underlying factors.

The results of an AAR can also help to inform a formal investigation/RCA but should not be considered a replacement for these processes.

There should be a process in place (which includes the unit manager) to develop and implement recommendations/actions from incident analysis and AARs.

Lessons learned and corrective action should be communicated to the appropriate stakeholders e.g., caregivers on a unit following an incident or near miss; the SPHM committee, leadership etc.

Safety Huddles

Safety huddles are brief (10-15 minutes), often informal meetings designed to proactively identify and mitigate potential risks and improve safety on a given unit or department.

In the context of patient handling-related incidents and near miss investigations, Safety Huddles are most effective when held immediately or soon after every near miss and include the staff and patient involved if feasible. Each person's input is helpful to get a clear picture of what happened. The information received will aid in making appropriate recommendations to prevent similar incidents in the future (VAH, 2016). The key questions listed for AARs above can also guide discussion.

Safety huddles also offer an effective means for *all* caregivers in a unit or department to learn from patient handling-related incidents and near misses and help prevent recurrence.

Safety Huddles and AARs have been shown to be a highly successful method of knowledge transfer, they:

- Promote inter-professional collaboration.
- Increase awareness of safety issues.
- Create an environment in which information is shared without fear of punishment.
- Contribute to a culture of safety within an organization.

(Ghoul et al., 2025)

Refer to **Section 9** for more information about the role of Safety Huddles in SPHM program sustainability. Refer to **Section 10** For more information on Incident investigation, RCA, AARs, and Safety Huddles.

Injury Management of WMSDs and Return-to-Work Programs

Planning for caregiver recovery and return to work following a patient handling related injury is a key component of a safe patient handling program.

The primary goal of the injury management program is to prevent physical impairment and disability through early identification, prompt, and appropriate treatment of MSDs. Other goals and benefits include maintaining employee morale, productivity, and efficiency, and controlling injury costs.

Early return-to-work (RTW) programs are one of the most effective tools used in case management to rehabilitate workers, keep them connected to the workplace, retain their skills and expertise and reduce high costs associated with absenteeism. RTW programs reduce the need for employees to remain on leave during what is a relatively short window of time in which an injury or illness can transition into a longer-term issue (JAN, ND). Research suggests that the likelihood of an injured worker returning to work *drops to 50 percent* by the 12th week of leave (Zurich, 2015).

The ANA SPHM Standards 2021, Standard 7 '*Include Safe Patient Handling and Mobility in Reasonable Accommodation and Post-Injury Return to Work*' states: "The employer and healthcare workers partner to establish a comprehensive safe patient handling and mobility (SPHM) program that can help the employer provide reasonable accommodations to healthcare workers who are injured at work" (ANA, 2021).

This goal is achieved through facilitating the safe utilization of injured employees, early return to work following injury, and monitoring caregiver injuries associated with patient handling activities.

Successful RTW programs require collaboration between the employer, injured employee, treating medical provider(s) and the employer's workers' compensation carrier or administrator.

Work with the department responsible for managing employees with occupational injuries and illnesses such as employee health or human resources, to determine how the SPHM coordinator, committee and program processes may be able to help facilitate effective accommodation of caregivers who have sustained patient handling-related injuries. Companies that provide the organization's worker's compensation and/or disability insurance may also be able to provide with expertise in RTW programs.

It is important to be aware that workers' compensation laws related to injury management and return-to-work programs vary from state to state. Additionally, if you are in a union environment, make sure you have the union's understanding and approval for your RTW program.

Injured employees must notify their employer of physical limitations, provide updated medical documentation, comply with the treatment plan, and return to work in a role that accommodates medical restrictions (ANA, 2021).

A structured process is necessary for ensuring that injured employees can return to work while adhering to medical restrictions. This process includes offering modified, transitional, or alternate work to the employee.

With *modified duty* adjustments are made (as reasonable feasible) to the employee's regular job to accommodate their medical restrictions. The use of SPHM technology may be a way to accommodate injured caregivers on modified duty.

For employees with restrictions that prevent them returning to their regular job, *transitional duty or work* allows an injured caregiver to stay safely in his or her present workplace in a modified or alternate capacity until he or she is recovered from the injury and can return to their regular job.

Safe Patient Handling and Mobility – Section 7

The goal with this type of modification is that the injured worker is constantly transitioned back to their normal work duties.

Alternate work is considered to be a temporary work assignment when the injured caregiver is unable to return to his or her regular job (Gallagher, 2013).

Well defined job descriptions that detail the essential physical job requirements are a key component to effective accommodation of injured workers. They provide a basis for medical providers and the employer to determine if an injured employee can safely perform their regular job or modified/transitional/alternative work duty within the physical restrictions they may have while recovering from an injury.

As discussed in **Section 3**, physical job requirements can be determined during formal ergonomics analysis of job tasks.

Ergonomics analysis can also be used to evaluate injured caregivers job tasks and potential modifications to ensure there is no potential risk(s) that could prevent recovery and ensure safe accommodation. **Section 3** provides tips for finding ergonomics expertise if a facility does not have an ergonomist or appropriately trained safety or health care professional to complete this activity,

Consider implementing a process to provide SPHM refresher training to injured caregivers who have not performed their regular duties for a period of time due to a work-related patient handling injury. Refreshing their knowledge and skills can help rebuild confidence and competency in using safe patient handling and mobility (SPHM) techniques and equipment and potentially reduce their risk of re-injury.

Establishing, capturing, and monitoring RTW goals and metrics should be part of the SPHM program measurement system (**Refer to Section 8**).

More information about injury management and effective return-to-work programs can be found in the references and resources provided in **Section 10**.

Managing Change and Making it Stick

The change process is a journey (**Figure 7.2**) that must be well managed if the desired change is to be successful and sustainable.

Implementing an SPHM program requires that caregivers and other stakeholders change the way they perform some elements of their work.

Change is required within leadership, management, units, and departments, between professional disciplines such as nursing and rehabilitation, and by individual caregivers and other employees. It also may require change by non-mobile patients (and their families) who are used to being manually lifted and moved. For example, those who have recurrent hospitalization or visits to a clinic and those who reside in a facility such as a nursing home.



[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)

Safe Patient Handling and Mobility – Section 7

Change is hard and resistance to change is common, so a key component of planning and implementing an SPHM program is anticipating and planning strategies to support stakeholders as they move through the required change process.

Effective change management essential to move from a culture of manual patient handling to one where SPHM becomes a standard of care and is embedded in the work culture at all levels of the organization or *'Just the way we do things around here.'*

Change management strategy is a planned approach that helps leaders to successfully guide an organization through change while minimizing disruption and the risk of unexpected consequences.

Key to success is the practice and process of supporting people through change, with the goal of ensuring that the change is successful in the long-term. Change management helps people to change their behaviors, attitudes, and/or work processes to achieve a desired business objective or outcome.

Change management as a discipline includes the processes, tools, and techniques used to manage the human elements of change which are applied at the individual, project, and organizational level before, during, and after the change occurs (PAHO 2022; Sharp Emerson, 2022).

There are several change management models that can be considered when planning, implementing, and sustaining a SPHM program. Each model varies in approach and application. Find out if there is a model that your organization uses when implementing other programs or initiatives.

Change management models often used in health care include:

- Kotter's Change Management Model. www.Kotterinc.com
- McKinsey 7-S Change Management Model. https://en.wikipedia.org/wiki/McKinsey_7S_Framework
- ADKAR Change Management Model. www.Prosci.com
- Lewin's Change Management Model. [Navigating Change with Precision: Unpacking Lewin's Change Management Model](#). Majka, M. 2024
- Rogers' Diffusion of Innovation Theory https://en.wikipedia.org/wiki/Diffusion_of_innovations
- The Iowa Model of Evidence-Based Practice <https://uihc.org/iowa-model-revised-evidence-based-practice-promote-excellence-health-care>

The following is a summary of effective change management strategies.



Did You Know?

Change affects individuals differently and it is important to understand their perceptions both negative and positive about the SPHM program and associated activities. Positive visible results from SPHM pilot initiatives can help reduce resistance and drive change especially with caregivers.

Anecdotally, this author has observed acceptance of SPHM in part because staff reported feeling less fatigued at the end of their 12-hour shift and the had more energy to enjoy non-work activities. Additionally, male nurses and aides reported that they like the SPHM technology because they received fewer requests from female colleagues for assistance with lifting and transferring patients.

Safe Patient Handling and Mobility – Section 7

The assessment of organizational culture and readiness for change, conducted during SPHM program planning activities in **Sections 2-5**, incorporated key elements of this process.

Prepare the organization for change

- Apply a structured change management method and integrate it with a project management approach.
- Ensure the required change (i.e., the desired SPHM program) is compatible with the organizational culture and level of readiness within the organization.
- Developing long term vision and goals. Identifying baseline measurements, key performance indicators, and process measurements.
- Define realistic achievable short and midterm objectives that will demonstrate visible results and progress early on to build momentum, keep stakeholders engaged and maintain their enthusiasm for change.
- Identify clear timelines.
- Develop a well-defined implementation plan.



Did You Know?

Change management and project management are complementary disciplines, both with the aim of ensuring organizational success through improvements.

Change management focuses on helping employees to manage disruptions during changes, while project management focuses on ensuring projects finish on time and within budget (PAHO, 2022).

Active & visible governance and leadership.

- Leaders and managers must "talk the talk and walk the walk". Leadership provides direction, resources, and inspiration to drive the change. Governance provides the framework and oversight to ensure the change stays on track and aligned with strategic goals.

Stakeholder engagement and support

- Involve key stakeholders in planning and implementation to foster buy-in and ownership.
- Empower employees to act on the program vision and provide them with the necessary resources and support.
- Actively solicit feedback from stakeholders throughout the process. Understand how change will impact them and address concerns throughout program planning, implementation, and maintenance.
- Create a change champion network. Identify and empower individuals who can effectively advocate for the change within their work team e.g., the SPHM champion, SPHM program coordinator, and committee together with unit based SPHM coaches/champions

Clear communication.

- Ensure frequent open and transparent communication that is customized to address the needs of the stakeholders. Proactively identify and address stakeholder concerns related to the required change.

Safe Patient Handling and Mobility – Section 7

Workflow analysis and redesign

- Understand how work is currently performed, identify and prioritize hazards and risks, and determine interventions and processes to address identified hazards and ensure employees possess the necessary knowledge and skills for optimal performance

Phased and structured implementation

- Include frequent assessment and adaptation of strategies and goals as needed

Training and education.

- Provide adequate training and offer ongoing support.

Celebrate successes.

- Reinforce positive behaviors and maintain motivation by recognizing and celebrating milestones and achievements

Monitoring and evaluating

- Monitor the progress of the change and gather feedback from stakeholders. Learn from experience. Use feedback to refine approach and change management process.

Resistance Management

- Identify and understand the reasons for resistance and provide support.

Source: Barrow & Annamaraju, 2022; Creasey, 202; Sharp Emerson, 2022; Miller, 2020; PAHO, 2022; Havard, 2022; RNAO, 2024.

Section 1. Table 2. Provides a summary of the barriers or factors within a health care organization that can prevent successful implementation and/ or sustainability of SPHM programs.

Knowledge transfer is also a critical element in successful management of change.

When organizations undergo transformation such as the adoption of SPHM technology and the



Did You Know?

You will notice that the core elements of change management reflect the core elements of OSHA's approach to management of effective occupational ergonomics, safety and health programs and the ANA SPHM standards.

Note: This toolkit outlines the sequence of steps and related activities in accordance with the principles of a change management process.



Want To Learn More?

Check out the 'The Leading Change Toolkit' (2024), by the Registered Nurses Association of Ontario.

The Leading Change Toolkit is a free, online, open-access evidence-informed implementation resource. It focuses on the uptake and sustainability of knowledge – or evidence – and uses two complementary frameworks to help you accelerate your success including the Social Movement Action and Knowledge-To-Action Frameworks. The toolkit also includes a section on how to engage persons with lived experience in a change initiative and/or as a member of a change team.

<https://rnao.ca/leading-change-toolkit>

Additional change management resources and tools are provided in Section 10.

Safe Patient Handling and Mobility – Section 7

implementation of new processes, it is essential that employees have the knowledge and skills needed to adapt and succeed in the 'new' environment.

Facilitators of knowledge transfer within an SPHM program include the core elements of any new program or initiative, including written policy and procedures and well-designed training programs that facilitate the transfer of skills learned to daily practice.

Other program components described in Toolkit also play a key role including executing a well-developed communications plan, having a supportive and visible senior leader as program champion, a dedicated SPHM program coordinator and peer leaders or unit SPHM champions.

Evidence supports that unit SPHM champions play a critical role in knowledge transfer. They act as change agents by promoting SPHM practices and serve as resources for their co-workers (Matz et al., 2019).

Tool 4g provides more information about unit based SPHM champion programs.

Implementing safety huddles (if not already in place) before starting an SPHM program can also assist to facilitate knowledge transfer. Safety huddles (**refer to page 7-22**) help establish stakeholder participation in program planning and technology selection and prepare them for changes as the program is implemented (Matz et al., 2019).

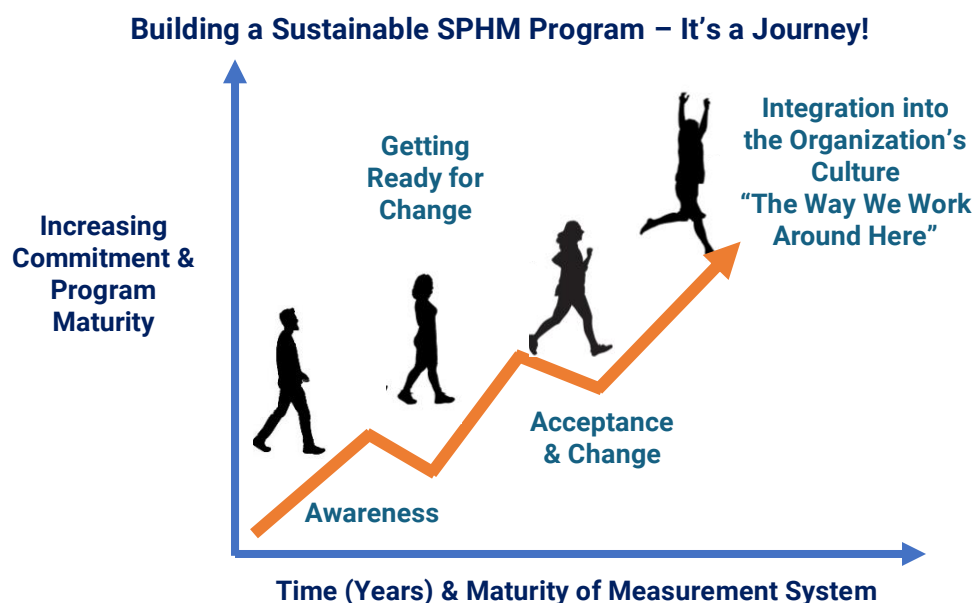


Figure 7.2 Integrating SPHM into a Health Care Organization's Culture.

Section Summary



SPHM Program Plan Implementation

STEP 12. Implement the SPHM Program

Implementation has many components and requires careful planning.

Change management principles and a continuous performance improvement approach should guide the implementation process.

Activities that facilitate successful SPHM program implementation include:

- Engaging the support of key stakeholders who will assist the SPHM program coordinator and committee to implement the plan.
- Ensuring roles and responsibilities of all involved in implementation activities are well defined and communicated.
- Developing implementation strategies based on whether a new program is to be rolled out or an existing program enhanced. For example, pilot the program on one or more units/departments or implementing it facility wide etc.
- Giving all caregivers and other employees opportunities to participate in program implementation and ensuring adequate support and resources are provided for success.
- Developing and implementing a structured process to selecting, and purchase SPHM technology that involves user trials and evaluation.
- Developing and implementing standard operating procedures to support use and maintenance of SPHM technology; SPHM Policy and Procedures for Specific Patient Populations and Patient Handling Scenarios; and a patient mobility assess protocol.
- Implementing a unit champion coaching program
- Education and training all stakeholders who will use SPHM technology or provide support services
- Review and enhancement of Incident Reporting, Response and Management process
- Frequent communication to build stakeholder trust and support
- Ongoing engagement of leadership and managers through frequent meetings and communications
- Regularly monitoring and reporting progress toward implementation objectives
- Documenting progress of program implementation and process improvements and changes made to the implementation plan. Highlighting which implementation strategies were effective, and not effective, and overall lessons learned, to aid with future program management.

Additional references and resources related to this Section are listed in **Section 10**.

Safe Patient Handling and Mobility – Section 7

References and Resources Used in this Section

- ACC6075 Moving and Handling People Guidelines 2012 Accident Compensation Corporation New Zealand. <https://www.acc.co.nz/assets/provider/acc6075-moving-and-handling-people-guidelines.pdf>
- Agency for Healthcare Research and Quality. (2022, August). System-focused event investigation and analysis guide. Rockville, MD. <https://www.ahrq.gov/patient-safety/settings/hospital/candor/modules/guide4.html>
- American Nurses Association. (2021). Safe patient handling and mobility: Interprofessional national standards across the Care Continuum. 2nd edition American Nurses Association; 2021. Silver Springs, MD
- Association of Occupational Health Professionals in Healthcare (AOHP). (2020). Beyond Getting Started: A Resource Guide for Implementing a Safe Patient Handling Program in the Acute Care Setting (4th ed.). AOHP. <https://www.aohp.org/aohp/Portals/0/Documents/ToolsForYourWork/BGSpublication/20-06%20BGS%20Safe%20Patient%20Handling.pdf>
- Association of perioperative registered nurses (AORN). (2021). eGuidelines+ Guidelines for Perioperative Practice: Safe Patient Handling and Movement.
- Bak, D., & Bak, S. (2024). Change management in healthcare—a scoping literature review. <https://ruj.uj.edu.pl/items/6781cbe5-aa60-4ebd-9f09-020b4942a6a7>
- Barrow, J. M., & Annamaraju, P. (2022). Change management in health care. In StatPearls [Internet]. StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK459380/>
- Barrow, J. M., & Annamaraju, P. (2022, September 18). Change management in health care. In *StatPearls* (Treasure Island, FL: StatPearls Publishing). Available from; <https://www.ncbi.nlm.nih.gov/books/NBK459380/>
- Buckwalter, K. C., Cullen, L., Hanrahan, K., Kleiber, C., McCarthy, A. M., Rakel, B., Steelman, V., Tripp-Reimer, T., & Tucker, S.; on behalf of the Iowa Model Collaborative. (2017). Iowa Model of Evidence-Based Practice: Revisions and validation. *Worldviews on Evidence-Based Nursing*, 14(3), 175–182.
- Campbell, R. (2020). Change management in health care. **The Health Care Manager**, 39(1), 50–65.
- Creasey, T. (2023, May 26; updated 2025, April 14). Best practices in change management. <https://www.prosci.com/blog/change-management-best-practices>
- Cullen L, Hanrahan K, Edmonds SW, Reisinger HS, Wagner M. Iowa Implementation for Sustainability Framework. *Implement Sci.* 2022 Jan 4;17(1):1. doi: 10.1186/s13012-021-01157-5. PMID: 34983585; PMCID: PMC8725573.
- Dusin, J., Melanson, A., & Mische-Lawson, L. (2023). Evidence-based practice models and frameworks in the healthcare setting: A scoping review. *BMJ Open*, 13(5), e071188. <https://pubmed.ncbi.nlm.nih.gov/37217268/>
- Emerson, M. S. (2022, November 18). 7 reasons why change management strategies fail and how to avoid them. Professional and executive development, Harvard. Last updated February 24, 2025. <https://professional.dce.harvard.edu/blog/7-reasons-why-change-management-strategies-fail-and-how-to-avoid-them/>
- Gabutti, I., Colizzi, C., & Sanna, T. (2023). Assessing organizational readiness to change through a framework applied to hospitals. *Public Organization Review*, 23, 1–22.
- Gallagher, S. (2013). Implementation Guide to the Safe Patient Handling and Mobility Interprofessional National Standards. American Nurses Association.
- Harrison, R., Fischer, S., Walpola, R. L., Chauhan, A., Babalola, T., Mears, S., & Le-Dao, H. (2021). Where do models for change management, improvement and implementation meet? A systematic review of the applications of change management models in healthcare. *Journal of Healthcare Leadership*, 13, 85–108.
- Iowa Health Care. (n.d.). The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care©. <https://uihc.org/iowa-model-revised-evidence-based-practice-promote-excellence-health-care©>
- Job Accommodation Network. (n.d.). Stay at Work (SAW)/Return to Work (RTW). Retrieved from <https://askjan.org/topics/return.cfm>
- Lachman, P., Linkson, L., Evans, T., Clausen, H., & Hothi, D. (2015). Developing person-centred analysis of harm in a paediatric hospital: a quality improvement report. *BMJ Quality & Safety*, 24(5), 337–344. <https://qualitysafety.bmj.com/content/qhcg/24/5/337.full.pdf>

Safe Patient Handling and Mobility – Section 7

Lachman, P., Runnacles, J., & Dudley, J. (2015). Equipped: overcoming barriers to change to improve quality of care (theories of change). *Archives of Disease in Childhood-Education and Practice*, 100(1), 13-18.

Matz M, Celona J, Martin M, McCoskey K, Nelson GG. (2019). Patient Handling and Mobility Assessments (2nd ed.); https://www.fgiguideelines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf

McLellan, D., Moore, W., Nagler, E., & Sorensen, G. (2017). Implementing an integrated approach weaving worker health, safety, and well-being into the fabric of your organization. Harvard T.H. Chan School of Public Health Center for Work, Health, and Well-being. https://centerforworkhealth.sph.harvard.edu/sites/default/files/10.12.17_Guidelines_Screen_post.pdf

Miller, H. (2020, March 19). 5 critical steps in the change management process. Harvard. <https://online.hbs.edu/blog/post/change-management-process>

Muselman, C. (2025, January 9). Managing the return-to-work process during recovery. Workers' Compensation Daily Headlines. <https://www.workerscompensation.com/daily-headlines/welcome-back-a-thoughtful-return-to-work-strategy/>

National Safety Council. (2025). The importance of musculoskeletal disorder and related injury surveillance: An organizational approach. https://www.nsc.org/getmedia/6c547ba2-4073-4963-826d-3ca899d18e14/nsc_msd_injurysurveillance_resource_2-20-25.pdf?srsid=AfmBOooFLpAvE-_OD2Te3vzLAfDAh-EQct7jDrv454mcTmcHa1LI-P71

NCCI Research Brief. (2015). *The relationship between accident report lag and claim cost in workers compensation insurance*. https://www.ncci.com/Articles/Pages/II_Relationship-Accident-Report-Lag-Claim-Cost-WC-Insurance.pdf

Newnam, S., Goode, N., Read, G. J., & Salmon, P. M. (2020). Closing the research-practice gap in healthcare: The development and usability evaluation of a patient handling incident investigation toolkit. *Safety Science*, 129, 104844.

Nilsen, P., & Bernhardsson, S. (2019). Context matters in implementation science: A scoping review of determinant frameworks that describe contextual determinants for implementation outcomes. *BMC Health Services Research*, 19(1), 1–21. <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-019-4015-3>

Nilsen, P., Seing, I., Ericsson, C., Birken, S. A., & Schildmeijer, K. (2020). Characteristics of successful changes in health care organizations: An interview study with physicians, registered nurses, and assistant nurses. *BMC Health Services Research*, 20, 1–8. <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-020-4999-8>

Occupational Safety and Health Administration. (n.d.). Ergonomics: Identify problems. <https://www.osha.gov/ergonomics/identify-problems#report-injuries>

Occupational Safety and Health Administration. (n.d.). Prevention of musculoskeletal disorders in the workplace. <https://www.osha.gov/ergonomics>

Pan American Health Organization & World Health Organization. (2022). Change Management in Public Health: Digital Transformation Toolkit Knowledge Tools. <https://iris.paho.org/handle/10665.2/56579>

Registered Nurses' Association of Ontario. (2024). Leading change toolkit (4th ed.). <https://rnao.ca/bpg/leading-change-toolkit>

Registered Nurses' Association of Ontario. (2012). Guide to implementation of best practice guidelines (2nd ed.). https://rnao.ca/sites/rnao-ca/files/RNAO_ToolKit_2012_rev4_FA.pdf

Safe Patient Handling and Mobility Guidebook. (2016, January). VHA Center for Engineering & Occupational Safety and Health (CEOSH), St. Louis, Missouri. https://www.stryker.com/content/dam/stryker/education-and-training/focusrn/resources/caregiver-safety/implementation-tools/VA%20SPHM_PDF.pdf

Safe patient handling programs are best practices guide for Washington hospitals. Washington safe patient handling steering committee, University of Washington NW Centre for Occupational Health and safety. 2011

Safety huddle in healthcare settings: a concept analysis (Ghoul, I., Abdullah, A., Awwad, F., & Dardas, L., n.d.). <https://pmc.ncbi.nlm.nih.gov/articles/PMC1191700>

Walker, L., et al. (2017). Sharing the lessons: The 10-year journey of a safe patient movement program. **International Journal of Safe Patient Handling & Mobility,** 7(1), 20–28.

Safe Patient Handling and Mobility – Section 7

Wharton School, University of Pennsylvania. (n.d.). After-action reviews: A simple yet powerful tool.

<https://executiveeducation.wharton.upenn.edu/thought-leadership/wharton-at-work/2021/07/after-action-reviews-simple-tool/>

World Health Organization. (2019, September). After action review debrief – Facilitators manual.

https://extranet.who.int/sph/sites/default/files/document-library/document/D.02%20Facilitators%20Manual%20Debrief%20AAR_sept2019.pdf

Zurich. (2015). Early intervention & RTW best practices.

SPHM Program Evaluation

Contents

SPHM Program Evaluation	1
Step 14. Evaluate the SPHM program	1
Why Evaluate the SPHM Program?	1
What Should Be Evaluated and How?	2
<i>Table 8.1 Choosing SPHM Program Evaluation Tools.</i>	4
Evaluation Methods	4
Implementation evaluation	5
Process evaluation	5
Outcome evaluation.....	7
<i>Table 8.2 Measuring Intangible and Complex Indicators.</i>	9
Lagging and Leading Indicators that measure SPHM program performance	10
<i>Table 8.3 Examples of Lagging and Leading Indicators.</i>	10
Lagging indicators	11
<i>Table 8.4 Factors that can Influence Lagging Indicators.</i>	12
<i>Table 8.5 The Importance of Coding and Standardizing Patient Handling Injury Data.</i>	13
Leading indicators.....	13
<i>Table 8.6 Essential Characteristics of Leading Indicators.</i>	15
Who Should Evaluate SPHM Program?	15
When Should the SPHM Program be Evaluated?	15
Analyzing and Interpreting Data	17
Communicating Program Results	17
Documenting and Recordkeeping	19
Post Implementation SPHM Employee Surveys	20
Developing SPHM Employee Surveys	20
<i>Table 8.7 Topics Included in the Post Implementation SPHM Employee Survey</i>	21
Conducting SPHM Employee Surveys	22
Analyzing and Reporting SPHM Survey Data	22
Post Implementation SPHM Worksite Audits	23
When Should Audits be Conducted.....	24
Who Should Conduct SPHM Audits?	25
Documenting and Communicating Audit Results	25
<i>Table 8.8 Determining Patient Satisfaction with SPHM Technology.</i>	26
Section Summary	27
Reference and Resources Used in this Section.....	28

SPHM Program Evaluation

Step 14

Evaluate the SPHM program

Why Evaluate the SPHM Program?

SPHM programs cannot be managed and sustained without clearly defined measurement systems. Program evaluation is an ongoing systematic process to determine the relevance, progress, efficiency, effectiveness, and impact of SPHM interventions (i.e., technology, practices, training etc.) and the implementation process.

The ANA SPHM standards (2021) Standard 8 states that “The employer and healthcare workers partner to establish a comprehensive system to evaluate safe patient handling and mobility (SPHM) program outcomes, trends, and processes, including staff performance, engagement, and compliance; staff injury incidence and severity; effectiveness of technology; and healthcare consumer outcome metrics” (ANA, 2021). The evaluation process described in this Section aligns with all elements of Standard 8

Tools that Support Content in this Section

8a. Program Measurement Plan

8b. SPHM post implementation survey and report template

8c. SPHM post implementation audit tool

8d. SPHM rounding tool

Ongoing evaluation of your SPHM program enables the SPHM coordinator, committee, and key stakeholders to ensure processes are effective, refine the program to meet evolving needs and enhance overall program performance.

Evaluation measures should identify program progress and indicate when goals are achieved.

As the program matures, the evaluation process follows a continuous improvement cycle, with each implementation phase informed by assessment results and organizational changes.

Demonstrating a commitment to program progress and value is essential to gaining stakeholder buy-in, driving change, and understanding cost impacts and return on investment. This information guides financial decisions and resource distribution to support continued program sustainability.

Ongoing evaluation of program outcomes and processes allows you to determine:

- The effectiveness of SPHM technology solutions and processes i.e., how well did they mitigate patient handling-related hazards and risk? Did they eliminate or reduce risk to an acceptable level?
- Periodic comparison of incident and injury rates and trends from patient handling to baseline levels.
- The degree of improvement in reducing the frequency and severity of patient handling incidents.

Safe Patient Handling and Mobility – Section 8

- Extent of reduction in patient handling incident frequency and severity.
- If there are any hazards that were previously unnoticed.
- If there are any unintended positive or negative consequences from implementing SPHM technology and processes.
- If there is ongoing compliance with procedures.
- If solutions and processes work well in context of the organization's culture in the present and future state.
- The relevance of solutions and processes over time with consideration to changes in delivery of patient care or to the physical environment, etc.
- Next steps to continually improve the program

Overall, evaluating SPHM solutions and implementation is essential for influencing employee behavior and achieving program goals.

What Should Be Evaluated and How?

SPHM program goals and evaluation measures and metrics should be determined during program planning (**Refer to Section 4**) together with a plan for how and when they will be evaluated.

There are many program outcomes and processes that can be measured. However, it is recommended to limit the metrics chosen and keep measurement tools/systems simple especially at the start of the program. This allows you to effectively demonstrate outcomes and in turn gain support for program expansion and sustainability.

As discussed in **Section 4**, metrics should be realistic, achievable, meaningful, identify accountabilities and help accurately check progress towards desired programs outcomes and change (**Refer to Table 8.1**).

Ultimately, the metrics chosen to evaluate and manage an SPHM program will depend on the availability and quality of data in an organization, resources including the budget required to collect, evaluate, and report data, and the methods a healthcare facility typically uses to evaluate program performance.

When determining how to evaluate your SPHM program consider:

- How data will be collected, analyzed, and reported. Consider using a variety of methods and tools needed and if they can be standardized to evaluate program performance and activities throughout an organization, within individual sites or departments, or for a pilot study group.



Quick Tip

Program Evaluation in a Nutshell!

- Choose metrics that address your organization's safety goals and challenges, not just what's easy to measure.
- Set measurable targets for each indicator so stakeholders have clear benchmarks.
- Explain to stakeholders what you're measuring, why, and how their roles contribute to safety improvements.
- Collect and review data regularly to ensure actionable insights for decisions.
- Use regular review of findings to improve the SPHM program and address issues promptly
- Document and report progress, highlight improvements and recognize stakeholder efforts to maintain their motivation.

Safe Patient Handling and Mobility – Section 8

- The target population e.g., when surveying caregivers, support service employees, patients, and/or specific units/departments etc. This helps guide the selection of appropriate data collection methods and tools that will yield data that effectively measures program success.
- The quality of data, its susceptibility to SPHM interventions, and the measurable relationship between implementing SPHM technology, program processes, and specific program goals.
- Availability of electronic data management, i.e., a computer-based data collection system that will be needed retroactively identify and extract data using built-in search functions and analyze and store data and create reports.
- How data will be shared the evaluation data with all stakeholders.
- How follow-up will be conducted based on the collected data and evaluated processes. Consider budget, staff, sample documents & templates, external assistance needed.

The same methods and tools that were used for collecting baseline injury and cost data and evaluating program needs such as the Gap Analysis tool and employee surveys (**Refer to Sections 2-4**), can be used to collect post implementation data. This will allow comparison of pre-and post-implementation results.

Table 8.1 lists the tools provided in this toolkit that can be used for program evaluation.

Program evaluation methods may evolve depending on effectiveness of data collection methods and the program maturity. If you introduce new assessment tools, make sure to use the first data collection as a baseline in which to compare other data collected during re-evaluation.

Tool 8a provides examples of process and outcomes related measures that can be used to evaluate your SPHM program, together with resources provided from this toolkit that can be used to assess each measure, organized in a project management format.

Choosing SPHM Program Evaluation Tools

Ideally the best way to evaluate program processes and outcomes is to use a standardized tool that demonstrates strong psychometric qualities, such as validity and reliability, and is tailored to the specific requirements of the program. However, finding such a tool that meets your program evaluation needs can be challenging. If no suitable tool exists, develop a custom one with input from subject matter experts and pilot test it with a comparable population to the population you will be evaluating in the program (VHA, 2016). Pilot testing a tool will help to determine validity (the extent to which a tool accurately measures what it intends to measure), and reliability (consistency of the results if it were administered multiple times under similar conditions). Pilot testing also helps to improve administration procedures.

When comparing results, it is important to evaluate the comparability of the data between units/department, and facilities as applicable, years, and sources. Utilizing data from the same source is critical (VHA, 2016).

The data-collection tools included in this Toolkit are intended to be adaptable. They offer a framework for data collection, allowing organizations to determine their methods of use, and identify if more information should be gathered from relevant stakeholder groups, and assess whether pilot testing of a tool is appropriate.

Choosing SPHM Program Evaluation Tools

Consider how data and what type of data is to be collected i.e., qualitative and/or quantitative data. Identify the resources required to develop or adapt, administer, and analyze findings for each type of tool used, ensuring that information collected is valid and reliable. For example, interviews or focus groups should be led by trained interviewers, and qualitative data should be managed and analyzed and interpreted by someone experienced in qualitative research design (VHA, 2016).

*Finding assistance to develop and administer program evaluation tools is discussed on **page 8-16**.*

Utilizing multiple data collection methods can increase participant reach and is considered acceptable, provided that the results remain comparable.

Tools to assist SPHM program evaluation and included in this toolkit:

- 2a. Master tool for tracking and analyzing incident and injury data.
- 2b. Injury data summary report
- 2c. Calculating direct and indirect injury costs
- 2d. Coding and analyzing injury data and costs
- 3a. Gap analysis tool
- 3b. Employee perception survey
- 3c. Work-related musculoskeletal disorder (WMSD) symptom/discomfort survey
- 3d. Manager survey of unit/department characteristics
- 3e. SPHM technology inventory survey
- 3f. Site visit assessment checklist
- 3g. Worksite assessment summary
- 4a. Prioritizing level of risk for SPHM and solutions
- 4d. Communications plan
- 6a. Education and training plan
- 7b. SPHM budget template

*And all tools provided in **Section 8***

The use of each tool is covered in its section.

Table 8.1 Choosing SPHM Program Evaluation Tools.

Evaluation Methods

SPHM program evaluation typically has three phases: implementation, process, and outcomes.

Each phase depends on the previous one: implementation evaluation must precede process evaluation, which should be completed before outcomes are evaluated.

The evaluation questions asked, and tools/sources will vary depending on the evaluation phase. Some tools may be appropriate for more than one phase of evaluation such an audit tool used during

Safe Patient Handling and Mobility – Section 8

program implementation to evaluate caregiver compliance when using SPHM technology on a pilot unit that may also be used to assess compliance following program implementation.

Implementation evaluation

This type of evaluation measures the extent to which the SPHM program was *implemented* as intended e.g., on a pilot unit/department (**Refer to Section 7**).

This evaluation focuses on determining if the implementation process worked as planned. It identifies what elements or activities did not work well and what needs to be changed and why. This allows you to identify barriers, challenges, and opportunities as they arise and adjust strategy for program implementation in other units/departments.

Program evaluation methods can be developed and tested during implementation to ensure they assess SPHM processes and capture the program's effectiveness accurately when they are used to evaluate the program after implementation.

Implementation measures can be evaluated using tools such as surveys, interviews, focus groups, and direct observation.

Process evaluation

This type of evaluation measures program activities and determines the degree to which they are executed as planned.

Process evaluations by providing insights into the actions and activities that drive program outcomes, allowing for proactive adjustments and continuous improvement efforts.

If process measures are not evaluated regularly, it can be difficult to determine the reasons behind specific program outcomes achieved.

Process measures are synonymous with leading indicators (**Refer to page 8-13**).

The goal of process evaluation is to improve understanding of program operations and optimize the SPHM program by:

- Assessing the effectiveness of SPHM solutions to reduce risk of harm to caregivers and patients
- Verifying compliance with SPHM policies and procedures
- Engaging stakeholders and *identifying cause for* resistance to change
- Track progress toward milestones and deadlines at the unit, department, and/or facility level
- Identifying activities needing improvement
- Developing strategies for compliance
- Identifying corrective actions directed toward improvement priorities
- Establishing short- and long-term improvement goals
- Taking additional actions when compliance and improvement is not achieved or sustained

Safe Patient Handling and Mobility – Section 8

Process evaluation is not used to make conclusions about program effectiveness for meeting long-term outcomes though it may reveal early indicators of impact. It is sometimes the only possible evaluation or main source for improvement, especially when a SPHM program is new.

Process measures can be evaluated using tools such as surveys, interviews, focus groups, and direct observations and audits and document reviews **Refer to Sections 3 and 4 for more information using evaluation tools provided with this Toolkit. Refer to Post Implementation SPHM surveys on page 8-20 and Post Implementation SPHM audits on page 8-23.**

Data collected through process evaluation is typically qualitative or descriptive in nature.

However, quantitative data might be used to track how many employees participated in the SPHM intervention (such as training attendance), measure intervention delivery (such as the number of overhead lifts installed versus the target number), and/or assess how closely SPHM processes implemented according to their intended design (for example, by using a patient mobility assessment tool).

SPHM program processes to be evaluated include:

- SPHM technology use - user competency and tracking counts of lift use
- SPHM technology logistics - availability, ease of access, cleaning, and maintenance
- Education & Training: number of sessions completed & attendance; competency assessments and effectiveness of training
- Patient mobility assessment and communication
- Unit based champion program - recruitment, training, supported and effective
- Incident reporting
- Incident response procedures & response to high hazard issues
- Post incident investigation and review - root cause analysis and tracking of corrective action to completion
- Policy implementation, review, update, and enforcement
- Worksite analysis - high risk jobs or tasks identified and analyzed; worksite audits completed with corrective action
- Hazard prevention & control - activities to identify and correct and prevent patient handling incidents; proactive facilities design
- Absence and disability management – return-to-work strategies and claims closure goals, management and injured employee services satisfaction
- Program management activities:
 - Management commitment and employee engagement
 - Communication related activities completed and reviewed for effectiveness
 - SPHM committee - membership; number of meetings and attendance etc.; effectiveness of the committee, etc.)
 - Recordkeeping methods

Safe Patient Handling and Mobility – Section 8

- Overall program goals and timelines met
- Program Compliance with State regulations, other organizational policies, appropriate professional codes of ethics, the Health Insurance Portability Privacy and Accountability Act, the Americans with Disabilities Act, state workers' compensation laws, and other applicable codes and regulations (ANA, 2021).

Outcome evaluation

Outcome evaluation assesses the long-term effects of the SPHM program, aiming to determine the program's specific impact e.g., to reduce patient handling related injury rates and improve specific patient outcomes amid various influencing factors. Many outcome measures that are used to determine if SPHM program goals are met are synonymous with lagging indicators or metrics (**Refer to page 8-11**).

Outcome evaluation is used for a variety of reasons including to:

- Determine whether the program met its stated goals
- Assess how the program impacted the target group(s) such as caregivers and patients, and how issues were addressed
- Compare effectiveness of the program approach to achieve desired goals with other approaches
- Assess the overall value of the program and contribution to organizational goals (e.g., meeting desired key performance indicators)
- Guide decisions to modify, continue, or discontinue the program

Outcome measures can be evaluated using employee injury/incident data, rates and related direct and indirect costs, patient quality/safety metrics (as related to SPHM activities), and employee and patient satisfaction surveys.

Data collected is typically quantitative that is 'countable' but measures such as evaluating caregiver job satisfaction or patient experience with use of SPHM technology will yield qualitative or descriptive information.

Examples of outcomes measures include:

- Total recordable injury rate (TRIR) per 100 per FTEs¹
- Lost workday incident rate 100 per FTEs
- Days Away Restricted or Transferred (DART) rate per 100 FTEs
- Average number of lost workdays per injured worker per injury
- # Injury cases
- #Lost workday cases
- Total (&/or average) workers' compensation costs



Quick Tip

Artificial intelligence (AI) is increasingly being used in health care in various ways with the goal of enhancing efficiency, accuracy, and patient care. Stay informed (via your SPHM program champion and stakeholders in Information Technology, about any AI-Powered software technologies is being implementing or is currently being used in other departments at your facility that could be leveraged to assist the SPHM program to streamline data collection

Safe Patient Handling and Mobility – Section 8

- Total (&/or average) to replace one injured worker per shift. Can be permanent or temporary replacement costs i.e., a caregiver who is away from work and/or restricted duty per shift due to a patient handling related injury
- Non-OSHA recordable cases/incidents
- # Patient falls related to mobility activities with a caregiver(s) per 1000 patient days²
- # Hospital acquired pressure injuries related to lack of or manual repositioning in bed per 1000 patient days
- Improvement in intangible indicators such as caregiver job satisfaction by score or percentage improvement (**Refer to Table 8.2**) and patient satisfaction with use of SPHM technology (**Refer to Table 8.8**).

1. Calculating incident and injury related rates provides a standardized approach to assessing outcomes, as they enable comparisons between facilities and units of varying sizes. The denominator used in the calculation is hours worked by the target or exposed employee population so that the rate of injury per 100 Full Time Equivalent Employees (FTE) can be calculated (BLS, 2025). Calculating incident, injury and severity rates is described in **Tool 2d**.
2. The denominator that is commonly used to standardize patient-related outcomes in an in-patient setting is "Bed days of care (BDOC)" i.e., to the total number of days patients spend in a hospital or other inpatient care setting. This number is often used to calculate events per standardized unit, such as per 1000 patient days.

When evaluating outcomes, economic related data should also be reviewed. This includes assessing if the projected return-on-investment and cost-benefit goal(s) were met as determined when determining the program budget (**Refer to Section 4**).



Quick Tip

As discussed in Section 1, two patient care tasks that are frequently 'missed' by nurses and CNAs are repositioning a patient in bed and patient ambulation. The consequences of missing these tasks are costly for patients and a health care facility. However, the frequency and consequences (cost) of missing these tasks may not be well known within your facility.

Consider conducting a brief pilot study to gather baseline data to determine how frequently these tasks are missed on a patient care unit that is identified as high risk for patient handling related injuries e.g. an intensive care unit (ICU) and then evaluate the impact of the SPHM program to reduce incidence of missed nursing care on that unit. Determine if

Partner with your patient safety and quality department for assistance. Students in baccalaureate and masters/advanced practice nursing programs may also be a resource for help.

Measuring Intangible and Complex Indicators

Organization related (operational losses)– caregiver turnover rate and satisfaction

Establishing a direct link between SPHM activities and intangible indicators such as improved employee retention, recruitment, and decreased turnover rates can be challenging due to the complex interplay of organizational, psychosocial, and individual factors that influence these outcomes.

Outcomes such as the impact of the SPHM program/activities on caregiver turnover are harder to evaluate because there are many other variables that may influence a caregiver’s decision to leave an organization.

If reduced caregiver turnover is used as an outcome measure in a SPHM program, it is important to support it with data. Unless job exit interviews are conducted and include specific questions related to the role of patient handling in a caregiver’s decision to leave employment, turnover rates may not be a credible measure.

Research supports that job satisfaction among healthcare professionals, particularly nurses, is strongly linked to positive patient outcomes (Yang et al., 2024) and healthcare employee retention, recruitment, and turnover rates (Galanis et al., 2023; Perlo et al., 2017).

Job satisfaction related to SPHM impact may be a better indicator to evaluate through a post implementation SPHM employee survey or other employee satisfaction survey that a facility may already conduct. This may include the AHRQ Surveys on Patient Safety Culture® (SOPS®) Workplace Safety Supplemental Items for hospitals (<https://www.ahrq.gov/sops/surveys/hospital/supplemental-items/workplace-safety.html>) that are that is designed for use with the core SOPS Hospital Survey to help hospitals assess the extent to which their organization's culture supports workplace safety for providers and staff. This survey does include questions about the availability and use of SPHM technology and can also be used to assess burnout in healthcare settings.

Refer to ‘Finding Assistance to Develop, Administer and Analyze SPHM Program Evaluation’ on **page 8-16**.

Although intangible benefits of SPHM Programs, such as improved morale and employee recruitment or retention, are hard to measure, providing anecdotal evidence of these benefits can be helpful. Linking these benefits to the organization's mission and values can further support the program's value.

Organization related (operational losses)–patient quality indicators

Many variables related to a patient’s clinical and physical status may influence the effect of SPHM technology and practices on patient outcomes. For example, skin integrity and fall rates are used as indicators of quality of care and variables such as a patient’s medical condition, environmental and other factors play into the probability of skin breakdown or patient falls. When using such metrics to assess the effect of SPHM on patient quality, ensure baseline data is accurate and reliable to clearly define the intervention's impact.

Evaluating patient satisfaction with the use of SPHM technology is reviewed in **Table 8.8**.

Table 8.2 Measuring Intangible and Complex Indicators.

Safe Patient Handling and Mobility – Section 8

Lagging and Leading Indicators that measure SPHM program performance

Lagging and leading indicators are metrics that are used to evaluate specific SPHM activities and overall program performance and progress within a defined period of time.

Leading indicators are proactive measures assessed through process evaluation, while outcome evaluation concerns lagging indicators that show results after events have occurred.

Thus, both types of indicators are needed to provide insights into past performance of an SPHM program and guide future program improvements.

The following provides guidance about the use of lagging and leading indicators when evaluating an SPHM program. Examples of lagging and leading indicators are shown in **Table 8.3**.

Lagging Indicators (Past Performance & Reactive)	Leading Indicators (Predictive & Proactive)
<i>Related to Patient handling Injuries</i> • Injury frequency and severity rates such as the OSHA DART Rate (Days Away from work, Job Restrictions, and/or Transfer) • Worker comp costs • First aid cases • Replacement costs for employees on restricted or modified duty • Employee turnover rates • Employee absentee rates • Patient injury rates e.g., falls, HAPIs	<i>Outcomes and corrective actions from:</i> • Employee surveys, interviews, focus groups • Proactive Safety Huddles • SPHM audits to review procedural compliance with use of SPHM technology and processes; technology availability & maintenance; identify hazards, etc. • Near-miss reporting • Ergonomics analysis to identify, quantify <i>and</i> address WMSD risk • Employee and patient satisfaction • Early mobility practices; correct use of patient mobility assessment protocols • Measuring the frequency, quality, and effectiveness of training • Availability and effectiveness of unit-based champions or peer coaches

Table 8.3 Examples of Lagging and Leading Indicators.

Safe Patient Handling and Mobility – Section 8

Lagging indicators

Employee injuries and their associated direct costs are frequently used to justify and evaluate SPHM programs. However, these indicators are considered “lagging” in nature because they measure past safety performance, meaning that employees have already been injured while performing patient handling tasks.

Lagging indicators are usually output oriented and easy to measure but have little to no direct correlation to daily activities as they reflect the cumulative effect of various actions and decisions taken over time. As past outcomes they cannot be directly influenced or changed once they have been measured.

Lagging indicators do not help to identify hazards and prevent injuries from occurring or assess program effectiveness.

Although lagging indicators can be beneficial in identifying and estimating future injury trends, evaluating a SPHM program using *only* “lagging” indicators, is considered a *reactive* approach to safety management and can be a barrier to safety improvement (Moore et al., 2022). For example, in smaller health care units/departments or locations such as outpatient clinics, there may not be enough injuries to identify trends, but high-risk patient handling activities that are performed intermittently place caregivers and patients at risk of injury. In this case injury data and costs alone may not be enough to justify purchase of SPHM technology and implement a program.

Using only lagging indicators can lead to complacency, for example, a low injury rate that misleads managers to overlook safety initiatives even when risks remain.

Lagging safety indicators are susceptible to being influenced or skewed by several factors (**Table 8.4**).

Lagging indicators can be useful for analyzing historical trends and evaluating overall effectiveness of an SPHM program to reduce injury rates and associated costs. However, using them alongside leading indicators and contextual information provides a more comprehensive understanding of an SPHM program’s performance. (Moore et al., 2022).

Factors that can Influence Lagging Indicators

Factors that can influence lagging indicators include:

- Underreporting of WMSDs
- Identifying a single event or patient handling task that causes a WMSD is difficult, since symptoms usually develop gradually due to the impact of cumulative exposure to patient handling, and may be impacted by psychosocial, organizational risk, and individual risk factors. A caregiver may experience pain for months before reporting an injury, so the actual date when the injury started may be recorded in the post-program implementation period or a later quarter/year.
- Injury claims management, including the access to early return-to-work programs, claims closure and reopening practices, together with state worker compensation laws, can influence the severity of patient handling claims such as the number cases, rates and costs of injuries with days away from work, restricted, or transferred duty.

Safe Patient Handling and Mobility – Section 8

Factors that can Influence Lagging Indicators

- OSHA recording keeping requirements also impacts accuracy of data when tracking severity of patient handling related injuries involving days away from work and/or days of job transfer or restriction. Cases recorded on the OSHA 300 log can be 'capped' at 180 days away from work and/or days of job transfer or restriction (OSHA, ND) so claims exceeding this limit may not reflect true severity (OSHA, ND).
- Misclassification of patient handling incidents due to undefined or non-standard/coded incident variables (**Refer to Table 8.5**).
- Variation about what information is included in the incident description on the OSHA 300 log and workers compensation 'first report of injury' forms. OSHA recordable data and workers compensation loss run reports do not provide enough detail about the task being performed, underlying causative factors occurring at the time of an incident or situational context such as, clinical factors affecting patient behavior, staffing levels etc.
- Injury rates can be impacted by the variability in culture of safety and injury reporting practices between by unit/department and/or between facilities within the same organization.
- In smaller health care units/departments with fewer employees or limited work hours a single patient handling incident can disproportionately skew lagging metrics such as Total Recordable Incident Rates (TRIR).

OSHA 300 log cases are limited to a maximum of 180 days away from work or on job transfer/restriction, so claims exceeding this limit may not reflect true severity (OSHA, ND).

Table 8.4 Factors that can Influence Lagging Indicators.

The Importance of Coding and Standardizing Patient Handling Injury Data

Consistency in definitions, measurement criteria, and in the use of evidence-based data collection methodologies is essential to ensure that the resulting information is both meaningful and actionable (ANA, 2021).

As discussed in **Section 2** and in **Tool 2d**, developing and adopting standardized coding methods for patient handling incident and injury related data should be completed when collecting and reviewing baseline data at the start of the SPHM program planning process. For example, coding patient handling incidents by specific activity types and causes.

This practice is essential to facilitate accurate analysis of data and identify trends before and after the program is implemented and sustained.

Your worker compensation carrier/third part administrator (TPA) may also be able assist you to standardized descriptions and common causes of patient handling related incidents.

The Importance of Coding and Standardizing Patient Handling Injury Data

The *Master Data* spreadsheet in **Tool 2a** provides an example of how injury data can be standardized to ensure accuracy of data measurement and management.

When documenting the program evaluation methods and metrics in your SPHM program plan, include an outline of your injury coding definitions and other procedures that aim to promote uniformity in reporting of injury data and quality measures. This includes clearly defining what care tasks are considered as patient handling related and will be included in program metrics.

For example, would a back strain suffered by a caregiver while transporting a patient in bed or on a stretcher be counted as a patient handling related task?

It is important to determine how information about caregiver injuries that occur during patient handling tasks but are not *directly* caused by manual handling techniques or SPHM technology use, will be recorded. For instance, if a caregiver is injured due to patient aggression during a pivot-transfer from bed to chair, consideration should be given to how this incident will be classified.

Such cases may require coding as both patient handling and workplace violence incidents, as analyzing prevention strategies from both perspectives supports caregiver safety and ensures accurate data collection. If these incidents are classified solely under patient handling or workplace violence, the resulting data may not fully reflect the contributing factors.

If data is collected and coded consistently over time confidence in data trends pre and post program implementation is enhanced.

Table 8.5 *The Importance of Coding and Standardizing Patient Handling Injury Data.*

Leading indicators

Leading indicators are *proactive* measures that can assess the effectiveness of SPHM related activities and identify potential problems such as injury risk within a program, that the employer can address *before* injuries occur (OSHA, 2016). They focus on behaviors and activities that predict future safety performance, allowing for early intervention and continuous improvement (Moore et al., 2022).

Leading indicators have a direct correlation to work activities and are easy to influence or control . They are input oriented because they define what actions must be taken to achieve SPHM program goals with measurable outcomes. However, they can be harder to measure in that they require more effort to track and quantify.

Leading indicators are metrics that *precede* lagging indicators. Addressing issues related to program activities identified by leading indicators may help to reduce injuries and influence changes in lagging indicators. For example, tracking near-miss reports (a leading indicator) enables early interventions that can reduce injury rates (a lagging indicator).

Tracking leading indicators is *essential* to demonstrate that SPHM program activities are effective and achieving the desired results.

Safe Patient Handling and Mobility – Section 8

Selecting appropriate leading indicators is crucial, as they inform decisions regarding safety initiatives and the allocation of resources (*Refer to Table 8.6*).

Select indicators that can be readily collected and analyzed, provide meaningful information, and help identify deficiencies in SPHM program efforts. Effective indicators are scalable and actionable, supporting program growth and continuous improvement.

An improvement in outcomes following an improvement in leading indicators demonstrates an association of leading with lagging indicators. This association is a necessary feature of leading indicators (Moore et al., 2022).

By using a balanced approach to program evaluation that includes both leading and lagging indicators, healthcare facilities can establish a robust SPHM program that effectively prevents injuries, promotes a strong safety culture, and supports the well-being of both patients and staff.

If a SPHM program is well designed and implemented effectively, injury rates and related costs typically decrease as the program matures, resulting in lower annual returns. Performance measures for the program should then shift from a reactive approach to a proactive strategy focused on managing risks associated with patient handling.

This highlights the importance of valuing a SPHM program for more than just reducing employee injury costs. To support continued investment of the program, it is necessary to assess additional operational outcomes to demonstrate the effects of SPHM on patient care quality, as well as staff comfort and satisfaction (ISO, 2012).

Essential Characteristics of Leading Indicators

Leading indicators should be:

Accurate - Indicators should be **clearly defined and measurable**, allowing for a certain understanding of what needs to be improved and by how much. The **data collected** for leading indicators needs to be accurate, complete, and unbiased to ensure reliable predictions.

Reliable - They must **reliably** produce consistent results when measured repeatedly under similar conditions.

Valid - Accurately measure what they are intended to measure

Predictive - display a clear correlation with the future outcomes being predicted, i.e., changes in the leading indicator should consistently precede and influence corresponding lagging outcomes.

Understandable - The metrics and what they measure are easily understood by all stakeholders

Meaningful - Easy to interpret across the organization, aligned with the SPHM program's strategic objectives and desired outcomes, and drive improvement

Adaptable - Can be easily applied to determine performance at an individual level, a unit/department level, and the aggregated organizational level

Actionable - Provides information that enables and drives stakeholders to take action to reduce patient handling related injuries

Essential Characteristics of Leading Indicators

Easy to collect, collate and report - Collection processes should be efficient and timely, utilizing existing data collection systems and processes wherever feasible, and amenable to automation and streamlined data processing.

Easy to Communicate - Presented in a manner that provides quick interpretation and understanding of the data and summaries by all stakeholders.

Real time - Monitored in real-time or as close as possible, to support informed decision-making and prompt action aimed at enhancing performance.

Adapted from OSHA, 2016; Rostykus w & Mallon J, 2017.

Table 8.6 Essential Characteristics of Leading Indicators.

Who Should Evaluate SPHM Program?

The SPHM program coordinator, the SPHM Committee and other key stakeholder groups including patient quality, risk management, medicine, nursing, and therapy should be involved in program evaluation.

Managers of patient care units/areas and support services departments together with caregivers can help provide context for information being reviewed in relation to a specific unit or department.

Engaging a diverse group of stakeholders with a variety of backgrounds, skills, and experience will assist in providing a range of perspectives and insights about the impact of the program and ongoing program improvement.

As with other program activities engaging employees in the evaluation process can facilitate program success and sustainability.

When Should the SPHM Program be Evaluated?

The scheduling of evaluation activities depends on the stage of program implementation and the type of evaluation being conducted. Process evaluations begin early in implementation, while outcome evaluations are essential after implementation and during ongoing sustainment.

Scheduling and frequency of evaluation activities will vary depending on:

- The type of evaluation e.g., unit or department-based SPHM audits of patient handling activities, as well as assessments of logistics including the availability of SPHM technology and slings, should be conducted with greater frequency than activities like employee perception surveys. This approach enables proactive identification and prevention of hazards before incidents occur.
- The estimate timeframe for seeing results after implementing new SPHM processes and technology.
- Resources that are available.

Safe Patient Handling and Mobility – Section 8

- Program maturity for example, after a program has been in place for 2–3 years, employee surveys may be conducted biennially rather than annually.
- State SPHM regulations. The ANA SPHM Standard advises conducting evaluations on a regular basis, however, state SPHM laws (if applicable) mandate what should be evaluated and when evaluations should be conducted.

Program efforts should be evaluated:

- At program initiation, to assess feasibility and establish baseline metrics.
- During program implementation to evaluate progress of new processes and guide improvements as needed.
- After program implementation on a unit(s)/department(s), to assess the impact of solutions to reduce hazards and risk and to evaluate program implementation processes.
- When the program is expanded within a facility/organization.
- When changes occur in the workplace e.g. in delivery of care such as use of new medical equipment and/or treatment protocols; new workflow; staffing mix, nursing load, etc, in the patient population, or when structural modifications are made to the building or a department that may affect SPHM related activities.
- When new SPHM technology is introduced e.g., on a unit/department with an existing SPHM program.
- Whenever the employer is made aware of a new or previously unrecognized patient handling hazard.
- As a result of recommendations from investigation of patient handling related incidents.
- Formally and in depth at least once a year for each unit/department where the SPHM program is implemented
- Formally and in depth at least once a year of the overall program to determine accomplishments and to set goals for the upcoming year.



Quick Tip

Finding Assistance to Develop, Administer and Analyze SPHM Program Evaluation

Your clinical education, patient safety/quality and/or human resources departments may be able to assist with designing and administering tools such as surveys for the SPHM program. Your IT department may assist you with computer-based survey administration, audit and injury data tracking, data analysis and report development.

Before launching a survey, senior management and, where applicable, human resources must approve its content. In unionized facilities, union representatives should also review surveys intended for their members.

The Marketing department (as applicable) may be able help identify how to best promote survey activities.

Larger teaching hospitals may have a research department and/or statisticians who help analyze program evaluation data to determine statistical significance of SPHM outcomes. Local universities or colleges may have business students or statisticians available to assist in developing or administering evaluation tools as part of a course project

Safe Patient Handling and Mobility – Section 8

Evaluation of outcomes measures such as employee injury-related metrics should be monitored frequently e.g., monthly, or quarterly timely identification to identify trends in a timely manner.

Tool 8a provides examples of evaluation frequencies for different measures.

Overall, the evaluation of the SPHM program is an ongoing effort to identify issues and ensure continuous improvement and program sustainability.

Analyzing and Interpreting Data

The goal of evaluation is to produce timely, accurate, and objective findings that support the stated purpose of the evaluation, such as learning, accountability, and/or SPHM process improvement.

Conclusions drawn should align with this purpose, and data and conclusions should be presented in a meaningful, useful, and balanced way, which outlines the strengths and weaknesses of the methodology used (VHA, 2016).

It is recommended that data be collected and analyzed by individuals with adequate skills and experience in quantitative and qualitative data analysis (VHA, 2016). Refer to '*Finding Assistance to Develop, Administer and Analyze SPHM Program Evaluation*' on **page 8-16**.

Assistance needed will depend on the evaluation methods used and the volume and quality of data collected, and depth of analysis needed to draw meaningful conclusions.

All evaluation results should be included in a performance improvement plan with strategies for corrective action.

A process to address manager and caregiver non-compliance of SPHM policy and procedures should be developed. As with the investigation of patient handling incidents, identifying the root cause of non-compliance must be considered from a systems perspective and not direct 'blame' towards one individual (**Refer to Section 7**).

Unit/department managers should be held accountable for injury rates only if they have control over the work environment. This includes having the appropriate SPHM technology and processes (with adequate staff training) and sufficient staffing needed for optimal performance and injury prevention.

Communicating Program Results

Regular meaningful and transparent communication with leadership and all stakeholders keeps everyone engaged in program efforts and supports ongoing program improvement. When employees can see that management is invested in their health and safety, both communication and practices typically improve.

This involves identifying the unit or department program data that will be shared with managers and employees from both pilot units or departments and across the organization, to assist in recognizing areas with fewer issues and to learn from their success.

It is also important to share program updates and successes with stakeholders who provide essential support services for the program such as EVS, facilities maintenance etc., as well as with patients and families.

Safe Patient Handling and Mobility – Section 8

Some program metrics may need to be reported more frequently early in the program and less frequently as the program becomes established.

Leadership should have clarified which program metrics they need and how often they wish to review them. As noted in **Section 4**, leadership should understand that some SPHM program goals, like significantly reducing patient handling incidents in the first year may not be feasible and incidents may in fact increase due to improved reporting systems and a focus on early injury reporting. However, program activities are generally associated with a reduction in the *severity rates and costs* of injuries during the earlier phase of program implementation.

How and when program outcomes, successes and progress will be shared with all stakeholders should be included in your SPHM Communications plan (**Refer to Section 4**).

Using multiple media to disseminate information is more effective than a single delivery method (**Refer to Section 4**). For example, showing positive program trends on visibly displayed dashboards together with conducting brief updates at staff meetings. For example, sharing scorecards that are used to track and evaluate the program's performance against key performance indicators (KPIs), measure its contributions to organizational objectives such as enhancing employee and patient satisfaction, and highlight areas for potential improvement activities.

Include information about how stakeholders can ask questions and provide feedback about data and can find out more about the program in general such as providing contact information for the SPHM program coordinator and SPHM committee members.

Having a dedicated webpage or repository on the facility intranet for all SPHM program related information can be an effective vehicle for ongoing communication to employees. Solicit assistance from your Information Technology department to determine ways employees can easily access relevant and timely information about the SPHM program and its progress.

Emphasizing successes and celebrating 'wins' helps build employee enthusiasm and support for the program. Commend program successes and 'good catches' (that prevent incidents and injuries) by individuals, specific disciplines, and unit(s)/department(s). Ensure they know how their efforts are making a difference in workplace safety.

Communicate remediation plans together with the time frame and persons/group responsible for completion for program activities that did not achieve expected results. This includes corrective action plans made after patient handling related near-misses and incidents occur.

It is also important to communicate with employees if, and why, a SPHM solution or process did not have the desired results, and why it may *not* be feasible to implement solutions that employees may have suggested. Providing this feedback to employees can assist to maintain employee involvement in the program.

Consider sharing your program efforts with your local community, e.g., authoring articles for local publications and working with local media to spotlight your program efforts.

Facilities with established, successful programs can be promoted as a more attractive place to work in terms of improved job satisfaction and employee wellbeing becoming an *Employer of Choice*.

State SPHM regulations may also define how program information and results are to be communicated.

Documenting and Recordkeeping

Ongoing documenting of all program evaluation activities and outcomes etc., is essential to effective management of the SPHM program and may be required by state SPHM regulations.

To facilitate program management, all program-related documentation should be stored in a specific location that is easily accessible to the SPHM program coordinator, committee members, and key stakeholders.

Unless state SPHM regulations or organizational policy specify otherwise, it is recommended that SPHM program records should be retained for at least 5 years, which is consistent with OSHA's requirements for work-related injury and illness reports.

SPHM Program documentation that is suggested or required (as stated):

- OSHA Log of Work-Related Injuries and Illnesses (OSHA Form 300 and 301) – *mandatory* for some employers with over 10 employees however, certain low-risk industries are exempt. For more information go to <https://www.osha.gov/recordkeeping/>
- Workers' compensation first report of injury or illness reports as required by state regulations.
- Records of all patient handling-related near misses and incident reports, including those resulting in injury and those resulting in no injury.
- Patient handling-related incidents and injury investigation process and corrective actions taken.
- Records of all SPHM program planning, implementation and evaluation activities including:
 - The SPHM program plan, project management timelines and activities, policy, and procedures etc.
 - Program evaluations outcomes and related process improvements activities e.g., injury data and cost analysis; gap analysis, employee surveys, worksite observations and audits, records of risk assessment/hazard analyses and corrective actions recommended and taken, patient safety/outcome related metrics, etc.
 - Training - the SPHM training plan, objectives, curriculum, qualifications and training of trainers, attendance, and training effectiveness evaluations etc (**Refer to Section 6**).
 - SPHM processes such as SPHM technology selection methods, quantity, technical specifications including functions and weight capacities, storage location and location of use, inspection and maintenance, and replacement etc., and SPHM patient assessment protocols (**Refer to Section 5**).
 - Design and construction projects involving SPHM.
- Documentation of SPHM committee meeting minutes.
- Documentation of communication activities to stakeholders.

Program documentation must ensure and guarantee patient and employee confidentiality in accordance with organizational policies and all applicable state and federal regulations.

Post Implementation SPHM Employee Surveys

Developing SPHM Employee Surveys

Employee surveys can be used to aid SPHM program hazard identification and assessment and inform program planning (**Refer to Section 3**) and evaluation activities.

The employee survey provided with this Section (**Tool 8b**) is specifically designed to evaluate caregiver *perception* of an SPHM program following implementation on a unit/department or facility wide. It was developed using information from current SPHM literature and input from several hospitals who have used it to periodically evaluate their SPHM programs.

It is a comprehensive survey in that it aims to solicit employee responses about all major elements of a SPHM program (**Refer to Table 8.7**). It includes both multiple choice and open-ended questions and can be adapted to suit your program needs.

Tool 3b may also be used to assess pre and post implementation changes in employee perceptions regarding the types and frequencies of patient handling tasks performed within their unit or work area, as well as their views on the physical demands and perceived risks associated with each task.

When developing or adapting an existing SPHM program evaluation survey, plan how the data will be used and frame questions in a way that will elicit the most helpful information. Consider the stakeholder audience and units/departments you are targeting in your program efforts. Ensure language and terminology used can be understood by the employees you are surveying. In general, to facilitate participation an employee survey should take no longer than 10-15 minutes to complete.

Conducting a pilot test of a survey assists in evaluating the tool's validity and reliability, as well as enhancing survey administration procedures.

The survey is designed to be administered on a periodic basis such as every 1 or 2 years so consistency in survey items is important to ensure reliable data comparison and trend analysis. The sample survey provided is estimated to require approximately 15 minutes to complete when administered as a computer-based survey.

Refer to **page 8-16** for more information about soliciting assistance to develop and administer surveys and who should approve content before use.

Safe Patient Handling and Mobility – Section 8

Topics Included in the Post Implementation SPHM employee survey (<i>Tool 8b</i>)	
• Demographics: ○ Unit/Department ○ Role ○ Shift • Employees overall experience related to use of SPHM technology and its ability to: ○ Reduce the chance of injury at work ○ Reduce physical fatigue and discomfort when lifting, repositioning, and transferring patients ○ Result in improved patient safety and comfort • Use of specific type of SPHM technology on the employee's unit/department per shift • Non-use of SPHM technology i.e., the number of times per shift where SPHM technology was not used despite being available • Why SPHM technology was not used • SPHM technology ○ Ease of use ○ Convenient location ○ Reliability ○ Being used to maximum capacity • Sufficient SPHM technology to meet the demands of patient handling and transfers in the unit/department • Slings management – use and supply ○ Easy to apply and remove ○ Clean slings are readily available for use whenever needed	• Education & training: ○ The employee received enough training to feel confident and safe when using SPHM technology for patient handling and transfers ○ The training provided information/skills that have allowed the employee to use SPHM technology more frequently ○ Barriers that prevented the caregiver from attending SPHM training • SPHM patient mobility assessment ○ Awareness of the SPHM patient mobility assessment tool ○ How often and when is the tool used • Whether or not use of SPHM technology to allows more time for patient care. • How satisfied an employee is with the current SPHM program and procedures • Whether or not management supports the use of SPHM technology for patient handling and transfers • Employee awareness of SPHM resources • Additional recommendations that employees may have to increase staff and patient safety and comfort during patient handling and mobility activities (open response) • Option to request a member of the SPHM team to contact the employee <i>Note: Questions are multiple choice with the option to add comments</i>

Table 8.7 Topics Included in the Post Implementation SPHM Employee Survey (*Tool 8b*).

Safe Patient Handling and Mobility – Section 8

Conducting SPHM Employee Surveys

In addition to designing a survey that is meaningful and readily understood by employees, marketing the survey well is critical to gaining a good response rate from employees.

If you have not already done so in your SPHM communications plan, identify the most effective ways to share survey information with staff in each department, such as bulletin boards, newsletters, emails, meetings, or safety huddles.

Make sure all department/unit managers have been notified about the survey launch and rationale. Employees should have a clear understanding of why the survey is being conducted; the importance of their participation; and how collected data will be used. Communicate that you will provide a summary report of survey findings, and the projected timeline for publication of that report.

Timing the launch of a survey is also critical. If your facility is already conducting or planning to conduct other surveys that involve your target audience, such as Press Ganey or employee satisfaction surveys, these activities may influence the response rate to the SPHM survey. Health care workers are often surveyed regularly on a broad range of topics that can create 'survey fatigue.'

Offering the survey via web-based applications such as Survey Monkey® can facilitate response rate and assist to expedite data analysis. Check with the Information Technology (IT) department at your facility to find out what application is available to help conduct the survey.

It is recommended that surveys are conducted on a voluntary basis, and are confidential and anonymous so that employees feel comfortable sharing their responses and experiences etc. You can add the option of allowing employees to provide their name and contact information if they choose to so that you can find out more about their responses as needed.

Include the contact information of the SPHM program coordinator or other member of the SPHM committee on the survey as a resource for employees that may have questions about contents of the survey or survey process etc.

Allowing employees to complete surveys on work time can also increase participation.

It is suggested that the survey is conducted for a 2–4-week period and then demographic data is reviewed to determine if more responses are desired from specific departments or units, shifts, and/or job categories. Consider marketing the survey again and allowing another 2 weeks to increase response rate as needed.

Analyzing and Reporting SPHM Survey Data

A key aspect of survey planning is determining who will analyze the data, how the analysis will be conducted, and reports developed. Commercial survey tools like Survey Monkey offer data analysis and graphs, but further analysis is often required for specific unit-level insights.

Tool 8b provides a survey report template.

A comprehensive survey report is usually provided to the SPHM committee, leadership, and senior management, while an executive summary is shared with employees. SPHM unit champions should review the overall summary and detailed data that is specific to their unit/department

Safe Patient Handling and Mobility – Section 8

Additionally, meeting with management and employee groups, such as staff on an SPHM pilot unit, to share survey findings fosters active engagement of leadership and employees in program development initiatives.

Post Implementation SPHM Worksite Audits

Periodic worksite audits of SPHM practices and the use and management of SPHM technology provide a proactive way to evaluate:

- Employee compliance with SPHM policy and procedures including the use of SPHM technology and completion of SPHM patient mobility assessment protocols
- The supply, care, and maintenance of SPHM technology
- Patient experience related to use of SPHM technology
- Barriers to SPHM adoption such as why caregivers choose manual patient handling instead of using SPHM technology (*if observed*) and facilitate process improvement
- Improvements needed to enhance specific program activities, such as the SPHM training curriculum.

They support ongoing staff involvement in the SPHM program, inform managers about its effectiveness in their unit or department, and offer guidance on corrective actions to improve compliance.

Audit content should be derived from data collected during worksite assessment activities including training related competencies developed from task observation and analysis (**Refer to Section 3**), which serve as the foundation for the development of appropriate SPHM policies and procedures.

Audits typically use checklists to record observations and evaluate compliance with program policy and procedures.

Tool 8c is an example of SPHM worksite audit tool that was developed, evaluated, and conducted at several hospitals.

It incorporates observation of caregivers performing patient handling tasks and evaluates use of SPHM technology ergonomics work practices and use of patient mobility assessment protocols.

It is also designed to facilitate evaluation of the patient experience when being lifted or mobilized with SPHM technology and caregiver feedback about feedback about the program. *Refer to evaluating patient experience with SPHM technology in Table 8.6*

Tools 3e and 3f may be utilized to review *SPHM technology-related logistics* within a unit or department, including the following aspects:

- Ease of access, suitable storage (including accommodation for battery charging) and availability
- Proper labeling such as weight capacity, instructions for use/job training aids, and maintenance service checks
- Condition of technology and accessories such as slings e.g., damaged or non-functioning
- The suitability of the technology for the patient population

Safe Patient Handling and Mobility – Section 8

Audits can also include a review of patient charts or records e.g., checking appropriate documentation and use of SPHM patient mobility assessment protocols (**Refer to Section 5**).

Workplace safety related hazards or issues that are observed during an SPHM audit and need to be addressed *immediately*, should be reported to the unit/department manager (and/or shift charge nurse or supervisor as needed) *during* the visit. Follow your facility protocol for reporting and addressing urgent safety hazards.

When Should Audits be Conducted

The program coordinator and SPHM committee should determine how often audits are to be conducted and by whom as part of program evaluation planning.

Audit frequency is dependent on resources available to conduct and evaluate audit data and the maturity of the SPHM program within a unit or department.

Examples of Audit Applications:

- Conducting quarterly audits during the first year after implementing the SPHM program in a pilot unit or department can help to identify and resolve challenges before they affect caregiver practices. This is especially important if the unit or department does not have a SPHM champion or coach to monitor process compliance on a more frequent basis. In the second year after implementation, audits conducted every 6–12 months may be suitable if program compliance is satisfactory and objectives are being met.
- Audits may be needed at certain times of the year to support decision making about SPHM program activities.
- SPHM program coordinators and committees may conduct unscheduled or “spot” audits to review and help units with persistent patient handling incidents or unmet SPHM patient safety related goals, even after program implementation.

For example, if the characteristics of the patient population on a unit have changed quickly and existing SPHM technology and protocols do not meet patient handling needs. An audit may reveal an increase in the number of admissions of immobile patients of size and/or cognitively impaired patients who are prone to aggression, to units unequipped to manage them. The unit may lack knowledge of how to seek help from the SPHM team or have no unit champion to address the situation promptly.

- Audit data gathered can be compared to data from areas where patient handling incidents/injuries have decreased to identify potential lessons to be learned.
- Audits can be conducted based on information about SPHM practices reported by employees during SPHM program surveys. For example, data from an employee SPHM survey indicates that caregivers do not use a certain type of available SPHM technology on a specific unit/department. A spot audit of the unit that includes interviews with the manager and employees will help determine why the technology is not used and how to address the issue.
- Audits can be used as part of the incident investigation process following specific patient handling related incidents including those involving adverse events.

Safe Patient Handling and Mobility – Section 8

- Some SPHM process elements may be incorporated into other routine safety audits such as Environment of Care (EOC) rounding.

Who Should Conduct SPHM Audits?

SPHM audits may be conducted by unit SPHM champions or coaches, the SPHM program coordinator, and members of the SPHM committee or worksite assessment team, depending on available resources (**Refer to Section 3**). Having units or departments with SPHM programs conduct self-audits can help promote program accountability and ownership.

Audits should be performed by staff who are trained and have experience in SPHM techniques and have received instruction on the use of the audit tool and process.

Follow your organization's process to gain permission to observe patient handling tasks and ensure HIPPA compliance. Your SPHM program champion and unit/department managers can provide guidance.

This author has solicited assistance from student nurses to conduct SPHM audits as part of a research project. Students benefit from gaining practical experience in quality improvement initiatives, evidence-based practice, learning about research methods and data analysis which are valuable skills for their future careers. They gain an increased awareness about the importance of SPHM to promote a culture of safety for both patients and caregivers and themselves as the next generation of nurses or health care professionals.

Documenting and Communicating Audit Results

As with other data gathered from other program evaluation activities, the results of worksite audits should be documented and communicated to unit/department managers and employees so that SPHM processes can be improved as needed and successes can be celebrated.

Non-compliance with SPHM policy and procedures should be addressed promptly (**Refer to page 8-17**). Conducting informal interviews with employees and managers can help identify causes of non-compliance and necessary changes to eliminate barriers.

Determining Patient Satisfaction with SPHM Technology

Evaluating patient satisfaction related to the use of SPHM technology is an important measure to capture when determining if SPHM enhances patient experience.

Patient satisfaction surveys such as the national Hospital Consumer Assessment of Healthcare Providers and Systems or HCAHPS survey (<https://www.hcahpsonline.org/>), or hospital quality surveys that are administered to recently discharged hospital patients do not typically include specific questions related to SPHM or mobility measures.

Therefore, you will likely need to develop a process and tool to evaluate patient and family satisfaction related to the use of SPHM technology.

This author has had the opportunity to work with several multidisciplinary SPHM committees to develop and evaluate several methods that attempt to capture patient feedback about the use of SPHM technology.

These included:

- a. Post discharge interviews via telephone (as part of a routine quality survey)
- b. Interviews with patients immediately prior to discharge from a hospital, and
- c. Interviews with patients immediately after they were mobilized with SPHM technology (if they were able to understand and respond to the questions asked).

The questions determined to be meaningful and that were posed to patients were:

1. Were you moved using equipment (used in methods a. and b)?
2. Were you comfortable during the transfer?
3. Did you feel safe during the transfer?
4. Did you receive education about the equipment prior to its use?

When patients were asked about their experience related to the use of SPHM technology (such as overhead and floor-based lifts and friction reducing devices) via telephone interview (1) or prior to discharge (2), few could remember if they were lifted or moved using SPHM technology.

Method (3) was the most effective in determining patient satisfaction with the use of SPHM technology. Family members were also asked about their perception of technology use if present when SPHM tasks were performed.

The SPHM audit tool (**Tool 8c**) includes questions 1-4.

This approach can be adapted to assess patient interactions with SPHM technology during rehabilitation therapy and collect real-time feedback on comfort and ease of use.

Table 8.8 *Determining Patient Satisfaction with SPHM Technology.*

Section Summary



SPHM Program Evaluation

STEP 13. Evaluate the SPHM Program

SPHM programs cannot be managed and sustained without clearly defined measurement systems. Program evaluation is a continuous, systematic process designed to assess the relevance, progress, efficiency, effectiveness, and impact of SPHM interventions—including technology, practices, training, and their implementation.

As a SPHM program matures, the evaluation process follows a continuous improvement cycle, with each implementation phase informed by assessment results and organizational changes.

SPHM program evaluation involves assessing:

- Process and strategies used to implement the program e.g., on a pilot unit/department to identify program-related barriers and opportunities and adjust strategy for program implementation in other units/departments.
- SPHM processes after implementation to determine the level of compliance with SPHM technology use and related activities that drive program outcomes and allow proactive adjustments and sustained improvement. Process measures are synonymous with leading indicators, i.e., proactive measures that evaluate the effectiveness of SPHM activities and identify potential problems, such as injury risks, which can be addressed before injuries occur.
- Outcomes to determine the program's measurable impact on achieving program goals and key performance indicators (KPIs). Many outcome measures used are synonymous with lagging indicators, i.e., metrics that show results after events have occurred, such as caregiver injury rates and associated costs.

Each stage of program evaluation builds on the previous one: implementation evaluation must precede process evaluation, which should be completed before outcomes are evaluated.

Evaluation activities and results should be documented and communicated to all stakeholders.

Regular communication of program progress, improvements, and recognition of stakeholder contributions fosters the active engagement of leadership and staff, supporting ongoing development and long-term sustainability of the program.

The tools provided in this toolkit can assist SPHM committees and stakeholders in conducting comprehensive evaluations. State regulations may specify how and when SPHM program evaluation should be conducted.

Additional references and resources related to this Section are listed in **Section 10**.

Safe Patient Handling and Mobility – Section 8

Reference and Resources Used in this Section

- Accident Compensation Corporation New Zealand. (2012). ACC6075 moving and handling people guidelines. <https://www.acc.co.nz/assets/provider/acc6075-moving-and-handling-people-guidelines.pdf>
- American College of Occupational and Environmental Medicine. (2021). Guide to a healthy and safe workplace. <https://acoem.org/acoem/media/Staff-Photos/Publications%20Images/CHAA-Guide-to-Healthy-Safe-Workplace-Rev-04-15-23.pdf>
- American Industrial Hygiene Association. (2020). Best practice guide for leading health metrics in occupational health and safety programs.
- American Nurses Association. (2021). Safe patient handling and mobility: Interprofessional national standards across the care continuum (2nd ed.). Silver Springs, MD: American Nurses Association.
- AON. (2014, April). 4 tactics to tune up the safe patient mobility program. White paper. <https://www.aon.com/attachments/risk-services/Techniques-for-Improving-a-Patient-or-Resident-%20Movement-Program.pdf>
- Association of Occupational Health Professionals in Healthcare (AOHP). (2020). Beyond getting started: A resource guide for implementing a safe patient handling program in the acute care setting (4th ed., Rev. Spring). <https://www.aohp.org/aohp/Portals/0/Documents/ToolsForYourWork/BGSpublication/20-06%20BGS%20Safe%20Patient%20Handling.pdf>
- Bureau of Labor Statistics. (2025, March 10). Injuries, illnesses, and fatalities: How to compute your firm's incidence rate for safety management. <https://www.bls.gov/iif/overview/compute-nonfatal-incidence-rates.htm>
- Collins, F. (2020). Implementing a safe patient handling and mobility program to prevent staff injury. <https://thescholarship.ecu.edu/handle/10342/8661>
- Galanis, P.; Moisoglou, I.; Katsiourmpa, A.; Vraka, I.; Siskou, O.; Konstantakopoulou, O.; Meimeti, E.; Kaitelidou, D. Increased Job Burnout and Reduced Job Satisfaction for Nurses Compared to Other Healthcare Workers after the COVID-19 Pandemic. *Nurs. Rep.* 2023, 13, 1090–1100. <https://doi.org/10.3390/nursrep13030095>
- Gallagher, S. (2013). Implementation guide to the safe patient handling and mobility interprofessional national standards. Silver Springs, MD: American Nurses Association.
- International Organization for Standardization. (2012). ISO/TR 12296:2012 Ergonomics—Manual handling of people in the healthcare sector. Geneva, Switzerland: ISO.
- Li, L. Z., Yang, P., Singer, S. J., Pfeffer, J., Mathur, M. B., & Shanafelt, T. (2024). Nurse burnout and patient safety, satisfaction, and quality of care: A systematic review and meta-analysis. *JAMA Network Open*, 7(11), e2443059.
- Loeppke, R., Boldrighini, J., Bowe, J., Braun, B., Eggins, E., Eisenberg, B. S., ... & Yarbrough, M. (2017). Interaction of health care worker health and safety and patient health and safety in the US health care system: recommendations from the 2016 summit. *Journal of Occupational and Environmental Medicine*, 59(8), 803-813.
- Matz, M., Celona, J., Martin, M., McCoskey, K., & Nelson, G. G. (2019). Patient handling and mobility assessments (2nd ed.). https://www.fgiguide.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf
- Missar, V. J., Fray, M., Matz, M., Raphan, C., & Weaver, W. (2017). Safe patient handling and mobility claims coding: A pragmatic and functional approach. American Society for Safe Patient Handling & Movement Professionals. <https://asphp.org/wp-content/uploads/2017/01/Safe-Patient-Handling-and-Mobility-Claims-Coding-A-Pragmatic-and-Functional-Approach-V18-7.pdf>
- Moore, L. L., Wurzelbacher, S. J., Chen, I.-C., Lampl, M. P., & Naber, S. J. (2022, July 7). What measures can companies use to evaluate safety management practices and identify opportunities for improvement? CDC Blog.
- New York State Partnership for Patients. (2020). A progressive mobility program toolkit.
- Occupational Safety and Health Administration. (1978, July 21; 1997, August 22; 2001, January 19). 1904.7 - General recording criteria. Regulations (Standards - 29 CFR) 1904 Recording and Reporting Occupational Injuries and Illnesses. <https://www.osha.gov/laws-regs/regulations/standardnumber/1904/1904.7>
- Occupational Safety and Health Administration. (2016). Recommended practices for safety and health programs (OSHA 3885). <https://www.osha.gov/safety-management>

Safe Patient Handling and Mobility – Section 8

Occupational Safety and Health Administration. (2019). Using leading indicators to improve safety and health outcomes. <https://www.osha.gov/leading-indicators>

Perlo, J., Balik, B., Swensen, S., Kabcenell, A., Landsman, J., & Feeley, D. (2017). IHI framework for improving joy in work (White Paper). Institute for Healthcare Improvement. Available at ihi.org

Rostykus, W., & Mallon, J. (2017). Leading measures preventing MSD's and driving ergonomic improvements. Professional Safety, September, 37–42.

The Council of State Governments. (2018). Stay-at-Work/Return-to-Work (SAW/RTW) Toolkit. https://seed.csg.org/wp-content/uploads/2020/06/seed_report_issue.pdf

VHA Center for Engineering & Occupational Safety and Health. (2016, January). Safe patient handling and mobility guidebook. St. Louis, MO: Author. https://www.stryker.com/content/dam/stryker/education-and-training/focusrn/resources/caregiver-safety/implementation-tools/VA%20SPHM_PDF.pdf

Washington Safe Patient Handling Steering Committee (2011). Safe patient handling programs: Best practices guide for Washington hospitals. University of Washington NW Center for Occupational Health and Safety.

SPHM Program Improvement & Sustainability

Contents

SPHM Program Improvement & Sustainability	1
Step 15. Sustain the SPHM program	1
Introduction	1
Planning for SPHM Program Sustainability	3
Table 9.1 Key Components for Sustainable, Health & Safety Programs.....	4
Recommendations for Sustaining an SPHM Program.....	6
Management Leadership.....	6
Leadership rounding	7
Keeping the program visible	7
Organization-wide safety huddles	7
Mid-level manager support	8
Orientation of new leaders and managers	8
Employee Involvement	8
Recognition and reward	9
SPHM support and coaching	9
New employees and temporary staff onboarding	10
Department based safety huddles	10
Safe Patient Handling Program Planning	12
Review of program metrics.....	12
Review of program activities	12
Updating the strategic plan	13
Documentation and recordkeeping.....	14
Addressing declining program resources.....	14
Table 9.2 Integrating SPHM into other Safety Initiatives.	15
SPHM Policy and Procedures.....	16
SPHM Program Management.....	16
SPHM program champion.....	16
SPHM program manager or coordinator.....	17
Safe patient handling committee.....	17
Communications/Social Marketing	18
Showcasing success	19
Sharing stories	19
Publications and presentations	19
Ongoing Hazard Identification/Analysis, Hazard Control and Prevention.....	19
SPHM rounding, audits and risk assessment	19
Review of SPHM technology	20
Review of SPHM patient mobility assessment and communication protocols	21

Safe Patient Handling and Mobility – Section 9

Collaborative problem solving	21
<i>Table 9.3 'Using SPHM technology Takes Too Long' – How to Address this Challenge.....</i>	<i>22</i>
Other considerations.....	23
Review and approval of new SPHM technology	23
<i>Table 9.4 Single-Handed Care.....</i>	<i>25</i>
Proactive design	25
<i>Table 9.5. SPHM and Health Care Design and Construction Guidelines.....</i>	<i>27</i>
Unit-Based SPHM Champion Program	27
SPHM Education and Training.....	28
Employee Training.....	28
New Employee Preceptor Programs	29
SPHM Program Manager and the SPHM Committee.....	29
Students and Health Care Schools	30
Injury Reporting, Investigation and Management of WMSDs	30
Section Summary.....	32
References and Resources Used in this Section	33

SPHM Program Improvement & Sustainability

Step 15

Sustain the SPHM program

Introduction

Sustaining a SPHM program involves maintaining the program at a consistent and effective level of activity. This requires regular monitoring of outcomes, continuous improvement of activities based on results, and ensuring that sufficient resources are allocated so the organization can continue to achieve the desired benefits.

Maintaining momentum and achieving long-term improvement and after implementing a SPHM program can be challenging. Sustained success depends on strong foundational structures and processes that support ongoing efforts and maintain outcomes from established program activities.

Sustaining a SPHM program is about change and creating a culture of safety that evolves and adapts to changing organizational needs and circumstances. It is about persistence and understanding that even well designed and implemented SPHM programs require time to be fully accepted and integrated into the daily routines of caregivers and stakeholders. For example, some units or departments may take a year or two to transition from use of manual patient handling to using SPHM technology and procedures as standard practice.

It is essential to have a well-defined plan of activities that facilitate the organization's ability to sustain SPHM program efforts and support required changes.

If there is no plan to maintain program activities after implementing a new occupational safety initiative, focus and enthusiasm may decline over time, which can result in work practices and processes returning to their previous state.

It is estimated that about two-thirds of change projects in healthcare *fail* for several reasons, including poor planning, unmotivated staff, ineffective communication, and widespread changes (Barrow & Annamaraju, 2022).

There are several challenges that healthcare organizations face when sustaining safety initiatives such as SPHM, many of which have been exacerbated by the COVID-19 pandemic. These include:

- The increased workloads experienced during the pandemic have resulted in extraordinary levels of burnout in nursing and other patient care related professions leading to high rates of caregiver turnover and greater reliance on temporary staff. High levels of burnout and staffing shortages can make it more challenging to implement and sustain changes in work practices that are needed to mitigate risk of harm to employees and patients (Martin et al., 2023).
- High employee turnover strains budgets and staffing, making it harder to deliver effective safety education and training to a constantly changing workforce.
- Changes in senior leadership can affect the overall organizational safety culture and shift the service and budget focus within an organization. Changes in mid-level management can impact safety culture within units and departments and the level of support for safety initiatives.

Safe Patient Handling and Mobility – Section 9

- Health care mergers and acquisitions can also impact resource alignment and culture (Burmeister 2023).
- The growing emphasis on workplace violence prevention initiatives in health care may affect the allocation of resources for sustaining some safety programs, including SPHM.

Violence by patients against caregivers has increased significantly over the past decade prompting an increased focus and investment by health care organizations to address this significant issue. Several states have regulations that require implementation of comprehensive violence prevention programs in hospitals. Joint Commission (TJC) accredited hospitals, behavioral health facilities, and home health entities must meet TJC violence prevention standards. As resources are directed to addressing WPV programs and meet regulatory requirements, funding for SPHM program sustainability may decline if budget and resources are not sufficient to address both needs.

- The current changes in the US health care systems related to reimbursement uncertainty may also impact future funding and support of programs such as SPHM.

Beyond the general factors outlined above, SPHM programs may face specific challenges that influence the long-term sustainability of even the most well-designed and effectively implemented initiatives. These include:

- a. A decline in employee injury rates and associated workers compensation costs leading to an assumption that goals are met and there is no need for a formal or stand-alone SPHM program.
- b. Conversely program efforts may not demonstrate desired outcomes in a time frame that leadership expects. For instance, a significant reduction in patient handling incidents and related injury rates might not be realistic in the first year due to a focus on early injury reporting (**Refer to Section 8**). Enough time must be allowed between implementing SPHM solutions and evaluating results to observe meaningful changes.
- c. Funding and resources for competency-based hands-on training may gradually decline, leading to a reduction in the quantity and quality of SPHM training offered.
- d. Funding and resources for SPHM technology maintenance and renewal is not sustained.
- e. A reduction or absence of clinical support and peer coaching may have an impact on staff adherence to SPHM techniques and their ability to access expertise in managing complex clients, such as individuals who are non- or partially-mobile and patients of size.

Factors c, d, and e, may lead to decreased use of SPHM technology by caregivers.

- f. Only one person is assigned to lead SPHM program efforts so when they change roles or leave the organization the program effectiveness declines.
- g. Many SPHM programs stall because they overlook the need for continuous improvement to achieve better results (AON, 2014)

Long term sustainability is best achieved when an SPHM program goes beyond the goal of just reducing employee injuries and is embedded into the organization's daily operations and existing services. Leadership and key stakeholders must view SPHM as a core value that is critical to an organization's efforts to ensure a culture of employee and patient safety.

Safe Patient Handling and Mobility – Section 9

A SPHM program that is woven into an organization's culture at the leadership and unit/department level and within professional disciplines, is more likely to survive when there is a change in leadership and unit/department management and/or key stakeholders.

The ultimate goal is that caring for and mobilizing patients using SPHM becomes standard practice or *'just the way things are done around here.'*

Planning for SPHM Program Sustainability

As there are many factors that affect the long-term viability of a SPHM program, sustainability planning should begin as SPHM program planning activities are being conducted and the program plan written (**Refer to Sections 2-4**).

This involves assessing whether and how each SPHM program element or activity will receive ongoing organizational support following implementation and identifying any potential challenges to sustainability.

Implementing best practices from change management theories can improve the likelihood of program success and lead to better outcomes in practice (**Refer to Section 7**).

As outlined in **Sections 2-4**, building partnerships and collaboration during program planning is essential for securing future support for the program. This includes creating a pool of resources and identifying possible revenue sources and funders to sustain ongoing program activities.

Sustainability strategies should be periodically reviewed throughout program evaluation and revised as necessary in response to new findings.

A continuous improvement approach that incorporates rigorous and ongoing evaluation helps demonstrate the value of an SPHM program, validates effectiveness, and guides implementation of cost-effective improvements to support sustainability.

Factors that contribute to the sustainability of health and safety programs are summarized in **Table 9.1**.

Evidence-based elements of successful sustainable SPHM programs are summarized in **Section 1**.

The guidance on SPHM program development presented in this toolkit is founded on evidence-based best practice for establishing sustainable employee and patient safety initiatives.

By applying and customizing the recommended program elements and activities to design and implement a SPHM program that aligns with your organization's needs, you can establish a solid foundation for lasting program success.



Quick Tip

Useful resources that provide information about sustaining safety programs :

- IHI Sustaining Improvement
<https://www.ihi.org/library/white-papers/sustaining-improvement>
- AHRQ Model for Sustaining and Spreading Safety Interventions
<https://www.ahrq.gov/hai/cauti-tools/guides/sustainability-guide.html>
- RNAO Leading Change Toolkit: Sustain knowledge use
<https://rnao.ca/bpg/leading-change-toolkit>

Additional resources are provided in **Section 10**.

Safe Patient Handling and Mobility – Section 9

This remainder of this section describes activities that contribute to SPHM program sustainability and categorizes them based on the main components of an evidence-based SPHM program as presented in this toolkit.

Key Components for Sustainable Health & Safety Programs
• Create a program that is aligned with the organization's culture of safety and readiness to change • Develop SMART goals that are aligned with organization's overall mission and values • Develop a comprehensive strategy that includes a well-articulated business case and details how goals will be achieved, sustained, and integrated in all aspects of operations • Identify all stakeholders who may be affected by and/or influence program efforts. Ensure they understand their roles and responsibilities and are held accountable • Ensure ongoing active support by leadership and management at every level • Actively engage and empower stakeholders in all aspects of program development, implementation, evaluation, and evolution • Ensure ongoing open communication to all stakeholders that promotes engagement in program activities, partnerships, and collaborations • Identify, quantify, prioritize, and mitigate hazards and risks using evidence-based strategies and a systems perspective that considers physical, psychological, organizational, and individual factors that contribute to risk • Develop clear program standards, policies, and procedures, which are communicated effectively, enforced, and adapted as needed to meet changing needs • Promote a non-punitive culture of reporting near misses, incidents, injuries • Establish a system for education, training, and maintaining stakeholder competence that is dynamic and evolves to meet the needs of a complex environment • Monitor and measure progress using reliable lagging and leading key metrics and adapt as needed • Manage the program through a culture of learning and continuous improvement that embraces flexibility and adaptability and incorporates a proactive approach to risk mitigation • Promote and celebrate achievements to inspire ongoing improvement <i>Adapted from Loeppke, R. et al, 2016, OSHA, 2016, AHA, 2021.</i>

Table 9.1 Key Components for Sustainable, Health & Safety Programs.

SPHM Program Sustainability – Addressing Non-Physical Risk Factors for Work-Related Musculoskeletal Disorders (WMSDs)

SPHM initiatives are primarily designed to reduce physical and biomechanical risks that contribute to WMSDs.

However, as highlighted in Section 1, organizational and psychosocial factors such as understaffing, excessive workloads, high turnover, fatigue, and burnout, are driving the caregiver turnover rates which have risen significantly since the COVID-19 pandemic (Office of the Surgeon General, 2022; Busis, et al., 2025). These factors are associated with an increased incidence of WMSDs among nurses and nurse assistants (Han et al., 2014; Bernal 2015; Oakman & Macdonald, 2019; Vinstrup, 2020; Graveling et al., 2021; Wåhlin et al., 2021).

The interaction and degree of influence these non-physical factors have on the development of WMSDs, and their relationship to biomechanical risks, is not yet fully understood. Thus, there is limited guidance about how to measure the extent to which they contribute to patient handling related WMSDs.

However, research suggests that for ergonomics initiatives such as SPHM, to effectively mitigate the risk of WMSDs, they must incorporate a holistic perspective. This means addressing not only biomechanical but also psychosocial, organizational, and individual contributors to musculoskeletal injuries (Graveling et al., 2021; Latvala, 2022).

Although further research is needed, it is likely that well-designed SPHM program supported by an organizational culture that takes a holistic approach to employee well-being could positively influence the effects of psychosocial and organizational risk factors on both staff injuries and patient safety.

SPHM programs have the potential to reduce the psychosocial and organizational risks that contribute to WMSDs, burnout, and staff turnover by enhancing overall job satisfaction. Evidence suggests that, overall, SPHM programs are linked to increased employee satisfaction (Waltrip, 2019).

The following identifies how SPHM programs may contribute to reducing caregiver fatigue, enhance job satisfaction and reduce turnover

- Exposure to workplace violence perpetrated by patients and/or coworkers, is associated with missed nursing care and nurse burnout (Havaei et al., 2020; Havaei & MacPhee, 2020; Vincent-Höper et al., 2020; Hogg et al., 2018). However, consistent use of SPHM technology has been shown to reduce the risk of patient-initiated violence when patient care tasks are performed (Kurowski & Ghaziri, 2019; Collins et al., 2006; Pihl-Thingvad et al., 2018; Risør et al., 2017).
- SPHM initiatives facilitate safer mobilization of patients, which can lead to better patient outcomes such as fewer hospital-acquired pressure injuries and falls (The Joint Commission, 2012; Kennedy, et al, 2015; Kurowski & Ghaziri, 2019; Spritzer, et al, 2015; Walden et al., 2013; Gucer et al., 2013; Yoder et al., 2014). The adoption of standardized patient mobility assessment and communication protocols not only ensures safe early and continuous patient mobility, but also fosters teamwork and collaboration among nursing, therapy, and medical

SPHM Program Sustainability – Addressing Non-Physical Risk Factors for Work-Related Musculoskeletal Disorders (WMSDs)

- professionals. These improvements may also contribute to greater job satisfaction among nurses and therapists.
- Access to expert guidance and peer coaching in SPHM may also alleviate a degree of workplace stress and boost job satisfaction.
- SPHM technology can reduce the number of staff needed to reposition and mobilize patients compared to manual methods (HFES, 2023), allowing caregivers to complete care tasks that may otherwise be omitted and enhancing professional satisfaction (**Refer to Section 1**).
- Consistent use of SPHM technology helps minimize caregiver fatigue. Anecdotal evidence suggests that staff appreciate SPHM solutions because they feel less exhausted at the end of long shifts and have more energy for activities outside of work. Some male nurses and aides have also noted that using SPHM technology leads to fewer requests from their female colleagues, further streamlining workflow and improving the work environment.

Recommendations for Sustaining an SPHM Program

Management Leadership

Ongoing management support along with employee engagement and participation within a culture of safety that embraces both patient and employee safety and wellbeing is essential for the long-term sustainability of an SPHM program.

Sustaining leadership commitment from the governing board and CEO down to frontline managers is essential to ensure both human and financial resources are provided for SPHM program sustainability.

This includes ongoing budget for training, SPHM technology purchase and maintenance, program leadership and other evidence-based program components elements that are essential to program sustainability such as unit-based peer champions or coaches.

Sustained leadership support is also essential to ensure accountability throughout the organization, foster management buy-in at all levels, and to ensure cooperation among all key stakeholders to ensure successful management of SPHM components.

Effective sustained leadership engagement involves demonstrating active participation and a visible commitment that promotes a safety culture that prioritizes SPHM and encourages staff compliance with SPHM best practices.

When leaders and managers empower staff to raise safety concerns and take prompt action to resolve them, it fosters greater employee engagement and contributes to a safer workplace environment.

In contrast, if leaders and managers ignore staff safety concerns or move too slowly to address them, the result is often disengaged and demoralized staff and an environment in which employee and patient harm is more likely to occur.

Safe Patient Handling and Mobility – Section 9

Leadership rounding

One method of increasing leadership and senior management visibility in the SPHM program is the use of executive leadership patient safety rounds that incorporates an employee safety focus. The goal of these regularly scheduled rounds, e.g., weekly, is to have informal conversations with frontline staff about safety issues and for leadership to demonstrate their support of an organizational culture that promotes nonpunitive reporting of errors, adverse events, near misses, and unsafe conditions (IHI, ND).

Rounding facilitates proactive problem-solving and *if implemented well*, demonstrates to employees that leadership values their input and are committed to their well-being thus facilitating an improved safety culture. However, safety rounds that are conducted without full commitment, sincerity, or effectiveness may undermine safety culture rather than enhance it, and waste time throughout the organization (Foster, & Mazur, 2023).

If there is an effective executive rounding program at your facility, work with your program champion and SPHM committee to determine how SPHM related items can be incorporated into the rounding structure.

Keeping the program visible

Achieving ongoing support requires keeping the SPHM program visible and demonstrating ongoing value to leadership, hospital boards and managers, and to the overall mission and business goals of the organization.

This involves not only providing data about program performance and meeting KPIs but also sharing program successes such as describing the impact the program has had on employees and patients from an individual perspective through meaningful stories and testimonials.

It is important that SPHM program leaders keep apprised of organization wide and unit/department changes in management, staffing, patient services, and facility design etc., that may potentially impact SPHM program related activities.

Demonstrating an awareness of an organization's current financial and operational challenges and any changes in their mission and business and service goals can help establish credibility.

Additionally, displaying adaptability with program initiatives and plans to address immediate business requirements is beneficial.

The SPHM program champion or executive sponsor together with director/manager members of the SPHM committee should assist in keeping the SPHM program manager and committee apprised of such changes within the organization. Unit-based SPHM champions can provide information about significant changes within their unit such as changes in patient demographics and acuity or new unit-based initiatives to address patient safety or workflow related challenges.

Organization-wide safety huddles

Another way to keep SPHM visible is to include key information about patient handling incidents or important SPHM information related to immediate patient care needs in organization wide safety huddles.

Safe Patient Handling and Mobility – Section 9

For example, reviewing recent patient handling related injuries or events including those involving patient falls or fall recovery and discussing prevention strategies, issues related to SPHM technology supply or logistics, and recognition of SPHM practices that facilitated safe patient care, etc.

There must be a process in place to communicate, develop, and implement recommendations/actions from leadership rounding activities and safety huddles.

*Note: Department huddles are discussed **page 9-10**.*

Mid-level manager support

Encourage managers of units/departments to share their experience about how SPHM activities benefit patient care and keep employees healthy and safe with other managers to help facilitate buy-in in future program implementation and stability efforts.

Visible unit/department manager support of the program is also essential for encouraging employee engagement and participation.

Orientation of new leaders and managers

Ensure that there is a process to familiarize leaders, directors and unit/department managers who are new to the organization or to their job position with the SPHM program, and their role and responsibilities within the program, and where to get SPHM assistance.

If feasible, have leaders and managers attend caregiver SPHM training and conduct a walkthrough with new managers to review SPHM technology and practices on their unit/department. These activities can reduce disruption in SPHM program activities that can occur when management changes and increase program support and sustainability.

Be prepared to address questions about use of a specific type or brand of SPHM technology and/or different SPHM practices that new leaders/managers may have used or seen at another health care facility. They may wish to implement SPHM technology or practices that do not meet existing program needs or may be beneficial to the program.

Employee Involvement

Ongoing employee participation and engagement in the SPHM program is about keeping them actively involved in decision making and all program activities as the program matures.

The goal is to maintain a high level of enthusiasm and foster a sense of ownership in the program. This includes commitment to ongoing and correct use of SPHM technology and practices and to provide essential feedback for continuous process and program improvement.

Achieving this goal includes ensuring that employees feel that:

- Their contributions to SPHM are recognized and valued
- Leadership and management visibly demonstrate that their wellbeing is a priority
- They have sufficient training, SPHM technology and support resources to lift and mobilize patients safely (**Refer to page 9-28**)

Safe Patient Handling and Mobility – Section 9

- Patient outcomes and experience are enhanced or improved through SPHM practices
- SPHM enhances their work experience and wellbeing

This toolkit outlines how employees can participate in SPHM program planning, implementation, and evaluation activities.

Additional ways of managing employee participation and engagement in the SPHM program are described below.

Recognition and reward

Ensure a process is in place to recognize and reward employee ideas and safety behaviors, and to disseminate learnings from their ideas and suggestions.

Recognizing and rewarding near-miss or 'good catch' reporting can help to achieve a system of proactive safety monitoring.

Note that a strategy of rewarding units or departments with lower injury rates is not recommended as this can discourage incident reporting, hindering data collection and injury prevention efforts.

Other activities that help reinforce good behaviors included acknowledging and rewarding employees for utilizing their training and encouraging SPHM practices on their units.

Celebrating success does not need to be elaborate. Small gestures such as unit pizza parties, staff beverage gift cards, and celebratory banners can go a long way to motivate employees. Rewards could also include public acknowledgement at meetings, a certificate of appreciation, or sharing employee suggestions and their outcomes on a unit specific noticeboard or web page. Remove staff identifiers unless explicit permission is given to publish identifying information. If a suggestion cannot be implemented, explain why.

Any method chosen to recognize and reward employees should be implemented consistently to encourage the adoption of SPHM practices.

Program growth is assisted when other units become inspired to adopt safety practices recognized and rewarded elsewhere in the organization.

SPHM support and coaching

Ensure there is a well-communicated process to enable employees to get real-time assistance with SPHM related challenges such as problem-solving mobilization of a patient with complex clinical issues; troubleshooting or getting immediate replacement for non-functioning SPHM technology; or getting a specific sling style and size that is not stocked on their unit/department. This includes ensuring access to assistance 24 hours a day, seven days a week.

Problem-solving assistance could be stratified by level and urgency of need. Some examples include:

- Having unit-based champions or a SPHM clinical expert available.
- Instructional materials and tip sheets e.g., pictorial job aids attached to SPHM technology; quick 'how-to' videos that are accessible on an internal SPHM program web page via QR code, or badge cards that include contact information for SPHM assistance and essential SPHM tips.

Safe Patient Handling and Mobility – Section 9

- Contact numbers to obtain technology supplies or maintenance posted on all unit/department phones and computer systems.
- Having an email box for the SPHM program where employees can provide general feedback and suggestions related to SPHM technology and practices etc. Email should be monitored regularly and responded to promptly.

New employees and temporary staff onboarding

The onboarding process of newly hired employees and temporary staff who will use SPHM technology or provide support services for the program, also impacts program sustainability.

Receiving training and support that is relevant to their role and responsibility within the program in a timely manner is important to avoid disruption to SPHM workflow and practices, and to foster engagement. Ensure that SPHM orientation efforts are supported by Human Resources and any other key departments involved in onboarding of new employees and temporary staff.

Department based safety huddles

Safety huddles are brief (10-15 minutes), often informal meetings designed to proactively identify and mitigate potential risks and improve safety on a given unit or department.

Using safety huddles during patient handling-related incidents and near miss investigations was described in **Section 7**. However, safety huddles are also useful to allow staff to discuss issues that could impact their safety and to ways to mitigate risks related to patient handling and mobility tasks, and other care activities.

Safety Huddles are generally brief and may involve the entire inter-professional team at a consistent time each shift.

SPHM related topics raised may cover several issues that may SPHM related challenges such as:

- Patients with elevated fall risk due to mobility changes
- Changes to a patient's cognitive functions or behaviors
- SPHM technology or device concerns (such as maintenance or availability)
- Environmental issues (e.g., clutter in patient rooms)
- Staffing considerations (e.g., numbers and experience levels)

Safety huddles are typically facilitated by the unit manager, his/her delegate such as a charge nurse, or a unit SPHM champion.

There should be a process in place (which includes the unit manager) to develop and implement recommendations/actions from safety huddles/employee ideas and suggestions.

SPHM and Engaging Generation Z

Generation Z, (born between the mid-to-late 1990s and the early 2010s) make up a significant demographic in the workforce and marketplace. A recently released report from Press Ganey stated that 24% of Gen Z RNs left the workforce in 2024 (Press Ganey, 2025). This was primarily due to unmet needs, centering around purpose, support, and alignment with their organizations. They will not remain in environments where they feel their work or wellbeing are not supported (Hatfield, 2025).

As discussed in **Section 6**, training is more effective when different generation learning styles are considered in the design and delivery of training.

This should also be considered when developing ways to engage caregivers in the SPHM program.

So how can SPHM help engage Gen Z nurses and create a supportive, inclusive workplace community?

Many of the activities discussed in this toolkit that are essential to creating effective sustainable SPHM program could help such as:

- Access to online learning modules, virtual simulations, and digital tools for communication and collaboration. This includes designing brief easily accessible (via QR code) training videos that reflect their specific work environment
- Creating Tik-Tok style promotional campaigns for program activities, tips, and tricks
- in-person communication during rounding and the use of peer coaching to provide real-time support in the workplace
- Ensuring prompt feedback following communications to the SPHM program manager or committee or submitting suggestions for improvements. Recognition for good catches and ideas.
- Prompt follow up from their manager after submitting an injury report and visible support from their manager following an occupational injury (and the SPHM team for patient handling related injuries)

If feasible, evaluating the relationship between SPHM and job satisfaction in Gen Z nursing staff could be helpful in further promoting the value of the SPHM program.

Safe Patient Handling and Mobility – Section 9

Safe Patient Handling Program Planning

Review of program metrics

It is recommended that the SPHM program manager/coordinator and committee review near miss, incident, and injury data monthly to identify trends in injury rates or other key metric indicators that require action.

Senior leadership in consultation with the SPHM program manager and committee should identify what metrics should be shared on a more regular basis and included in the organization's monthly metrics review. This should have been determined before program implementation but should be evaluated during program review activities.

At least annually determine whether your SPHM program process measures, performance indicators and goals are still relevant to support program sustainability (**Refer to Sections 4 & 8**).

Metrics should accurately assess program success and clearly identify which SPHM activities are effective, and which may require improvement. If they do not, then determine how they could be modified to better support improvements in the SPHM program.

Assess whether the program is achieving its return on investment as outlined in the SPHM program plan.

If program goals were *not* met as expected, determine why and document the contributing factors, so you can effectively explain the gaps to leadership and outline strategies for addressing them.

Consider if program evaluation activities are too time consuming and resource intensive. For example, too many metrics are used they may impede program operations and allocate valuable resources to data collection rather than effective program administration.

Ensure the injury data coding system (**Refer to Section 2**) used to identify source and causes of patient handling incidents remains effective and relevant, for example that it (together with data from other program evaluation tools) effectively informs where to direct program efforts and training content.

Given that injury data is driven by the effectiveness of the injury reporting system and efforts to encourage early reporting of patient handling incidents and injuries, it is important to review this activity periodically and address barriers to reporting (**Refer to page 9-30**).

Review of program activities

On an annual basis use the gap analysis tool provided (**Tool 3a**) together with data from other program evaluation activities to conduct a thorough review of all program components. Compare findings to those from your previous gap analysis and other baseline data to determine progress made towards program goals.

The SPHM program manager/coordinator and committee should conduct this review and identify the program's strengths and weaknesses, opportunities for improvement, and threats to sustainability.

As you did at the beginning of program planning, assess the current organization's culture to evaluate readiness for continued leadership support of the SPHM program. When barriers to successful adoption of SPHM are identified within particular units or departments, assess whether and how the culture of safety may have changed. Factors to consider include the impact of management turnover, interprofessional relationships such as those between nursing and therapy, or nursing and medicine,

Safe Patient Handling and Mobility – Section 9

significant caregiver turnover and changes in staffing levels or credentials, as well as modifications in the care services provided.

As the program is being reviewed, consider how the wants and needs of stakeholders such as leadership, management, employees, unit-based SPHM champions, patients, etc., are identified and addressed.

Assess processes that may be slow or inefficient such as time to repair, order and/or replace SPHM technology and determine how they can be improved.

Program review should be conducted using a systems thinking perspective which considers how various program elements (people, processes, equipment, environment) interrelate and influence outcomes rather than focusing only on outcomes of isolated activities. This approach helps in understanding the program's impact and progress in a broader context, helps to identify root causes of issues and barriers to use of SPHM technology and practices, and guides design of more effective interventions for improvement and growth (ASSP, 2021; Goy, 2024).

Updating the strategic plan

Use the annual program evaluation activities described above to refine your SPHM program's strategic plan.

Consider the following:

- What are the specific goals and KPIs for the next year of the program that build on program activities and outcomes implemented to date (**Refer to Section 4**). Make sure goals are achievable and meet organizational needs.
- What do you want your program to look like 2, 5, and 10 years in the future?
- What will be the focus for your program expansion to other units; new build plans; new service line integration with SPHM?
- What type of SPHM technology and staff resources will you need to meet these goals?
- Who do you need to collaborate with to support program efforts?
- What will be the source(s) of funding?
- What impact will your program have to the organization? How is it of value?

When creating a budget, include immediate and ongoing funds *needed to support sustainability* (**Refer to Section 4**). Include funding needed for replacement and disposal of older SPHM technology as necessary and to maintain adequate supplies of items such as washable and/or disposable slings, friction reducing devices and other SPHM technology components as needed.

In addition to the program's primary funding source, investigate if funding is available from other sources such as other departments or cost centers who have embraced and seen success with the SPHM program such as perioperative or imaging services.

Check whether your institution's foundation or your workers' compensation insurance carrier can help with funding. Some insurers offer reimbursement if safety programs lower your premiums.

Certain states, for example Minnesota and Oregon, provide grants to support safety and health initiatives. Additionally, states such as Oregon and Washington offer financial assistance programs to

Safe Patient Handling and Mobility – Section 9

accommodate workers who have become temporarily or permanently disabled because of occupational injuries.

Visit your state's Department of Labor and Industries or the website for your state's OSHA-approved plan to determine whether funding assistance opportunities are available.

Creating varied funding sources can help with program sustainability.

Ensure that budget requests needing capital funding are submitted within the organization's capital budget planning cycle to avoid delays in future funding opportunities. Your program champion should be able to help submit and support capital expenses for approval.

Present the revised strategic plan to leadership for approval (**Refer to Section 4**).

Review the strategic plan quarterly between annual program assessments to ensure the SPHM program is on track and adjust strategies as organizational changes occur.

Documentation and recordkeeping

Ensure that the written SPHM program plan is updated to reflect changes in program strategies and components as they occur. Ensure any regulatory documentation and recordkeeping requirements are being met.

Review and where possible, streamline recordkeeping practices for all elements of the program. Keep appraised (in collaboration with your IT department) of newer AI driven safety management software that improves efficiency of recordkeeping, streamline reporting, enhances data analysis and other aspects of program management.

Addressing declining program resources

If some program goals were not met as expected or threats are identified that could impact future program activities such as a decrease in planned funding and/or human resources, remain persistent in your efforts to keep the program on track and of value to the organization.

If risk factors for WMDs were not reduced as intended, revisit the planning stage of the problem-solving cycle and review best practices and lessons learned. Re-evaluate whether to sustain program elements that lack evidence of positive outcomes, however, do ensure enough time has been allowed to see desired outcomes before stopping a specific activity.

If funding is limited due to competition for resources from other programs, and a new program cannot be expanded or an existing program cannot be sustained, narrow the program scope to address SPHM needs in the highest-risk areas rather than lowering implementation standards. *Refer to Sections 3 & 4 for information on how to prioritize SPHM needs*). For example, focus available resources on implementing SPHM effectively in one or two units, rather than spreading them across many areas.

Another approach to supporting SPHM program sustainability is to integrate the program with other patient safety related initiatives that are well-funded (**Refer to Table 9.2**).

Integrating SPHM into other Safety Initiatives

Merging or integrating SPHM programs with patient fall prevention and early mobility programs is a growing trend in hospital settings.

There is early evidence that this approach can successfully reduce caregiver injuries and improve patient outcomes/reduce harm (Dang et al., 2022; Dickinson et al 2018; Kayser et al., 2020; Turner et al., 2021). The use of SPHM technology and practices to facilitate early, safe, and progressive mobility and reduce fall risk further supports the critical value of an SPHM program to a healthcare organization. Information about the role of SPHM and early mobility programs can be found in **Section 10**.

As your program matures and/or if resources and funding are being reduced over time after program implementation, explore the value of integrating SPHM into these programs.

The use of mobility coaches to support early mobility programs is also gaining momentum in acute care settings. If financial and resource support of a unit-based SPHM champion program is waning, consider expanding the role of SPHM unit-based champions to incorporate mobility coaching.

Integrating SPHM practices into early mobility programs creates a synergy that benefits both patients and staff.

Further integration could include providing coaching to address other key occupational safety needs such as violence prevention and employee wellness which further expands the value of a unit-based champion program.

Establishing strategic links with other key groups, programs and disciplines within your organization can also help support SPHM sustainability, for example bariatric and workplace violence prevention programs or having nursing, therapy, and facilities collaborate on patient lift use, rounding, and data collection.

Connect proven elements of the SPHM program to other programs and services within and across organizations to expand and maintain service provision. These include processes used and lessons learned when implementing SPHM program elements such training programs, injury coding systems and effective data analysis, hazard assessment and prioritization and strategies to develop solutions, and how to facilitate employee engagement etc.

Aligning SPHM programs with other patient and employee safety initiatives allows a holistic or systems approach to risk reduction and improving both employee and patient satisfaction.

As noted in **Section 1**, employee injuries from managing uncooperative/aggressive patients are some of the costliest worker compensation claims. Evidence supports that use of SPHM technology can reduce the risk of employee injury from patient violence. Having SPHM representation on a facility's workplace violence prevention committee and being involved in development of protocols for safely mobilizing patients at risk of violence is essential. For example, assessing a patient's risk of aggression should be part of a SPHM mobility assessment protocol when determining a patient's SPHM needs (**Refer to Section 5**).

Table 9.2 Integrating SPHM into other Safety Initiatives.

Safe Patient Handling and Mobility – Section 9

SPHM Policy and Procedures

Review the SPHM policy and all related procedures, including SOPs and those for specific patient populations and handling scenarios, at least once a year (**Refer to Section 7**).

Determine if policy and procedures accurately reflect program elements and edit contents as needed and incorporate any missing elements. For example, are there established policies and procedures for managing care for non-mobile patients of size in response to an increased admission rate?

Review contents for usability and ensure that documents remain easily accessible to employees. Determine if some procedures can be consolidated to reduce redundancy and simplify use.

As an SPHM program matures it is not unusual to identify new procedures that need to be developed to address more complex SPHM situations such as patient extraction from a vehicle or turning a patient who is on extracorporeal membrane oxygenation (ECMO) between supine and prone positions. Consider using mock simulation to develop procedures for handling and mobility of complex patients and emergency situations etc. Include caregivers responsible for conducting these mobility tasks in this process.

SPHM policy and procedures should be reviewed by the program manager and committee, with input from unit-based champions. Stakeholders with relevant expertise should help update or create procedures, which typically require approval by the appropriate authority such as leadership.

The review process should audit policy implementation and whether the policy is consistently reinforced by management at all levels (**Refer to Section 8**).

A process to address manager and caregiver non-compliance of SPHM policy and procedures should have been developed during initial program planning and policy development. Periodically review if this process is effective.

Ensure all written documentation is updated to reflect any changes to the SPHM policy and procedures.

SPHM Program Management

SPHM program champion

As discussed in **Section 2**, having a SPHM program champion or executive sponsor is essential to assist with successful implementation and sustainability of an SPHM program.

Periodically evaluate the role and effectiveness of the program champion or executive sponsor as the program matures. If the champion changes roles or leaves the organization, work with leadership to select and orient a new champion.

The program champion or executive sponsor should meet with the program manager/coordinator at least annually to assess the level of support for the program and identify support gaps (such as funding, resources, or employee acceptance). Completing a SWOT analysis to identify strengths, weaknesses, opportunities, and threats can assist with this review.

This review could follow the annual program gap assessment conducted by the SPHM program manager/coordinator and committee/team (**Refer to page 9-12**).

Identify ways the executive sponsor can better seek additional support and strengthen the program's network of advocates.

Safe Patient Handling and Mobility – Section 9

Develop and execute a plan for the program champion and other key stakeholders as needed to strengthen daily positive messaging about the program.

SPHM program manager or coordinator

Dedicated safe patient handling and mobility (SPHM) managers or coordinators play a crucial role in the sustainability and success of SPHM programs (Kielich et al, 2025).

If not already in place, it is highly recommended that a dedicated position for an SPHM manager or coordinator is established to support maintenance and improvement of the program.

As described in Section 2, the program manager or coordinator directs the development, execution, evaluation, ongoing improvement, and sustainability of the facility's SPHM program. They serve as an advocate and expert liaison between patient outcomes, caregiver safety, and safe mobility practices throughout the organization (Kielich et al, 2025). They also play a critical role in establishing and ensuring the effectiveness of unit-based SPHM champion or coach programs.

Whether the program should be led by a manager or a coordinator depends on the organization's structure and the scope of responsibilities assigned to the role.

A full-time manager or coordinator is recommended but this typically depends on the size of the facility/organization, budgetary factors, and the scope of the SPHM program.

The role of and reporting structure for the program manager/coordinator and department responsibility of a SPHM program is discussed in **Section 2**. A sample SPHM program manager job description is provided in **Tool 2e**.

Appointing a dedicated SPHM manager or coordinator demonstrates an organization's commitment to maintaining the SPHM program.

Kielich et al, state that "Some of the greatest challenges to building viable SPHM programs include failure to change practice or culture and an inability to build a sustainable program that frontline workers believe benefits themselves and their patients.

Appointing a dedicated coordinator with appropriate credentials, experience, background, and administrative support, who has comprehensive oversight of the SPHM program, could help overcome these challenges" (Kielich et al, 2025).

Visibility of the SPHM program manager/coordinator to leadership is critical to sustaining the program and ensuring its value is understood. They should attend key meetings with leadership and stakeholders to review program progress, discuss program improvement and future plans.

After the SPHM program is implemented the SPHM manager or coordinator's role and effectiveness should be periodically evaluated.

The program risks losing momentum and failing without ongoing support and succession planning for the program manager/coordinator.

Safe patient handling committee

As mentioned in **Sections 1 and 2**, a multidisciplinary SPHM committee or team is important for planning, implementing, and sustaining the program.

Safe Patient Handling and Mobility – Section 9

As your SPHM program matures, revisit the structure and membership of your committee for relevance and effectiveness. Have a plan to address membership attrition and maintain 100% stakeholder representation.

Develop an effective orientation process for new committee members to facilitate their engagement and commitment.

Periodically review and revise the committee mission and project charter for alignment with program goals. Ensure documentation of meetings and committee activities is maintained and stored in a central location that is accessible to stakeholders.

Ensure that the committee reporting structure within the organization remains suitable and effective.

Some committees may develop further and form subcommittees to address patient care areas with specific patient handling requirements as their programs grow, such as outpatient clinics, diagnostic imaging, perioperative services, and emergency departments. Additionally, a workgroup or taskforce can be established to focus on specific patient handling challenges, such as care of patients of larger size or those considered at higher risk for violence.

In smaller facilities with a mature SPHM program the committee may be incorporated into the facility employee safety committee for resource efficiency.

Make sure to recognize the committee's work and commitment to employee and patient safety.

The program manager and committee should keep current with SPHM research, practices, and technological advances (**Refer to page 9-28**).

Communications/Social Marketing

Your SPHM program communications plan provides the framework for activities to help to keep SPHM visible and convey program progress and success to all stakeholders within your facility and beyond (**Refer to Section 4 and Tool 4d for information about marketing the program**).

Periodically review and update the plan. Evaluate if communications methods are effective and if additional resources are needed to implement them.

Identify if there are additional stakeholder groups that should be included in the plan. For example, collaborating with other health care facilities that frequently admit to and/or accept patients after discharge from your facility to improve communication about SPHM patient mobility needs.

Continuing to build strong relationships with program stakeholders is vital to secure the engagement and support needed for program sustainability.

Develop strategies to engage stakeholders who appear uncommitted to the program. Anecdotally, physicians are often especially challenging to get involved early in SPHM efforts. Enlisting a senior physician to advocate for SPHM and show how it benefits medical care, and patient outcomes may improve engagement by medical team members. Physicians with WMSDs, such as surgeons, can also serve as respected advocates.

Safe Patient Handling and Mobility – Section 9

Showcasing success

Continue to share program progress including lessons learned and celebrate successes with all stakeholders to promote ongoing engagement. Use a variety of media and strategies to distribute information and maintain its relevance. Use organization wide events such as national nurses' week to showcase program initiatives.

Make sure effective channels are established for employee feedback about the program to maintain engagement and address concerns.

Sharing stories

Sharing program outcome data is important (**Refer to Section 8**) however, the use of stories can be a powerful way to engage stakeholders and help them understand how the SPHM Program positively affects employee and patient safety.

Well-crafted stories that are credible and relevant to the audience can be used to communicate a problem, provide context, and present a solution (Leary, 2022).

Stories engage emotions, build trust, and make information memorable and easier to remember. Stories can be more effective than using facts and figures alone in persuading people and inspiring action (Wright & Rich, 2025).

One method of sharing stories is to create short video clips featuring employees, patients, and their families sharing their experiences regarding the beneficial impact of SPHM on their individual lives.

Publications and presentations

Sharing information about your program by publishing in peer-reviewed journals together with presenting at conferences or webinars for professional associations such as those for SPHM, nursing, therapy, ergonomics, and nursing leadership, brings positive attention to your organization.

Coordinate with your facility's marketing team to request local media coverage highlighting your program's benefits for staff and patients.

Ongoing Hazard Identification/Analysis, Hazard Control and Prevention

SPHM rounding, audits and risk assessment

Ongoing program evaluation processes that should be conducted to facilitate program sustainability are described in **Section 8**.

Periodic audits and rounding of units/departments within the SPHM program are essential to proactively identify and address ergonomics/patient handling-related risk factors that may contribute to employee and patient harm. These activities allow review of staff compliance with SPHM policies and practices and if SPHM technology is being managed appropriately to facilitate use.

Periodic risk assessment incorporating ergonomics evaluation can be conducted to review patient handling tasks and workflow to monitor the effectiveness of control measures (*Also refer to Table 9.3*). This process assesses whether changes in work practices, use of SPHM technology, or the patient

Safe Patient Handling and Mobility – Section 9

population being mobilized have altered caregiver exposure to biomechanical risk factors that require attention.

Ergonomics assessments of patient rooms and care areas help create safe, accessible spaces for those with mobility needs, reducing fall risks and improving workflow for caregivers.

Risk quantification can help prioritize patient handling tasks for improvement as programs expand to additional care areas or as new patient handling needs emerge. SPHM technology solutions and practices are reevaluated following implementation to ensure risk factors for WMSDs, and user error are mitigated.

Audits and rounding can be conducted by unit-based SPHM champions, the program manager/coordinator, and/or members of the SPHM committee. Ergonomics evaluations should be conducted by employees with appropriate expertise.

With proper instruction, nursing staff on modified or transitional duty may be able to assist with program audits and other evaluation activities. Student nurses may also help as part of an academic project and clinical rotation.

Refer to **Section 8** and **Tools 8c and 8d** for more information about SPHM post implementation audits and rounding.

Identification of patient handling related issues could also be incorporated in regular safety and environment of care rounds or other patient care related rounding e.g., falls prevention.

Review of SPHM technology

Evaluate SPHM technology use. Some powered lifts systems can track usage, and some vendors can provide software that tracks use in real time.

Radio frequency identification tracking (RFID) or Bluetooth tagging systems can be used to track SPHM technology including slings within a facility to help prevent loss and to locate needed equipment (**Refer to Section 5**). Periodically review that location tracking systems are working as expected and that batteries are replaced as needed.

To facilitate use of SPHM technology, the following technology management factors should be reviewed and deficits addressed during proactive rounding and audit activities.

- Ease of access, suitable storage (including accommodation for battery charging) and availability
- Proper labeling such as weight capacity, instructions for use/job training aids, and maintenance service checks
- Condition of technology and accessories such as slings e.g., damaged, worn, or non-functioning
- Sling management, e.g., supply, laundering (if applicable), inspection, disposal etc.
- Cleaning and infection prevention
- Preventative maintenance and repair effectiveness
- Adequate quantity of technology
- Suitability of technology for the patient population

Tools 3e, 3f, and 5a may be customized to assess SPHM technology-related logistics.

Safe Patient Handling and Mobility – Section 9

Assess how well departments like maintenance, biomed, and facilities management are notified of patient handling equipment issues, and how they respond to requests or replace faulty equipment.

Ensure facility and SPHM technology manufacturer infection control protocols are followed, including any specific procedures for equipment used in C.diff or isolation rooms, such as enhanced cleaning of wheels and foot plates.

Review of SPHM patient mobility assessment and communication protocols

Audits are also conducted to ensure SPHM processes such as protocols to assess, communicate and document patient mobility status and SPHM needs are being consistently and correctly completed.

This requires periodic audits of patient charts and any other documentation that is used to communicate a patient's SPHM needs such as whiteboards in patient rooms, signage on room doors and digital nurse station monitoring displays, and communication practices between nursing at shift change handoff, and between nursing and therapy staff.

Collaborative problem solving

Unit/department rounding and audits, together with information from injury investigations, staff surveys and feedback/suggestion processes can help to identify barriers to the adoption of SPHM technology and practices which can then be addressed with input from stakeholders.

Rounding and audit activities facilitate collaboration between caregivers and managers to address technology use challenges.

Barriers to use include limited availability of SPHM technology, inadequate training and skill development and/or the influence of unit culture and work organization. For example, lack of support to use SPHM technology by managers and/or peers (i.e., nursing, therapy, physicians), understaffing, time pressure and patient or family refusal to use lift technology. **Refer to Section 1** for more information about common barriers to SPHM and how to address them.

A common barrier to the use of SPHM technology is the perception that completing patient handling tasks “takes too long” with technology compared to handling a patient manually (Mechan 2014).

However, studies show that nurses often overestimate how much time they spend on care tasks like patient handling and mobility compared to actual measurements of tasks being performed (Mechan 2014). Addressing this issue is discussed in **Table 9.3**.



Quick Tip

Leaving a flat repositioning sling under a non-mobile patient in bed and/or during procedures in locations with overhead lifts is a time -saver that can facilitate lift use (Knibbe & Knibbe, 2022). Collaboration with Wound Ostomy nursing staff is essential for this process to be approved (Refer to Section 5 for more information about leaving slings under patients).

Having housekeeping or EVS staff place flat repositioning slings on beds with overhead lifts during bed-making after patient discharge can streamline lift use for caregivers. EVS staff should be trained on this process and informed of its importance. Ensure a consistent supply of slings is available for EVS needs.

Safe Patient Handling and Mobility – Section 9

Ensure that a process is in place to address SPHM-related hazards and issues identified during audits and rounding activities and implement solutions promptly.

Keep staff updated on solution progress. Explain if solutions they suggest cannot be implemented and why, and outline which alternative actions can effectively address the identified issues. Providing this feedback helps maintain employee engagement in the program.

'Using SPHM Technology Takes Too Long' – How to Address this Challenge

If caregivers are concerned about the time needed to use SPHM technology, and there are no barriers such as SPHM technology access, or training and skill level, peer support, etc., consider an conducting an ergonomics analysis to improve work processes (**Refer to Section 3 for more information about conducting ergonomics analysis**).

Observe a variety of caregivers completing the tasks of concern and conduct time-studies to determine the shortest, average, and longest length of time taken to complete a task. Determine work practices that hinder and those that improve efficiency.

This includes evaluating if fewer caregivers are needed when using SPHM technology to mobilize a patient. It is not unusual for caregivers who are used to needing many coworkers to manually handle a patient forget that fewer may be needed when using SPHM practices (**Refer to Table 9.4**).

Consider the time savings for staff when not having to search for many caregivers to perform manual handling tasks and the consequences of interrupting those caregivers .

*Core ergonomic practices that can improve patient handling efficiency and reduce exposure to risk factors for injury when using technology are provided in **Section 5**.*

Time to use SPHM technology improves with repetition, practice, and accumulated experience. Caregivers who are more skilled and efficient in performing a mobility task with SPHM technology can provide invaluable insight and help to publicize more efficient techniques to coworkers. Visibly demonstrating time-saving work practices in SPHM training classes and at point of care can help dispel myths of time inefficiency with SPHM technology use.

Ergonomics evaluation also provides an opportunity to determine if skills taught in SPHM training are being applied or if there are gaps in training content.

When developing an efficient SPHM process and/or changing the way SPHM technology is to be used, always conduct a risk assessment to ensure there are no unintentional negative safety or care-related consequences.

Solicit assistance from your vendor(s) to ensure their SPHM technology is being used in the safest, most efficient way.

Seek vendor/manufacture approval if you change the way their SPHM technology is to be used and document the change in process, details of the risk assessment conducted and rationale for why the change is needed etc.

Incorporate work process changes into SPHM training and instructional materials and aids etc and have unit-based SPHM champions reinforce them at point of care.

Table 9.3 'Using SPHM technology Takes Too Long' – How to Address this Challenge.

Safe Patient Handling and Mobility – Section 9

Other considerations

As outlined in **Section 5**, the standardization of SPHM technology and accessories by design is important to minimize the risk of use error and enhancing training effectiveness, for example, a single brand and model of overhead lift is used for most applications.

In cases where technology is not yet standardized, it is advisable to assess how this impacts the effectiveness and costs associated with the SPHM training program, as well as the occurrence of near misses and incidents attributed to user error. It is recommended to review the potential implementation of a standardization strategy for SPHM technology as the program progresses.

When evaluating SPHM workflow and technology utilization, determine whether there are any barriers to placement of patients who need mobility assistance in rooms with necessary SPHM technology such as overhead lifts. For example, there are not enough rooms to accommodate several non-mobile patients of size who are admitted in the same time period. Relocating patients and resources to accommodate higher-risk patients can incur significant costs, however, identifying these expenses provides valuable data to support additional investment in overhead lifts and other appropriate SPHM technology.

Collaborate with unit managers and patient placement or admissions staff to assess the frequency of this situation and its subsequent outcomes.

Review and approval of new SPHM technology

Look for innovative new technology for the SPHM program. Your technology vendors should keep you apprised of new products and how they may be suitable for your program.

Information about new technology is often mentioned on professional association listservs related to SPHM such as the Association of Safe Patient Handling Professionals (ASPHP), professional networking platforms such as LinkedIn; and in professional journals such as the International Journal for SPHM and Falls Management. Attending SPHM, fall prevention and other healthcare related ergonomics, safety and health conferences can provide an opportunity to try new SPHM technology.

Review the SPHM technology approval process for effectiveness. Stay apprised of changes to the procurement process e.g., changes to group purchasing organization (GPO) plans that may affect what technology you may be able purchase for the program. Provide education about program to new procurement staff as needed.

SPHM technology vendors play a role in supporting SPHM programs however, SPHM technology vendors may directly approach a unit or department manager to demonstrate their products rather than through the SPHM program manager and committee.

Additionally, nursing and therapy staff may want their manager to purchase SPHM technology they have seen demonstrated when attending a professional conference or trade show.

It is important that stakeholders, including Procurement, send requests to purchase new SPHM technology or additional devices to the SPHM program manager/coordinator and committee to verify their suitability for SPHM requirements.

Single-Handed Care

Is a minimum of two caregivers *always* required when using powered or mechanical SPHM technology such as overhead and floor-based lifts?

In US health care systems, it is customary practice to require at least two caregivers when using powered SPHM technology, rather than allowing a single caregiver to operate the equipment.

There appears to be no specific US regulations requiring at least two caregivers to operate a patient lift. Neither CMS nor the FDA set caregiver minimums, though manufacturers may include such instructions for their lifts.

There are circumstances when having one caregiver use a powered lift device is feasible and can be beneficial to ensure that patient mobility tasks are performed as clinically required.

In the UK, efforts toward ‘single handed care’ or ‘reduced carer handling’ have increased over the past decade, specifically in community-based services such as home health. Key reasons for the rise in single-handed care initiatives include cost savings, workforce rationalization, and advances in assistive technology and related techniques (Whitehead et al., 2022).

Single-handed care is being seen as a solution to address the shortage of community care workers and the overall cost of care associated with the increase in the elderly population.

Care tasks, including patient handling and mobility, are completed by fewer care workers with use of a variety of SPHM equipment, *only* after a thorough risk assessment and review of care needs to ensure a patient’s health and well-being (Nightingale Hammerson et al., 2024).

In Denmark, a manufacturer of SPHM technology lifts partnered with 43 nursing homes to implement a single-handed care initiative using overhead lifts and shower chairs. Staff were extensively trained in the use of the lift and hygiene technology and risk assessment prior to program implementation. The outcomes showed that 75% of all moving and handling care and hygiene tasks changed from requiring two people to one. Staff reported improved comfort and job satisfaction and a better connection with a resident during the task. Residents expressed feeling safer and more secure with one caregiver and the nursing homes also experienced significant cost savings (Mechan, 2024).

With the continued shortage of caregivers in the US and the prevalence of missed nursing care such as repositioning and ambulating a patient, health care facilities with successful and established SPHM programs should review if one caregiver can safely perform some patient handling tasks.

A standardized and thorough risk assessment is key to determining if one caregiver can safely perform mobility tasks (**Refer to Section 5**). Caregivers must be proficient with the SPHM technology to be used.

Anecdotally, in one large hospital system single-handed care has been practiced for over a decade when using overhead and powered sit-to-stand lifts.

Based on a mobility risk assessment, one nurse or nursing assistant (as delegated by an RN) can:

1. Reposition a non-mobile patient in bed using a repositioning flat sling and overhead lift in the following circumstances:

Single-Handed Care	
	• The patient is not of size or • At risk of being combative or aggressive • The patient does not require peri-care or wound care. • Assistance is not needed to manage medical devices such as IV lines, airway management etc. • An RN assessment has determined that there are no clinical indications or medical orders requiring two or more caregivers.
	2. Operate a powered sit-to-stand lift if the patient is not of size, does not have medical devices attached to them such as an intravenous infusion system, and the physical environment allows for easy maneuvering of the lift. Patients who may become combative are not transferred in powered sit-to stands for safety reasons.

Table 9.4 *Single-Handed Care.*

Proactive design

Incorporating SPHM and ergonomics design principles from the concept stage of building projects is a proactive cost-beneficial approach to preventing employee injuries and optimizing workflow and efficiency. This is especially true when installing overhead lift systems which are usually easier and more cost-effective to install when part of construction versus retrofit project.

Planning for lift installation at concept stage allows for a greater choice of overhead track configuration and expands functionality of the lift system. It also provides an opportunity to incorporate lessons learned from any previous overhead lift installation.

For these reasons, new construction projects present an appropriate opportunity to consider future SPHM needs and install as many overhead lifts as possible.

Other SPHM design-related considerations include ensuring adequate storage and charging locations for floor-based lift equipment, storage for accessories such as slings and reviewing workflow patterns to ensure that users can easily and quickly access SPHM technology.

Establish a process for incorporating SPHM and ergonomics design principles into all planned renovations or new construction of patient care areas, such as in-patient units, diagnostic and treatment areas, and clinics etc. Include this process in the SPHM program plan.

Work with the organization's design and construction department or staff who are responsible for building planning, to create design standards that include SPHM and ergonomics in building projects, such as specifying overhead lift configurations, reach distances for accessing components like handsets and hanger bars, and standardizing brands and models of overhead lifts and hanger bar configuration.

Refer to **Section 5** and **Tool 5a** for more information about design resources for overhead lift installation. Information about ergonomics design principles can be found in **Section 10**.

Safe Patient Handling and Mobility – Section 9

Ensure that there is a process to inform the SPHM program manager/coordinator and committee when any remodeling in patient care areas or new construction is planned.

As a construction project proceeds the SPHM program manager/coordinator and SPHM committee should be updated regularly about progress, review plans and have input regarding any design changes impacting the original plan to incorporate SPHM and ergonomics.

All stakeholders affected by the construction project, including caregivers, should be actively involved in SPHM design discussions.

The use of 3D drawings and mock-ups of planned workspaces that allow stakeholders to visualize layouts and assess workflows before construction begins, are essential to soliciting user feedback and engagement about the project.

Providing information to stakeholders about ergonomics design principles and workflow related to the use of SPHM technology enables them to review building plans more effectively.

Building guidelines that require health care facilities to incorporate SPHM principles when designing new buildings and remodeling in patient care areas are discussed in **Table 9.5**.

SPHM and Health Care Design and Construction Guidelines

The "Facilities Guidelines Institute (FGI) Guidelines for Design and Construction of Health Care Facilities" (is a national standard document that provides minimum standards for the planning, design, and construction of health facilities in the US to ensure patient safety and functionality. FGI publishes guidelines for design and construction Hospitals for Residential Health, Care and Support Facilities, and for Outpatient Facilities (<https://www.fgiguideelines.org/guidelines/editions/>).

43 states have adopted some edition of the FGI Guidelines, for use in their regulation of the licensing or construction of health care and residential care facilities with some states adopting specific editions or allowing for equivalency.

From 2018 on, the FGI guidelines include specific design requirements for patients of size including the use of ceiling or floor-based lifts to facilitate care (FGI, 2023).

Since 2014, the FGI has mandated a Safety Risk Assessment (SRA) before renovations or new construction in healthcare facilities. Safe patient handling is included as one of 7 elements of the SRA that must be assessed. The Center for Health Design (CHD), in collaboration with FGI, developed an online tool to support completion of this assessment (<https://www.healthdesign.org/sra>).

The SRA is most useful early in the design process and must be on file with the institution when undergoing regulatory design review. The SRAs are also helpful for participants new to the process or project type to use as examples on future projects (Alcaraz, 2021).

The guidelines require health care facilities to incorporate SPHM principles when designing new buildings, additions, and renovations of patient care and treatment areas with the goal of optimizing patient care and employee safety.

SPHM and Health Care Design and Construction Guidelines

To provide architects, planners, state regulators, and health care organizations guidance about the rationale for, and relationship of, the physical environment with SPHM technology and practices, the FGI provides a Patient Handling and Mobility Assessments (PHAMA) white paper that provides

invaluable information about building design and SPHM technology together with program development information.

The Joint Commission addresses safe patient handling in health care design through its Environment of Care standard: EC.02.06.05 #1. Although this standard does not provide criteria specific to safe patient handling and mobility, it does require organizations that are building new facilities or undergoing major renovations to follow the FGI health care design and construction guidelines or their state construction guidelines, which often are the FGI Guidelines. Since the FGI Guidelines documents include the PHAMA and other design criteria related to safe patient and resident handling, projects required to meet these standards must be designed and built to facilitate safe patient handling (Matz et al., 2019).

Patient Handling and Mobility Assessments: A White Paper (2nd ed. 2019) (PHAMA)

<https://www.fgiguideguidelines.org/resource/patient-handling-and-mobility-assessments-2nd-ed/>

Table 9.5. *SPHM and Health Care Design and Construction Guidelines.*

Unit-Based SPHM Champion Program

Evidence supports that the presence of SPHM peer champions or coaches is critical to SPHM program sustainability. Unit-based champions programs are discussed in **Section 4** and **Tool 4g**.

A SPHM champion program requires careful planning and ongoing budgetary resources to implement and be able to sustain the program effectively.

Activities to keep unit-based SPHM champions engaged include:

- Ensuring roles and responsibilities are clear e.g., conducting unit-based audits, safety huddles, unit-training etc.
- Having enough time to perform their duties as champions/coaches
- Recognizing and celebrating the work of the unit champions
- Consistent meetings and collaboration
- Working with unit champions to review their role and responsibilities and revise activities to improve effectiveness as needed
- Annual refresher training
- 'Just in time' training and mock simulation to problem solve complex and/or emergent patient mobility tasks

Safe Patient Handling and Mobility – Section 9

- Rounding with the SPHM program manager/coordinator and if feasible the program champion/executive sponsor
- Providing SPHM tips e.g., through a periodic newsletter or SPHM unit champions web page
SPHM newsletters can be a useful tool to keep managers and caregivers updated on SPHM tips and program news, celebrate 'good catches'; remind them about upcoming SPHM training and how to solicit SPHM assistance.
- Coordinate regularly with other unit champions if present in the facility, such as wound care, falls, and infection prevention.
- Ensure there is an effective plan for recruiting and onboarding new unit-based SPHM champions as attrition occurs and/or the program expands.

There is evidence to support that *safety* coaching programs in work environments where safety is critical are effective in increasing cooperation and communication, promoting safety behaviors and reducing accidents (Moon, K. 2024).

The use of mobility coaches to support early mobility programs is gaining momentum in acute care settings. If funding and resources for a unit-based champion program are declining, consider ways to change the role of the SPHM champions to incorporate a focus on early mobility and falls prevention.

Refer to Table 9.2 Integrating SPHM into other safety initiatives.

If having a unit-based champion program is not feasible make sure that there are varied and effective ways for caregivers to access SPHM information including having SPHM clinical expertise available to help address mobility challenges of patients with complex medical needs and patients of size. **Refer to Employee Involvement on page 9-8.**

SPHM Education and Training

Employee Training

A well planned and maintained SPHM education and training program is critical for sustaining an SPHM program.

This includes periodic SPHM retraining or refresher training for employees and unit-based SPHM champions to update SPHM skills and best practices and stay aware of changes within the SPHM program as it matures to meet changing health care delivery needs e.g., changes in the patient population and/or services provided.

In addition to formal training sessions, unit-based coaching, and providing written and video based instructional materials, identify other activities to share SPHM information and tips to keep employees engaged.

For example, developing games and quizzes with 'prizes' either in a formal training session or in their work area if feasible. Mock simulations of fall recovery using SPHM technology, deescalating of patients who becomes physically violent during SPHM tasks, or other challenging and infrequent scenarios can help to build staff confidence and promote problem solving.

Review and address any barriers to staff attendance to new hire and periodic SPHM education and training.

Safe Patient Handling and Mobility – Section 9

Assess how well temporary or contract caregivers are oriented towards SPHM policy and practices. Compare patient handling incident rates for temporary staff versus employees and address any negative trends. For example, increasing unit-based SPHM champions coaching support for temporary staff and revisiting training effectiveness.

Periodically review and update training materials to ensure they remain relevant.

Section 6 provides information about developing and implementing an SPHM training program for new and existing employees and how to sustain SPHM training competencies. Training of temporary staff is also discussed.

Consider the use of wearable sensor technology that can help employees monitor body postures and promote improvements in body mechanics when using SPHM technology and performing care tasks **(Refer to Section 3 for more information)**.

New Employee Preceptor Programs

In facilities with a preceptor program for newly licensed nurses and other caregivers, it is important that preceptors maintain up-to-date SPHM skills and consistently teach correct SPHM practices.

Regularly check that SPHM information provided by preceptors accurately reinforces what new caregivers learn in formal SPHM training.

SPHM Program Manager and the SPHM Committee

New and relevant research should be incorporated into the program to continually improve content. This can be achieved by:

- Attending webinars, such as those offered by the Association of Safe Patient Handling Professionals (ASPHP.org) and SPHM technology vendors can help the program manager/coordinator to stay current on the latest topics and best practices.
- Regular review of new studies and literature for information about new SPHM technology, tools and evidence-based practices and processes that are shown to be effective in reducing employee and patient injuries.
- SPHM, fall prevention and other healthcare related safety and health conferences, also offer valuable networking and an opportunity to learn about new SPHM technology and update skills.
- Connecting with nearby healthcare facilities that have SPHM programs. SPHM staff from these facilities may be aware of informal SPHM networking groups in your area, including those located in Oregon, Washington, Minnesota, and New York.
- Local chapters of ergonomics, occupational/employee health nursing and safety professional associations may offer opportunities to connect with other professionals who manage or are involved in SPHM programs. These include the:
 - American Association of Occupational Health Nurses (AAOHN.org)
 - Association of Occupational Health Professionals (AOHP.org)
 - American Society of Safety Professionals (ASSP.org)

Safe Patient Handling and Mobility – Section 9

- Human Factors & Ergonomics Society ([HFES.org](https://www.hfes.org))

Students and Health Care Schools

If your facility offers a clinical rotation program to nursing and therapy students, ensure that there is a policy that defines the role of students and their clinical instructors when SPHM tasks are being performed. Clarify the role of the student if they are with a nurse or therapist (employee) who performs a patient handling task.

Collaborate with the health education schools who send students to your facility to determine the desired protocol. Provide clinical instructors with information about SPHM policy and protocols at your facility so that they can educate their students about the critical role of SPHM to prevent employee and patient injuries etc.

SPHM training for clinical instructors is also essential if they may assist caregivers with patient handling tasks while on a unit/department with their student.

One way to provide this is to have clinical instructors attend your facility's SPHM training class for new employees or for unit-based champions or offer SPHM training for faculty at the health care school.

Ask the health schools to include SPHM education and training in their curriculum and help guide them through the process of doing this (*Refer to 'Did You Know'*).

Injury Reporting, Investigation and Management of WMSDs

Incident and near miss reporting and investigation together with injury management of WMSDs and return-to-work (RTW) programs are discussed in **Section 7**.

Ensuring these program elements are effective is important to program sustainability as they mitigate the human and financial costs of workplace injuries and foster a proactive, preventative safety culture.

When reviewing the effectiveness of injury reporting systems during program plan review, ensure that processes to facilitate early reporting of employee's



Did You Know?

Most US health care education programs, such as nursing, therapy, and radiology, do not include SPHM in their core curriculum.

Many programs still teach outdated practices that emphasize proper body mechanics to prevent injury during manual patient handling, leaving new graduates unprepared to safely assist patients. As a result, students and patients are exposed to an increased risk of harm.

Without sufficient SPHM education, some students are injured during clinical internships due to manual patient handling thereby increasing their risk of reinjury upon entering the workforce and potentially affecting overall workforce sustainability in U.S. healthcare. Insufficient SPHM training by health care schools also places a greater burden on healthcare organizations to provide additional training for their new caregivers.

Health care education programs, in collaboration with clinical partners, can drive culture change by equipping students with the knowledge and skills necessary to safeguard their well-being and that of their patients.

To find out more about how to address these gaps view the Association of Safe Patient Handling Professionals (ASPHP) white paper, 'Safe Patient Handling and Mobility (SPHM) Education in Health Care Student Curriculum (2023)'.

<https://asphp.org/wp-content/uploads/2023/09/SPHM-Curriculum-White-Paper.pdf>

Safe Patient Handling and Mobility – Section 9

injuries are in place. Activities that facilitate the reporting of incidents and near misses related are described in **Section 7**. This review benefits all occupational safety and health programs including the SPHM program.

Conduct periodic workers compensation claims review with your organization's carrier or third-party administrator to ensure patient handling related claims are accurately defined and closed in a timely manner to minimize claims costs.

Work with Employee Health and Human Resources and Injury Claims partners to review effectiveness of the return-to-work process for injured caregivers.

Solicit input about the RTW process from unit/department managers and caregivers who have experienced the process. Determine if caregivers on modified or transitional duty received adequate support from, and felt valued by injury management staff, their manager, the SPHM team and their coworkers throughout the process. Address any resistance to modified or transitional duties and barriers to process success.

Sharing success stories of employees who recover from injuries and resume their caregiving roles can reduce resistance to transitional duties, demonstrate the organization's commitment to its caregivers, and encourage early reporting of injuries.

Section Summary



SPHM Program Plan Implementation

STEP 15. Sustain the SPHM Program

Sustaining a SPHM program involves maintaining the program at a consistent and effective level of activity. This requires regular monitoring of outcomes, continuous improvement of activities based on results, and ensuring that sufficient resources are allocated so the organization can continue to achieve the desired benefits.

Achieving long-term improvement after implementing a SPHM program can be challenging. Sustained success depends on strong foundational structures and processes that support ongoing efforts and maintain outcomes from established program activities.

Activities that facilitate SPHM program sustainability include:

- **Management Leadership** that includes visible ongoing commitment to sustaining the program by leaders and managers at all levels. This includes allocating adequate resources, ensuring policy enforcement, and accountability, and creating an environment that facilitates reporting of safety concerns by employees and prompt action to address them.
- Ongoing **Employee Participation and Engagement** to maintain a high level of enthusiasm for and commitment to using SPHM technology and practices and to provide essential feedback for continuous program improvement. This requires keeping employees actively involved in decision making and all program activities as the program matures.
- **SPHM Program Management** that includes regular evaluation of program processes and outcome data to identify areas for improvement, determining future program goals that align with organizational priorities and changing needs, securing program funding needed for sustainability, and ensuring effective management of program activities.
- Regular review of **SPHM Policy and Procedures** to ensure relevancy, enforcement practices, and enhancement to incorporate any missing elements.
- **Communications/Social Marketing** that include sharing of program successes both inside and outside of the organization and recognizing and rewarding employee ideas and safety behaviors.
- **Ongoing Hazard Identification/Analysis, Hazard Control and Prevention** to proactively identify and address ergonomics/patient handling-related risk factors that may contribute to employee and patient harm. This also includes developing SPHM and ergonomics design standards and incorporating them into all building projects.
- **Support for SPHM Champion/Coaching programs.** Ensuring ongoing budgetary, training and resource support of these programs.
- Ongoing **SPHM Education and Training** for all stakeholders. This also includes having the SPHM program manager/coordinator and committee stay informed about new SPHM technology and best practices and engaging health care school partners to incorporate SPHM into curriculum
- Ensuring that **Injury Reporting, Investigation and Management of WMSDs and Return-to-Work** and processes are effective and equitable

Additional references and resources related to this Section are listed in **Section 10**.

Safe Patient Handling and Mobility – Section 9

References and Resources Used in this Section

- Accident Compensation Corporation. (2012). ACC6075 moving and handling people guidelines. New Zealand. <https://www.acc.co.nz/assets/provider/acc6075-moving-and-handling-people-guidelines.pdf>
- Alamgir, H., Li, O. W., Yu, S., Gorman, E., Fast, C., & Kidd, C. (2009). Evaluation of ceiling lifts: Transfer time, patient comfort and staff perceptions. *Injury*, 40 (9), 987–992.
- Alcaraz, M. (2021, September 28). Guidance on how to outline a safety risk assessment and why it's best to do it early in the design process. <https://www.hfmmagazine.com/articles/4290-conducting-an-fgi-safety-risk-assessment>
- American Hospital Association. (2023, July 21). Supporting the health care workforce: Lessons following the COVID-19 pandemic. Retrieved from <https://www.aha.org/system/files/media/file/2023/07/WorkforceWhitePaper.pdf>
- American Society for Health Care Engineering of the American Hospital Association. (n.d.).
- Association of Occupational Health Professionals in Healthcare. (2020). *Beyond Getting Started: A Resource Guide for Implementing a Safe Patient Handling Program in the Acute Care Setting* (4th ed.). <https://www.aohp.org/aohp/Portals/0/Documents/ToolsForYourWork/BGSpublication/20-06%20BGS%20Safe%20Patient%20Handling.pdf>
- ASSP. (2021, February 11). How systems thinking can improve safety management. <https://www.assp.org/news-and-articles/how-systems-thinking-can-improve-safety-management>
- Bak, D., & Bak, S. (2024). Change management in healthcare—a scoping literature review.
- Bernal, D., Campos-Serna, J., Tobias, A., Vargas-Prada, S., Benavides, F. G., & Serra, C. (2015). Work-related psychosocial risk factors and musculoskeletal disorders in hospital nurses and nursing aides: A systematic review and meta-analysis. *International Journal of Nursing Studies*, 52(2), 635–648.
- Burmeister, D. B. (2023). Understanding the wide-reaching impact of healthcare merger and acquisition activity. *International Journal of Health Policy and Management*, 12, 8049.
- Busis, N. A., Alexander, C. M., Castner, J., Singer, S., Smith, C. D., Bernstein, C. A., & Cipriano, P. (2025, April). A path to improved health care worker well-being: Lessons from the COVID-19 pandemic. A discussion paper. National Academy of Medicine. <https://nam.edu/perspectives/a-path-to-improved-health-care-worker-well-being-lessons-from-the-covid-19-pandemic/>
- Cipher Health. (2017). Executive rounding as a management strategy. https://www.patientcarelink.org/wp-content/uploads/2021/02/4-CipherHealth-executive_rounding_whitepaper_final_.pdf
- Clifford, J., Scott, D., Kelly, S., & Hanover, C. (2024). Leader rounding for high reliability and improved patient safety. *Federal Practitioner*, 41(1), 16. <https://pmc.ncbi.nlm.nih.gov/articles/PMC11147447/pdf/fp-41-01-16.pdf>
- Collins, F. (2020). Implementing a safe patient handling and mobility program to prevent staff injury. <https://thescholarship.ecu.edu/handle/10342/8661>
- Collins, J. W., Nelson, A., & Sublet, V. (2006). *Safe lifting and movement of nursing home residents* (DHHS [NIOSH] Publication No. 2006-117). Cincinnati, OH: National Institute for Occupational Safety and Health. <http://www.cdc.gov/niosh/docs/2006-117/>
- Dang, T., Roberts, D., Murray, A., & Wiggermann, N. (2022). A return-on-investment model using clinical and economic data related to safe patient handling and mobility programs in the ICU. *International Journal of Industrial Ergonomics*, 92, 103372.
- Dickinson, S., Taylor, S., & Anton, P. (2018). Integrating a standardized mobility program and safe patient handling. *Critical Care Nursing Quarterly*, 41(3), 240-252.
- Enos, P., Monaghan, P., & Odum, S. (2019). International round table discussion: Safe patient handling & mobility: What is working, what needs to change, and where does the future lie? *International Journal of Safe Patient Handling and Mobility*, 9(3), 122–127.
- Ford, E. W. (n.d.). The vital role of executive rounding in promoting a culture of safety in hospitals. <https://www.ache.org/blog/2024/the-vital-role-of-executive-rounding-in-promoting-a-culture-of-safety-in-hospitals>

Safe Patient Handling and Mobility – Section 9

- Foster, M., & Mazur, L. (2023). Impact of leadership walkarounds on operational, cultural and clinical outcomes: A systematic review. *BMJ Open Quality*, 12(4), e002284.
- Goh, Y. M. (2024). *Introduction to workplace safety and health management: A systems thinking approach* (Vol. 8). World Scientific.
- Goh, Y. M., Love, P., & Dekker, S. (2014). Editorial for special issue – ‘Systems thinking in workplace safety and health’. *Accident Analysis & Prevention*, 68.
- Graveling, R., Smith, A., & Hanson, M. (2021). Musculoskeletal disorders: Association with psychosocial risk factors at work. A literature review. European Agency for Health and Safety at Work. https://osha.europa.eu/sites/default/files/2021-11/MSDs_association_pshychosocial_risks_factors_at_work_report.pdf
- Gucer, P. W., Gaitens, J., Oliver, M., & McDiarmid, M. A. (2013). Sit-stand powered mechanical lifts in long-term care and resident quality indicators. *Journal of Occupational and Environmental Medicine*, 55(1), 36–44.
- Han, K., Trinkoff, A. M., & Geiger-Brown, J. (2014). Factors associated with work-related fatigue and recovery in hospital nurses working 12-hour shifts. *Workplace Health & Safety*, 62(10), 409–414.
- Hatfield, G. (2025, July 21). Boosting Gen Z engagement: The secret to nurse retention? *Health Leaders*. <https://www.healthleadersmedia.com/cno/boosting-gen-z-engagement-secret-nurse-retention>
- Havaei, F., & MacPhee, M. (2020). The impact of heavy nurse workload and patient/family complaints on workplace violence: An application of human factors framework. *Nursing Open*, 7(3), 731–741.
- Havaei, F., Astivia, O. L. O., & MacPhee, M. (2020). The impact of workplace violence on medical-surgical nurses’ health outcome: A moderated mediation model of work environment conditions and burnout using secondary data. *International Journal of Nursing Studies*, 109, 103666.
- Hogh, A., Baernholdt, M., & Clausen, T. (2018). Impact of workplace bullying on missed nursing care and quality of care in the eldercare sector. *International Archives of Occupational and Environmental Health*, 91(8), 963–970.
- How Systems Thinking Can Improve Safety Management Feb 11, 2021 <https://www.assp.org/news-and-articles/how-systems-thinking-can-improve-safety-management>
- Human Factors and Ergonomics Society. (2023). Prevention of musculoskeletal disorders in healthcare workers: Safe patient handling and mobility programs. Washington, DC. https://asphp.org/wp-content/uploads/2024/12/Safe_Patient_Handling_and_Mobility_WhitePaper-Final.pdf
- Institute for Healthcare Improvement. (n.d.). Patient Safety Leadership WalkRounds. IHI. <https://www.ihl.org/library/tools/patient-safety-leadership-walkrounds#:~:text=Senior%20leaders%20conduct%20weekly%20WalkRounds,WalkRounds%E2%84%A2%20in%20the%20organization>
- Kay, K., Glass, N., & Evans, A. (2014). It’s not about the hoist: A narrative literature review of manual handling in healthcare. *Journal of Research in Nursing*, 19(3), 226–245.
- Kayser, S. A., Wiggermann, N. E., & Kumpar, D. (2020). Factors associated with safe patient handling practice in acute care and its relationship with patient mobilization: A cross-sectional study. *International Journal of Nursing Studies*, 104, 103508.
- Kennedy, B., & Kopp, T. (2015). Safe patient handling protects employees, too. *Nursing*, 45(8), 65–67. <http://doi.org/10.1097/01.NURSE.0000466460.70493.55>
- Kielich, R., Jaworski, T., Boynton, T., & Hopewell, N. (2025, June). Who handles the handling? A look at the need for a full-time dedicated Safe Patient Handling and Mobility Coordinator. *American Nurse Journal*. <https://www.myamericannurse.com/who-handles-the-handling/>
- King Jensen, M. (2023). Factors predicting sustainability using a multisite safe patient handling program. *International Journal of Safe Patient Handling and Mobility*, 13(1), 14–21.
- Knibbe, H., & Knibbe, N. (2022). Time flies when you deliver care: An international inventory of promising, innovative routes towards more efficiency in health care. *International Journal of Safe Patient Handling & Mobility*, 12(4), 111–116.
- Knibbe, H., Morley, S., Moed, K., & Rich, A. (2025). Addressing the SPHM circle of life. *International Journal of Safe Patient Handling & Mobility*, 15(1), 6-9.

Safe Patient Handling and Mobility – Section 9

- Korkis, L., & Storms, A. (2025). Bridging generations: Fostering motivation and engagement through the development of a nursing professional practice model. *Nurse Leader*, 23(4).
- Kurowski, A., & Ghaziri, M. (2019). The role of safe patient handling in reducing Type II workplace violence in healthcare setting. *CPH News and Views*, (61). <https://www.uml.edu/Research/CPH-NEW/News/emerging-topics/News-views-62.aspx>
- Latvala, S. (2022). The problem with using SHM programming as the singular interventional approach to addressing work related musculoskeletal disorders among nurses. *International Journal of Safe Patient Handling and Mobility*, 12(4), 120–123.
- Leary, M. (2022). Applying storytelling to health and healthcare. *American Nurse Journal*.
- Liberty Mutual (2024, September 24). Trauma-informed care: A paradigm in healthcare delivery. <https://business.libertymutual.com/insights/trauma-informed-care-an-approach-to-healing-through-sensitivity-and-understanding/>
- Loeppke, R., et al. (2017). Interaction of health care worker health and safety and patient health and safety in the US health care system: Recommendations from the 2016 summit. *Journal of Occupational and Environmental Medicine*, 59(8), 803–813. <https://pubmed.ncbi.nlm.nih.gov/28796664/>
- Loud, J. (2016). Major risk: Moving from symptoms to systems thinking. *Professional Safety*, October, 50–56.
- Manuele, F. A. (2019). Systems/macro thinking: A primer. *Professional Safety*, January, 37–42.
- Martin, B., Kaminski-Ozturk, N., O'Hara, C., & Smiley, R. (2023). Examining the impact of the COVID-19 pandemic on burnout and stress among U.S. nurses. *Journal of Nursing Regulation*, 14(1), 4-12.
- Matz, M., Celona, J., Martin, M., McCoskey, K., & Nelson, G. G. (2019). Patient handling and mobility assessments (2nd ed.). https://www.fgiguideguidelines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf
- McCain, N., Ferguson, T., Hultquist, T. B., Wahl, C., & Struwe, L. (2023). Influencing a culture of quality and safety through huddles. *Journal of Nursing Care Quality*, 38(1), 26–32.
- Mechan, P. (2014). Challenging the myth that it takes too long to use safe patient handling and mobility technology: A task time investigation. *American Journal of Safe Patient Handling & Mobility*, 4(2), 46–51.
- Mechan, P. (2024). Care delivery practices and programmatic decisions—influence workforce performance. Presentation at the ASPHP National Conference, San Diego, CA.
- Miller, L. (2025). Integrating trauma-informed care into SPHM. Presented at ASPHP Conference. Atlanta, GA.
- Missar, V. (2014). Four tactics to tune up a safe patient mobility program. Aon White Paper, April 2014. <https://www.aon.com/attachments/risk-services/Techniques-for-Improving-a-Patient-or-Resident-%20Movement-Program.pdf>
- Moon, K. (2024). Effect of a safety leadership training including coaching on safety performance and climate in wood-processing companies. *Safety and Health at Work*, 15(3), 310–316.
- National Safety Council. (2025). The importance of musculoskeletal disorder and related injury surveillance: An organizational approach. https://www.nsc.org/faforms/msd_injury_surveillance_report
- National Safety Council. (n.d.). Position/Policy Statement Connecting Sustainability with Workplace Safety and Health (No. 175). https://www.nsc.org/getattachment/c5124534-153f-4610-9d25-4d33179417d6/w-connecting%20sustainability%20with%20workplace%20safety%20and%20health%20-%20175?srsId=AfmBOooQUHl8ydGsFYnWdA6pMB6dl2ce8Yr54SUbrAtzD4dR1bl46_ej
- Nightingale Hammerson, A1 Risk Solutions, & Care England. (2024). Are two people always required for moving and handling? <https://nightingalehammerson.org/wp-content/uploads/2024/10/Single-Handed-Care.pdf>
- Oakman, J., & Macdonald, W. (2019). The APHIRM toolkit: An evidence-based system for workplace MSD risk management. *BMC Musculoskeletal Disorders*, 20, 504. <https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/s12891-019-2828-1>
- Office of the Surgeon General. (2022). Addressing Health Worker Burnout: The US Surgeon General's Advisory on Building a Thriving Health Workforce. www.surgeongeneral.gov/burnout

Safe Patient Handling and Mobility – Section 9

OSHA. (2016). Recommended practices for safety and health programs. (OSHA 3885). <https://www.osha.gov/safety-management>

Park, S., Lavender, S. A., Sommerich, C. M., & Patterson, E. S. (2018). Increasing the use of patient lifting devices in nursing homes: Identifying the barriers and facilitators affecting the different adoption stages for an ergonomics intervention. *International Journal of Safe Patient Handling and Mobility*, 8, 9–24.

Pihl-Thingvad, J., Brandt, L. P., & Andersen, L. L. (2018). Consistent use of assistive devices for patient transfer is associated with less patient-initiated violence: Cross-sectional study among health care workers at general hospitals. *Workplace Health & Safety*, 66(9), 453–461.

Press Ganey. (2025). Nursing Experience 2025. https://info.pressganey.com/e-books-research/nurse-experience-2025?utm_medium=scnt&utm_content=pr&utm_campaign=CL-STOFNU#main-contentNurse

Risør, B. W., Casper, S. D., Andersen, L. L., & Sørensen, J. (2017). A multi-component patient-handling intervention improves attitudes and behaviors for safe patient handling and reduces aggression experienced by nursing staff: A controlled before-after study. *Applied Ergonomics*, 60, 74–82.

Ryu, I. S., & Shim, J. (2021). The influence of burnout on patient safety management activities of shift nurses: The mediating effect of compassion satisfaction. *International Journal of Environmental Research and Public Health*, 18(22), 12210.

Silverstein, B. (2013). Sustaining Safe Patient Handling Programs – Presentation about the WA state Safe Patient Handling initiative at the 2013 WA State Safe Patient Handling Conference. Seattle, WA.

Singer, S. J., & Tucker, A. L. (2014). The evolving literature on safety walkrounds: Emerging themes and practical messages. *BMJ Quality & Safety*, 23(10), 789–800.

Spritzer, S. D., Riordan, K. C., Berry, J., Corbett, B. M., Gerke, J. K., Hoerth, M. T., ... & Noe, K. H. (2015). Fall prevention and bathroom safety in the epilepsy monitoring unit. *Epilepsy & Behavior*, 48, 75–78.

The Center for Health Design. (2014, 2017). Safety Risk Assessment Toolkit: A process to mitigate risk [CHD Tools]. Retrieved from The Center for Health Design SRA website. <https://www.healthdesign.org/sra>

The Joint Commission. (2012). Improving patient and worker safety: Opportunities for synergy, collaboration and innovation. Oakbrook Terrace, IL: The Joint Commission. <https://www.patientcarelink.org/the-joint-commission-improving-patient-worker-safety-opportunities-for-synergy-collaboration-innovation/>

Turner, R., Agarwal, N., Agarwal, S., & Best, L. (2020). Bringing life to a systemwide early mobility clinical practice: Part 1. *International Journal of Safe Patient Handling & Mobility*, 10(4), 126–133.

Turner, R., Agarwal, N., Agarwal, S., Best, L., & Noble, J. (2021). Bringing life to a systemwide early mobility clinical practice: Part 2. *International Journal of Safe Patient Handling & Mobility*, 11(1), 190–198.

Van Eerd, D., Munhall, C., Irvin, E., Rempel, D., Brewer, S., van der Beek, A. J., ... & Amick, B. (2016). Effectiveness of workplace interventions in the prevention of upper extremity musculoskeletal disorders and symptoms: An update of the evidence. *Occupational and Environmental Medicine*, 73(1), 62–70.

Vincent-Höper, S., Stein, M., Nienhaus, A., & Schablon, A. (2020). Workplace aggression and burnout in nursing—The moderating role of follow-up counseling. *International Journal of Environmental Research and Public Health*, 17(9), 3152. <https://doi.org/10.3390/ijerph17093152>

Vinstrup, J., Jakobsen, M. D., & Andersen, L. L. (2020). Poor sleep is a risk factor for low-back pain among healthcare workers: Prospective cohort study. *International Journal of Environmental Research and Public Health*, 17(3), 996.

Wåhlin, C., Stigmar, K., & Nilsing Strid, E. (2022). A systematic review of work interventions to promote safe patient handling and movement in the healthcare sector. *International Journal of Occupational Safety and Ergonomics*, 28(4), 2520–2532.

Walden, C. M., Bankard, S. B., Cayer, B., et al. (2013). Mobilization of the obese patient and prevention of injury. *Annals of Surgery*, 258(4), 646–651.

Walker, L., et al. (2017). Sharing the lessons: The 10-year journey of a safe patient movement program. *International Journal of Safe Patient Handling & Mobility*, 7(1), 20–28.

Whitehead, P. J., Rooney, L., Adams-Thomas, J., Bailey, C., Greenup, M., Southall, C., & Whittington, S. (2022). ‘Single-handed care’ initiatives and reviews of double-handed homecare packages: A survey of practices in English

Safe Patient Handling and Mobility – Section 9

local authorities with adult social care responsibilities. *Health & Social Care in the Community*, 30(6), e5560–e5569.

Wright, L., & Rich, A. (2025, March). Tell me a story: Influencing SPHM engagement through storytelling. Presented at the ASPHP National SPHM Conference, Atlanta, GA.

Yoder, J. et al. (2014). Outcomes of a safe patient handling program implementation. *American Journal of Safe Patient Handling & Movement*, 4(4), 111–117.

Ziam, S., Lakhali, S., Laroche, E., Lane, J., Alderson, M., & Gagné, C. (2023). Musculoskeletal disorder (MSD) prevention practices by nurses working in health care settings: Facilitators and barriers to implementation. *Applied Ergonomics*, 106, 103895.

SPHM Resources

Introduction

This section offers a comprehensive collection of articles and downloadable resources designed to support the development, implementation, and ongoing maintenance of Safe Patient Handling and Mobility (SPHM) programs across diverse healthcare environments.

Information is provided in the following categories:

- **SPHM General Resources:** Includes links to other toolkits and websites offering a wide range of programmatic and instructional tools relevant to all healthcare settings. These resources provide additional, relevant information pertaining to the SPHM topics listed in this section.
- **Ergonomics Resources, Analysis Tools and Courses**
- **Resources by:**
 - SPHM Program Component as outlined in this Toolkit
 - Acute Care Specialty Areas
 - Other Healthcare Environments – Outpatient Facilities, Emergency Medical Services, Long Term Care, and Home Health Care
- **Health Care Education Institutions - Resources related to integration of SPHM into curricula**
- **Exoskeletons & Robotics and Patient Handling**
- **Selected General Patient Safety Information - Early Mobility, Pressure Injury and Fall Prevention, and Missed Nursing Care to support broader patient safety initiatives within SPHM programs**

For further information, please refer to the individual toolkit sections. These sections contain additional resources and reference materials.

It is important to note that some resources and articles cited in this section were published more than ten years ago. Despite their publication date, these materials have been included because they continue to provide valuable and relevant information applicable to current practices.

Safe Patient Handling and Mobility – Section 10

Contents

SPHM General Resources	1
Books	1
Journals	2
White Papers.....	2
Toolkits and Guidance.....	2
Occupational Safety and Health Agency (OSHA)	2
Healthcare – numerous resources https://www.osha.gov/healthcare/	3
National Institute for Occupational Safety and Health (NIOSH)	4
Other	5
Associations	7
Certification	8
Laws and Standards	8
Effectiveness of SPHM Laws.....	10
Ergonomics – Resources, Analysis Tools and Courses	11
Web Based Resources.....	11
Books & Articles (Selected).....	13
Ergonomics Analysis Tools (Selected)	14
Courses.....	16
Resources by SPHM Program Component	16
Defining the Need for an SPHM Program	16
Occupational Injury Data Sources.....	16
Incidence & Worker Compensation Costs of Patient Handling WMSDs - Acute Care & Nursing	17
Risk Factors for Patient Handling Related WRMSDs	19
Biomechanical	19
Psychosocial and Organizational.....	25
Program Outcomes - General and Acute Care	26
Business Case for SPHM.....	34
SPHM and Patient Safety	37
SPHM Program Management and Foundation	38
Culture of Safety	38
Healthcare Worker Wellbeing (Selected)	40
Leadership and Occupational Safety in Healthcare.....	42
Employee Engagement – Participatory Ergonomics	43
Barriers and Facilitators to use of SPHM Technology.....	44
Underreporting of WMSDs.....	46
Program Management.....	46
Managing Change	48
Hazard Identification and Assessment	50
Risk Assessment	50
Hazard Control and Prevention	51
Engineering Controls – SPHM Technology and Design of the Built Environment	51
Standards & Regulations	51
Guidelines	52
Building Design	52

Safe Patient Handling and Mobility – Section 10

SPHM Technology - General	54
Overhead/Ceiling Lifts.....	57
Floor Lifts.....	58
Floor Lift – Push Force.....	58
Sit to Stand Technology	59
Friction Reducing Devices	60
Gait Belts	61
Transfer belts.....	62
Slideboards for Seated & Supine Transfers	62
Wheelchair	63
Bathing and Toileting	63
Beds and Stretchers	63
Transport chairs.....	65
Slings.....	65
Leaving Slings and other SPHM Devices under a patient.....	66
Work Practice and Administrative Controls	67
Unit-Based Champion Programs	67
Lift Teams.....	68
Mobility Assessment Protocols.....	69
SPHM and Early Mobility Programs.....	72
Placing a Patient into a Prone Position using SPHM Technology	74
SPHM Education and Training.....	75
Incident Reporting, Response and Management.....	82
Incident Investigation.....	82
Return to Work Programs	82
SPHM and Specialty Care Areas in Acute Care.....	85
Critical Care	85
Perioperative.....	85
Emergency Department.....	87
Diagnostic Imaging	87
Pediatrics.....	88
Rehabilitation & Therapy	90
Professional Association SPHM Position Statements	90
Incidence of WMSDs - Physical and Occupational Therapists	90
SPHM and Rehabilitation Practices	91
Bariatrics/Patients of Size.....	95
Books & Toolkits	95
Journal.....	97
Statistics.....	97
Articles	97
SPHM and Workplace Violence Prevention	100
Other Health Care Settings.....	102
Ambulatory Care	102
Long Term Care	103
Guidelines, Tools, and Training	103
Articles	103

Safe Patient Handling and Mobility – Section 10

Incident Rates and Costs of Resident Handling Related Injuries	103
Safe Resident Handling Programs Outcomes	104
Other	108
Home Health & Community Care	110
Books, Web Based Resources, Training.....	110
Articles	111
Incident Rates and Costs of Patient Handling Related Injuries	111
Risk Factors for Injury	112
Safe Client Handling Interventions	113
Emergency Medical Services (EMS)	115
Health Care Education Institutions	116
SPHM and Students	117
Interprofessional.....	117
Radiation Therapy	117
Nursing	118
Physical Therapy.....	119
Occupational Therapy	119
Exoskeletons & Robotics and Patient Handling	120
General Patient Safety Information - Early Mobility, Pressure Injury and Fall Prevention, and Missed Nursing Care	122
Patient Safety Data	122
Early Mobilization General Information (Selected).....	122
Toolkits.....	122
Articles	123
Pressure Injury Prevention – General (Selected)	126
Fall Prevention – General (Selected)	128
Missed Nursing Care.....	129
Books.....	129
Articles	129

SPHM General Resources

Books

Gallagher, A. (2017). **The manual handling revolution: How health professionals can achieve creative solutions for people with disabilities and their caregivers**. Risk Managed Australia Pty Ltd.

Gallagher, A., & Small, E. (2021). **SmartCare: How in-home aged care providers can mitigate risk, maximise their workforce and deliver quality care**. ISBN: 1922553484, 9781922553485.
<https://riskmanaged.com.au/>

Gallagher, S. (2013). **Implementation guide to the safe patient handling and mobility interprofessional national standards**. American Nurses Association.

Gallagher, S. (2015). **A practical guide to bariatric safe patient handling & mobility**. Visioning Publishers LLC.

Hignett, S., Hignett, S., Crumpton, E., et al. (2002). **Evidence-based patient handling: Tasks, equipment, and interventions**. Psychology Press.

International Organization for Standardization. (2012). **ISO/TR 12296:2012 Ergonomics—Manual handling of people in the healthcare sector**. Geneva, Switzerland: ISO www.iso.org

MacGregor, H. (2016). **Moving and handling patients at a glance**. Wiley-Blackwell. ISBN: 978-1-118-85343-6

Marras, W. S. (2008). **The working back: A systems view**. John Wiley & Sons, Inc.

McGill, S., 2015. **Low back disorders: Evidence-based prevention and rehabilitation**. 3rd edition (4th edition coming soon) Human Kinetics, Windsor, Canada

National Back Exchange UK

<https://www.nationalbackexchange.org/publications>

- Moving and handling in the community and residential care
- Safer moving and handling in the perioperative environment
- Moving and handling of plus size people
- Manual handling of children (2nd edition)
- Dementia care

Nelson, A. (Ed.). (2006). **Safe patient handling and movement: A practical guide for health care professionals**. Springer Publishing.

Nelson, A. L., Motacki, K., & Menzel, N. (2009). **The illustrated guide to safe patient handling and movement**. Springer.

Nelson, A., & Baptiste, A. S. (2006). Evidence-based practices for safe patient handling and movement. **Orthopaedic Nursing**, 25(6), 366-379.

Smith, J., Simpson, P., & Fray, M.(Eds) (2023). **HOP7: The guide to handling of people**. Person-centered practice <https://backcare.org.uk/hop7m/hop-purchase/>

The Joint Commission. (2012). **Improving patient and worker safety: Opportunities for synergy, collaboration and innovation**. <https://www.patientcarelink.org/wp-content/uploads/2021/02/6-TJC-ImprovingPatientAndWorkerSafety-Monographpdf.pdf>

Safe Patient Handling and Mobility – Section 10

Journals

International Journal of SPHM and Falls Management. Visioning Publishing, FL.
<https://sphmjjournal.com/>

White Papers

AIHA, ASPHP, & ANA. (2024, November). **Safe patient handling and mobility (SPHM): A process to protect health care workers and recipients. White paper.** Falls Church, VA: American Industrial Hygiene Association, Association of Safe Patient Handling Professionals, & American Nurses Association.
<https://www.aiha.org/education/white-papers/safe-patient-handling-and-mobility-sphm-a-process-to-protect-health-care-workers-and-recipients>

Association of Safe Patient Handling Professionals, Inc. (2023, March). **Safe patient handling and mobility (SPHM) education in health care student curriculum: A white paper.** Warrendale, PA.
<https://asphp.org/wp-content/uploads/2023/03/SPHM-Curriculum-White-Paper-March-2023.pdf>

Human Factors and Ergonomics Society. (2023). **Prevention of musculoskeletal disorders in healthcare workers: Safe patient handling and mobility programs.** Washington, DC.
<https://www.hfes.org/Portals/0/Safe%20Patient%20Handling%20and%20Mobility.pdf>

Toolkits and Guidance

Occupational Safety and Health Agency (OSHA)

OSHA - General

All About OSHA 3302-12R 2024 (2024)
https://www.osha.gov/sites/default/files/publications/all_about_OSHA.pdf

OSH Act of 1970 – General Duty Clause <https://www.osha.gov/laws-regs/oshact/section5-duties>

1904.7 - General recording criteria. Regulations (Standards - 29 CFR) 1904 Recording and Reporting Occupational Injuries and Illnesses. (1978, July 21; 1997, August 22; 2001, January 19)
<https://www.osha.gov/laws-regs/regulations/standardnumber/1904/1904.7>

OSHA Log of Work-Related Injuries and Illnesses (OSHA Form 300 and 301)
<https://www.osha.gov/recordkeeping/>

Inspection guidance for inpatient healthcare settings (2015, June 25)... <https://www.osha.gov/laws-regs/standardinterpretations/2015-06-25-0>

OSHA Technical Manual (OTM) Section VII: Chapter 1. Back Disorders and Injuries (ND).
<https://www.osha.gov/otm/section-7-ergonomics/chapter-1>

Business Case for Safety and Health <https://www.osha.gov/businesscase>

Recommended Practices for Safety and Health Programs – webpage with resources
<https://www.osha.gov/safety-management/additional-resources-by-topic>

Using leading indicators to improve safety and health outcomes OSHA 3970 June 2019
<https://www.osha.gov/leading-indicators>

Safe Patient Handling and Mobility – Section 10

OSHA Worker Safety in Health Care

Healthcare – numerous resources <https://www.osha.gov/healthcare/>

Worker Safety in Hospitals Caring for our Caregivers <https://www.osha.gov/hospitals>

- **Understanding the Problem** – Facts and Self-Assessment Tools and Resources
<https://www.osha.gov/hospitals/understanding-problem>
- **Safety & Health Management Systems** – Safety management tools
<https://www.osha.gov/hospitals/mgmt-tools-resources>
- **Hospital eTool** <https://www.osha.gov/etools/hospitals>
 - [Administration](#)
 - [Central Sterile Supply](#)
 - [Clinical Services](#)
 - [Emergency Department](#)
 - [Facilities Management](#)
 - [Food Services](#)
 - [Heliport](#)
 - [Hospital-wide Hazards](#) – including
 - [Safety and Health Management Systems and Programs](#)
 - [Work-related Musculoskeletal Disorders](#) by specific hospital areas
 - [Biological Hazards – Infectious Diseases](#)
 - [Housekeeping/Cleaning](#)
 - [Recordkeeping](#)
 - [Electrical Safety](#)
 - [Housekeeping](#)
 - [Laboratory](#)
 - [Laundry](#)
 - [Patient Care Unit](#)
 - [Pharmacy](#)
 - [Surgical Suite](#)
 - [Fire Hazards](#)
 - [Hazardous Chemicals](#)
 - [Glutaraldehyde](#)
 - [Latex Allergy](#)
 - [Noise](#)
 - [Mercury](#)
 - [Slips/Trips/Falls](#)
 - [Work-related Stress](#)
 - [Workplace Violence](#)

Nursing Homes and Personal Care Facilities <https://www.osha.gov/nursing-home>

Home Healthcare <https://www.osha.gov/home-healthcare>

OSHA – SPHM

Worker Safety in Hospitals Caring for our Caregivers - Safe Patient Handling

<https://www.osha.gov/hospitals/patient-handling> Numerous Tools and Resources

Safe Patient Handling

- [MSD Assessment](#)
- [Management Support](#)
- [Policy / Program Development](#)
- [Facility & Patient Needs Assessment](#)
- [Facilitating Change](#)
- [Safe Patient Handling Equipment](#)
- [Education & Training](#)
- [Program Evaluation](#)

Healthcare – Safe Patient Handling <https://www.osha.gov/healthcare/safe-patient-handling>

Links to multiple tools

- [Hazards and Solutions](#)
- [Training and Additional Resources](#)

Safe Patient Handling and Mobility – Section 10

- [State Legislation](#)
- [Starting a Safe Patient Handling Program](#)

Ergonomics: Prevention of musculoskeletal disorders in the workplace. (n.d.). Numerous resources <https://www.osha.gov/ergonomics>

Guidelines for Nursing Homes: Ergonomics for the Prevention of Musculoskeletal Disorders. OSHA Publication 3182, (2003, Revised March 2009). https://www.osha.gov/sites/default/files/publications/final_nh_guidelines.pdf

OSHA vs. Beverly Enterprises Stipulation and Settlement Agreement. OSHA, 2002. <https://www.osha.gov/enforcement/cwsa/beverly-enterprises-inc-02262002>

OSHA and Worker Safety Handling with Care Practicing: Safe Patient Handling. The Joint Commission (TJC), 2017. https://lhatrustfunds.com/assets/uploads/documents/11-Pages_from_ECN_20_2017_08-2.pdf

National Institute for Occupational Safety and Health (NIOSH)

SPHM & Ergonomics

About Safe Patient Handling and Mobility Multiple Resources <https://www.cdc.gov/niosh/healthcare/prevention/sphm.html>

Applications manual for the revised NIOSH lifting equation (DHHS [NIOSH] Publication No. 94-110, Revised 9/2021). (1994/2021). Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. <https://doi.org/10.26616/NIOSH PUB94110revised092021>

Caring for Yourself While Caring for Others (2015). Training for Homecare Workers DHHS (NIOSH) Publication No. 2015-102. <https://www.cdc.gov/niosh/docs/2015-102/default.html>

Elements of Ergonomics Programs. <https://www.cdc.gov/niosh/ergonomics/ergo-programs/index.html>

Ergonomics and Musculoskeletal Disorders <https://www.cdc.gov/niosh/ergonomics/>

Healthcare Workers and Occupational Hazards Multiple Resources. https://www.cdc.gov/niosh/healthcare/?CDC_AAref_Val=https://www.cdc.gov/niosh/topics/safepatient/default.html

Hierarchy of Controls. <https://www.cdc.gov/niosh/topics/hierarchy/>

NIOSH Hazard Review: Occupational Hazards in Home Healthcare DHHS (NIOSH) PUBLICATION NUMBER 2010-125 <https://www.cdc.gov/niosh/docs/2010-125/>

NIOSH Science Blog <https://blogs.cdc.gov/niosh-science-blog/>
Numerous topics including healthcare, back injuries, musculoskeletal disorders and more.

Prevention through Design. <https://www.cdc.gov/niosh/ptd/about/index.html>

Safe lifting and movement of nursing home residents (DHHS [NIOSH] Publication No. 2006-117). Collins, J. W., Nelson, A., & Sublet, V. (2006). Cincinnati, OH: National Institute for Occupational Safety and Health. <http://www.cdc.gov/niosh/docs/2006-117/>

Safe Patient Handling Nursing School Curriculum Module (2009). Waters TR, Nelson A, Hughes N, Menzel N. DHHS (NIOSH) Publication No. 2009-127. <http://www.cdc.gov/niosh/docs/2009-127/>

The Unique Occupational Environment of the Home Healthcare Worker (2020). Bien E., & Smith R. <https://blogs.cdc.gov/niosh-science-blog/2020/09/29/hhcws/>

Safe Patient Handling and Mobility – Section 10

Healthcare Worker Wellbeing

Impact Wellbeing™ Guide 2024 <https://www.cdc.gov/niosh/docs/2024-109/default.html>

NIOSH training for nurses on shift work and long work hours (2015). By Caruso CC, Geiger-Brown J, Takahashi M, Trinkoff A, Nakata A. Cincinnati, OH: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2015-115 (Revised 4/2024). <https://doi.org/10.26616/NIOSH PUB2015115revised102023>

Safety Culture in Healthcare Settings (2023). Training course by Rogers B, Francis R, Dembski-Hart P, Hessels A, Hilton T, Casey M, Martin M. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2023-135, <https://www.cdc.gov/niosh/docs/2023-135/default.html>

Talking About Mental Health at Work.

<https://www.cdc.gov/niosh/healthcare/impactwellbeing/talking.html>

Total Worker Health® Program <https://www.cdc.gov/niosh/twh/programs/index.html>

Other

Professional associations and other government entities from the US, Canada and beyond with numerous downloadable resources.

Accident Compensation Corporation New Zealand. (2012). ACC6075 moving and handling people guidelines. <https://www.acc.co.nz/assets/provider/acc6075-moving-and-handling-people-guidelines.pdf>

American Industrial Hygiene Association (AIHA) (2014). Safe Patient Handling and Mobility Tip Sheet. AIHA/OSHA Alliance. https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/OSHA-Quick-Tips-on-SPHM_Final-Mar2014.pdf

Association of Occupational Health Professionals in Healthcare. (2020). Beyond Getting Started: A Resource Guide for Implementing a Safe Patient Handling Program in the Acute Care Setting (4th ed.). <https://www.aohp.org/aohp/Portals/0/Documents/ToolsForYourWork/BGSPublication/20-06%20BGS%20Safe%20Patient%20Handling.pdf>

Association of periOperative Registered Nurses (2021). Guideline for Safe Patient Handling and Movement. In *Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc; 2021. (For purchase) <https://aornguidelines.org/guidelines/content?sectionid=192587418&view=book>

Association of PeriOperative Registered Nurses (2015). Pocket reference guide: Safe patient handling and movement in the perioperative setting. https://www.aorn.org/docs/default-source/aorndocuments/toolkits/safe-patient-handling/safe-patient-handling-pocket-reference-guide.pdf?sfvrsn=36a9944f_0

Association of PeriOperative Registered Nurses (2024). AORN Guideline for Safe Patient Handling: Evidence Table 2024. https://www.aorn.org/docs/default-source/guidelines-resources/evidence-rating-and-tables/evidence-table-safe-patient-handling-and-movement-020824.pdf?sfvrsn=2aa44a90_1

Association of Rehabilitation Nurses, ARN (2008). Safe Patient Handling Toolkit for the Interdisciplinary Team. <https://rehabnurse.org/advance-your-practice/practice-tools/sph-toolkit>

Canadian Centre for Occupational Health and Safety Safe Patient Handling Program https://www.ccohs.ca/oshanswers/hsprograms/patient_handling.html

European Agency for Safety and Health at Work (2025). Musculoskeletal health and risk factors in the HeSCare sector – a review of existing information. <https://osha.europa.eu/en/publications/musculoskeletal-health-and-risk-factors-hescare-sector-review-existing-information>

Safe Patient Handling and Mobility – Section 10

Health and Safety Executive UK. Moving and handling in health and social care
<https://www.hse.gov.uk/healthservices/moving-handling/index.htm>

Massachusetts Nurses Association (2021). Safe Patient Handling and Mobility Toolkit.
<https://www.massnurses.org/files/file/SPH-Toolkit.pdf>

Matz M, Celona J, Martin M, McCoskey K, Nelson GG. (2019). **Patient Handling and Mobility Assessments (PHAMA)** (2nd ed.) Facility Guidelines Institute. https://www.fgiguideines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf

National Public Radio. June 24, 2015 OSHA launches program to protect nursing employees [All Things Considered audio]. Zwerdling D. 6 - brief audio sections including Even 'Proper' Technique Exposes Nurses' Spines to Dangerous Forces with Dr W Marras. NPR.org. Published February 11, 2015.
<http://www.npr.org/series/385540559/injured-nurses>

Nova Scotia Health Injury Prevention. Safe patient handling and mobility - various SPHM technology training resources.
<https://library.nshealth.ca/InjuryPrevention#:~:text=The%20Nova%20Scotia%20Health%20Safe,the%20handling%20or%20mobility%20activity.>

SafeCare BC. The Provincial Safe Resident Handling Standards for Musculoskeletal Injury Prevention in British Columbia 2011. <https://safecarebc.ca/resources/assorted/provincial-safe-resident-handling-standards-for-musculoskeletal-injury-prevention-in-bc/>

WA State Dept. of Labor and Industries. Safe Patient Handling <https://lni.wa.gov/safety-health/safety-research/completed-projects/safe-patient-handling>

Western New York Council on Occupational Safety and Health (WNYCOSH) (2016). Safe Patient Handling Workgroup Report to the Commissioner of Health. New York State Dept. of Health. *This large toolkit contains a variety of tools including SPHM policy and training materials from hospitals and long-term care facilities in New York State.*
https://www.health.ny.gov/statistics/safe_patient_handling/docs/sph_report.pdf

WorkSafeBC Patient handling – numerous resources related to use of SPHM technology
<https://www.worksafebc.com/en/health-safety/industries/health-care-social-services/topics/patient-handling>

WorkSafe Victoria– Australia Healthcare and social assistance – working – numerous SPHM resources.
<https://www.worksafe.vic.gov.au/healthcare>

WorkSafe Victoria– Australia Transferring people safely: A handbook for workplaces 2009. How to minimize the risk of health, aged care, rehabilitation and disability services workers being injured when moving people.
<https://www.worksafe.vic.gov.au/resources/transferring-people-safely-handbook-workplaces>

Yorkshire Back Exchange UK. Moving and Handling of People Hoisting Guidance 2023.
[https://www.nationalbackexchange.org/sites/default/files/content-files/Useful%20Links/Yorkshire%20Back%20Exchange%20\(YBE\)%20HOIST%20GUIDANCE%202023.pdf](https://www.nationalbackexchange.org/sites/default/files/content-files/Useful%20Links/Yorkshire%20Back%20Exchange%20(YBE)%20HOIST%20GUIDANCE%202023.pdf)

US Dept of Veterans Affairs Safe Patient Handling and Mobility (SPHM)
<http://www.publichealth.va.gov/employeehealth/patient-handling/index.asp>

Numerous SPHM Guidelines including:

- Safe Patient Handling and Mobility (SPHM) Solutions Everywhere for Everyone.
<https://www.publichealth.va.gov/docs/employeehealth/SPHM-Solutions-Everywhere-for-Everyone.pdf>
- Patient Safety Simulations in a VA Virtual Environment.
<https://www.publichealth.va.gov/docs/employeehealth/PSP-Getting-Started-Guide.pdf>

Safe Patient Handling and Mobility – Section 10

- [Patient Safety Simulations in a VA Virtual Environment](#) (324 KB, PDF)
- [Patient Handling \(Lifting\) Equipment Coverage & Space Recommendations](#) (1.01 MB, PDF)
Guidelines for equipment used for patient-handling that addresses coverage and installation issues surrounding ceiling-mounted lifts, and coverage and storage issues surrounding ceiling-mounted lifts, and coverage and storage issues for portable/floor-based lifts
- [VHA Directive 1611 - Safe Patient Handling and Mobility Program](#) (41 KB, PDF)
Provides background and policy for implementing the Safe Patient Handling Program at Veterans Health Administration facilities
- [VHA Installation and Relocation Checklist for Ceiling Mounted Patient Lifts](#) (152 KB, PDF)
Required checklist for every installation or relocation of a ceiling mounted patient lift in VHA facilities, from National Center for Patient Safety (NCPS) Patient Safety Alert AL14-07
- [VHA Corrective and Preventive Maintenance Checklist for Ceiling Mounted Patient Lifts](#) (124 KB, PDF)
Required checklist for every preventive maintenance or significant corrective maintenance of a ceiling mounted patient lift in VHA facilities, from NCPS Patient Safety Alert AL14-07

Office of Construction & Facilities Management <https://www.cfm.va.gov/til/>.

The Technical Information Library (TIL) contains technical publications related to the planning, design, leasing, and construction of VA facilities. The TIL Catalog is an alphabetical listing of publications with descriptions and contact information.

- VA Barrier Free Design Standard, A Supplement to the Architectural Barriers Act. Accessibility Standards (ABAAS) January 1, 2017 rev 5/01/25 PG-18-13 Office of Construction & Facilities Management Facilities Standards Service. <https://vatilms.va.gov/vatilms/reports/PG-18-13>
- Safe Patient Handling and Mobility Design Criteria AUGUST 1, 2021. <https://vatilms.va.gov/vatilms/reports/PG-18-13>

Safe Patient Handling and Mobility Guidebook VHA Center for Engineering & Occupational Safety and Health (CEOSH) St. Louis, Missouri. January 2016.

https://www.stryker.com/content/dam/stryker/education-and-training/focusrn/resources/caregiver-safety/implementation-tools/VA%20SPHM_PDF.pdf

Bariatric Safe Patient Handling and Mobility Guidebook: A Resource Guide for Care of Persons of Size.

Center for Engineering & Occupational Safety and Health (CEOSH). Veterans Affairs. 2015 Rev. 2025.

<https://www.asphp.org/wp-content/uploads/2011/05/Baraiatrice-SPHM-guidebook-care-of-Person-of-Size.pdf>

Associations

Association for Safe Patient Handling Professionals (ASPHP). <https://asphp.org/>

The following professional associations have health care interest groups related to SPHM and health care safety, health & ergonomics. This list is not exhaustive.

- American Association of Occupational Health Nurses (AAOHN) <https://www.aaohn.org/>
- American Industrial Hygiene Association (AIHA) <https://www.aiha.org/>
- American Nurses Association (ANA) <https://www.nursingworld.org/>
- American Occupational Therapy Association. www.aota.org
- American Physical Therapy Association www.apta.org/
- American Society of Safety Professionals (ASSP) www.assp.org

Safe Patient Handling and Mobility – Section 10

- Association of Occupational Health Professionals (AOHP) www.aohp.org
- Association of periOperative Registered Nurses (AORN) <https://www.aorn.org/>
- Human Factors & Ergonomics Society (HFES) www.hfes.org
- Institute of Industrial and Systems Engineers (IISE)/Applied Ergonomics www.iise.org
- International Ergonomics Association (IEA). <https://iea.cc/>
- National Association of Orthopedic Nurses (NAON) <https://www.orthonurse.org/>
- Oregon Coalition for Health Care Ergonomics (OCHE) www.hcergo.com

Certification

Certified Safe Patient Handling Professionals (CSPHP) <https://csphp.org/sphm-certification/>

Board of Certification in Professional Ergonomics (BCPE) <https://bcpe.org/>

Laws and Standards

Also refer to Engineering Controls – SPHM Technology

American Nurses Association. **Safe Patient Handling and Mobility Interprofessional Standards Across the Care Continuum 2nd edition**. American Nurses Association; 2021. Silver Springs, MD. The ANA's Safe Patient Handling and Mobility (SPHM) standards provide national guidelines to prevent injuries to both patients and healthcare workers, aiming to eliminate manual patient handling and create a safety-focused environment. Eight evidence-based standards needed to implement and maintain a successful SPHM program are described. <https://www.nursingworld.org/nurses-books/safe-patient-handling-and-mobility-2nd-edition2/>

The Facility Guidelines Institute (FGI) guidelines for design and construction of health care facilities in the US, i.e., the Guidelines for Design and Construction of Hospitals; for Residential Health, Care and Support Facilities; and for Outpatient Facilities. These Guidelines include elements such as risk assessment, space requirements, and design specifications that directly support safe patient handling (as provided in the PHAMA – **Refer to page 10-6**). 43 states have adopted these guidelines or an equivalency to regulate design of health care facilities, aiming to establish environments that safe and effective for patients and healthcare professionals. <https://www.fgiguideguidelines.org/guidelines/editions/>

Federal OSHA – Occupational Safety and Health Regulations - Refer to page 10-2.

U.S. Dept of Justice Civil Rights Division. **Access to Medical Care for Individuals with Mobility Disabilities**. Last updated: June 26, 2020, and the **Americans With Disabilities (ADA) Access to Medical Care for Individuals with Mobility Disabilities—Use of SPHM Technology in Clinics**. 2010. <https://www.ada.gov/resources/medical-care-mobility/>

International Standards Organization www.iso.org

ISO Standards & Technical Reports related to SPHM technology, and occupational safety and health programs (selected)

ISO 10535:2021 Assistive products – Hoists for the transfer of persons – Requirements and test methods. International Organization for Standardization, Geneva, Switzerland. ISO 10535 details the design and testing requirements manufacturers of patient lifts and slings should meet before their products are made available for use in any health care or home/community environment. In the US, ISO 10535 is recognized as a consensus standard by the Food and Drug Administration (FDA) as applied to

Safe Patient Handling and Mobility – Section 10

patient lifts and slings, thus, manufacturers of such devices should at a minimum, meet ISO 10535 design and testing criteria.

ISO 45001, Occupational Health and Safety Management Systems (OHSMS). This standard establishes needs in the following areas: Understanding context of the organization, leadership, and worker participation, planning for the OHS system, support, operation, performance evaluation, and improvement. It is a good benchmark to use in evaluating SPHM programs.

ISO 7101:2023 Health Care Organization Management - Management Systems for Quality in Health Care Organizations – Requirements. This is the first international standard for quality management in healthcare organizations, providing a framework for delivering effective, safe, and patient-centered care.

ISO TR 12296 (E) 2012 Ergonomics Manual Handling of People in the Health Care Sector provides guidance for assessing the problems and risks associated with manual patient handling in the health care sector, and for identifying and applying ergonomic strategies and solutions to those problems and risks.

SPHM & Ergonomics State Laws

- California Labor Code Sec. 6403.5 – California Labor Code Section 6403.5 (public.law) A-1136 signed into law October 2011 https://california.public.law/codes/ca_lab_code_section_6403.5
- Title 8, California Code of Regulations (CCRs), Section 5110 Repetitive Motion Injuries <https://www.dir.ca.gov/title8/5110.html>
- Hawaii House Concurrent Resolution No. 16 – HCR16. https://www.capitol.hawaii.gov/sessions/session2006/_bills/HCR16_.htm
- Illinois 210 ILCS 45/Art – 210 ILCS 45/ Nursing Home Care Act. <https://www.ilga.gov/Legislation/publicacts/view/097-0866>
- Illinois Public Act 097-0122 <https://www.ilga.gov/documents/legislation/ilcs/documents/021000850K6.25.htm>
- Maryland SB 879 signed into law April 2007 <https://mgaleg.maryland.gov/2007rs/bills/sb/sb0879f.pdf>
- Minnesota HB 712.2 signed into law May 2007. <https://www.revisor.mn.gov/statutes/cite/182.6553>
- Minnesota Omnibus Bill: SF3035 (Article 1. Section 21.182.677; pages 10-15) *Ergonomics programs* applicable to licensed health care facilities effective on July 1, 2023. <https://www.revisor.mn.gov/statutes/cite/182.677#>
- Massachusetts -An Act relative to safe patient handling and mobility in certain health facilities. Introduce in 2024 legislative session. Currently in committee. <https://malegislature.gov/Bills/193/S1436> <https://malegislature.gov/Bills/193/H2247>
- New Jersey https://web.doh.nj.gov/apps2/documents/bc/hcab_nop_safe_patient_handling_0910.pdf
- New York Guidance <https://www.nysna.org/sites/default/files/attach/ajax/2015/08/NYSSafePatientHandlingLaw.pdf>
- Rhode Island H 7386 signed into law July 2007 - <https://webserver.rilegislature.gov/BillText06/HouseText06/H7386.htm>

Safe Patient Handling and Mobility – Section 10

SPHM & Ergonomics State Laws

- Texas SB 1525. June 17, 2005 –
<https://capitol.texas.gov/tlodocs/79R/billtext/html/SB01525F.htm>
- Washington ESHB 1672 signed into law on March 2006 -
<https://lawfilesexxt.leg.wa.gov/Biennium/2005-06/Pdf/Bill%20Reports/House/1672-S.HBR.pdf>
- Washington RCW 49.17.520 Rules related to preventing musculoskeletal injuries 2023.
<https://app.leg.wa.gov/RCW/default.aspx?cite=49.17.520>

Effectiveness of SPHM Laws

Choi, J. S., & Cramer, E. (2016). Reports from RNs on safe patient handling and mobility programs in acute care hospital units. *Journal of Nursing Administration*, 46, 566–573.

Francis, R., Fray, M., & Morley, S. (2019). Does federal, government, or state legislation mandating SPHM make a difference to compliance? International round table discussion. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 9(4), 149–153.

Fray, M., & Davis, K. G. (2024). Effectiveness of safe patient handling equipment and techniques: A review of biomechanical studies. *Human factors*, 66(10), 2283-2322.

Kayser SA, Wiggermann NE, Kumpar D. (2020). Factors associated with safe patient handling practice in acute care and its relationship with patient mobilization: A cross-sectional study. *International Journal of Nursing Studies*. 104: 103508.

Lapane, K. L., Dubé, C. E., & Jesdale, B. M. (2016). Worker injuries in nursing homes: is safe patient handling legislation the solution? *The journal of nursing home research sciences*, 2, 110.

Lee, S. J., Lee, J. H., & Gershon, R. R. (2015). Musculoskeletal symptoms in nurses in the early implementation phase of California's safe patient handling legislation. *Research in Nursing & Health*, 38(3), 183–193.

Lee, S. J., Lee, J. H., and Robert Harrison. (2019). Impact of California's safe patient handling legislation on musculoskeletal injury prevention among nurses. *American Journal of Industrial Medicine*, 62, no. 1: 50-58.

Lee, S. J. (2020). Impact of Safe Patient Handling Legislation on Musculoskeletal Disorders Among California Healthcare Workers. Labor Research and Evaluation (LRE) Grants Grant No.: EO-30270-17-60-5-6.

Lee, S. J., Kang, K. J., & Lee, J. H. (2021). Safe patient handling legislation and changes in programs, practices, perceptions, and experience of musculoskeletal disorders by hospital characteristics: A repeated cross-sectional survey study. *International Journal of Nursing Studies*, 113, 103791.

Lee, S. J., Lee, J. H., & Harrison, R. (2022). Safe patient handling legislation and musculoskeletal disorders among California healthcare workers: Analysis of workers' compensation data, 2007–2016. *American journal of industrial medicine*, 65(7), 589-603.

Lee, S. J., Stock, L., Michalchuk, V., Adesoye, K., & Mullen, K. (2021). Impact of California Safe Patient Handling Legislation: Health care workers' perspectives. *Workplace Health & Safety*, 69(3), 124–133.

Monaghan, H. M. (2013). Safe patient handling & movement: Legislation, accreditation, quality, and recognition. *American Journal of Safe Patient Handling & Movement*, 3(3), 103–109.

Safe Patient Handling and Mobility – Section 10

New York State Assembly Subcommittee on Workplace Safety. (2011). Safe patient handling in New York: Short term costs yield long term results. Retrieved from <http://assembly.state.ny.us/comm/WorkPlaceSafe/20110527a/index.pdf>

Powell-Cope, G., & Rugs, D. (2015). What elements of the 2013 American Nurses Association safe patient handling and mobility standards are reflected in state legislation? *American Journal of Safe Patient Handling & Movement*, 5(1), 13–18. Retrieved from <https://sphmjournal.com/>

Public Citizen (2015). Safe Patient Handling Report Series Uplifting an Industry? State-Based Safe Patient Handling Laws Have Yielded Improvements But Are Not Adequately Protecting Health Care Workers <https://www.citizen.org/article/safe-patient-handling-report-series/>

Rockefeller, K., & Weaver, J. (2016). Physical therapists and safe patient handling and mobility in states with and without legislation. *American Journal of Safe Patient Handling & Movement*, 6(3), 98–103.

Rosebush, C. E., Schofield, K. E., Ramirez, M., Zaidman, B., Erickson, D. J., Tschida, B., and McGovern, P. M. (2022). Differential effectiveness of the Minnesota Safe Patient Handling Act by health care setting: An exploratory study. *American Journal of Industrial Medicine*, 65(2), 105-116.

Silverstein, B., Howard, N., & Adams, D. (2011). Washington State's safe patient handling legislation: Does it make a difference? *American Journal of Safe Patient Handling and Movement*, 1(3), 29–35.

Silverstein, B., and Schurke, J. (2011). Washington State Department of Labor and Industries' SHARP Program: Implementation of Safe Patient Handling in Washington State Hospitals. Olympia, WA: Safely and Health Assessment and Research for Prevention. <https://lni.wa.gov/safety-health/safety-research/files/2011/SafePatientHandlingRpt2010.pdf>

Weinmeyer, R. (2016). Safe patient handling laws and programs for health care workers. *AMA journal of ethics*, 18(4), 416-421. <https://journalofethics.ama-assn.org/article/safe-patient-handling-laws-and-programs-health-care-workers/2016-04>

Ergonomics – Resources, Analysis Tools and Courses

Web Based Resources

Cal/OSHA Consultation Services Branch <https://www.dir.ca.gov/dosh/consultation.html>

Easy Ergonomics 1999 https://www.dir.ca.gov/dosh/dosh_publications/easerg2.pdf

Easy Ergonomics for desk top Users 2022
https://www.dir.ca.gov/dosh/dosh_publications/computerergo.pdf

Ergonomic Guidelines for Manual Material Handling 2007
https://www.dir.ca.gov/dosh/dosh_publications/mmh.pdf

Canadian Center for Occupational Health and Safety CCOHS. Ergonomic - numerous resources
<https://www.ccohs.ca/topics/hazards/ergonomic>

Chartered Institute of Ergonomics and Human Factors, UK. Numerous resources related to human factors in health care and musculoskeletal disorders in all industries. <https://ergonomics.org.uk/The>

Ergonomics and human factors at work. (2013). www.hse.gov.uk/pubns/indg90.htm.

Encyclopedia of Occupational Health & Safety 4th ed 1998 29. Ergonomics. Chapter Editors: Wolfgang Laurig and Joachim Vedder. <https://www.iloencyclopaedia.org/contents/part-iv-66769/ergonomics-52353>

Guidance to help design effective and usable work procedures for health and social care teams.
www.ergonomics.org.UK

Safe Patient Handling and Mobility – Section 10

Health and Safety Executive UK. Ergonomics and human factors at work A brief guide. 2013.
<https://www.hse.gov.uk/pubns/indg90.pdf>

Health and Safety Executive UK. Human factors and ergonomics resources.
<https://www.hse.gov.uk/humanfactors/>

International Ergonomics Association (IEA) What is Ergonomics and other resources -
<https://iea.cc/about/what-is-ergonomics/>

International Labor Organization

Principles and guidelines for human factors /ergonomics (HFE) design and management of work systems (2021). Jointly prepared by the International Labour Office (ILO) and the International Ergonomics Association (IEA). <https://www.ilo.org/publications/principles-and-guidelines-human-factors-ergonomics-hfe-design-and-0>

Ergonomic checkpoints: Practical and easy-to-implement solutions for improving safety, health and working conditions(2010).<https://www.ilo.org/resource/training-material/ergonomic-checkpoints-practical-and-easy-implement-solutions-improving>

Work organization and ergonomics (1998). <https://www.ilo.org/publications/work-organization-and-ergonomics>

Institute for Work & Health (IWH) Numerous resources and research publications related to worker safety and health programs. <https://www.iwh.on.ca/systematic-review-program>

NIOSH - Ergonomics and Musculoskeletal Disorders – various resources
<https://www.cdc.gov/niosh/ergonomics/index.html>

OSHA Ergonomics <https://www.osha.gov/SLTC/ergonomics/>

OSHA Computer Workstations eTool <https://www.osha.gov/etools/computer-workstations>

Public Services Health and Safety Association, Ontario, Canada. Numerous resources related to ergonomics, WMSDs and worker wellbeing. <https://www.pshsa.ca/>

The European Agency for Safety and Health at Work (EU-OSHA). Numerous publications related to ergonomics and musculoskeletal disorders <https://osha.europa.eu/en>

American Industrial Hygiene Association (AIHA), 2019. The Facts About Ergonomics: Dispelling Myths: Position Statement. <https://www.aiha.org/education/white-papers/the-facts-about-ergonomics-dispelling-myths>

UCLA Ergonomics Website <http://ergonomics.ucla.edu>

U.S. Department of Defense Design Criteria Standard Human Engineering. MIL-STD-1472H (15 September 2020). Although applicable to design and development of military systems, equipment, and facilities, this standard is a useful ergonomics design resource that can be applied or adapted to any occupational work environment. https://quicksearch.dla.mil/qsdcdetails.aspx?ident_number=36903

U.S. Department of Defense Defense Support Service Center (DSSC). Workplace Ergonomics Reference Guide 4th Edition A Publication of the Computer/Electronic Accommodations Program 2024
<https://cap.mil/file/get/documents/d91b865c-fb88-44e6-bf9e-1fca53c182e6.pdf>

WA State Dept. of Labor and Industries.

Sprains & Strains- numerous resources including analysis tools and training and the Ergonomics Ideas Bank <https://lni.wa.gov/safety-health/preventing-injuries-illnesses/sprains-strains/>

Office Ergonomics. These self-help courses can help you set-up a safe and comfortable computer workstation. <https://lni.wa.gov/safety-health/preventing-injuries-illnesses/sprains-strains/office-ergonomics>

Safe Patient Handling and Mobility – Section 10

WorkSafe BC – Numerous resources.

Sprains & strains <https://www.worksafebc.com/en/health-safety/injuries-diseases/sprains-strains>

Ergonomics <https://www.worksafebc.com/en/health-safety/hazards-exposures/ergonomics>

Books & Articles (Selected)

Bhattacharya, A., & McGlothlin, J. D. (Eds.). (2012). *Occupational ergonomics: theory and applications* (2nd edition). CRC Press.

Bootsman, R., Markopoulos, P., Qi, Q., Wang, Q., & Timmermans, A. A. (2019). Wearable technology for posture monitoring at the workplace. *International Journal of Human-Computer Studies*, 132, 99-111.

Carayon, P. (Ed.). (2012). *Handbook of human factors and ergonomics in health care and patient safety*. 2nd Edition CRC press.

Carayon, P., Wetterneck, T. B., Rivera-Rodriguez, A. J., Hundt, A. S., Hoonakker, P., Holden, R., & Gurses, A. P. (2014). Human factors systems approach to healthcare quality and patient safety. *Applied Ergonomics*, 45(1), 14–25.

Carayon, P., Wooldridge, A., Hoonakker, P., Hundt, A. S., & Kelly, M. M. (2020). SEIPS 3.0: Human-centered design of the patient journey for patient safety. *Applied ergonomics*, 84, 103033. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7152782/pdf/nihms-1569499.pdf>

Chaffin, D. B., Andersson, G. B. J., & Martin, B. J. (2006). *Occupational biomechanics* (4th ed.). New York: Wiley-Intersciences.

Chartered Institute of Ergonomics and Human Factors. (2020). Guidance to help design effective and usable work procedures for health and social care teams. <https://chfg.org/guidance-to-help-design-effective-and-usable-work-procedures-for-health-and-social-care-teams/>

Eastman Kodak. (2004). *Ergonomic Design for People at Work*. 2nd edition. John Wiley & Sons, Inc.

Holden, R. J., & Carayon, P. (2021). SEIPS 101 and seven simple SEIPS tools. *BMJ quality & safety*, 30(11), 901-910. <https://qualitysafety.bmj.com/content/30/11/901>

Karwowski, W., Szopa, A., & Soares, M. M. (Eds.). (2021). *Handbook of standards and guidelines in human factors and ergonomics*. Crc Press.

Lind, C. M., Diaz-Olivares, J. A., Lindecrantz, K., & Eklund, J. (2020). A wearable sensor system for physical ergonomics interventions using haptic feedback. *Sensors*, 20(21), 6010.

Marras WS. *The Working Back: A Systems View*. John Wiley & Sons. 2008.

Melles, M., Albayrak, A., & Goossens, R. (2021). Innovating health care: key characteristics of human-centered design. *International Journal for Quality in Health Care*, 33(Supplement_1), 37-44.

National Research Council (US) and Institute of Medicine (US) Panel on Musculoskeletal Disorders and the Workplace. *Musculoskeletal Disorders and the Workplace: Low Back and Upper Extremities*. Washington (DC): National Academies Press (US); 2001. 6, Biomechanics. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK222434/>

Norman D. (2013). *The Design of Every Day Things*. 3rd Edition. Currency Doubleday.

Oakman, J., & Macdonald, W. (2019). The APHIRM toolkit: An evidence-based system for workplace MSD risk management. *BMC Musculoskeletal Disorders*, 20, 504.

Rogers, B., Buckheit, K., & Ostendorf, J. (2013). Ergonomics and nursing in hospital environments. *Workplace Health & Safety*, 61, 429–439.

Safe Patient Handling and Mobility – Section 10

Salvendy, G. & Karwowski W. (Ed.). (2021). Handbook of Human Factors and Ergonomics 5th edition John Wiley & Sons. ISBN:9781119636113

Stefana, E., Marciano, F., Rossi, D., Cocca, P., & Tomasoni, G. (2021). Wearable devices for ergonomics: A systematic literature review. *Sensors*, 21(3), 777. <https://pubmed.ncbi.nlm.nih.gov/33498904/>

Soares, M. M., & Rebelo, F. (2016). *Ergonomics in design: Methods and techniques*. CRC Press.

Sujan, M., Pickup, L., Vosper, H., & Catchpole, K. (2022). *Making human factors and ergonomics work in health and social care: chapter 1*. Chartered Institute of Ergonomics and Human Factors <https://ergonomics.org.uk/asset/CECAEB97%2D627E%2D490E%2DBF7C154C0A2BDB38/>

Wilson, J. R. (2014). Fundamentals of systems ergonomics/human factors. *Applied ergonomics*, 45(1), 5-13.

Ergonomics Analysis Tools (Selected)

American Industrial Hygiene Association. AIHA. Apps and eTools Resource Center

<https://www.aiha.org/public-resources/healthierworkplaces/healthier-community-resources/apps-and-tools-resource-center>

Ergonomic Assessment Toolkit 2023. <https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/ErgonomicAssessmentToolkit.pdf>

Cornell University Ergonomics Web -various ergonomics guides and tools.

<https://ergo.human.cornell.edu/>

Gallagher, S Sesek R, Sesek B, Nail, I, Pool N, Budnick, P. (2022) Fatigue Failure Ergonomics Assessment Tools Advance MSD Prevention Strategies. *Ergoweb*, February 2, 2022. <https://ergoweb.com/fatigue-failure-ergonomics-assessment-tools-advance-msd-prevention-strategies/>

Hignett, S., & McAtamney, L. (2000). Rapid entire body assessment (REBA). *Applied Ergonomics*, 31, 201-205.

ISO Manual handling of people in the healthcare sector: Technical report ISO/TR 12296: Annex A, provides examples of other tools that can be used for risk assessment of manual patient handling tasks.

<https://www.iso.org/standard/51310.html> (requires purchase)

Kee, D., Na, S., & Chung, M. K. (2020). Comparison of the Ovako working posture analysis system, rapid upper limb assessment, and rapid entire body assessment based on the maximum holding times. *International Journal of Industrial Ergonomics*, 77, 102943.

Liberty Mutual

Manual Materials Handling website provides tools to calculate risk associated with *materials handling* tasks involving lifting, lowering, pushing, pulling, and carrying.

<https://libertymmhtables.libertymutual.com/>

Manual Materials handling guidelines.2014 <https://safetyresourcesblog.com/wp-content/uploads/2014/08/liberty-mutual-snook-tables.pdf>

Potvin JR, Ciriello VM, Snook SH, Maynard WS, Brogmus GE. The Liberty Mutual manual materials handling (LM-MMH) equations. *Ergonomics*. 2021 Aug;64(8):955-970.

<https://pubmed.ncbi.nlm.nih.gov/33729096/>

National Center for Health Statistics.(2021). Anthropometric reference data for children and adults:

United States, 2015–2018. Fryar CD, Carroll MD, Gu Q, Afful J, Ogden CL. *Vital Health Stat* 3(46). 2021.

Accessed July 30, 2022. https://www.cdc.gov/nchs/data/series/sr_03/sr03-046-508.pdf

Safe Patient Handling and Mobility – Section 10

The Revised NIOSH Lifting Equation can be used to assess risk of low back disorders associated with manual lifting tasks that involve lifting and lowering. NIOSH [1994]. *Applications manual for the revised NIOSH lifting equation* <https://www.cdc.gov/niosh/docs/94-110/>

The Revised NIOSH Lifting Equation (RNLE) Applications Manual guides users on how to use the RNLE. <https://www.cdc.gov/niosh/topics/ergonomics/nlecalc.htm>

Waters, T. R., Putz-Anderson, V., & Garg, A. (1994). *Applications manual for the revised NIOSH lifting equation*. <https://www.cdc.gov/niosh/docs/94-110/default.html>

The RNLE is also available on an app (from Apple IOS store or Google play store) together with the composite lifting index (CLI) that can be used to calculate risk for multiple lifting tasks <https://www.cdc.gov/niosh/ergonomics/about/RNLE.html>

Garg, A., Boda, S., Hegmann, K. T., Moore, J. S., Kapellusch, J. M., Bhoyar, P., ... & Malloy, E. J. (2014). The NIOSH lifting equation and low-back pain, part 1: Association with low-back pain in the BackWorks prospective cohort study. *Human Factors*, 56(1), 6-28.

Garg, A., & Kapellusch, J. M. (2016). The Cumulative Lifting Index (CULI) for the Revised NIOSH Lifting Equation: Quantifying risk for workers with job rotation. *Human Factors*, 58(4), 683-694.

Garg, A., Kapellusch, J. M., Hegmann, K. T., Moore, J. S., Boda, S., Bhoyar, P., & Malloy, E. J. (2014). The NIOSH lifting equation and low back pain, part 2. *Human Factors*, 56(1), 44-57.

Lu, M.-L., Putz-Anderson, V., Garg, A., & Davis, K. G. (2016). Evaluation of the impact of the revised National Institute for Occupational Safety and Health lifting equation. *Human Factors*, 58(4), 667-682.

Lu, M.-L., Waters, T. R., Krieg, E., & Werren, D. (2014). Efficacy of the revised NIOSH lifting equation to predict risk of low back pain associated with manual lifting. *Human Factors*, 56(1), 73-85.

Waters, T. R., Putz-Anderson, V., Garg, A., & Fine, L. J. (1993). Revised NIOSH equation for the design and evaluation of manual lifting tasks. *Ergonomics*, 36(7), 749-776.

Waters, T. R., Lu, M.-L., Piacitelli, L. A., Werren, D., & Deddens, J. A. (2011). Efficacy of the Revised NIOSH Lifting Equation to predict risk of low back pain due to manual lifting: Expanded cross-sectional analysis. *Journal of Occupational and Environmental Medicine*, 53(10), 1061-1067.

Waters, T., Occhipinti, E., Colombini, D., Alvarez-Casado, E., & Fox, R. (2016). Variable Lifting Index (VLI): A new method for evaluating variable lifting tasks. *Human Factors*, 58(4), 695-711.

Snook, S. H., & Ciriello, V. M. (1991). The design of manual handling tasks: revised tables of maximum acceptable weights and forces. *Ergonomics*, 34(9), 1197-1213.

TU Delft DINED anthropometric database. DINED is a project of the Applied Ergonomics and Design Section of the Human-Centered Design Department of the TU Delft faculty of Industrial Design Engineering. <https://dined.io.tudelft.nl/en/about>

University of Michigan Anthropometric Data Sources. <http://mreed.umtri.umich.edu/mreed/downloads.html>

Washington State's Department of Labor & Industries (L&I) Numerous Assessment tools <https://lni.wa.gov/safety-health/preventing-injuries-illnesses/sprains-strains/evaluation-tools>

The Physical Job Evaluation Checklist User Guide Health Care and Social Assistance. July 2017 SHARP Publication No. 40-21-2017 <https://lni.wa.gov/safety-health/safety-research/files/2017/PhysJobEvalChecklistHealthcare.pdf>

Safe Patient Handling and Mobility – Section 10

Courses

Summary of Ergonomics/Human Factors Graduate Programs, Certificates, and Online Courses Available Around the World. <https://www.ergofoundation.org/resources/ergonomics-online-courses-around-the-world>

University of Michigan. Center for Occupational Health and Safety Engineering. Offer in person and virtual training in ergonomics and human factors engineering. <https://cohse.umich.edu/>

Oregon OSHA Everyday Ergonomics online course
<https://osha.oregon.gov/edu/courses/pages/ergonomics-for-everyone-online-course.aspx>

Resources by SPHM Program Component

Defining the Need for an SPHM Program

Note: Also refer to the SPHM General Resources listed above when looking for additional information and tools related to SPMH program components.

Occupational Injury Data Sources

US Bureau of Labor Statistics

Occupational Injury and Illness data - Federal <http://www.bls.gov/iif/> and State <https://www.bls.gov/iif/state-data.htm>

News Release: Employer-Reported Workplace Injuries and Illnesses, 2023. 11/08/2024
<https://www.bls.gov/news.release/pdf/osh.pdf>

Bureau of Labor Statistics. (2025, March 10). Injuries, illnesses, and fatalities: How to compute your firm's incidence rate for safety management. <https://www.bls.gov/iif/overview/compute-nonfatal-incidence-rates.htm>

Fact Sheet: Occupational injuries and illnesses resulting in musculoskeletal disorders (MSDs). US Bureau of Labor Statistics. n.d. Last updated May 1, 2020. <https://www.bls.gov/iif/factsheets/msds.htm>

Hospital workers: an assessment of occupational injuries and illnesses. June 2017.
<https://www.bls.gov/opub/mlr/2017/article/hospital-workers-an-assessment-of-occupational-injuries-and-illnesses.htm>

Occupational injuries and illnesses among registered nurses. November 2018.
<https://www.bls.gov/opub/mlr/2018/article/occupational-injuries-and-illnesses-among-registered-nurses.htm>

Liberty Mutual

Workplace Safety Index - Healthcare and Social Assistance, 2021.
https://business.libertymutual.com/wp-content/uploads/2021/06/2021_WSI_1003_R2.pdf

Workplace Safety Index 2020: Healthcare and Social Assistance. N/D. Last reviewed May 2020.
https://business.libertymutual.com/wp-content/uploads/2021/04/WSI_1003.pdf

Safe Patient Handling and Mobility – Section 10

Workplace Safety Indexes 2023: Healthcare and Social Assistance (August 2023). Liberty Mutual.
<https://business.libertymutual.com/>

Liberty Mutual 2024 Workplace Safety Index
<https://business.libertymutual.com/insights/2024-workplace-safety-index/>

National Safety Council

Work Safety Trends <https://injuryfacts.nsc.org/work/work-overview/work-safety-introduction/>

National Safety Council 2023 Worker Injury Facts, NSC 2023.
<https://injuryfacts.nsc.org/work/costs/work-injury-costs/>

National Safety Council. (2025). The importance of musculoskeletal disorder and related injury surveillance: An organizational approach. https://www.nsc.org/faforms/msd_injury_surveillance_report

National Safety Council. (n.d.). Position/Policy Statement Connecting Sustainability with Workplace Safety and Health (No. 175). https://www.nsc.org/getattachment/c5124534-153f-4610-9d25-4d33179417d6/w-connecting%20sustainability%20with%20workplace%20safety%20and%20health%20-%20175?srsId=AfmBOoo0UHI8ydGsFYnWdA6pMB6dl2ce8Yr54SUbrAtzD4dR1bl46_ej

Incidence & Worker Compensation Costs of Patient Handling WMSDs - Acute Care & Nursing

Also refer to Business Case for SPHM and to Incidence of WMSDs in Therapists, and to Long Term Care, EMS and Home Health for incidence of WMSDs in those care settings.

Almhdawi, K. A., Alrabbaie, H., Kanaan, S. F., Oteir, A. O., Jaber, A. F., Ismael, N. T., & Obaidat, D. S. (2020). Predictors and prevalence of lower quadrant work-related musculoskeletal disorders among hospital-based nurses: A cross-sectional study. *Journal of Back and Musculoskeletal Rehabilitation*, 33(6), 885-896.

Anderson, S. P., & Oakman, J. (2016). Allied health professionals and work-related musculoskeletal disorders: A systematic review. *Safety and Health at Work*, 7(4), 259–267.

Amberson, T., Graves, J. M., & Sears, J. M. (2024). Overview of occupational injuries among registered nurses in Washington State, 2007 to 2019. *Workplace Health & Safety*, 72(5), 187-195.

Asfaw, A., Pana-Cryan, R., Bushnell, T., & Sauter, S. (2015). Musculoskeletal disorders and associated healthcare costs among family members of injured workers. *American Journal of Industrial Medicine*, 58, 1205–1216.

Bernardes, R. A., Caldeira, S., Parreira, P., Sousa, L. B., Apóstolo, J., Almeida, I. F., ... & Guardado Cruz, A. (2023). Foot and ankle disorders in nurses exposed to prolonged standing environments: A scoping review. *Workplace Health & Safety*, 71(3), 101-116.

Bhimani, R. (2016b). Understanding work-related musculoskeletal injuries in rehabilitation from a nursing perspective. *Rehabilitation Nursing*, 41, 91–100.

D'Agostin, F., & Negro, C. (2017). Symptoms and musculoskeletal diseases in hospital nurses and in a group of university employees: A cross-sectional study. *International Journal of Occupational Safety and Ergonomics*, 23, 274–284.

Davis, K. G., Freeman, A. M., Ying, J., & Huth, J. R. (2021). Workers' compensation costs for healthcare caregivers: Home healthcare, long-term care, and hospital nurses and nursing aides. *American Journal of Industrial Medicine*, 64(5), 369–380.

Safe Patient Handling and Mobility – Section 10

- Faisal, S., Rahman, S. A., Abou-ElWafa, H., Al-Wehedy, A., & Kamel, E. (2025). Low back pain among nursing assistants at Mansoura University hospitals: prevalence and risk. *International Journal of Occupational Safety and Health*, 15(1), 67-77.
- Gomaa, A. E., Tapp, L. C., Luckhaupt, S. E., Vanoli, K., Sarmiento, R. F., Raudabaugh, W. M., & Sprigg, S. M. (2015). Occupational traumatic injuries among workers in health care facilities—United States, 2012–2014. *Morbidity & Mortality Weekly Report*, 64(15), 405–414. <https://www.cdc.gov/mmwr>
- Gomma, A. E., Tapp, L. C., Luckhaupt, S. E., et al. (2020). Why surveillance informatics is an integral part of a safe patient handling program: Occupational injuries due to patient handling and movement in 116 US hospitals. *Journal of Association of Occupational Health Professionals*, 40(3), 16–25.
- Graham, P., & Dougherty, J. P. (2012). Oh, their aching backs! Occupational injuries in nursing assistants. *Orthopaedic Nursing*, 31(4), 218–223.
- Haas, A. D., Hunter, D. A., & Howard, N. L. (2018). Bringing a structural perspective to work: Framing occupational safety and health disparities for nursing assistants with work-related musculoskeletal disorders. *Work*, 59(2), 211-229.
- Johnson, K., Swinton, P., Pavlova, A., & Cooper, K. (2023). Manual patient handling in the healthcare setting: a scoping review. *Physiotherapy*, 120, 60-77.
- Jones V, Missar V, Bronson M, Grant J. Aon health care workers compensation barometer. Aon plc. 2016. <https://www.aon.com/risk-services/thought-leadership/report-2016-health-care-barometer.jsp>
- Jones V, Missar V, Zmyslowski K, Cregg H, Zhang K. Aon health care workers compensation barometer (GDM08049). Aon plc. 2018. <https://www.aon.com/risk-services/thought-leadership/report-2018-health-care-barometer.jsp>
- Khairallah, G. M., Al-Hajj, S., Mowafi, H., Rahme, D. V., & Sakr, C. J. (2025). Occupational injury severity among healthcare workers: a retrospective study. *BMC Public Health*, 25(1), 1-9.
- Kok, J. D., De Vroonhof, P., Snijders, J., Roullis, G., Clarke, M., Peereboom, K., & Isusi, I. (2019). Work-related MSDs: prevalence, costs and demographics in the EU (European Risk Observatory Executive summary). Publications Office of the European Union, 1-18. https://osha.europa.eu/sites/default/files/Work_related_MSDs_prevalence_costs_and_demographics_in_EU_summary.pdf
- Krishnan, K. S., Raju, G., & Shawkataly, O. (2021). Prevalence of work-related musculoskeletal disorders: Psychological and physical risk factors. *International journal of environmental research and public health*, 18(17), 9361.
- Lee, S.-J., Faucett, J., Gillen, M., Krause, N., & Landry, L. (2013). Risk perception of musculoskeletal injury among critical care nurses. *Nursing Research*, 62, 36–44.
- Lin, S. C., Lin, L. L., Liu, C. J., Fang, C. K., & Lin, M. H. (2020). Exploring the factors affecting musculoskeletal disorders risk among hospital nurses. *Plos one*, 15(4), e0231319.
- Martin, C. J., Jin, C., Bertke, S. J., Yiin, J. H., & Pinkerton, L. E. (2020). Increased overall and cause-specific mortality associated with disability among workers' compensation claimants with low back injuries. *American journal of industrial medicine*, 63(3), 209-217.
- McLaughlin, K. H., Young, D. L., Colantuoni, E., Funk, K., Stone, A. M., Ballreich, J., & Hoyer, E. H. (2023). Impaired hospitalized patient mobility is associated with nurse injuries. *Occupational Medicine*, 73(9), 554-556.
- Occupational injuries for consecutive and cumulative shifts among hospital registered nurses and patient care associates: a case-control study. (2012). Hopcia K, Dennerlein JT, Hashimoto D, Orechia T, Sorensen G. *Workplace Health Saf.* 60(10):437-444.

Safe Patient Handling and Mobility – Section 10

- Rainbow, J. G., Chou, K., Bethel, C., Rothers, J., Sans-Fuentes, M. A., & Dudding, K. M. (2024). More Than Just a Pain in the Back: Pain Among American Nurses and Its Relationship to Modifiable Work Factors and Work Performance. *Nursing Administration Quarterly*, 48(4), 336-346.
- Ribeiro T, Serranheira F, Loureiro H. Work related musculoskeletal disorders in primary health care nurses. *Applied Nursing Research*. 2017; 33: 72-77
- Samaei, S. E., Mostafaei, M., Jafarpoor, H., & Hosseiniabadi, M. B. (2017). Effects of patient-handling and individual factors on the prevalence of low back pain among nursing personnel. *Work*, 56(4), 1–11.
- Schlossmacher, R., & Amaral, F. G. (2012). Low back injuries related to nursing professionals working conditions: A systematic review. *Work*, 41(Suppl 1), 5737–5738.
- Sezgin, D., & Esin, M. N. (2015). Predisposing factors for musculoskeletal symptoms in intensive care unit nurses. *International Nursing Review*, 62, 92–101.
- Strid, E. N., Wåhlin, C., Ros, A., & Kvarnström, S. (2021). Health care workers' experiences of workplace incidents that posed a risk of patient and worker injury: A critical incident technique analysis. *BMC Health Services Research*, 21(1), 1-12.
- Safety and Health Assessment and Research for Prevention (SHARP) Program in the Washington State Department of Labor and Industries (2015). Work-Related Musculoskeletal Disorders (WRMSDs) in Washington State Health Care A Summary of Research Study Findings 2015. Publication No. 40-13-2015. https://www.lni.wa.gov/safety-health/safety-research/files/2015/Healthcare_summary_FINAL.pdf
- Sun, W., Zhang, H., Tang, L., He, Y., & Tian, S. (2021). The factors of non-specific chronic low back pain in nurses: A meta-analysis. *Journal of back and musculoskeletal rehabilitation*, 34(3), 343-353
- Trinkoff, A. M., Lipscomb, J. A., Geiger-Brown, J., Storr, C. L., & Brady, B. A. (2003). Perceived physical demands and reported musculoskeletal problems in registered nurses. *American Journal of Preventive Medicine*, 24(3), 270-275.
- Unruh, L., & Asi, Y. (2018). Determinants of workplace injuries and violence among newly licensed RNs. *Workplace Health & Safety*, 66(10), 482-492.
- Walton, A. L., & Rogers, B. (2017). Workplace hazards faced by nursing assistants in the United States: A focused literature review. *International Journal of Environmental Research and Public Health*, 14(5), 544.
- Wang SY, Liu LC, Lu MC, Koo M. Comparisons of musculoskeletal disorders among ten different medical professions in Taiwan: a nationwide, population-based study. (2015). 10(4):e0123750.
- Wiggermann, N., Francis, R., & Solomon, A. (2024). Individual and organizational factors associated with injury history and patient handling behaviors: Results from a nationwide survey of healthcare workers. *Applied Ergonomics*, 118, 104251.
- Yassi, A., & Lockhart, K. (2013). Work-relatedness of low back pain in nursing personnel: A systematic review. *International Journal of Occupational and Environmental Health*, 19, 223–244.

Risk Factors for Patient Handling Related WRMSDs

Biomechanical

Al Qaraghli MI, De Jesus O. Lumbar Disc Herniation. [Updated 2023 Aug 23]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK560878/>

Alessa, F., & Ning, X. (2018). Changes of lumbar posture and tissue loading during static trunk bending. *Human Movement Science*, 57, 59-68.

Safe Patient Handling and Mobility – Section 10

- Andersen, T. B., Schibye, B., & Skotte, J. (2001). Sudden movements of the spinal column during health-care work. *International Journal of Industrial Ergonomics*, 28(1), 47-53.
- Banks, J. J., Zhou, J., Riehle, C. O., & Wiggermann, N. E. (2024). Biomechanical stresses on healthcare workers during manual patient bed-to-chair transfers. *International Journal of Industrial Ergonomics*, 101, 103584.
- Banks, J. J., Zhou, J., Riehle, C. O., & Wiggermann, N. E. (2025). Low back demands from assisting a patient with an unexpected loss of balance. *Clinical Biomechanics*, 122, 106448
- Belbeck, A., Cudlip, A. C., & Dickerson, C. R. (2014). Assessing the interplay between the shoulders and low back during manual patient handling techniques in a nursing setting. *International Journal of Occupational Safety and Ergonomics*, 20(1), 127-137.
- Broderick, V., Barrett, B., Phillips, S., Cowan, L., Friedman, Y., McKinney, A., ... & Bulat, T. (2023). Staff low back injury risk during assisted falls virtual reality simulations. *Workplace Health & Safety*, 71(6), 304-310.
- Casiano VE, Sarwan G, Dydyk AM, et al. Back Pain. [Updated 2023 Dec 11]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK538173/>
- Chini, G., Varrecchia, T., Tatarelli, A., Silveti, A., Fiori, L., Draicchio, F., & Ranavolo, A. (2022). Trunk muscle co-activation and activity in one-and two-person lifting. *International Journal of Industrial Ergonomics*, 89, 103297.
- Choi, S. D., & Brings, K. (2016). Work-related musculoskeletal risks associated with nurses and nursing assistants handling overweight and obese patients: A literature review. *Work*, 53(2), 439-448.
- Cholewicki, J., & McGill, S. M. (1996). Mechanical stability of the in vivo lumbar spine: implications for injury and chronic low back pain. *Clinical Biomechanics*, 11(1), 1-15.
- Cholewicki, J., Breen, A., Popovich Jr, J. M., Reeves, N. P., Sahrmann, S. A., Van Dillen, L. R., ... & Hodges, P. W. (2019). Can biomechanics research lead to more effective treatment of low back pain? A point-counterpoint debate. *Journal of Orthopaedic & Sports Physical Therapy*, 49(6), 425-436.
- Cimolin, V., Cau, N., Tacchini, E., Galli, M., Rigoldi, C., Rinolfi, M., & Capodaglio, P. (2016). Spinal load in nurses during emergency lifting of obese patients: Preliminary results. *Medicina Del Lavoro*, 107, 356-363.
- Daikoku, R., & Saito, Y. (2008). Differences between novice and experienced caregivers in muscle activity and perceived exertion while repositioning bedridden patients. *Journal of Physiological Anthropology*, 27(6), 333-339.
- Davis, K. G., & Jorgensen, M. J. (2005). Biomechanical modeling for understanding of low back injuries: A systematic review. *Occupational Ergonomics*, 5(1), 57-76.
- Daynard D, Yassi A, Cooper JE, Tate R, Norman R, Wells R. Biomechanical analysis of peak and cumulative spinal loads during simulated patient-handling activities: a substudy of a randomized controlled trial to prevent lift and transfer injury of health care workers. *Appl Ergon*. 2001 Jun;32(3):199–214.
- de Looze, M.P., Zinzen, E., Caboor, D., van Roy, P., Clarijs, J.P., 1998. Muscle strength, task performance and low back load in nurses. *Ergonomics*. 41, 1095-1104.
- Dickerson, C. R., Brookham, R. L., & Chopp, J. N. (2011). The working shoulder: Assessing demands, identifying risks, and promoting healthy occupational performance. *Physical Therapy Reviews*, 16(5), 310-320.
- Dydyk AM, Ngnitewe Massa R, Mesfin FB. Disc Herniation. [Updated 2023 Jan 16]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK441822/>

Safe Patient Handling and Mobility – Section 10

- Freitag, S., Ellegast, R., Dulon, M., & Nienhaus, A. (2007). Quantitative measurement of stressful trunk postures in nursing professions. *Annals of Occupational Hygiene*, 51(4), 385-395.
- Freitag, S., Seddouki, R., Dulon, M., Kersten, J. F., Larsson, T. J., & Nienhaus, A. (2013). The effect of working position on trunk posture and exertion for routine nursing tasks: An experimental study. *Annals of Occupational Hygiene*, 58, 317–325.
- Fray, M., & Hignett, S. (2015, August). An evaluation of the biomechanical risks for a range of methods to raise a patient from supine lying to sitting in a hospital bed. In Proceedings 19th Triennial Congress of the IEA (Vol. 9, p. 14).
- Gallagher, S., & Heberger, J. R. (2013). Examining the interaction of force and repetition on musculoskeletal disorder risk. *Human Factors*, 55, 108-124.
- Gallagher, S., & Marras, W. S. (2012). Tolerance of the lumbar spine to shear: A review and recommended exposure limits. *Clinical Biomechanics*, 27(10), 973-978.
- Gallagher, S., & Schall, M. C., Jr. (2017). Musculoskeletal disorders as a fatigue failure process: Evidence, implications and research needs. *Ergonomics*, 60, 255-269.
- Gallagher, S. (2021). Determinants of the Fatigue Life of Musculoskeletal Tissues. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 65, No. 1, pp. 484-488). Sage CA: Los Angeles, CA: SAGE Publications.
- Gherscovi, E. D., & Mayer, J. M. (2023). Relationship of healthy building determinants with back and neck pain: a systematic review. *American Journal of Health Promotion*, 37(1), 103-131.
- Gracey, E., Burssens, A., Cambre, I., Schett, G., Lories, R., McInnes, I. B., ... & Elewaut, D. (2020). Tendon and ligament mechanical loading in the pathogenesis of inflammatory arthritis. *Nature Reviews Rheumatology*, 16(4), 193-207.
- Harrity, R., Semakula, R., Dehom, S., D'Errico, E., & Roberts, L. (2023). Preserving the Bedside Nurse: Grip Strength and Orthopedic Problems Among Nurses and Nursing Students. *Workplace Health & Safety*, 71(6), 276-281.
- Heidarimoghadam, R., Mosaferchi, S., Ray, P. K., Saednia, H., Najafi Ghobadi, K., & Morteza pour, A. (2023). The differences between normal and obese patient handling: re-structural analysis of two questionnaires. *BMC Musculoskeletal Disorders*, 24(1), 359.
- Hoyle, B., & Fray, M. (2024). Lifting legs into bed: A pilot study to measure the physical impact of assisted bed transfers on healthcare workers. *International Journal of Safe Patient Handling & Mobility*, 14(2), 74-83
- Holtermann, A., Clausen, T., Aust, B., Mortensen, O. S., & Andersen, L. L. (2013). Risk for low back pain from different frequencies, load mass and trunk postures of lifting and carrying among female healthcare workers. *International Archives of Occupational and Environmental Health*, 86(4), 463-470.
- Hoozemans, M. J., Kingma, I., De Vries, W. H., & Van Dieen, J. H. (2008). Effect of lifting height and load mass on low back loading. *Ergonomics*, 51(7), 1053-1063
- Hu, B., Shan, X., Zhou, J., & Ning, X. (2013). The effects of stance width and foot posture on lumbar muscle flexion-relaxation phenomenon. *Clinical Biomechanics*, 29(3), 311-316.
- Huang, Z., Nagata, A., Kanai-Pak, M., Maeda, J., Kitajima, Y., & Nakamura, M. (2014). Automatic evaluation of trainee nurses' patient transfer skills using multiple kinect sensors. *IEICE Transactions on Information and Systems*, E97-D(1), 107-118.
- Iavernig, T., Zanette, M., Miani, A., Ronchese, F., & Larese Filon, F. (2023). Incidence of shoulder disorders in a cohort of healthcare workers from 2009 to 2020. *International Archives of Occupational and Environmental Health*, 1-7.
- Jakobsen, M. D., Vinstrup, J., & Andersen, L. L. (2022). Factors associated with high physical exertion during healthcare work: Cross-sectional study among healthcare workers. *Work*, 71(4), 881-888.

Safe Patient Handling and Mobility – Section 10

- Jakobsen, M. D., Sundstrup, E., Brandt, M., Jay, K., Aagaard, P., & Andersen, L. L. (2015). Physical exercise at the workplace prevents deterioration of work ability among healthcare workers: cluster randomized controlled trial. *BMC public health*, 15(1), 1-9.
- Jäger, M., Jordan, C., Theilmeier, A., Wortmann, N., Kuhn, S., Nienhaus, A., & Luttmann, A. (2013). Lumbar-load analysis of manual patient-handling activities for biomechanical overload prevention among healthcare workers. *Annals of Occupational Hygiene*, 57(4), 528-544.
- Jäger, M. (2018). Extended compilation of autopsy-material measurements on lumbar ultimate compressive strength for deriving reference values in ergonomic work design: The Revised Dortmund Recommendations. *EXCLI journal*, 17, 362.
- Ji, X., Littman, A., Hettiarachige, R. O., & Piovesan, D. (2023). The Effect of Key Anthropometric and Biomechanics Variables Affecting the Lower Back Forces of Healthcare Workers. *Sensors*, 23(2), 658.
- Jones, A. (2018). Manual handling risks to midwives associated with birthing pools: literature review and incident analysis. Report 1132. HSE. <https://www.hse.gov.uk/research/rhhtm/1101-1200.htm>.
- Kee, D., Na, S., & Chung, M. K. (2020). Comparison of the Ovako working posture analysis system, rapid upper limb assessment, and rapid entire body assessment based on the maximum holding times. *International Journal of Industrial Ergonomics*, 77, 102943.
- Kim, H.-K., & Zhang, Y. (2017). Estimation of lumbar spinal loading and trunk muscle forces during asymmetric lifting tasks: Application of whole-body musculoskeletal modelling in OpenSim. *Ergonomics*, 60, 563-576. [
- Kim, W. J., & Jeong, B. Y. (2024). Exposure time to work-related hazards and factors affecting musculoskeletal pain in nurses. *Applied Sciences*, 14(6), 2468.
- Knapik, G. G., & Marras, W. S. (2009). Spine loading at different lumbar levels during pushing and pulling. *Ergonomics*, 52(1), 60-70.
- Knibbe JJ, Knibbe NE. Static load in the nursing profession; the silent killer? *Work*. 2012; 41 Suppl 1:5637-5638
- Larson, R. E., & Rice, M. S. (2015). Hand forces involved when completing a lateral bed to plinth transfer. *OTD, OTR/L*, 5(3).
- Larson, R., Johnson, W., & Mitchell U. (2020). A Review of Sliding a Patient Up In Bed: Implications For Technique And Effects On The Low Back. Research & Reviews: Journal of Medical and Health. 86-93 Sciences. e-ISSN:2319-9865
- Larson, R. E., Murtagh, E. M., & Rice, M. S. (2018). Forces involved when sliding a patient up in bed. *Work*, 59(3), 439-448.
- Lee, T., Roy, A., Power, P., Sembajwe, G., & Dropkin, J. (2022). Ergonomic exposures and control measures associated with mass fatality decedent handling in morgues and body collection points in a New York healthcare system during COVID-19: A case series. *International Journal of Industrial Ergonomics*, 88, 103260.
- Lloyd, J. D. (2004). Biodynamics of back injury: manual lifting and loads. In *Back injury among healthcare workers: causes, solutions, and impacts* (pp. 27-35). Boca Raton, FL: Lewis Publishers.
- Lu, M. L., Waters, T., Werren, D., & Piacitelli, L. (2011). Human posture simulation to assess cumulative spinal load due to manual lifting. Part II: Accuracy and precision. *Theoretical Issues in Ergonomics Science*, 12(2), 189-203.
- Marras, W. S., Davis, K. G., Kirking, B. C., & Bertsche, P. K. (1999). A comprehensive analysis of low-back disorder risk and spinal loading during the transferring and repositioning of patients using different techniques. *Ergonomics*, 42(7), 904–926.

Safe Patient Handling and Mobility – Section 10

- Marras, W. S., Ferguson, S. A., Lavender, S. A., Splittstoesser, R. E., & Yang, G. (2014). Cumulative spine loading and clinically meaningful declines in low-back function. *Human Factors and Ergonomics Society*, 56(1), 29-43.
- Marras, W. S., Walter, B. A., Purmessur, D., Mageswaran, P., & Wiet, M. G. (2016). The contribution of biomechanical-biological interactions of the spine to low back pain. *Human Factors*, 58, 965-975.
- McGill, S. M. (1997). The biomechanics of low back injury: Implications on current practice in industry and the clinic. *Journal of Biomechanics*, 30(5), 465-475.
- Modes RJ, Lafci Fahrioglu S. Anatomy, Back. [Updated 2023 Feb 27]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. <https://www.ncbi.nlm.nih.gov/books/NBK539746/>
- Muthukrishnan, R., & Maqbool Ahmad, J. (2021). Ergonomic risk factors and risk exposure level of nursing tasks: association with work-related musculoskeletal disorders in nurses. *European Journal of Physiotherapy*, 23(4), 248-253.
- Nakagawa, H., Mori, K., Takahashi, K., Yamashiro, K., Ogura, Y., & Goto, A. (2017). The motion analysis of transferring from bed to wheelchair conducted in the nursing field with focusing on the body pressure distribution. In V. G. Duffy (Ed.), *Applications in health, safety, ergonomics, and risk management: Ergonomics and design: 8th International Conference* (pp. 141-159).
- Nedresky, D., Reddy, V., & Singh, G. (2023). Anatomy, back, nucleus pulposus. In *StatPearls [Internet]*. StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK535373/>
- Owlia, M., Kamachi, M., & Dutta, T. (2020). Reducing lumbar spine flexion using real-time biofeedback during patient handling tasks. *Work*, 66(1), 41-51.
- Pedersen, M. T., Essendrop, M., Skotte, J. H., Jørgensen, K., Schibye, B., & Fallentin, N. (2007). Back muscle response to sudden trunk loading can be modified by training among healthcare workers. *Spine*, 32(13), 1454-1460.
- Potvin, J. (2017). An ergonomics simulation study of a clinical recliner, chair, and bed during sit-to-stand patient lifting. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 7(2), 64-73.
- Potvin, J. (2017). An ergonomics simulation study of patient demands during sit-to-stand from a recliner, clinical chair, and bed system. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 7(4), 141-146.
- Qureshi, S. M., Purdy, N., Greig, M. A., Kelly, H., VanDeursen, A., & Neumann, W. P. (2023). Developing a simulation tool to quantify biomechanical load and quality of care in nursing. *Ergonomics*, 66(7), 886-903
- Rathore, M., Sharma, D., Sinha, M. B., Siddiqui, A., & Trivedi, S. (2014). A focused review – Thoracolumbar spine: Anatomy, biomechanics and clinical significance. *Indian Journal of Clinical Anatomy and Physiology*, 1(1), 2014.
- Samaei, S. E., Mostafaei, M., Jafarpour, H., & Hosseinabadi, M. B. (2017). Effects of patient-handling and individual factors on the prevalence of low back pain among nursing personnel. *Work*, 56(4), 551-561.
- Santaguida, P. L., Pierrynowski, M., Goldsmith, C., & Fernie, G. (2005). Comparison of cumulative low back loads of caregivers when transferring patients using overhead and floor mechanical lifting devices. *Clinical Biomechanics*, 20(9), 906-916.
- Shahvarpour, A., Shirazi-Adl, A., Mecheri, H., & Larivière, C. (2014). Trunk response to sudden forward perturbation - Effects of preload and sudden load magnitudes, posture and abdominal muscle pre-activation. *Journal of Electromyography and Kinesiology*, 24, 394-403.
- Silvia CE, Boswick DS, Lillquist D, Wallace D, Perkins M. An ergonomic comparison between mechanical and manual patient transfer techniques. *Work*. 2002;19:19-34.

Safe Patient Handling and Mobility – Section 10

- Skotte, J. H., Essendrop, M., Hansen, A. F., & Schibye, B. (2002). A dynamic 3D biomechanical evaluation of the load on the low back during different patient-handling tasks. *Journal of biomechanics*, 35(10), 1357-1366.
- Splittstoesser, R. E., Marras, W. S., & Best, T. M. (2012). Immune responses to low back pain risk factors. *Work*, 41(Supplement 1), 6016-6023.
- Stringer, E. J., Rice, M. S. (2014). Perception, experience, and ground reaction forces when performing and assessing pivot transfers. *OTJR: Occupation, Participation and Health*, 34(3), 141-149.
- Szeto, G. P. Y., Wong, K. T., Law, K. Y., & Lee, E. W. C. (2013). A study of spinal kinematics in community nurses performing nursing tasks. *International Journal of Industrial Ergonomics*, 43, 203–209.
- Tariq, M. S. (1997). The biomechanics of low back injury: Implications on current practice in industry and the clinic. *Journal of Biomechanics*, 30(5), 465-475.
- Tariq RA, George JS, Ampat G, Toney-Butler TJ. Back Safety. 2023 Jul 22. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan–. PMID: 30085608.
- Theilmeyer, A., Jordan, C., Luttmann, A., & Jäger, M. (2010). Measurement of action forces and posture to determine the lumbar load of healthcare workers during care activities with patient transfers. *Annals of Occupational Hygiene*, 54(8), 923-933.
- Ulin SS, Chaffin DB, Patellos CL, et al. A biomechanical analysis of methods used for transferring totally dependent patients. *SCI Nurs*. 1997;14(1):19-27.
- Usmani, A. R., Kotowski, S. E., Kim, J., Huston, T. R., & Davis, K. G. (2023). Biomechanical investigation of optimal bed height for egressing and ingressing hospital beds. *Human Factors in Healthcare*, 4, 100053.
- Village, J., Frazer, M., Cohen, M., Leyland, A., Park, I., & Yassi, A. (2005). Electromyography as a measure of peak and cumulative workload in immediate care and its relationship to musculoskeletal injury: An exploratory ergonomic study. *Applied Ergonomics*, 36(5), 609-618.
- Vinstrup, J., Jakobsen, M. D., Madeleine, P., & Andersen, L. L. (2020). Physical exposure during patient transfer and risk of back injury & low-back pain: prospective cohort study. *BMC Musculoskeletal Disorders*, 21(1), 1-8
- Waters, T. R. (2007). When is it safe to manually lift a patient? *AJN The American Journal of Nursing*, 107(8), 53-58.
- Waters, T. R., Lu, M., Werren, D., & Piacitelli, L. (2011). Human posture simulation to assess cumulative spinal load due to manual lifting. Part I: Methods. *Theoretical Issues in Ergonomics Science*, 12(2), 176-188.
- Weston, E. B., Aurand, A., Dufour, J. S., Knapik, G. G., & Marras, W. S. (2018). Biomechanically determined hand force limits protecting the low back during occupational pushing and pulling tasks. *Ergonomics*, 61(6), 853-865.
- Weston, E. B., Khan, S. N., & Marras, W. S. (2017). Wheelchair pushing and turning: lumbar spine and shoulder loads and recommended limits. *Ergonomics*, 60(12), 1754-1765.
- Wiltman, S. A., Pechtl, K. S., Huppert, T. J., & Chambers, A. J. (2019, November). Influence of Flooring on Lower Extremity Blood Oxygenation and Volume during Prolonged Standing. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 63, No. 1, pp. 1278-1282). Sage CA: Los Angeles, CA: SAGE Publications.
- Zhou, Jie, "Trunk Biomechanical Responses during Sudden Loading" (2014). Graduate Theses, Dissertations, and Problem Reports. 156. <https://researchrepository.wvu.edu/etd/156>
- Zwerdling D. OSHA launches program to protect nursing employees [All Things Considered audio]. National Public Radio. June 24, 2015. 6 - brief audio sections including Even 'Proper' Technique Exposes

Safe Patient Handling and Mobility – Section 10

Nurses' Spines to Dangerous Forces with Dr W Marras. NPR.org. Published February 11, 2015.
<http://www.npr.org/series/385540559/injured-nurses>

Psychosocial and Organizational

Andersen, L. L., Vinstrup, J., Villadsen, E., Jay, K., & Jakobsen, M. D. (2019). Physical and psychosocial work environmental risk factors for back injury among healthcare workers: Prospective cohort study. *International Journal of Environmental Research and Public Health*, 16(22), 4528.

Afsharian, A., Dollard, M. F., Glozier, N., Morris, R. W., Bailey, T. S., Nguyen, H., & Crispin, C. (2023). Work-related psychosocial and physical paths to future musculoskeletal disorders (MSDs). *Safety Science*, 164, 106177.

Bernal, D., Campos-Serna, J., Tobias, A., Vargas-Prada, S., Benavides, F. G., & Serra, C. (2015). Work-related psychosocial risk factors and musculoskeletal disorders in hospital nurses and nursing aides: A systematic review and meta-analysis. *International Journal of Nursing Studies*, 52(2), 635-648.

Bezzina, A., Austin, E., Nguyen, H., & James, C. (2023). Workplace psychosocial factors and their association with musculoskeletal disorders: A systematic review of longitudinal studies. *Workplace Health & Safety*, 71(12), 578-588

The Canadian Center for Occupational Health and Safety Musculoskeletal Disorders - Psychosocial Factors, <https://www.ccohs.ca/oshanswers/psychosocial/musculoskeletal.html>

Caponecchia C, Mayland E, Bentley T, Farr-Wharton B, Coman R, Gopaldasani V, Jokic T, Manca D, O'Neill S, Huron V, Onnis L-a, Green N. (2022). Psychosocial Hazard Work Re-Design Tool (PHReD-T) Safework NSW and NSW Centre for WHS. <https://workdesignformentalhealth.squarespace.com/s/PHReD-T-PDF>

Chu, P. C., Chin, W. S., Guo, Y. L., & Shiao, J. S. (2019). Long-term effects of psychological symptoms after occupational injury on return to work: A 6-year follow-up. *International Journal of Environmental Research and Public Health*, 16(2), 235.

Ellis, L. A., Falkland, E., Hibbert, P., Wiig, S., Ree, E., Schultz, T. J., ... & Braithwaite, J. (2023). Issues and complexities in safety culture assessment in healthcare. *Frontiers in Public Health*, 11, 1217542.

European Agency of Health and Safety at Work 2021. Psychosocial factors in the prevention of work-related musculoskeletal disorders (MSDs) <https://osha.europa.eu/sites/default/files/psychosocial-risks-infosheet-en.pdf>

Graveling R, Smith A and Hanson M. (2021). musculoskeletal disorders: association with psychosocial risk factors at work. A literature review. European Agency of Health and Safety at Work https://osha.europa.eu/sites/default/files/2021-11/MSDs_association_pshychosocial_risks_factors_at_work_report.pdf

Gómez, M. A. L., Sabbath, E., Boden, L., Williams, J. A., Hopcia, K., Hashimoto, D., & Sorensen, G. (2019). Organizational and psychosocial working conditions and their relationship with mental health outcomes in patient-care workers. *Journal of Occupational and Environmental Medicine*, 61(12), e480-e485.

Han, K., Trinkoff, A. M., & Geiger-Brown, J. (2014). Factors associated with work-related fatigue and recovery in hospital nurses working 12-hour shifts. *Workplace Health & Safety*, 62(10), 409-414.]

Hu, Q., Dollard, M. F., & Taris, T. W. (2022). Organizational context matters: Psychosocial safety climate as a precursor to team and individual motivational functioning. *Safety Science*, 145, 105524.

Johnston, H. (2023). Musculoskeletal Disorders (MSD) and Mental Health: The Role of Psychosocial Factors in Optimizing Prevention. Position Paper. Cre-MSD. University of Waterloo. CRE-MSD 4234-2. https://uwaterloo.ca/centre-of-research-expertise-for-the-prevention-of-musculoskeletal-disorders/sites/default/files/uploads/documents/4234-2_cre-msd_position_paper_2023_johnston_psychosocial_factors.pdf

Safe Patient Handling and Mobility – Section 10

- Kim, S. S., Okechukwu, C. A., Dennerlein, J. T., Boden, L. I., Hopcia, K., Hashimoto, D. M., et al. (2014). Association between perceived inadequate staffing and musculoskeletal pain among hospital patient care workers. *International Archives of Occupational and Environmental Health*, 87(3), 323-330.
- Liang, H. Y., Tseng, T. Y., Dai, H. D., Chuang, J. Y., & Yu, S. (2023). The relationships among overcommitment, effort-reward imbalance, safety climate, emotional labour and quality of working life for hospital nurses: A structural equation modeling. *BMC Nursing*, 22(1), 1-10.
- Marras, W. S., Davis, K. G., Heaney, C. A., Maronitis, A. B., & Allread, W. G. (2000). The influence of psychosocial stress, gender, and personality on mechanical loading of the lumbar spine. *Spine*, 25(23), 3045-3054.
- Reme, S. E., Shaw, W. S., Boden, L. I., Tveito, T. H., O'Day, E. T., Dennerlein, J. T., & Sorensen, G. (2014). Worker assessments of organizational practices and psychosocial work environment are associated with musculoskeletal injuries in hospital patient care workers. *American Journal of Industrial Medicine*, 57, 810-818.
- Roquelaure, Y. (2018). Musculoskeletal disorders and psychosocial factors at work. *European Trade Union Institute. Report 142*. https://www.etui.org/sites/default/files/ez_import/EN-Report-142-MSD-Roquelaure-WEB.pdf
- Schulte, P. A., Sauter, S. L., Pandalai, S. P., Tiesman, H. M., Chosewood, L. C., Cunningham, T. R., ... & Howard, J. (2024). An urgent call to address work-related psychosocial hazards and improve worker well-being. *American journal of industrial medicine*, 67(6), 499-514.
- Shieh, S. H., Sung, F. C., Su, C. H., Tsai, Y., & Hsieh, V. C. (2016). Increased low back pain risk in nurses with high workload for patient care: A questionnaire survey. *Taiwanese Journal of Obstetrics and Gynecology*, 55(4), 525.
- Vignoli, M., Guglielmi, D., Balducci, C., & Bonfiglioli, R. (2015). Workplace bullying as a risk factor for musculoskeletal disorders: The mediating role of job-related psychological strain. *BioMed Research International*, 2015.
- Vinstrup, J., Jakobsen, M. D., & Andersen, L. L. (2020). Poor sleep is a risk factor for low-back pain among healthcare workers: Prospective cohort study. *International Journal of Environmental Research and Public Health*, 17(3), 996.
- Zare, A., Choobineh, A., Hassanipour, S., & Malakoutikhah, M. (2021). Investigation of psychosocial factors on upper limb musculoskeletal disorders and the prevalence of its musculoskeletal disorders among nurses: A systematic review and meta-analysis. *International Archives of Occupational and Environmental Health*, 94(5), 1113-1136.
- Zhang, Y., ElGhaziri, M., Nasuti, S., & Duffy, J. F. (2020). The comorbidity of musculoskeletal disorders and depression: associations with working conditions among hospital nurses. *Workplace health & safety*, 68(7), 346-354.

Program Outcomes - General and Acute Care

Refer to Long Term Care, EMS and Home Health for program outcomes in those care settings.

- Abdul Halim, N. S. S., Mohd Ripin, Z., & Ridzwan, M. I. Z. (2023). Efficacy of interventions in reducing the risks of work-related musculoskeletal disorders among healthcare workers: A systematic review and meta-analysis. *Workplace Health & Safety*, 71(12), 557–576.
- Adamczyk, M. A. (2018). Reducing intensive care unit staff musculoskeletal injuries with implementation of a safe patient handling and mobility program. *Critical Care Nursing Quarterly*, 41(3), 264–271.

Safe Patient Handling and Mobility – Section 10

- Alqahtani, S., Joseph, J., Dicianno, B., Layton, N. A., Toro, M. L., Ferretti, E., ... & Cooper, R. (2021). Stakeholder perspectives on research and development priorities for mobility assistive-technology: a literature review. *Disability and Rehabilitation: Assistive Technology*, 16(4), 362-376.
- American Nurse Today. (2014, September). Current topics in safe patient handling and mobility. https://www.myamericannurse.com/wp-content/uploads/2014/07/ant9-Patient-Handling-Supplement-821a_LOW.pdf
- Anderson, M. P., Carlisle, S., Thomson, C., Ross, C., Reid, H. J., Hart, N. D., & Clarke, A. (2014). Safe moving and handling of patients: an interprofessional approach. *Nursing Standard*, 28(46).
- Andrews, V. D., & Southard, E. P. (2017). Safe patient handling: Keeping health care workers safe. *MedSurg Nursing*, 26(1), S4-S4.
- Aslam, I., Davis, S. A., Feldman, S. R., & Martin, W. E. (2015). A review of patient lifting interventions to reduce health care worker injuries. *Workplace Health & Safety*, 63(6), 267–275.
- Bernardes, J. M., Monteiro-Pereira, P. E., Gómez-Salgado, J., Ruiz-Frutos, C., & Dias, A. (2022). Healthcare workers' knowledge for safe handling and moving of the patient. *International Journal of Occupational Safety and Ergonomics*, 28(4), 2105-2111.
- Bhimani, R. (2016). Prevention of work-related musculoskeletal injuries in rehabilitation nursing. *Rehabilitation Nursing*, 41, 326–335.
- Black, T. R., Shah, S. M., Busch, A. J., Metcalfe, J., & Lim, H. J. (2011). Effect of transfer, lifting, and repositioning (TLR) injury prevention program on musculoskeletal injury among direct care workers. *Journal of occupational and environmental hygiene*, 8(4), 226-235.
- Bonomi, J., Brooks, S., Chapman, T., Garrison, E., & White, L. (2017). Implementing a safe patient handling program in a community hospital setting. *International Journal of Safe Patient Handling & Mobility*, 7(2), 74–81.
- Burdorf, A., et al. (2013). Assessment of the impact of lifting device use on low back pain and musculoskeletal injury claims among nurses. *Occupational and Environmental Medicine*, 70, 491–497.
- Butler, L. A., Claycomb, M., Stutzman, S., & Shutzer-Hill, D. (2011). Reducing patient movement-related injuries through the development, implementation, and sustainability of a comprehensive safe patient handling and movement program. *American Journal of Safe Patient Handling & Mobility*, 2(2), 19–27.
- Caspi, C. E., Dennerlein, J. T., Kenwood, C., Stoddard, A. M., Hopcia, K., Hashimoto, D., & Sorensen, G. (2014). Results of a pilot intervention to improve health and safety for healthcare workers. *Journal of Occupational and Environmental Medicine*, 55(12), 1449–1455.
- Celona, J. (2014). Elements of a successful safe patient handling and mobility program. *American Nurse Today*, 9(9), 4–6. Accessed July 30, 2022. <https://www.americannursetoday.com>
- Charney, W., Simmons, B., Lary, M., & Metz, S. (2006). Zero lift programs in small rural hospitals in Washington state: Reducing back injuries among health care workers. *AAOHN Journal*, 54(8), 355–358.
- Choi, J. S., & Cramer, E. (2016). Reports from RNs on safe patient handling and mobility programs in acute care hospital units. *Journal of Nursing Administration*, 46, 566–573.
- Cloutier, M., Thomas-Olson, L., & Helal, N. (2012). Creating a safe client handling culture in the challenging environment of emergency departments. Retrieved from <https://www.worksafebc.com/en/resources/about-us/research/creating-safe-client-handling-culture-emergency-departments?lang=en>
- Collins, F. (2020). Implementing a Safe Patient Handling and Mobility Program to Prevent Staff Injury. <https://thescholarship.ecu.edu/handle/10342/8661>
- Cortez, W., Gill, R., & Chun, G. (2017). Peer feedback drives improved injury rates. *Nursing Management*, 48(10), 16–19.

Safe Patient Handling and Mobility – Section 10

Cullen, L., Seaton, M., Janni, V., Pennathur, A., Pennathur, P., Blondin, M., & Stenger, K. (2025). Call to action to reduce the occupational hazard associated with patient handling for workforce preservation. *Nursing Outlook*, 73(3), 102402.

Dacanay Jr, D. A. (2024). Safe patient handling and mobility: Bridging the gap between perception and practice. *Nursing2025*, 54(4), 57-62.

Daily, M. K. (2014). Evaluation of a continued safe patient and handling program (Doctoral dissertation, UMASS-Amherst).

https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1035&context=nursing_dnp_capstone

Davis, L., Miner, C., Laramie, A., Sparer, E. H., & Wegman, D. (2014). Moving into the Future: Promoting safe patient handling for worker and patient safety in Massachusetts hospitals. *Occupational Health Surveillance Program*. Boston: Commonwealth of Massachusetts.

Dennerlein, J. T., O'Day, E. T., Mulloy, D. F., Somerville, J., Stoddard, A. M., Kenwood, C., ... & Hashimoto, D. (2017). Lifting and exertion injuries decrease after implementation of an integrated hospital-wide safe patient handling and mobilisation programme. *Occupational and Environmental Medicine*, 74(5), 336-343. <https://oem.bmj.com/content/oemed/74/5/336.full.pdf>

Dickinson, S., Taylor, S., & Anton, P. (2018). Integrating a standardized mobility program and safe patient handling. *Critical Care Nursing Quarterly*, 41(3), 240–252.

Elnitsky, C. A., Powell-Cope, G., Besterman-Dahan, K. L., Rugs, D., & Ullrich, P. M. (2015). Implementation of safe patient handling in the US Veterans health system: A qualitative study of internal facilitators' perceptions. *Worldviews on Evidence-Based Nursing*, 12(4), 208–216.

https://www.nursingcenter.com/ce_articleprint?an=00000446-201811000-00023

Enos, L., Francis, R., & Kumpar, D. (2019). Improving patient outcomes and organizational financial health: The safe patient handling and mobility connection. *American Nurse Today*, 14(11), 21-22

Enos, L., Monaghan, H., & Odum, M. (2019). International round table discussion: Safe patient handling & mobility: What is working, what needs to change, and where does the future lie? *International Journal of Safe Patient Handling & Mobility*, 9(3), 122–127.

Evanoff, B., Wolf, L., Aton, E., Canos, J., & Collins, J. (2003). Reduction in injury rates in nursing personnel through introduction of mechanical lifts in the workplace. *American Journal of Industrial Medicine*, 44, 451–457.

Fragala, G. (2016). Reducing occupational risk to ambulatory caregivers. *Workplace Health & Safety*, 64, 414–419.

Fragela, C., et al. (2016). Patient-handling injuries: Risk factors and risk-reduction strategies. *American Nurse Today*, 11(5), 40–43. <https://www.myamericannurse.com/wp-content/uploads/2016/05/Patient-Handling-Safety-426b.pdf>

Francis, R., & Dawson, J. M. (2016). Safe patient handling and mobility: The journey continues. *American Nurse Today*, 11(5), 38-39.

Fray, M., & Hignett, S. (2013). TROPHI: development of a tool to measure complex, multi-factorial patient handling interventions. *Ergonomics*, 56(8), 1280-1294.

Gallagher, S. M., & Dawson, J. M. (2016). Charting a path forward: Results and recommendations from ANA's SPHM environmental scan. *American Nurse Today*, 11(3), 18-20.

Garg, A., & Kapellusch, J. M. (2012). Long-term efficacy of an ergonomics program that includes patient-handling devices on reducing musculoskeletal injuries to nursing personnel. *Human factors*, 54(4), 608-625.

Gibson, K., Costa, B., & Sampson, A. (2017). Linking Worker Health and Safety with Patient Outcomes: A Systematic Review. *Institute for Safety, Compensation and Recovery Research*, 190.

Safe Patient Handling and Mobility – Section 10

https://research.iscrr.com.au/_data/assets/pdf_file/0006/1321719/Evidence-Review_Linking-worker-health-and-safety-with-patient-outcomes.pdf

Gusenius, T. M., Decker, M. M., & Weidemann, A. G. (2018). Using shared governance to achieve a culture change in safe patient handling. *International journal of orthopaedic and trauma nursing*, 31, 35-39.

Hallmark, B., Mechan, P., & Shores, L. (2015). Ergonomics: safe patient handling and mobility. *Nursing Clinics*, 50(1), 153-166.

Hegewald, J., Berge, W., Heinrich, P., Staudte, R., Freiberg, A., Scharfe, J., ... & Seidler, A. (2018). Do technical aids for patient handling prevent musculoskeletal complaints in health care workers? A systematic review of intervention studies. *International Journal of Environmental Research and Public Health*, 15(3), 476.

Hodgson, M., Matz, M. W., & Nelson, A. (2013). Patient handling in the Veterans Health Administration: Facilitating change in the health care industry. *Journal of Occupational and Environmental Medicine*, 55(10), 1230–1237.

Howard, N. (2016). Safe patient handling & mobility programs and policies: Short term vs long term evaluation. *American Journal of Safe Patient Handling & Movement*, 6(3), 130–131.

Jakobsen, M. D., Aust, B., Kines, P., Madeleine, P., & Andersen, L. L. (2019). Participatory organizational intervention for improved use of assistive devices in patient transfer. *Scandinavian Journal of Work, Environment & Health*, 45(2), 146-157.

Johnstone, J. (2020). Manual handling: the challenges of different care environments. *British Journal of Nursing*, 29(6), 358-363.

Jones, D. (2023). The impact on patient and provider safety with the use of safe patient handling technology. *International Journal of Safe Patient Handling & Mobility*, 13(4), 125-130.

Jones, D., & Eaferton, G. (2020). Reducing preventable injuries through the Safe Patient Handling and Mobility Program Bundle. *International Journal of Safe Patient Handling & Mobility*, 1(4), 134–138.

Kanaskie, M. L., & Snyder, C. (2018). Nurses and nursing assistants decision-making regarding use of safe patient handling and mobility technology: A qualitative study. *Applied Nursing Research*, 39, 141-147.

Kay, K., Glass, N., & Evans, A. (2014). It's not about the hoist: A narrative literature review of manual handling in healthcare. *Journal of research in nursing*, 19(3), 226-245.

Kayser, S. A., Wiggermann, N. E., & Kumpar, D. (2020). Factors associated with safe patient handling practice in acute care and its relationship with patient mobilization: A cross-sectional study. *International Journal of Nursing Studies*, 104, 103508.

Kayser, S., Wiggermann, N., Kumpar, D., & Hill-Rom, R. N. (2019, November). Prevalence of safe patient handling practice in US Acute care hospitals. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 63, No. 1, pp. 1073-1077). Sage CA: Los Angeles, CA: SAGE Publications

Kennedy, B., & Kopp, T. (2015). Safe patient handling protects employees too. *Nursing2022*, 45(8), 65-67.

King Jensen, M. (2023). Factors predicting sustainability using a multi-site safe patient handling program. *Int J SPHM*, 13(1), 14-21.

Kneafsey, R., Clifford, C., & Greenfield, S. (2015). Perceptions of hospital manual handling policy and impact on nursing team involvement in promoting patients' mobility. *Journal of clinical nursing*, 24(1-2), 289-299.

Knibbe, J. J., Knibbe, N. E., & Waaijer, E. (2012). Flying through the hospital: efficiency and safety of an ergonomic solution. *Work*, 41(Supplement 1), 5642-5643.

Safe Patient Handling and Mobility – Section 10

- Knibbe, H., & Knibbe, N. (2022). Time flies when you deliver care: An international inventory of promising, innovative routes towards more efficiency in health care. *International Journal of Safe Patient Handling & Mobility*, 12(4), 111–116.
- Knibbe, H., Morley, S., Moed, K., & Rich, A. (2025). Addressing the SPHM circle of life. *International Journal of Safe Patient Handling & Mobility*, 15(1), 6-9.
- Koppelaar, E., Knibbe, J. J., Miedema, H. S., & Burdorf, A. (2009). Determinants of implementation of primary preventive interventions on patient handling in healthcare: a systematic review. *Occupational and Environmental Medicine*, 66(6), 353-360.
- Koppelaar, E., Knibbe, J. J., Miedema, H. S., & Burdorf, A. (2011). Individual and organisational determinants of use of ergonomic devices in healthcare. *Occupational and Environmental Medicine*, 68(9), 659-665.
- Koppelaar, E., Knibbe, J. J., Miedema, H. S., & Burdorf, A. (2013). The influence of individual and organisational factors on nurses' behavior to use lifting devices in healthcare. *Applied Ergonomics*, 44(4), 532–537.
- Krill C, Raven C, Staffileno BA. (2012). Moving from a clinical question to research: the implementation of a safe patient handling program. *Medsurg Nurs*. 2012 Mar-Apr;21(2):104-6, 116. PMID: 22667003. <http://www.ncbi.nlm.nih.gov/pubmed/22667003>
- Krill, C., Staffileno, B. A., & Raven, C. (2012). Empowering staff nurses to use research to change practice for safe patient handling. *Nursing Outlook*, 60(3), 157–162.
- Kucera, K. L., Schoenfisch, A. L., McIlvaine, J., Becherer, L., James, T., Yeung, Y. L., ... & Lipscomb, H. J. (2019). Factors associated with lift equipment use during patient lifts and transfers by hospital nurses and nursing care assistants: A prospective observational cohort study. *International journal of nursing studies*, 91, 35-46.
- Kurowski, A. (2022). Using Participatory Ergonomics to Address Patient Handling Injuries in a Community Hospital. *CPH News and Views Issue* 73.
- Labreche, M. (2023). An interdisciplinary team approach for reducing injuries among patient transporters at a level 1 trauma center. *International Journal of Safe Patient Handling & Mobility*, 13(4), 115-124.
- Latha, S. S., Wilson, K., Davis, K. G., & Kotowski, S. E. (2019). Reality of safe patient handling policies and programs in hospitals across the United States. *International Journal of Safe Patient Handling*, 9(2), 69-76.
- Latvala, S. (2022). The problem with using SPHM programming as the singular interventional approach to addressing work related musculoskeletal disorders among nurses. *International Journal of Safe Patient Handling & Mobility*, 12(4), 120-123.
- Latvala, S. M., & Masterman, R. (2017). The development and implementation of a safe patient handling and mobility pilot program in acute care. *International Journal of Safe Patient Handling & Mobility*, 7(2), 57–63.
- Lee, C., Knight, S. W., Smith, S. L., Nagle, D. J., & DeVries, L. (2018). Safe patient handling and mobility: development and implementation of a large-scale education program. *Critical Care Nursing Quarterly*, 41(3), 253-263.
- Lee, S. J., & Lee, J. H. (2017). Safe patient handling behaviors and lift use among hospital nurses: A cross-sectional study. *International journal of nursing studies*, 74, 53-60.
- Lee, S. J., & Rempel, D. (2020). Comparison of lift use, perceptions, and musculoskeletal symptoms between ceiling lifts and floor-based lifts in patient handling. *Applied ergonomics*, 82, 102954.
- Li, J., Wolf, L., & Evanoff, B. (2004). Use of mechanical patient lifts decreased musculoskeletal symptoms and injuries among health care workers. *Injury Prevention*, 10, 212–216.

Safe Patient Handling and Mobility – Section 10

- Lin, F., Wang, A., & Cavuoto, L. (2017). Toward unobtrusive patient handling activity recognition for injury reduction among at-risk caregivers. *Journal of Biomedical and Health Informatics*, 21, 682–695.
- Lipscomb, H. J., Schoenfisch, A. L., Myers, D. J., Pompeii, L. A., & Dement, J. M. (2012). Evaluation of direct workers' compensation costs for musculoskeletal injuries surrounding interventions to reduce patient lifting. *Occupational and environmental medicine*, 69(5), 367-372.
- Macdonald, W., & Oakman, J. (2015). Requirements for more effective prevention of work-related musculoskeletal disorders. *BMC musculoskeletal disorders*, 16(1), 1-9.
- Marshall, L., Villeneuve, J., & Grenier, S. (2018). Effectiveness of a multifactorial ergonomic intervention and exercise conditioning kinesiology program for subsequent work-related musculoskeletal disorder prevention. *Work*, 61(1), 81-89.
- Martimo, K. P., Verbeek, J., Karppinen, J., Furlan, A. D., Takala, E., & Kuijer, P. P. (2008). Effect of training and lifting equipment for preventing back pain in lifting and handling: Systematic review. *BMJ*, 336(7641), 429–431.
- Martin, P. J., Harvey, J. T., Culvenor, J. F., & Payne, W. R. (2009). Effect of a nurse back injury prevention intervention on the rate of injury compensation claims. *Journal of safety research*, 40(1), 13-19.
- Mayeda-Letourneau, J. (2014). Safe patient handling and movement: A literature review. *Rehabilitation Nursing*, 39, 123–129.
- McCoskey, K. L. (2007). Ergonomics and patient handling. *Aaohn Journal*, 55(11), 454-462.
- McMillan, J., Moo, A., Newnam, S., & de Silva, A. (2018). Improvements in patient handling for worker and patient safety. WorkSafe Victoria (WSV), The Institute of Safety, Compensation and Recovery Research (ISCRR). https://www.iscrr.com.au/_data/assets/pdf_file/0004/1321771/Environmental-Scan-Improvements-in-patient-handling-for-worker-and-patient-safety.pdf
- Miller, L. J., Mahar, S., & Nicastro, B. (2022). Transforming safety at the bedside with safe patient handling practice. *International Journal of Safe Patient Handling & Mobility*, 12(1), 6–12.
- Nelson, A., & Baptiste, A. (2004). Evidence-Based practices for safe patient handling and movement. *Online Journal of Issues in Nursing*, 9(3), 4. <http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Volume92004/No3Sept04/EvidenceBasedPractices>
- Nelson, A., Matz, M., Chen, F., Siddharthan, K., Lloyd, J., & Fragala, G. (2006). Development and evaluation of a multifaceted ergonomics program to prevent injuries associated with patient handling tasks. *International Journal of Nursing Studies*, 43(6), 717–733. <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1058&context=veterans>
- Newkirk, E., & Allison, A. (2024). Decreasing nurse injuries: Outcomes of a safe patient handling and mobility program. *Clinical Nurse Specialist*, 38(4), 193-194.
- New York State Assembly Subcommittee on Workplace Safety. (2011). Safe patient handling in New York: Short term costs yield long term results. Retrieved from <http://assembly.state.ny.us/comm/WorkPlaceSafe/20110527a/index.pdf>
- Olinski, C., & Norton, C. E. (2017). Implementation of a safe patient handling program in a multihospital health system from inception to sustainability: Successes over 8 years and ongoing challenges. *Workplace Health & Safety*, 65(11), 546–559.
- Ollevier, A., Goderis, T., Schiettekatte, S., & Osstyn, S. (2021). The Eulift project: Towards an innovative app in safe patient handling. *International Journal of Safe Patient Handling & Mobility*, 11(4), 160–168.
- Owen, B. D., Keene, K., & Olson, S. (2002). An ergonomic approach to reducing back/shoulder stress in hospital nursing personnel: A five year follow up. *International Journal of Nursing Studies*, 39, 295–302.

Safe Patient Handling and Mobility – Section 10

- Padrutt, J. et al., (2024). Tornado triage: An escape room experience promoting leadership and team building for safe patient handling and mobility program. *International Journal of Safe Patient Handling & Mobility*, 14(2), 55-63.
- Park, S. (2015). *Investigating the Impacts of Barriers and Facilitators Affecting the Adoption of Lifting Devices in Health Care Facilities*. The Ohio State University.
- Poole Wilson, T., Davis, K. G., Kotowski, S. E., & Daraiseh, N. (2015). Quantification of patient and equipment handling for nurses through direct observation and subjective perceptions. *Advances in Nursing*, 2015.
- Powell-Cope, G., Toyinbo, P., Patel, N., Rugs, D., Elnitsky, C., Hahm, B., ... & Hodgson, M. (2014). Effects of a national safe patient handling program on nursing injury incidence rates. *Journal of Nursing Administration*, 44(10), 525–534.
- Przybycz, L., & Levin, P. F. (2017). Initial results of an evidence-based safe patient handling and mobility program to decrease hospital worker injuries. *Workplace Health & Safety*, 65(2), 83–88.
- Ratzon, N. Z., Bar-Niv, N. A., & Froom, P. (2016). The effect of a structured personalized ergonomic intervention program for hospital nurses with reported musculoskeletal pain: An assigned randomized control trial. *Work*, 54(2), 367-377.
- Richardson, A., Gurung, G., Derrett, S., & Harcombe, H. (2019). Perspectives on preventing musculoskeletal injuries in nurses: A qualitative study. *Nursing Open*, 6(3), 915-929.
- Richardson, A., McNoe, B., Derrett, S., & Harcombe, H. (2018). Interventions to prevent and reduce the impact of musculoskeletal injuries among nurses: A systematic review. *International Journal of Nursing Studies*, 82, 58–67.
- Richarz, H. U., Tamayo, A., Rahmig, J., Siepmann, T., & Barlinn, J. (2023). The impact of mechanical devices for lifting and transferring of patients on low back pain and musculoskeletal injuries in health care personnel—A systematic review and meta-analysis. *Journal of Occupational Health*, 65(1), e12423.
- Rockefeller, K. (2008). Using technology to promote safe patient handling and rehabilitation. *Rehabilitation Nursing*, 33(1), 5–11.
- Rogers, B., Buckheit, K., & Ostendorf, J. (2013). Ergonomics and nursing in hospital environments. *Workplace health & safety*, 61(10), 429-439.
- Roussel, N. A., Kos, D., Demeure, I., Heyrman, A., Clerck, M. D., Zinzen, E., ... & Nijs, J. (2015). Effect of a multidisciplinary program for the prevention of low back pain in hospital employees: a randomized controlled trial. *Journal of back and musculoskeletal rehabilitation*, 28(3), 539-549.
- Rugs, D., Toyinbo, P., Patel, N., Powell-Cope, G., Hahm, B., Elnitsky, C., ... & Sutton, B. (2013). Processes and outcomes of the Veterans Health Administration safe patient handling program: study protocol. *JMIR Research Protocols*, 2(2), e2905.
- Sabbath, E. L., Yang, J., Dennerlein, J. T., Boden, L. I., Hashimoto, D., & Sorensen, G. (2019). Paradoxical impact of a patient-handling intervention on injury rate disparity among hospital workers. *American Journal of Public Health*, 109(4), 618–625.
- Sampath, S. L., Wilson, K., Davis, K., & Kotowski, S. (2019). Reality of safe patient handling policies and programs in hospitals across the United States. *International Journal of Safe Patient Handling & Mobility*, 9(2), 69–76.
- Schoenfisch, A. L., Kucera, K. L., Lipscomb, H. J., McIlvaine, J., Becherer, L., James, T., & Avent, S. (2019). Use of assistive devices to lift, transfer, and reposition hospital patients. *Nursing Research*, 68(1), 3–12.
- Schoenfisch, A. L., Lipscomb, H. J., Pompeii, L. A., Myers, D. J., & Dement, J. M. (2013). Musculoskeletal injuries among hospital patient care staff before and after implementation of patient lift and transfer equipment. *Scandinavian Journal of Work, Environment & Health*, 39(1), 27–36.

Safe Patient Handling and Mobility – Section 10

Schoenfisch, A. L., Myers, D. J., Pompeii, L. A., & Lipscomb, H. J. (2011). Implementation and adoption of mechanical patient lift equipment in the hospital setting: The importance of organizational and cultural factors. *American Journal of Industrial Medicine*, 54(12), 946–954.

Sepehrian, R., Hashjin, A. A., & Farahmandnia, H. (2024). A systematic review of programs and interventions for reduction of sickness absence in nursing staff with work-related musculoskeletal disorders. *Journal of Education and Health Promotion*, 13(1), 205.

Siddharthan K, Nelson A, Tiesman H, Chen F. Cost Effectiveness of a Multifaceted Program for Safe Patient Handling. In: Henriksen K, Battles JB, Marks ES, Lewin DI, eds. *Advances in Patient Safety: From Research to Implementation (Volume 3: Implementation Issues)*. Rockville (MD): Agency for Healthcare Research and Quality (US); February 2005.

Stevens, L., Rees, S., Lamb, K. V., & Dalsing, D. (2013). Creating a culture of safety for safe patient handling. *Orthopaedic Nursing*, 32(3), 155–164.

Stevens, M. L., Boyle, E., Hartvigsen, J., Mansell, G., Sogaard, K., Jørgensen, M. B., ... & Rasmussen, C. D. (2019). Mechanisms for reducing low back pain: a mediation analysis of a multifaceted intervention in workers in elderly care. *International archives of occupational and environmental health*, 92, 49-58.

Swenson, S. L. (2020). 7 tips nurses should know about safe patient handling: Following this advice can help protect you and your patients. *American Nurse Journal*, 15(5), 68-71.

Tang, K., Diaz, J., Lui, O., Proulx, L., Galle, E., & Packham, T. (2020). Do active assist transfer devices improve transfer safety for patients and caregivers in hospital and community settings? A scoping review. *Disability and Rehabilitation: Assistive Technology*, 15(6), 614-624.

Teeple, E., Collins, J. E., Shrestha, S., Dennerlein, J. T., Losina, E., & Katz, J. N. (2017). Outcomes of safe patient handling and mobilization programs: A meta-analysis. *Work*, 58(2), 173–184.

Theis, J. L., & Finkelstein, M. J. (2014). Long-term effects of safe patient handling program on staff injuries. *Rehabilitation Nursing*, 39(1), 26–35.

Thomas, D. R., & Thomas, Y. L. (2014). Interventions to reduce injuries when transferring patients: A critical appraisal of reviews and a realist synthesis. *International Journal of Nursing Studies*, 51, 1381–1394.

Thornton, S. An Ergonomics Approach to Managing Transfers from Two Handed to Single Handed Care. Sarah Thornton MSc Thesis Ergonomics & Human Factors – Health & Community Care Loughborough University.

Todd, M., Key, M., Rice, M., & Salmon, M. (2014). Moving and handling issues in the delivery of chronic oedema management. *British Journal of Community Nursing*, 19(Sup10), S6-S12.

Totzkay, D. L. (2018). Multifactorial strategies for sustaining safe patient handling and mobility. *Critical Care Nursing Quarterly*, 41(3), 340–344.

Trešlová, M., Filausová, D., Šedová, L., & Hajduchová, H. (2020). Awareness of Patient Physical Handling Issues Associated with Routine Nursing Care. *Nursing Reports*, 10(2), 56-65.

Van Hoof, W., O'Sullivan, K., O'Keeffe, M., Verschueren, S., O'Sullivan, P., & Dankaerts, W. (2018). The efficacy of interventions for low back pain in nurses: A systematic review. *International Journal of Nursing Studies*, 77, 222–231.

Vendittelli, D., Penprase, B., & Pittiglio, L. (2016). Musculoskeletal injury prevention for new nurses. *Workplace Health & Safety*, 64, 573–585.

Vollman, K. M., & Bassett, R. (2014). Transforming the culture: the key to hardwiring early mobility and safe patient handling: culture change requires deliberate focus, staff education, and full engagement. *American Nurse Today*, 9(9), S7-S7.

Safe Patient Handling and Mobility – Section 10

Wählin, C., Stigmar, K., & Nilsing Strid, E. (2022). A systematic review of work interventions to promote safe patient handling and movement in the healthcare sector. *International Journal of Occupational Safety and Ergonomics*, 28(4), 2520-2532.

Wählin, C., Buck, S., Sandqvist, J., Enthoven, P., Fock, J., Andreassen, M., & Strid, E. N. (2023). Evaluation of the implementation and effectiveness of a multifactorial intervention strategy for safe patient handling and movement in the healthcare sector: a study protocol of a cluster randomised controlled trial. *BMJ open*, 13(2), e067693.

Walker, L., et al. (2017). Sharing the lessons: The 10-year journey of a safe patient movement program. *International Journal of Safe Patient Handling & Mobility*, 7(1), 20–28.

Waltrip, K. (2019). A survey of healthcare workers on safe patient handling and mobility resource availability, utilization, and adherence (Doctoral dissertation). Dissertations, 910.
<https://irl.umsl.edu/dissertation/910>

Wanless, S. (2017). Applying theories of health behavior and change to moving and handling practice. *International Journal of Safe Patient Handling & Mobility (Healthcare Training)*, 7(3), 105–109.

Weinel, D. (2008). Successful implementation of ceiling-mounted lift systems. *Rehabilitation Nursing*, 33(2), 63-66.

Wiggermann, N., Francis, R., & Solomon, A. (2024). Individual and organizational factors associated with injury history and patient handling behaviors: Results from a nationwide survey of healthcare workers. *Applied Ergonomics*, 118, 104251.

Wurzelbacher, S. J., Bertke, S. J., Lampl, M. P., Bushnell, P. T., Meyers, A. R., Robins, D. C., & Al-Tarawneh, I. S. (2014). The effectiveness of insurer-supported safety and health engineering controls in reducing workers' compensation claims and costs. *American Journal of Industrial Medicine*, 57, 1398–1412.

Yassi, A., Cooper, J. E., Tate, R. B., Gerlach, S., Muir, M., Trottier, J., et al. (2001). A randomized controlled trial to prevent patient lift and transfer injuries of health care workers. *Spine*, 26(16), 1739–1746.

Yeung, Y. (2015). Increase access to healthcare services with safe patient handling and mobility equipment. *American Journal of Safe Patient Handling & Mobility*, 5(4), 104–147.

Yoder et al. Outcomes of a safe patient handling program implementation. (2014). *American Journal SPHM*, 4(4):111-117.

Ziam, S., Laroche, E., Lakhal, S., Alderson, M., & Gagne, C. (2020). Application of MSD prevention practices by nursing staff working in healthcare settings. *International Journal of Industrial Ergonomics*, 77, 102959.

Business Case for SPHM

Also refer to SPHM Programs Outcomes

Anand, P., Kranker, K., & Chen, A. Y. (2019). Estimating the hospital costs of inpatient harms. *Health Services Research*, 54(1), 86-96.

Bohl, A. A., et al. (2022). The business case for a safe patient handling and mobility program. *Journal of Nursing Administration*, 52(1), 38-44

Celona, J. N., & Matz, M. (2014). Making the business case for a safe patient handling and mobility program. *American Nurse Today*, 9(9).

Collins, J. W., & Nelson, A. (2006). Safe lifting and movement of nursing home residents. DHHS (NIOSH) Publication No. 2006-117. Cincinnati, OH: National Institute for Occupational Safety and Health. Retrieved from <http://www.cdc.gov/niosh/docs/2006-117/>

Safe Patient Handling and Mobility – Section 10

- Dang, T., Roberts, D., Murray, A., & Wiggermann, N. (2022). A return-on-investment model using clinical and economic data related to safe patient handling and mobility programs in the ICU. *International Journal of Industrial Ergonomics*, 92, 103372.
<https://www.sciencedirect.com/science/article/pii/S0169814122001135>
- Enos, L. (2011). Making the business case to initiate, sustain and evaluate safe patient handling programs Part 1. *American Journal of Safe Patient Handling and Movement*, 1(3), 8-15.
- Enos, L. (2011). Making the business case to initiate, sustain and evaluate safe patient handling programs Part 2. *American Journal of Safe Patient Handling and Movement*, 1(4), 8-16.
- Enos, L., Francis, R., & Kumpar, D. (2019). Improving patient outcomes and organizational financial health: The safe patient handling and mobility connection. *American Nurse Today*, 14(11), 21-22.
- Fray, M., et al. (2015). Developing a worldwide method for cost benefit analysis for safe patient handling interventions, to be completed by safe patient handling practitioners. A pilot study. In *Proceedings of the 19th Triennial Congress of the IEA*. Melbourne, Australia. Retrieved from Loughborough University Institutional Repository: https://dspace.lboro.ac.uk/dspace-jspui/bitstream/2134/18949/3/IEA15_Fray_Costs_Survey_Final_April_2015.pdf
- Garg, A., & Kapellusch, J. M. (2012). Long-term efficacy of an ergonomics program that includes patient-handling devices on reducing musculoskeletal injuries to nursing personnel. *Human Factors*, 54(4), 608-625.
- Hallmark, B., Mechan, P., & Shores, L. (2015). Ergonomics safe patient handling and mobility. *Nursing Clinics of North America*, 50(1), 153-166.
- Hunter, B., Branson, M., & Davenport, D. (2010). Saving costs, saving health care providers' backs, and creating a safe patient environment. *Nursing Economics*, 28(2), 130-134.
- Ip, W., Gober, J., & Rostykus, W. (2016). Ergonomics return on investment: Show me the money. *Professional Safety*, 61(04), 48-52.
- Joliff, J. (2006). The miracle of lifting technology. *Nursing Homes*.
<https://www.thefreelibrary.com/The+miracle+of+lifting+technology%3A+retired+administrator+Joe+Joliff...-a0162791508>
- Jones V, Missar V, Zmyslowski K, Cregg H, Zhang K. Aon health care workers compensation barometer (GDM08049). Aon plc. 2018. <https://www.aon.com/risk-services/thought-leadership/report-2018-health-care-barometer.jsp>
- La Duke P. Going for broke: Building a business case for safety. OHS Professional. March 2020:14-7. <https://issuu.com/safetyinstitute/docs/ohspromarch2020final?fr=sZGE3NDk4NDY0Nw>
- Lidegaard, M., Olsen, K. B., Legg, S. J., & Douwes, J. (2019). The impact of national guidelines covering moving and handling of people on injury rates and related costs. *Scandinavian Journal of Work, Environment & Health*, 45(6), 631-641.
- Lipscomb, H. J., Schoenfisch, A. L., Myers, D. J., Pompeii, L. A., & Dement, J. M. (2012). Evaluation of direct workers' compensation costs for musculoskeletal injuries surrounding interventions to reduce patient lifting. *Occupational and Environmental Medicine*, 69(5), 367-372.
- Martin, P. J., Harvey, J. T., Culvenor, J. F., & Payne, W. R. (2009). Effect of a nurse back injury prevention intervention on the rate of injury compensation claims. *Journal of Safety Research*, 40(1), 13-19.
- Matz, M., et al. (2019). Patient handling and mobility assessments. *Facility Guidelines Institute, 2nd ed.*
https://www.fgiguideelines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf
- Miller, L. J., Mahar, S., & Nicastro, B. (2022). Transforming safety at the bedside with safe patient handling practice. *International Journal of Safe Patient Handling & Mobility & Falls Management*, 12(1), 6-12.

Safe Patient Handling and Mobility – Section 10

Occupational Safety and Health Administration. (2014). Safe patient handling programs: Effectiveness and cost savings (No. 3279). https://www.osha.gov/sites/default/files/3.5_SPH_effectiveness_508.pdf

Olinski, C., & Norton, C. E. (2017). Implementation of a safe patient handling program in a multihospital health system from inception to sustainability: successes over 8 years and ongoing challenges. *Workplace health & safety*, 65(11), 546-559.

Reid, C. R., Johnson, P. W., Marklin Jr, R. W., Seeley, P., Spielholz, P., & Goggins, R. (2017, September). Communicating the value of ergonomics to management—Part 2: Ergonomics ROI case study applications. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 61, No. 1, pp. 973-975). Sage CA: Los Angeles, CA: SAGE Publications.

Reid, C. R., McGowan, B., Williamson, C., Alexander, D., Whitehead, C., & Sobhani, A. (2017, September). Communicating the value of ergonomics to management—Part 1: Language, ROI, and models. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 61, No. 1, pp. 920-923). Sage CA: Los Angeles, CA: SAGE Publications.

Richardson, A., McNoe, B., Derrett, S., & Harcombe, H. (2018). Interventions to prevent and reduce the impact of musculoskeletal injuries among nurses: A systematic review. *International Journal of Nursing Studies*, 82, 58-67.

Richarz, H. U., Tamayo, A., Rahmig, J., Siepmann, T., & Barlinn, J. (2023). The impact of mechanical devices for lifting and transferring of patients on low back pain and musculoskeletal injuries in health care personnel—A systematic review and meta-analysis. *Journal of occupational health*, 65(1).

Ryan, T., Rice, V., Saunders, J., & Limbrick, S. (2018). Measuring the effectiveness of workplace health management programs: An Australian example. *Preventive Medicine Reports*, 11, 56-62.

Siddharthan, K., & Nelson, A. (2005). A business case for patient care ergonomic interventions. *Nursing Administration Quarterly*, 29(1), 63-71.

Siddharthan, K., Nelson, A., Tiesman, H., & Chen, F. (2006). Cost effectiveness of a multifaceted program for safe patient handling. *Advances in Patient Safety*, 3, 347-358.

Sousa, A. D., Baixinho, C. L., Presado, M. H., & Henriques, M. A. (2023). The effect of interventions on preventing musculoskeletal injuries related to nurses work: systematic review. *Journal of personalized medicine*, 13(2), 185

Spiegel, J., Yassi, A., Ronald, L. A., Tate, R. B., Hacking, P., & Colby, T. (2002). Implementing a resident lifting system in an extended care hospital: Demonstrating cost—benefit. *AAOHN Journal*, 50(3), 128-134.

Sultan-Taieb, H., Parent-Lamarche, A., Gaillard, A., Stock, S., Nicolakakis, N., Hong, Q. N., ... & Berthelette, D. (2017). Economic evaluations of ergonomic interventions preventing work-related musculoskeletal disorders: A systematic review of organizational-level interventions. *BMC Public Health*, 17(1), 1-13.

Tabbush, V., Pelton, L., Mate, K., & Duong, T. (2019). The business case for becoming an age-friendly health system. *Institute for Healthcare Improvement*.

Teeple, E., Collins, J. E., Shrestha, S., Dennerlein, J. T., Losina, E., & Katz, J. N. (2017). Outcomes of safe patient handling and mobilization programs: A meta-analysis. *Work*, 58(2), 173-184.

Thomas, D. R., Thomas, Y. L., Ashton, T., Wallaart, J., Armstrong, D., & McMahon, A. (2012). Assessing the costs and benefits of moving and handling programs. Wellington: ACC.

U.S. Government Accounting Office (GAO). (1997). Worker protection: Private sector ergonomics programs yield positive results. GAO/HEHS-97-163, p. 137. <https://www.gao.gov/products/hehs-97-163>

Vaughan, J., Driver, J., & Hall, E. (2021). A new model for successful safe patient handling programs. *Advances in Human Aspects of Healthcare*, 13(13).

Wiggermann, N., Hallbeck, S., James, T., Kumpar, D., Williamson, R., & Wolf, L. (2016). Preventing our caregivers from becoming patients: Challenges, successes, and trends faced by hospital risk managers

Safe Patient Handling and Mobility – Section 10

and ergonomists. In *Proceedings of the Human Factors and Ergonomics Society 2016 Annual Meeting* (pp. 965-969).

SPHM and Patient Safety

Also refer to SPHM and Early Mobility on page 10-72.

Clark, M., Phillips, L., & Knibbe, H. J. J. (2014). Lifting and transfer devices: a bridge between safe patient handling and pressure ulcer prevention. *Int J SPHM*, 5(1), 154-160.

Edger, M. (2017). Effect of a patient-repositioning device in an intensive care unit on hospital-acquired pressure injury occurrences and cost. *Journal of Wound, Ostomy and Continence Nursing*, 44(3), 236-240.

Enos, L. (2013). Safe patient handling and patient safety: Identifying the current evidence base and gaps in research. *American Journal of Safe Patient Handling and Movement*, 3(3), 94–102.

Enos, L. et al. Enhancing nursing care and patient outcomes. *American Nurse Today* Vol 14. Number 9.

Enos, L., & Hess, J. (2011). Implementing a sustainable safe patient/patient handling program: The Oregon Facility of Choice Program. Presentation at the Governor's Safety and Health Conference, Portland, Oregon.

Frampton, K., & Wells, C. (2023). Using evidence-based practice to reduce falls associated with toileting while promoting mobility. *International Journal of Safe Patient Handling & Mobility*, 13(3), 87-93.

Fray, M., Hignett, S., & Gyi, D. (2022). Impact of ultra-low height healthcare beds on falls and mobility: A systematic review. *International Journal of Safe Patient Handling & Mobility*, 12(1), 21-32.

Gibson, K., Costa, B., & Sampson, A. (2017). Linking worker health and safety with patient outcomes. WorkSafe Victoria (WSV). The Institute of Safety, Compensation and Recovery Research (ISCRR). http://www.iscrr.com.au/_data/assets/pdf_file/0006/1321719/Evidence-Review_Linking-worker-health-and-safety-with-patient-outcomes.pdf

Gucer, P. W., Gaitens, J., Oliver, J. M., & McDiarmid, M. A. (2013). Sit-stand mechanical lifts in long-term care and resident quality indicators. *Journal of Occupational and Environmental Medicine*, 55(1), 36–44.

Knibbe, H. J., & Knibbe, N. E. (2021). Prevention of pressure ulcers: exploring the influence of nurses, equipment and working techniques. *Advances in Human Aspects of Healthcare and Medicine*, 14.

Loeppke, R., Boldrighini, J., Bowe, J., Braun, B., Eggins, E., Eisenberg, B. S., ... & Kapp, E. A. (2017). Interaction of health care worker health and safety and patient health and safety in the US health care system: Recommendations from the 2016 summit. *Journal of Occupational and Environmental Medicine*, 59(8), 803–813. <https://acoem.org/Guidance-and-Position-Statements/Joint-Statements-Summit-Recommendations-Proceedings/Interaction-of-Health-Care-Worker-Health-and-Patient-Health-and-Safety-in-the-US-Health-Care-System>

McMillan, J., Moo, A., Newnam, S., & de Silva, A. (2018). Improvements in patient handling for worker and patient safety. WorkSafe Victoria (WSV). The Institute of Safety, Compensation and Recovery Research (ISCRR). https://www.iscrr.com.au/_data/assets/pdf_file/0004/1321771/Environmental-Scan_Improvements-in-patient-handling-for-worker-and-patient-safety.pdf

Nelson, A., Collins, J., Siddharthan, K., Matz, M., & Waters, T. (n.d.). The link between safe patient handling and patient outcomes in long-term care. *Rehabilitation Nursing*, 33(1), 33–43.

Spritzer, S. D., Riordan, K. C., Berry, J., Corbett, B. M., Gerke, J. K., Hoerth, M. T., ... & Noe, K. H. (2015). Fall prevention and bathroom safety in the epilepsy monitoring unit. *Epilepsy & Behavior*, 48, 75-78.

Safe Patient Handling and Mobility – Section 10

Strid, E. N., Wåhlin, C., Ros, A., & Kvarnström, S. (2021). Health care workers' experiences of workplace incidents that posed a risk of patient and worker injury: A critical incident technique analysis. *BMC Health Services Research*, 21(1), 1–12.

Way, H. (2016). Safe Patient Handling Initiative in Level I trauma center results in reduction of hospital-acquired pressure injury and fewer patient handling injuries. *American Journal of Safe Patient Handling & Movement*, 6(4), 160-165.

World Health Organization. (2020). Health worker safety: A priority for patient safety. <https://apps.who.int/iris/handle/10665/339287>

Zolot, J. (2017). Nurse perception of workplace safety affects patient care. *The American Journal of Nursing*, 117(2), 14.

SPHM Program Management and Foundation

Culture of Safety

Articles

Alrabae, Y. M. A., Aboshaiqah, A. E., & Tumala, R. B. (2021). The association between self-reported workload and perceptions of patient safety culture: A study of intensive care unit nurses. *Journal of Clinical Nursing*, 30(7-8), 1003-1017.

Black, J. M., Salsbury, S., & Vollman, K. M. (2018). Changing the perceptions of a culture of safety for the patient and the caregiver: Integrating improvement initiatives to create sustainable change. *Critical care nursing quarterly*, 41(3), 226-239.

Ellis, L. A., Falkland, E., Hibbert, P., Wiig, S., Ree, E., Schultz, T. J., ... & Braithwaite, J. (2023). Issues and complexities in safety culture assessment in healthcare. *Frontiers in Public Health*, 11, 1217542.

Jeong, G., & Kang, S. W. (2021). Exploring Nurses' Perceptions of Safety: A Phenomenological Study. *Advances in Nursing Science*, 44(2), E65-E76.

Kreitzer, M. J., Carter, K., Coffey, D. S., Goldblatt, E., Grus, C. L., Keskinocak, P., ... & Valachovic, R. W. (2019). Utilizing a systems and design thinking approach for improving well-being within health professions' education and health care. *Nam Perspectives*.

Loeppke, R., Boldrighini, J., Bowe, J., Braun, B., Eggins, E., Eisenberg, B. S., ... & Kapp, E. A. (2017). Interaction of health care worker health and safety and patient health and safety in the US health care system: Recommendations from the 2016 summit. *Journal of Occupational and Environmental Medicine*, 59(8), 803–813. <https://acoem.org/Guidance-and-Position-Statements/Joint-Statements-Summit-Recommendations-Proceedings/Interaction-of-Health-Care-Worker-Health-and-Patient-Health-and-Safety-in-the-US-Health-Care-System>

McGonagle, A. K., Essenmacher, L., Hamblin, L., Luborsky, M., Upfal, M., & Arnetz, J. (2016). Management commitment to safety, teamwork, and hospital worker injuries. *Journal of hospital administration*, 5(6), 46. <https://pmc.ncbi.nlm.nih.gov/articles/PMC5113017/pdf/nihms822672.pdf>

Murray J, Sorra J, Gale B, et al. Ensuring Patient and Workforce Safety Culture in Healthcare. PSNet [internet]. Rockville (MD): Agency for Healthcare Research and Quality, US Department of Health and Human Services. 2024. <https://psnet.ahrq.gov/perspective/ensuring-patient-and-workforce-safety-culture-healthcare>

Safe Patient Handling and Mobility – Section 10

Phillips J, Malliaris AP, Bakerjian D. (2021, April). Nursing and patient safety. AHRQ Primer. Nursing and Patient Safety. PSNet [internet]. Rockville (MD): Agency for Healthcare Research and Quality, US Department of Health and Human Services. <https://psnet.ahrq.gov/primer/nursing-and-patient-safety>

Sabbath, E. L., Pan, Y., McTernan, M. L., Peters, S. E., Lovett, S. M., Stelson, E. A., ... & Boden, L. I. (2024). Adding injury to insult: Unfair treatment at work and occupational injury among hospital patient-care workers. *American journal of industrial medicine*, 67(7), 667-676.

Swensen, S., Pugh, M., McMullan, C., & Kabcenell, A. (2013). High-impact leadership: Improve care, improve the health of populations, and reduce costs (White Paper). Cambridge, MA: Institute for Healthcare Improvement.

Schmidt, B. (August 10, 2014). Survey: Work-related injuries and their potential impact on quality patient care to be of great concern to nursing workforce. Patient Safety and Quality Healthcare. <https://www.psqh.com/news/survey-work-related-injuries-and-their-potential-impact-on-quality-patient-care-to-be-of-great-concern-to-nursing-workforce>

Healthcare Worker and Patient Safety - Resources

Agency for Healthcare Research and Quality (AHRQ) Surveys on Patient Safety Culture® (SOPS®) Workplace Safety Supplemental Items for hospitals
<https://www.ahrq.gov/sops/surveys/hospital/supplemental-items/workplace-safety.html>

Institute for Healthcare Improvement

National Action Plan to Advance Patient Safety <https://www.ihl.org/partner/initiatives/national-steering-committee-patient-safety/national-action-plan-advance-patient-safety>

- Declaration to Advance Patient Safety. (2022).
- Safer Together: A National Action Plan to Advance Patient Safety. (2020).
- Implementation Resource Guide: A National Action Plan to Advance Patient Safety. (2020).
- Self-Assessment Tool: A National Action Plan to Advance Patient Safety

Develop a Culture of Safety and other Safety Improvement Tools. Website with Multiple Resources. <http://www.ihl.org/resources/Pages/Changes/DevelopaCultureofSafety.aspx>

Leading a Culture of Safety: A Blueprint for Success. Boston: American College of Healthcare Executives and Institute for Healthcare Improvement; 2017.
<https://www.ihl.org/library/publications/leading-culture-safety-blueprint-success>

Perlo, J., Balik, B., Swensen, S., Kabcenell, A., Landsman, J., & Feeley, D. (2017). IHI framework for improving joy in work (White Paper). Institute for Healthcare Improvement.
<http://www.ihl.org/resources/Pages/IHIWhitePapers/Framework-Improving-Joy-in-Work.aspx>

“Psychological PPE”: Promote Health Care Workforce Mental Health and Well-Being
<https://www.ihl.org/Topics/Joy-In Work/Pages/default.aspx>

Through the Eyes of the Workforce: Creating Joy, Meaning, and Safer Health Care. The Lucian Leape Institute at the National Patient Safety Foundation Feb 2013.
<https://www.ihl.org/library/white-papers/ihl-framework-improving-joy-work>

Safe Patient Handling and Mobility – Section 10

Healthcare Worker and Patient Safety - Resources

Workforce Well-Being and Joy in Work. <https://www.ihl.org/library/topics/workforce-well-being-and-joy-work>

The Joint Commission (TJC). (2017). The Essential Role of Leadership in Developing a Safety Culture. Sentinel Event Alert, Issue 57, March 1, 2017. <https://www.jointcommission.org/en-us/knowledge-library/newsletters/sentinel-event-alert/issue-57f>

The Joint Commission (2024). High Reliability. <https://www.jcrinc.com/what-we-offer/high-reliability/>

National Institute for Occupational Safety and Health. Rogers B, Francis R, Dembski-Hart P, Hessels A, Hilton T, Casey M, Martin M. (2023). Safety Culture in Healthcare Settings. DHHS (NIOSH) Publication No. 2023-135, <https://www.cdc.gov/niosh/docs/2023-135/default.html>

World Health Organization (WHO) (2021). Towards eliminating avoidable harm in health care. Final draft Global Patient Safety Action Plan 2021-2030. <https://www.who.int/teams/integrated-health-services/patient-safety/policy/global-patient-safety-action-plan>

Paradiso, L., & Sweeney, N. (2019). Just Culture: It's more than Policy. Nursing Management (Springhouse): 50(6), 38-45.
https://journals.lww.com/nursingmanagement/Fulltext/2019/06000/Just_culture_It_s_more_than_policy.9.aspx

Rogers, B. Safety Culture and Health Care July 9, 2020 NIOSH Science Blog. <https://blogs.cdc.gov/niosh-science-blog/2020/07/09/hc-safety-culture/>

Schmidt B. Survey: Work-related Injuries and Their Potential Impact on Quality Patient Care to be of Great Concern to Nursing Workforce. Patient Safety and Quality Healthcare. August 10, 2014. <https://www.psgh.com/news/survey-work-related-injuries-and-their-potential-impact-on-quality-patient-care-to-be-of-great-concern-to-nursing-workforce>

Healthcare Worker Wellbeing (Selected)

- Aiken, L. H., Lasater, K. B., Sloane, D. M., Pogue, C. A., Rosenbaum, K. E. F., Muir, K. J., ... & US Clinician Wellbeing Study Consortium. (2023, July). Physician and nurse well-being and preferred interventions to address burnout in hospital practice: factors associated with turnover, outcomes, and patient safety. In *JAMA health forum* (Vol. 4, No. 7, pp. e231809-e231809). American Medical Association.
- The American Nurses Association. Health Nurse Healthy Nation Reports 2017-2024. <https://www.healthynursehealthynation.org/our-resources/annual-reports/>
- American Nurses Association (ND). Nurse Well-Being: Building Peer and Leadership Support <https://www.nursingworld.org/foundation/programs/nurse-wellbeing/>
- American Nurses Association (ND). Combating Stress <https://www.nursingworld.org/practice-policy/work-environment/health-safety/combating-stress/>

Healthcare Worker Wellbeing (Selected)

- American Hospital Association. (2023, July 21). Supporting the health care workforce: Lessons following the COVID-19 pandemic. Retrieved from <https://www.aha.org/system/files/media/file/2023/07/WorkforceWhitePaper.pdf>
- Baek, G., Cha, C., Lee, M., & Cho, A. (2024). Online mindfulness-based interventions for healthcare professionals: A scoping review. *Workplace Health & Safety*, 72(11), 460-482.
- Busis, N. A., Alexander, C. M., Castner, J., Singer, S., Smith, C. D., Bernstein, C. A., & Cipriano, P. (2025, April). A path to improved health care worker well-being: Lessons from the COVID-19 pandemic. A discussion paper. National Academy of Medicine. <https://nam.edu/perspectives/a-path-to-improved-health-care-worker-well-being-lessons-from-the-covid-19-pandemic/>
- Center for Health Design. Staff wellbeing toolbox (ND). <https://www.healthdesign.org/staff-wellbeing-toolbox>
- Harvard T.H. Chan School of Public Health Center for Work, Health, and Well-being (August 2017). Implementing an Integrated Approach Weaving Worker Health, Safety, and Well-being into the Fabric of Your Organization https://centerforworkhealth.sph.harvard.edu/sites/default/files/10.12.17_Guidelines_Screen_post.pdf
- Howard, J., & Houry, D. (2024). Protecting the mental health and well-being of the nation's health workforce. *American Journal of Public Health*, 114(S2), 137-141.
- International Labour Office (2012). Stress prevention at work checkpoints. PUT in Psycholo <https://www.ilo.org/media/358911/download>
- Kirch, D., Murthy, V., & Nasca, T. (2024). *National plan for health workforce well-being*. V. J. Dzau (Ed.). Washington, DC: National Academies Press.
- Li, L. Z., Yang, P., Singer, S. J., Pfeiffer, J., Mathur, M. B., & Shanafelt, T. (2024). Nurse burnout and patient safety, satisfaction, and quality of care: A systematic review and meta-analysis. *JAMA Network Open*, 7(11), e2443059. [
- National Institute for Occupational Safety and Health
 - Fundamentals of Total Worker Health® Approaches Essential Elements for Advancing Worker Safety, Health, and Well-Being. 2016. https://www.cdc.gov/niosh/docs/2017-112/pdfs/2017_112.pdf
 - Impact Wellbeing™ Guide 2024 <https://www.cdc.gov/niosh/docs/2024-109/default.html>
 - Talking About Burnout, Moral Injury, and Mental Health at Work: Tips for Healthcare Workers. Aug 2024. <https://www.cdc.gov/niosh/healthcare/impactwellbeing/talking.html>
 - Total Worker Health® Program <https://www.cdc.gov/niosh/twh/programs/index.html>
- National Academy of Medicine. (2022). National Plan for Health Workforce Well-Being. <http://nap.nationalacademies.org/26744> and
- Action Collaborative on Clinician Well-Being and Resilience <https://nam.edu/our-work/programs/clinician-resilience-and-well-being/>
- Office of the Surgeon General. (2022). Addressing Health Worker Burnout: The US Surgeon General's Advisory on Building a Thriving Health Workforce. www.surgeongeneral.gov/burnout

Safe Patient Handling and Mobility – Section 10

Healthcare Worker Wellbeing (Selected)

- Resiliency Toolkit. A Comprehensive Guide for Health Centers & Their Staff 2022 National Health Care for the Homeless Council (NHCHC) and STAR² Center are HRSA-funded National Training and Technical Assistance Partners (NTTAPs) <https://nhchc.org/wp-content/uploads/2023/01/Organizational-Leadership-and-Resiliency-Toolkit-2022-New.pdf>
- SafeCare BC. Series of videos related to self-care for health care workers. https://www.youtube.com/channel/UCoBtG_p7VryPSXYavGXxxHA/videos
- Stress First Aid for Health Care Workers (2020). Watson, P., & Westphal, R.J. National Center for PTSD. www.ptsd.va.gov
- U.S. Centers for Disease Control. (2023). Health Workers Face a Mental Health Crisis. Centers for Disease Control and Prevention (CDC) Vital Signs Updated October 24, 2023. <https://www.cdc.gov/vitalsigns/health-worker-mental-health/index.html><https://www.cdc.gov/vitalsigns/health-worker-mental-health/index.html>
- Yellowlees, P & Rea, M. (2022). Burnout A Primer. September 27, 2022. Agency for Healthcare Research and Quality: Rockville, MD, USA <https://psnet.ahrq.gov/primer/burnout>

Leadership and Occupational Safety in Healthcare

American Association of Colleges of Nursing (AACN). Developing Nurse Wellbeing and Leadership <https://www.aacnnursing.org/our-initiatives/well-being-resilience>

AWARE-NS Nova Scotia Health & Community Services Safety Association (2025). Leader safety playbook. <https://playbook.awarens.ca/>

Clifford, J., Scott, D., Kelly, S., & Hanover, C. (2024). Leader rounding for high reliability and improved patient safety. *Federal Practitioner*, 41(1), 16. <https://pmc.ncbi.nlm.nih.gov/articles/PMC11147447/pdf/fp-41-01-16.pdf>

Ford, E. W. (n.d.). The vital role of executive rounding in promoting a culture of safety in hospitals. <https://www.ache.org/blog/2024/the-vital-role-of-executive-rounding-in-promoting-a-culture-of-safety-in-hospitals>

Foster, M., & Mazur, L. (2023). Impact of leadership walkarounds on operational, cultural and clinical outcomes: A systematic review. *BMJ Open Quality*, 12(4), e002284.

McGonagle, A. K., Essenmacher, L., Hamblin, L., Luborsky, M., Upfal, M., & Arnetz, J. (2016). Management commitment to safety, teamwork, and hospital worker injuries. *Journal of hospital administration*, 5(6), 46

Martínez-Córcoles, M. (2018). High reliability leadership: A conceptual framework. *Journal of contingencies and crisis management*, 26(2), 237-246.

The Missouri Hospital Association (2025). High Reliability Organization Toolkit <https://www.mohospitals.org/how-we-help-hospitals/quality-care-and-patient-safety/process-improvement/hro-toolkit>

Patient Safety Leadership WalkRound IHI ND. <https://www.ihl.org/library/tools/patient-safety-leadership-walkrounds#:~:text=Senior%20leaders%20conduct%20weekly%20WalkRounds,WalkRounds%E2%84%A2%20in%20the%20organization>

Safe Patient Handling and Mobility – Section 10

- Registered Nurses' Association of Ontario. (2013). *Developing and sustaining nursing leadership* (2nd ed.). Toronto, ON: Registered Nurses' Association of Ontario. <https://rnao.ca/bpg/guidelines/developing-and-sustaining-nursing-leadership>
- Singer, S. J., & Tucker, A. L. (2014). The evolving literature on safety walkrounds: Emerging themes and practical messages. *BMJ Quality & Safety*, 23(10), 789–800.
- Sinsky, C. A., Biddison, L. D., Mallick, A., Dopp, A. L., Perlo, J., Lynn, L., & Smith, C. D. (2020). Organizational evidence-based and promising practices for improving clinician well-being. *NAM Perspectives*, 2020.
- Tawfik, D. S., Adair, K. C., Palassoff, S., Sexton, J. B., Levoy, E., Frankel, A., ... & Profit, J. (2023). Leadership behavior associations with domains of safety culture, engagement, and health care worker well-being. *The Joint Commission Journal on Quality and Patient Safety*, 49(3), 156-165.
- Vogus, T., Lee, M., & Mossburg, S. E. February 26, 2025. High Reliability Organization (HRO) Principles and Patient Safety. *High Reliability Organization (HRO) Principles and Patient Safety*. <https://psnet.ahrq.gov/perspective/high-reliability-organization-hro-principles-and-patient-safety>
- Wagner, A., Rieger, M. A., Manser, T., Sturm, H., Hardt, J., Martus, P., ... & WorkSafeMed Consortium Luntz E. Rieger MA Sturm H. Wagner A. Hammer A. Manser T. Martus P. Holderried M. (2019). Healthcare professionals' perspectives on working conditions, leadership, and safety climate: a cross-sectional study. *BMC health services research*, 19(1), 53.
- Weckman, A., McGaffigan, P., & Howell, K. (2025). A Leader's Guide to Transforming Care Delivery and Improving Nurse Well-Being. *Nurse Leader*, 23(2), 191-195.
- Ystaas, L. M. K., Nikitara, M., Ghobrial, S., Latzourakis, E., Polychronis, G., & Constantinou, C. S. (2023). The impact of transformational leadership in the nursing work environment and patients' outcomes: a systematic review. *Nursing Reports*, 13(3), 1271-1290.

Employee Engagement – Participatory Ergonomics

- Bohr, P. C., Evanoff, B. A., & Wolf, L. D. (1997). Implementing participatory ergonomics teams among health care workers. *American Journal of Industrial Medicine*, 32(3), 190-196.
- Buckle, P. (2021). Participatory ergonomics and preventing musculoskeletal disorders in the workplace. <https://osha.europa.eu/en/publications/participatory-ergonomics-and-preventing-musculoskeletal-disorders-workplace>
- Burgess-Limerick, R. (2018). Participatory ergonomics: Evidence and implementation lessons. *Applied ergonomics*, 68, 289-293.
- Davies, K., Weale, V., & Oakman, J. (2023). A participatory ergonomics intervention to re-design work and improve the musculoskeletal health of paramedics: protocol for a cluster randomised controlled trial. *BMC Musculoskeletal Disorders*, 24(1), 716.
- Elkefi, S., & Sabra, R. (2024). Use of Participatory Ergonomics to Ensure the Safety of Patients and Healthcare Workers in Cancer Care Settings; PECS Framework. In *Hospital Supply Chain: Challenges and Opportunities for Improving Healthcare* (pp. 359-377). Cham: Springer Nature Switzerland.
- Hansen, A. F., Hasle, P., Caroly, S., Reinhold, K., Järvis, M., Herrig, A. O., ... & Jensen Stochkendahl, M. (2024). Participatory ergonomics: What works for whom and why? A realist review. *Ergonomics*, 67(1), 13-33.
- Kurowski, A. (2022). Using Participatory Ergonomics to Address Patient Handling Injuries in a Community Hospital. *CPH News and Views Issue 73*.

Safe Patient Handling and Mobility – Section 10

- Punnett, L., Nobrega, S., Zhang, Y., Gore, R., Kurowski, A., & SHIFT Project Research Team. (2020). Safety and Health through Integrated, Facilitated Teams (SHIFT): stepped-wedge protocol for prospective, mixed-methods evaluation of the Healthy Workplace Participatory Program. *BMC Public Health*, 20, 1-14.
- Krishnanmoorthy, G., Rampal, S., Karuthan, S. R., Baharudin, F., & Krishna, R. (2025). Effectiveness of Participatory Ergonomic Interventions on Work-Related Musculoskeletal Disorders, Sick Absenteeism, and Work Performance Among Nurses: Systematic Review. *JMIR Human Factors*, 12(1), e68522.
- Elkefi, S., Sabra, R., Marie Hajjar, J., Idriss-Wheeler, D., & Aref, E. (2025). The role of participatory ergonomics in supporting the safety of healthcare workers; a systematic review. *Theoretical Issues in Ergonomics Science*, 26(3), 257-303.
- Punnett, L., Henning, R., Warren, N. D., & CPH-NEW Research Team. (n.d.). Participatory ergonomics as a model for integrated programs to prevent musculoskeletal disorders [to promote employee health]: Evolution of a program. PowerPoint Presentation. <https://hwc.public-health.uiowa.edu/wp-content/uploads/2016/01/TWHsymslides-Punnett.pdf>
- Rodrigues, V., & Rocha, R. (2023). Participatory ergonomics approaches to design and intervention in workspaces: A literature review. *Theoretical Issues in Ergonomics Science*, 24(4), 413-428.
- Sormunen, E., Mäenpää-Moilanen, E., Ylisassi, H., Turunen, J., Remes, J., Karppinen, J., & Martimo, K. P. (2022). Participatory ergonomics intervention to prevent work disability among workers with low back pain: a randomized clinical trial in workplace setting. *Journal of Occupational Rehabilitation*, 32(4), 731-742.
- Watts, B. (2025). *Ergonomics and Diversity, Equity, and Inclusion: Theory and Practice*. CRC Press.

Barriers and Facilitators to use of SPHM Technology

- Alamgir, H., Li, O. W., Yu, S., Gorman, E., Fast, C., & Kidd, C. (2009). Evaluation of ceiling lifts: transfer time, patient comfort and staff perceptions. *Injury*, 40(9), 987-992.
- Fray, M., Waterson, P., & Munro, C. (2015). Macro and micro ergonomic outcomes in healthcare: Unravelling the relationship between patient handling performance and safety climate. *IIE Transactions on Occupational Ergonomics and Human Factors*, 3(1), 58–71.
- Gusenius, T. M., Decker, M. M., & Weidemann, A. G. (2018). Using shared governance to achieve a culture change in safe patient handling. *International Journal of Orthopedic and Trauma Nursing*, 31, 35–39.
- Hignett, S. (2001). Embedding ergonomics in hospital culture: Top-down and bottom-up strategies. *Applied Ergonomics*, 32, 61–69.
- Humrickhouse, R., & Knibbe, H. J. (2016). The Importance of Safe Patient Handling to Create a Culture of Safety: An Evidential Review. *The Ergonomics Open Journal*, 9(1).
- Kanaskie, M. L., & Snyder, C. (2018). Nurses and nursing assistants' decision-making regarding use of safe patient handling and mobility technology: A qualitative study. *Applied Nursing Research*, 39, 141-147.
- Khairallah, G. M., Mowafi, H., Al-Hajj, S., Brackett, A., & Sakr, C. J. (2024). Barriers and facilitators for the use of patient lifts by healthcare workers: A scoping review. *International Journal of Environmental Research and Public Health*, 21(12), 1659.
- Koppelaar, E., Knibbe, J. J., Miedema, H. S., & Burdorf, A. (2011). Individual and organisational determinants of use of ergonomic devices in healthcare. *Occupational and Environmental Medicine*, 68(9), 659-665
- Kucera, K. L., Schoenfisch, A. L., McIlvaine, J., Becherer, L., James, T., Yeung, Y. L., ... & Lipscomb, H. J. (2019). Factors associated with lift equipment use during patient lifts and transfers by hospital nurses

Safe Patient Handling and Mobility – Section 10

and nursing care assistants: A prospective observational cohort study. *International journal of nursing studies*, 91, 35-46

Lee, S. J., & Lee, J. H. (2017). Safe patient handling behaviors and lift use among hospital nurses: A cross-sectional study. *International Journal of Nursing Studies*, 74, 53-60.

Lee, S. J., Faucett, J., Gillen, M., Krause, N., & Landry, L. (2010). Factors associated with safe patient handling behaviors among critical care nurses. *American Journal of Industrial Medicine*, 53(9), 886–897.

MacCulloch, P. A. (2023). *Investigating Hospital Safety Culture Characteristics Related to Nurse Patient Handling Policies and Practices. A Mixed Method Study* (Doctoral dissertation, University of Massachusetts Lowell).

Mechan, P. (2014). Challenging the myth that it takes too long to use safe patient handling and mobility technology: A task time investigation. *American Journal of Safe Patient Handling & Movement*, 4, 46–51.

Monaghan, H. M. (2020). The challenge of change: Why are staff resistant to using safe patient handling equipment? *International Journal of Safe Patient Handling & Mobility*, 10(1), 7–12.

Noble, N. L., & Sweeney, N. L. (2018). Barriers to the use of assistive devices in patient handling. *Workplace Health & Safety*, 66(1), 41-48.

Osborne, A. R., Connell, C., & Morphet, J. (2021). Investigating emergency nurses' beliefs and experiences with patient handling in the emergency department. *Australasian Emergency Care*, 24(1), 49-54.

OSHA (2013). Busting the Myths. https://www.osha.gov/sites/default/files/3.1_Mythbusters_508.pdf

Park, S. (2015). *Investigating the Impacts of Barriers and Facilitators Affecting the Adoption of Lifting Devices in Health Care Facilities*. The Ohio State University

Punnett, L., Nobrega, S., Zhang, Y., Rice, S., Gore, R., & Kurowski, A. (2020). Safety and health through integrated, facilitated teams (SHIFT): Stepped-wedge protocol for prospective, mixed-methods evaluation of the Healthy Workplace Participatory Program. *BMC Public Health*, 20(1), 1-14.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7526105/>

Rickett, B., Orbell, S., & Sheeran, P. (2006). Social-cognitive determinants of hoist usage among health care workers. *Journal of Occupational Health Psychology*, 11(2), 182.

Schoenfisch, A. L., Kucera, K. L., Lipscomb, H. J., McIlvaine, J., Becherer, L., James, T., & Avent, S. (2019). Use of assistive devices to lift, transfer, and reposition hospital patients. *Nursing Research*, 68(1), 3-12.

Schoenfisch, A. L., Myers, D. J., Pompeii, L. A., & Lipscomb, H. J. (2011). Implementation and adoption of mechanical patient lift equipment in the hospital setting: the importance of organizational and cultural factors. *American journal of industrial medicine*, 54(12), 946-954.

Schoenfisch, A. L., Myers, D. J., Pompeii, L. A., & Lipscomb, H. J. (2011). Implementation and adoption of

Swenson, S. L. (2020). 7 tips nurses should know about safe patient handling: Following this advice can help protect you and your patients. *American Nurse Journal*, 15(5), 68-71.

Totzkay, D. L. (2018). Multifactorial strategies for sustaining safe patient handling and mobility. *Critical Care Nursing Quarterly*, 41(3), 340-344.

Wiggermann, N., Francis, R., & Solomon, A. (2024). Individual and organizational factors associated with injury history and patient handling behaviors: Results from a nationwide survey of healthcare workers. *Applied Ergonomics*, 118, 104251.

Ziam, S., Lakhal, S., Laroche, E., Lane, J., Alderson, M., & Gagné, C. (2023). Musculoskeletal disorder (MSD) prevention practices by nurses working in health care settings: Facilitators and barriers to implementation. *Applied Ergonomics*, 106, 103895.

Safe Patient Handling and Mobility – Section 10

Underreporting of WMSDs

Galizzi M, Miesmaa P, Punnett L, Slatin C; Phase in Healthcare Research Team. Injured workers' underreporting in the health care industry: an analysis using quantitative, qualitative, and observational data. *Industrial Relations: A Journal of Economy and Society*. 2010; 49(1): 22-43.

Kyung, M., Lee, S. J., Dancu, C., & Hong, O. (2023). Underreporting of workers' injuries or illnesses and contributing factors: a systematic review. *BMC Public Health*, 23(1), 558.

Menzel NN. Underreporting of musculoskeletal disorders among health care workers: research needs. *AAOHN Journal*. 2008; 56(12): 487-494.

Siddharthan, K., Hodgson, M., Rosenberg, D., Haiduven, D., & Nelson, A. (2006). Under-reporting of work-related musculoskeletal disorders in the Veterans Administration. *International Journal of Health Care Quality Assurance*, 19(6), 463-476.

Program Management

Also refer to SPHM Programs Outcomes and Business Case for SPHM

Agency for Healthcare Research and Quality (2020). Section 4: Ways To Approach the Quality Improvement Process. Content last reviewed January 2020. <https://www.ahrq.gov/cahps/quality-improvement/improvement-guide/4-approach-qi-process/index.html>

Agency for Healthcare Research and Quality (2023), Team Steps® 3.0. <https://www.ahrq.gov/teamsteps-program/index.html>

AIHA. (2020, September 9). Best practice guide for leading health metrics in occupational health and safety programs. <https://www.aiha.org/best-practice-guide-for-leading-health-metrics-in-oehs-programs>

American College of Occupational and Environmental Medicine. (2021). Guide to a healthy and safe workplace. <https://acoem.org/acoem/media/Staff-Photos/Publications%20Images/CHAA-Guide-to-Healthy-Safe-Workplace-Rev-04-15-23.pdf>

American Library Association.(ND). Effective Committees: The Basics best practices in committee effectiveness. <https://www.ala.org/yalsa/aboutyalsa/yalsahandbook/effectivecommittees>

American Society for Health Care Engineering (ASHE) 2021. ASHE Chapter Handbook Chapter 6. The importance of effective committees. https://www.ashe.org/sites/default/files/ashe/06_committees.pdf

Bottino, B. (2024, November 24). Selling safety to leadership. *Safe and Health*. NSC pub. <https://www.safetyandhealthmagazine.com/articles/26187-selling-safety-to-leadership>

Boynton, T. (2023). Coding and applying injury claims data to implement and sustain effective safe patient handling and mobility solutions. *International Journal of Industrial Ergonomics*, 93, 103397.

Boynton, T. (2025). Coding, tracking and trending injury data to improve practice and safety for caregivers and their patients. *Archives of Physical Medicine and Rehabilitation*, 106(4), e20. 1145.

Brace, T., & Nusser, J. (2021, April). Guided brainstorming: A method for solving ergonomic issues. *Professional Safety PSJ*, 35-39.

Clausen, J., Gruber, C., (2023). How to partner with workers compensation insurance carriers to improve your safe patient handling program. *International Journal of Safe Patient Handling & Mobility*, 13(3), 94-97.

Dusin, J., Melanson, A., & Mische-Lawson, L. (2023). Evidence-based practice models and frameworks in the healthcare setting: A scoping review. *BMJ Open*, 13(5), e071188. <https://pubmed.ncbi.nlm.nih.gov/37217268/>

Safe Patient Handling and Mobility – Section 10

Endalamaw, A., Khatri, R. B., Mengistu, T. S., et al. (2024). A scoping review of continuous quality improvement in healthcare system: Conceptualization, models and tools, barriers and facilitators, and impact. *BMC Health Services Research*, 24, 487.

Enos, L., Hucknall, C., & McMahon, A. (2017). The Right To Refuse. International Round Table Discussion: *International Journal Of Safe Patient Handling & Mobility*, 7(2): 82-90

Falco, K., & Monaghan, H. M. (2018). Soft skills: The foundation for effective SPHM program leadership: A national survey. *International Journal of Safe Patient Handling & Mobility*, 8(2), 76–90.

Goh, Y. M., Love, P., & Dekker, S. (2014). Editorial for special issue – ‘Systems thinking in workplace safety and health’. *Accident Analysis & Prevention*, 68.

Health and Safety Executive UK. (2013). Managing for health and safety (HSG65). <https://www.hse.gov.uk/pubns/books/hsg65.htm>

Institute for Healthcare Improvement (IHI). (n.d.). <https://www.ihl.org/resources/tools/sbar-tool-situation-background-assessment-recommendation>

Institute for Healthcare Improvement / National Patient Safety Foundation. (2017). Optimizing a business case for safe health care: An integrated approach to safety and finance. Cambridge, MA: Institute for Healthcare Improvement. <http://www.ihl.org/resources/Pages/Tools/Business-Case-for-Safe-Health-Care.aspx>

Institute for Healthcare Improvement. (n.d.). Quality Improvement Essentials Toolkit. <https://www.ihl.org/resources/tools/quality-improvement-essentials-toolkit>

Kielich, R., Jaworski, T., Boynton, T., & Hopewell, N. (2025, June). Who handles the handling? A look at the need for a full-time dedicated Safe Patient Handling and Mobility Coordinator. *American Nurse Journal*. <https://www.myamericannurse.com/who-handles-the-handling/>

Latvala, S., Masterman, R., Rasul, R., & Dropkin, J. (2021). Effect of Safe Patient Handling and Mobility Coordinators on Work-Related Musculoskeletal Injuries, Proximal Mental Illness, and Patient Related Safety Events in New York State Intensive Care Unit Registered nurses in the Age of Covid-19: The Methods. *Int J of SPHM*, 11(1), 16-33.

Manuele, F. A. (2019). Systems/macro thinking: A primer. *Professional Safety*, January, 37–42.

Mendonca, K & Thorman, S. (2024). UC Berkley Guide to Managing Human Resources Team Building Toolkit. https://hr.berkeley.edu/sites/default/files/bpm_team_building_toolkit_6-5-2024.pdf

Minnesota Department of Health. (n.d.). Objectives and goals: Writing meaningful goals and SMART objectives. <https://www.health.state.mn.us/communities/practice/resources/phqitoolbox/objectives.html>

Minnesota OSHA Workplace Safety Consultation. (2017). Recommendations for successful safe-patient-handling committees. Best practices, suggested activities for skilled nursing care facilities. <http://www.dli.mn.gov/Wsc.asp>

Missar, V. (2014). Four tactics to tune up a safe patient mobility program. Aon White Paper, April 2014. <https://www.aon.com/attachments/risk-services/Techniques-for-Improving-a-Patient-or-Resident-%20Movement-Program.pdf>

Missar, V. J., Fray, M., Matz, M., Raphan, C., & Weaver, W. (2016). Safe patient handling and mobility claims coding: A pragmatic and functional approach. *American Society for Safe Patient Handling & Movement Professionals*. <https://asphp.org/wp-content/uploads/2017/01/Safe-Patient-Handling-and-Mobility-Claims-Coding-A-Pragmatic-and-Functional-Approach-V18-7.pdf>

Monaghan, H. M. (2022). The importance of effective leadership in implementing a successful safe patient handling and mobility program. *International Journal of Safe Patient Handling & Mobility*, 12(2), 47–51.

Safe Patient Handling and Mobility – Section 10

O'Donnell, B., & Gupta, V. (2023, April 3). Continuous Quality Improvement. In StatPearls (Internet). Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK559239/>

Occupational Safety and Health Administration.

Leading Indicators (2019). Pub 3970 <https://www.osha.gov/leading-indicators>

Business Case for Safety and Health <https://www.osha.gov/businesscase>

Recommended Practices for Safety and Health Programs – webpage with resources
<https://www.osha.gov/safety-management/additional-resources-by-topic>

Registered Nurses' Association of Ontario. (n.d.). Guide to implementation of best practice guidelines (2nd ed). https://rnao.ca/sites/rnao-ca/files/RNAO_ToolKit_2012_rev4_FA.pdf

Rostykus, W., & Mallon, J. (2017). Leading measures preventing MSD's and driving ergonomic improvements. Professional Safety, September, 37–42.

University of California . (n.d.). Smart Goals a How to Guide https://www.ucop.edu/local-human-resources/_files/performance-appraisal/How%20to%20write%20SMART%20Goals%20v2.pdf

University of Tennessee Health Science Center. (n.d.). Deming's 14 Points.
<https://www.uthsc.edu/its/business-productivity-solutions/lean-uthsc/deming.php>

UMass Lowell. Healthy Workplace Participatory Program

HWPP: A Total Worker Health® Program Toolkit [The Healthy Workplace Participatory Program](#)

HWPP Tools For Lean <https://www.uml.edu/research/cph-new/healthy-work-participatory-program/case-studies/hwpp-case-study-tools-for-lean.aspx>

Facilitation Skills Training Video Series. CPH-NEW's Total Worker Health (TWH) Facilitator Training Course. UMass Lowell. <https://www.uml.edu/research/cph-new/education-training/twh-facilitator/>

Wikström, E., Severin, J., Jonsdottir, I. H., & Akerstrom, M. (2022). Process facilitators shifting between the support and expert roles in a complex work environment intervention in the Swedish healthcare sector. *Journal of Health Organization and Management*, 36(9), 25-47.

Wright, L. R., Severson, L. A., & Homola, J. (2022). Round table discussion: The role of the insurance industry in providing a safe healthcare employee environment. *International Journal of Safe Patient Handling & Mobility (Sphm)*, 12(2), 53-59.

Managing Change

Bak, D., & Bak, S. (2024). Change management in healthcare—a scoping literature review.
<https://ruj.uj.edu.pl/items/6781cbe5-aa60-4ebd-9f09-020b4942a6a7>

Barrow, J. M., & Annamaraju, P. (2022, September 18). Change management in health care. In StatPearls (Treasure Island, FL: StatPearls Publishing). Available from;
<https://www.ncbi.nlm.nih.gov/books/NBK459380/>

Change management. Barrow JM, Annamaraju P. Change Management In Health Care. 2022 Sep 18. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. PMID: 29083813.
<https://pubmed.ncbi.nlm.nih.gov/29083813/>

Emerson, M. S. (2022, November 18). 7 reasons why change management strategies fail and how to avoid them. Professional and executive development, Harvard. Last updated February 24, 2025.
<https://professional.dce.harvard.edu/blog/7-reasons-why-change-management-strategies-fail-and-how-to-avoid-them/>

Safe Patient Handling and Mobility – Section 10

EvidenceNOW Tools for Change. Content last reviewed August 2024. Agency for Healthcare Research and Quality, Rockville, MD. <https://www.ahrq.gov/evidencenow/tools/index.html>

Gabutti, I., Colizzi, C., & Sanna, T. (2023). Assessing organizational readiness to change through a framework applied to hospitals. *Public Organization Review*, 23, 1–22.

Harrison, R., Fischer, S., Walpole, R. L., Chauhan, A., Babalola, T., Mears, S., & Le-Dao, H. (2021). Where do models for change management, improvement and implementation meet? A systematic review of the applications of change management models in healthcare. *Journal of Healthcare Leadership*, 13, 85–108.

Health Research & Educational Trust. (2016, March). Culture of Safety Change Package: 2016 Update. Chicago, IL: Health Research & Educational Trust.

https://www.gha.org/Portals/0/Documents/Initiatives/QualityPatientCare/HRETHEN_ChangePackage_CultureofSafety.pdf

Hilton K, Anderson A. IHI Psychology of Change Framework to Advance and Sustain Improvement. Boston: Institute for Healthcare Improvement; 2018. <https://www.ihl.org/>

Nilsen, P., & Bernhardsson, S. (2019). Context matters in implementation science: A scoping review of determinant frameworks that describe contextual determinants for implementation outcomes. *BMC Health Services Research*, 19(1), 1–21.

<https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-019-4015-3>

Nilsen, P., Seing, I., Ericsson, C., Birken, S. A., & Schildmeijer, K. (2020). Characteristics of successful changes in health care organizations: An interview study with physicians, registered nurses, and assistant nurses. *BMC Health Services Research*, 20, 1–8.

<https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-020-4999-8>

Pan American Health Organization & World Health Organization. (2022). Change Management in Public Health: Digital Transformation Toolkit Knowledge Tools. <https://iris.paho.org/handle/10665.2/56579>

Prosci. (2023). Best practices in change management: 12th edition executive summary.

<https://www.prosci.com/blog/change-management-best-practices>

Prosci. (n.d.). How to use a readiness assessment for change management.

<https://www.prosci.com/blog/when-should-you-use-a-change-management-readiness-assessment>

Radin Umar, R. Z., Sommerich, C. M., Lavender, S. A., Sanders, E., & Evans, K. D. (2018). Conceptual frameworks for the workplace change adoption process: Elements integration from decision making and learning cycle process. *Ergonomics*, 61(9), 1173–1186.

Registered Nurses Association of Ontario (RNAO) (2024). Leading change toolkit (4th ed.).

<https://rnao.ca/bpg/leading-change-toolkit>

Sarran, P., Clark, D., & Mendonca, K. (2011). Change Management Toolkit: Tips, tools, and techniques for leading a successful change initiative. *University of California Berkeley*.

https://hr.berkeley.edu/sites/default/files/change_management_toolkit.pdf

Scoville R, Little K, Rakover J, Luther K, Mate K. (2016). Sustaining Improvement. IHI White Paper.

Cambridge, Massachusetts: Institute for Healthcare Improvement <https://www.ihl.org/library/white-papers/sustaining-improvement>

Sujan, M., Bowie, P., Smyth, M., & Rashid, N. (2020). Achieving sustainable change: Capturing lessons from COVID-19. *Chartered Institute of Ergonomics and Human Factors*.

<https://ergonomics.org.uk/static/5c337ec8-67f1-48d6-80054ef876f66671/Achieving-Sustainable-Change.pdf>

Wanless, S. (2017). Applying theories of health behavior and change to moving and handling practice. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 7(3), 105-109.

Change management models often used in health care include: **(Refer to Toolkit Section 7)**

Safe Patient Handling and Mobility – Section 10

- Kotter's Change Management Model. www.Kotterinc.com
- McKinsey 7-S Change Management Model. https://en.wikipedia.org/wiki/McKinsey_7S_Framework
- ADKAR Change Management Model. www.Prosci.com
- Lewin's Change Management Model. [Navigating Change with Precision: Unpacking Lewin's Change Management Model](#). Majka, M. 2024
- Rogers' Diffusion of Innovation Theory https://en.wikipedia.org/wiki/Diffusion_of_innovations
- The Iowa Model of Evidence-Based Practice <https://uihc.org/iowa-model-revised-evidence-based-practice-promote-excellence-health-care>

Hazard Identification and Assessment

Risk Assessment

Also refer to Ergonomics Tools and General SPHM resources

Abedini, R., Choobineh, A. R., & Hasanzadeh, J. (2015). Patient manual handling risk assessment among hospital nurses. *Work*, 50, 669–675.

Battevi, N., & Menoni, O. (2012). Screening of risk from patient manual handling with MAPO method. *Work*, 41, 1920–1927.

Battevi, N., Menoni, O., Ricci, M. G., & Cairoli, S. (2006). MAPO index for risk assessment of patient handling in hospital wards. *Ergonomics*, 49(7), 671–687.

Buck, S., Sandqvist, J., Nilsing Strid, E., Knibbe, H. J., Enthoven, P., & Wåhlin, C. (2022). Translation and cross-cultural adaptation of the risk assessment instrument TilThermometer for a Swedish version – patient handling in the healthcare sector. *BMC Musculoskeletal Disorders*, 23(1), 531.

Callison, M. C., & Nussbaum, M. A. (2012). Identification of physically demanding patient-handling tasks in an acute care hospital. *International Journal of Industrial Ergonomics*, 42(3), 261–267.

Fray, M., & Hignett, S. (2013). TROPHI: Development of a tool to measure complex, multi-factorial patient handling interventions. *Ergonomics*, 56, 1280–1294.

Gattinger, H., Stolt, M., Hantikainen, V., Köpke, S., Senn, B., & Leino-Kilpi, H. (2015). A systematic review of observational instruments used to assess nurses' skills in patient mobilization. *Journal of Clinical Nursing*, 24, 640–661.

Grant, M. P., Okechukwu, C. A., Hopcia, K., Sorensen, G., & Dennerlein, J. T. (2018). An inspection tool and process to identify modifiable aspects of acute care hospital patient care units to prevent work-related musculoskeletal disorders. *Workplace Health & Safety*, 66(3), 144–158.

Hodder, J. N., Holmes, M. W., & Kier, P. J. (2010). Continuous assessment of work activities and posture in long term care nurses. *Ergonomics*, 53(9), 1097–1107.

Knibbe, H. J. J., Knibbe, N. E., & Heitink, D. E. B. L. (2016). Evaluating different methods of showering and washing patients: Assessing ergonomic, time, and quality aspects. *American Journal of Safe Patient Handling & Movement*, 6(2), 49–64.

Kurowski, A., Buchholz, B., ProCare Research Team, & Punnett, L. (2014). A physical workload index to evaluate a safe resident handling program for nursing home personnel. *Human factors*, 56(4), 669–683.

Safe Patient Handling and Mobility – Section 10

Lin, F., Song, C., Xu, X., Cavuoto, L., & Xu, W. (2017). Patient handling activity recognition through pressure-map manifold learning using a footwear sensor. *Smart Health*, 1, 77-92.

Occupational Health and Safety Administration (OSHA). (n.d.). Facility and patient needs assessment: Worker safety in hospitals. https://www.osha.gov/dsg/hospitals/needs_assessment.html

Poole Wilson, T., Davis, K. G., Kotowski, S. E., & Daraiseh, N. (2015). Quantification of patient and equipment handling for nurses through direct observation and subjective perceptions. *Advances in Nursing*.

Sorensen, G., Sparer, E., Williams, J. A., Gundersen, D., Boden, L. I., Dennerlein, J. T., & Pronk, N. P. (2018). Measuring best practices for workplace safety, health, and well-being: The Workplace Integrated Safety and Health Assessment. *Journal of Occupational and Environmental Medicine*, 60(5), 430-439.

The Center for Health Design. (2014, 2017). Safety Risk Assessment Toolkit: A process to mitigate risk [CHD Tools]. Retrieved from The Center for Health Design SRA website.

<https://www.healthdesign.org/sra>

Villarroya, A., Arezes, P., Díaz de Freijo, S., & Fraga, F. (2017). Validity and reliability of the HEMPA method for patient handling assessment. *Applied Ergonomics*, 65, 209–222.

Villarroya, A., Arezes, P., Díaz-Freijo, S., & Fraga, F. (2016). Comparison between five risk assessment methods of patient handling. *International Journal of Industrial Ergonomics*, 52, 100–108.

Wählin, C., Kvarnström, S., Öhrn, A., & Nilsing Strid, E. (2020). Patient and healthcare worker safety risks and injuries. Learning from incident reporting. *European Journal of Physiotherapy*, 22(1), 44-50.

White-Heisel R, Canfield JP, Young-Hughes S. Examining the Factor Structure and Reliability of the Safe Patient Handling Perception Scale: An Initial Validation Study. *Rehabil Nurs*. 2017; 42(3): 164-171.

Hazard Control and Prevention

Engineering Controls – SPHM Technology and Design of the Built Environment

Standards & Regulations

ANSI/AAMI HE75:2009 (R2018). Human factors engineering - Design of medical devices.

https://webstore.ansi.org/standards/aami/ansiaamihe752009r2018?srsId=AfmBOoqeJcQ7q1_xXtl6fA0eQaxMnGGyIA009m92SjG63Gy2B57fc73e

Centers for Medicare and Medicaid Services (CMS) Patient Lifts - Policy Article A52516. Original Effective Date 10/01/2015; Revision Effective Date 01/01/2020. <https://www.cms.gov/medicare-coverage-database/view/article.aspx?articleid=52516&ver=26&keyword=patient%20lifts&keywordType=stats&areald=all&docType=NCA,CAL,NCD,MEDCAC,TA,MCD,6,3,5,1,F,P&contractOption=all&sortBy=relevance&bc=1>

ISO 10535:2021 Assistive products — Hoists for the transfer of persons — Requirements and test methods. International Organization for Standardization, Geneva, Switzerland. (For purchase).

<https://www.iso.org/standard/32155.html>

ISO 14971:2019 - Medical devices - Application of risk management to medical devices (including powered patient lifts) and

ISO 20417:2021. Medical devices — Information to be supplied by the manufacturer. [ISO.org](https://www.iso.org)

Safe Patient Handling and Mobility – Section 10

Guidelines

American Association for Safe Patient Handling and Movement (April 2016). Healthcare Recipient Sling and Hanger Bar Compatibility Guidelines. <https://asphp.org/wp-content/uploads/2011/05/AASPHM-Sling-Hanger-Bar-Guidelines-2016.pdf>

Building Design

ADA National Network. Accessible Medical Diagnostic Equipment (2017). <https://adata.org/factsheet/accessible-medical-diagnostic-equipment>

ARJO Access and Design portal Architects and Planners. Space & design requirements for SPHM. <https://www.arjo.com/en-us/services-solutions/healthcare-solutions/architects-and-planners/>

Facility Guidelines Institute. (2022). Guidelines for design and construction of hospitals. Facility Guidelines Institute. <https://www.fgiguide.org/guidelines/editions/>

Health Quality Council of Alberta. Healthcare Facility Mock-up Evaluation Guidelines: Using Simulation to Optimize Return on Investment for Quality and Patient Safety. Calgary, Alberta, Canada: Health Quality Council of Alberta; October 2020. <https://hqa.ca/wp-content/uploads/2021/11/Healthcare-facility-mock-up-evaluation-guidelines-FINAL.pdf>

Interior Health BC (2020). Staff Safety Guidelines For Interior Health Facility Design Projects Created November 24, 2017 Revised March 6, 2020. <https://www.interiorhealth.ca/sites/default/files/PDFS/staff-safety-guidelines-for-healthcare-facility-design-projects.pdf>

Living better in the built environment. Make sure the environment of care is both safe and comfortable for patients, visitors, and staff. (2015). Mills, G. Joint Commission Perspectives, 35(9), 9–11.

Matz M, Celona J, Martin M, McCoskey K, Nelson GG. (2019). Patient Handling and Mobility Assessments (PHAMA) (2nd ed.) Facility Guidelines Institute. https://www.fgiguide.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf

The Center for Health Design. (2014, 2017). Safety Risk Assessment Toolkit: A process to mitigate risk [CHD Tools]. Retrieved from The Center for Health Design SRA website. <https://www.healthdesign.org/sra>

U.S. Dept of Justice Civil Rights Division. Access to Medical Care for Individuals with Mobility Disabilities. Last updated: June 26, 2020. <https://www.ada.gov/resources/medical-care-mobility/>

U.S. Dept of Justice Civil Rights Division. Department of Health and Human Services Office for Civil Rights (HHS OCR), 2010. Americans With Disabilities (ADA) Access to Medical Care for Individuals With Mobility Disabilities—Use of SPH Equipment in Clinics. <https://www.hhs.gov/sites/default/files/ocr/civilrights/understanding/disability/adamobilityimpairmentsguidance.pdf>

US Access Board (ND). Guide to the ADA Accessibility Standards. <https://www.access-board.gov/ada/guides/>

US dept of Veterans Affairs Safe Patient Handling and Mobility (SPHM) - various guidance related to design and construction. **Also refer to page 10-6.** <http://www.publichealth.va.gov/employeehealth/patient-handling/index.asp>

Welcome to the Accessibility Online Webinar Series. Archived and Live webinars related to ADA standards and design requirements. <https://www.accessibilityonline.org/ao/>

WorkSafe Victoria (2007). A guide to designing workplaces for safer handling of people for health, aged care, rehabilitation and disability facilities (3rd ed.). <https://www.worksafe.vic.gov.au/resources/guide-designing-workplaces-safer-handling-people>

US Food and Drug Administration (FDA) -Regulations & Resources Related to SPHM Technology

- **CFR - Code of Federal Regulations Title 21.** Food and Drug Administration.
<https://www.ecfr.gov/current/title-21>
 - PART 880—GENERAL HOSPITAL AND PERSONAL USE DEVICES
<https://www.ecfr.gov/current/title-21/chapter-I/subchapter-H/part-880>
 - 880.5510 Non-AC-powered patient lift. <https://www.ecfr.gov/current/title-21/chapter-I/subchapter-H/part-880/subpart-F/section-880.5510>
 - § 880.5500 AC-powered patient lift. <https://www.ecfr.gov/current/title-21/chapter-I/subchapter-H/part-880/subpart-F/section-880.5500>
- **Manufacturer and User Facility Device Experience** or MAUDE data represents reports of adverse events involving medical devices.
<http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/textsearch.cfm>
- **Medical Product Safety Network** adverse event reporting program designed to promote reporting of medical device issues by healthcare organizations. Searchable data base provided. MedSun: U.S. Food & Drug Administration (FDA).
<https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/Medsun/searchreport.cfm>
- **Recalls, Market Withdrawals, & Safety Alerts.** <http://www.fda.gov/Safety/Recalls/default.htm>
- **Medical Device Recalls database**
<https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfRES/res.cfm>
- **Learn if a Medical Device Has Been Cleared by FDA for Marketing – good explanation of Classes of devices and process to market.**<https://www.fda.gov/medicaldevices/resourcesforyou/consumers/ucm142523.htm>
- **TPLC - Total Product Life Cycle**
<https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfTPLC/tplc.cfm>

The Total Product Life Cycle (TPLC) database integrates premarket and postmarket data about medical devices. It includes information pulled from CDRH databases including Premarket Approvals (PMA), Premarket Notifications (510[k]), Adverse Events, and Recalls. You can search the TPLC database by device name or procode to receive a full report about a particular product line. **Search parameters:** lift, patient, Non-AC-Powered Patient Lift since 2015.
https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfTPLC/tplc.cfm?id=FSA&min_report_year=2015
- **General Hospital Devices and Supplies – Patient Lifts.** <https://www.fda.gov/medical-devices/general-hospital-devices-and-supplies/patient-lifts>
- **Patient Lifts Safety Guide (PDF).** <http://www.fda.gov/downloads/MedicalDevices/ProductsandMedicalProcedures/HomeHealthandConsumer/HomeUseDevices/UCM386178.pdf>
- **Recognized Consensus Standards. Food and Drug Administration.**
https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfStandards/detail.cfm?standard_identification_no=31767
- **Human Factors and Medical Devices** - An overview <https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/human-factors-and-medical-devices>

US Food and Drug Administration (FDA) -Regulations & Resources Related to SPHM Technology

- **Human Factors and Medical Devices . Information for Health Care Professional, Manufacturers and Consumers.** Human Factors: Information for Consumers, Patients, and Caregivers <https://www.fda.gov/medical-devices/human-factors-and-medical-devices/human-factors-information-consumers-patients-and-caregivers>
- **Applying Human Factors and Usability Engineering to Medical Devices.** Guidance for Industry and Food and Drug Administration Staff. Issued 2016 <https://www.fda.gov/media/80481/download>

SPHM Technology - General

Abdul Halim, N. S. S., Ripin, Z. M., & Ridzwan, M. I. Z. (2022). Effects of patient transfer devices on the risk of work-related musculoskeletal disorders: a systematic review. *International Journal of Occupational Safety and Ergonomics*, 1-21.

Aslam, I., Davis, S. A., Feldman, S. R., & Martin, W. E. (2015). A review of patient lifting interventions to reduce health care worker injuries. *Workplace health & safety*, 63(6), 267-275.

Bitkina, O. V., Kim, H. K., & Park, J. (2020). Usability and user experience of medical devices: An overview of the current state, analysis methodologies, and future challenges. *International Journal of Industrial Ergonomics*, 76, 102932.

Callihan, M. L., Eyer, J. C., McCoy, C. J., Dailey, A. M., Diket, K. M., Robinson, A. T., & Kaylor, S. (2021). Development and feasibility testing of a contextual patient movement intervention. *Journal of Emergency Nursing*, 47(1), 101-112.

Crockett, S., Dellon, E. S., Biggers, L., & Ernst, D. A. (2021). Use of Patient Abdominal Compression Device Reduces Staff Musculoskeletal Pain Associated With Supporting Colonoscopy: Results From a Randomized Controlled Trial. *Gastroenterology Nursing*, 44(2), 136.

Crossley, B. (2014). Heavy lifting: What to do when patient lifts aren't up to the task. *Biomedical Instrumentation & Technology*, 48, 300–301.

Curran, J., & Fray, M. (2019). An efficiency evaluation of different hoisting devices to complete three frequent patient transfers. In *Health and Social Care Systems of the Future: Demographic*

Davis, D., Jensen, A. D., & Kuzma, T.(2017). Safe Patient Handling & Mobility Technology. International round table discussion: *International Journal of Safe Patient Handling & Mobility (SPHM)*, 7(4), 152–157.

de Ruiter, H. P., & Liaschenko, J. (2011). To lift or not to lift: patient-handling practices. *AAOHN Journal*, 59(8), 337-343.

Elnitsky, C. A., Lind, J. D., Rugs, D., & Powell-Cope, G. (2014). Implications for patient safety in the use of safe patient handling equipment: A national survey. *International Journal of Nursing Studies*, 51(12), 1624-1633.

Emergency Nurses Association (2016). Avoiding the Log Roll Maneuver: Alternative Methods for Safe Patient Handling. <https://enau.ena.org/>

Fetzer, S. J. (2020). Application of a positioning wedge during colonoscopy of obese patients to mitigate nurse pain. *Workplace Health & Safety*, 68(7), 320-324.

Safe Patient Handling and Mobility – Section 10

- Fragala, G., & Fragala, M. (2013). Repositioning Patients in Chairs—An Improved Method. *Workplace Health & Safety*, 61(4), 141-144.
- Fragala, G., & Fragala, M. (2013). Repositioning patients in chairs: An improved method. *Workplace Health & Safety*, 61, 141–144.
- Fragala, G., & Fragala, M. (2014). Improving the safety of patient turning and repositioning tasks for caregivers. *Workplace Health & Safety*, 62, 268–273.
- Freiberg, A., Euler, U., Girbig, M., Nienhaus, A., Freitag, S., & Seidler, A. (2016). Does the use of small aids during patient handling activities lead to a decreased occurrence of musculoskeletal complaints and diseases? A systematic review. *International archives of occupational and environmental health*, 89, 547-559.
- Garg, A., & Kapellusch, J. M. (2012). Long-term efficacy of an ergonomics program that includes patient-handling devices on reducing musculoskeletal injuries to nursing personnel. *Human factors*, 54(4), 608-625.
- Hegewald, J., Berge, W., Heinrich, P., Staudte, R., Freiberg, A., Scharfe, J., ... & Seidler, A. (2018). Do technical aids for patient handling prevent musculoskeletal complaints in health care workers?—A systematic review of intervention studies. *International journal of environmental research and public health*, 15(3), 476.
- Hu, C. T., DiPaola, C. P., Conrad, B. P., Horodyski, M., Del Rossi, G., & Rechline, G. R. (2013). Motion is reduced in the unstable spine with the use of mechanical devices for bed transfers. *The Journal of Spinal Cord Medicine*, 36(1), 58-65.
- Humphreys, H. C., Choi, Y. M., & Book, W. J. (2023). Advanced patient transfer assist device with intuitive interaction control. *Assistive Technology*.
- Hwang, J., Kuppam, V. A., Chodraju, S. S. R., Chen, J., & Kim, J. H. (2018, September). Evaluation of Different Patient Transfer Devices in Reducing Biomechanical Exposures among Professional Caregivers. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 62, No. 1, pp. 933-937). Sage CA: Los Angeles, CA: SAGE Publications.
- Hwang, J., Ari, H., Matoo, M., Chen, J., & Kim, J. H. (2019, November). Effects of patient turning devices on muscular demands of caregivers. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 63, No. 1, pp. 1069-1072). Sage CA: Los Angeles, CA: SAGE Publications.
- Iwakiri, K., Sotoyama, M., & Takahashi, M. (2021). Evaluation of lifting and lowering velocities while using a patient lift for transfer during nursing care. *International Journal of Industrial Ergonomics*, 86, 103194.
- Jäger, M., Jordan, C., Theilmeier, A., Wortmann, N., Kuhn, S., Nienhaus, A., & Luttmann, A. (2013). Lumbar-load analysis of manual patient-handling activities for biomechanical overload prevention among healthcare workers. *Annals of occupational hygiene*, 57(4), 528-544.
- Jakobsen, M. D., Aust, B., Dyreborg, J., Kines, P., Illum, M. B., & Andersen, L. L. (2016). Participatory organizational intervention for improved use of assistive devices for patient transfer: study protocol for a single-blinded cluster randomized controlled trial. *BMC Musculoskeletal Disorders*, 17(1), 1-11.
- Kay, K., Glass, N., & Evans, A. (2014). It's not about the hoist: A narrative literature review of manual handling in healthcare. *Journal of research in nursing*, 19(3), 226-245.
- Koppelaar E, Knibbe HJ, Miedema HS, Burdorf A. The influence of ergonomic devices on mechanical load during patient handling activities in nursing homes. *Ann Occup Hyg* 2012; 56(6): 708-18.
- Lee, S. J., & Lee, J. H. (2017). Safe patient handling behaviors and lift use among hospital nurses: A cross-sectional study. *International journal of nursing studies*, 74, 53-60.
- Li, J., Wolf, L., & Evanoff, B. (2004). Use of mechanical patient lifts decreased musculoskeletal symptoms and injuries among health care workers. *Injury Prevention*, 10, 212–216.

Safe Patient Handling and Mobility – Section 10

Mechan P, and Wright LR. A history of safe patient handling and mobility technology *Am J SPHM*. 2015;5(3):87-103,106-107.

Monaghan, H.M. (2011). Safe Patient Handling Equipment Challenges in Inpatient Psychiatric Units: Design Recommendations and Potential Solutions.

http://www.visn8.va.gov/PatientSafetyCenter/fallsteam/Psychiatry_EquipmentRedesign.pdf

Infrastructure design: a critical element in the care of the patient with obesity. (2021). Ortiz, V. E., Ottolino, R. J., Matz, M. W., Uppot, R. N., & Winters, B. (2021) *Journal of Patient Safety*, 17(8), e1522-e1529.

Perez, A. (2023). Safe patient handling and movement: Equipment safety. *International Journal of Safe Patient Handling & Mobility*, 13(2), 41-55.

Pellino, T. A., Owen, B., Knapp, L., & Noack, J. (2006). The evaluation of mechanical devices for lateral transfers on perceived exertion and patient comfort. *Orthopaedic Nursing*, 25(1), 4-10.

Pay, N. A., Sommerich, C. M., & Lavender, S. A. (2021). Assessment of alternative methods for informal caregivers to perform patient repositioning tasks. *Applied Ergonomics*, 93, 103360.

Rugs, D., Elnitsky, C., Lind, J., & Powell-Cope, G. (2012). Mitigating adverse events with patient handling equipment: A photo-narrative project. *American Journal of Safe Patient Handling. Mov.*, 2(4), 112–118.

Salmani Nodooshan, H., Choobineh, A., Razeghi, M., & Shahnazar Nezhad Khales, T. (2017). Designing, prototype making and evaluating a mechanical aid device for patient transfer between bed and stretcher. *International Journal of Occupational Safety and Ergonomics*, 23(4), 491-500.

Schoenfisch, A. L., Kucera, K. L., Lipscomb, H. J., McIlvaine, J., Becherer, L., James, T., & Avent, S. (2019). Use of assistive devices to lift, transfer, and reposition hospital patients. *Nursing Research*, 68(1), 3-12.

Silvia, C. E., Boswick, D. S., Lillquist, D., Wallace, D., & Perkins, M. S. (2002). An ergonomic comparison between mechanical and manual patient transfer techniques. *Work*, 19(1), 19-34.

Sivakanthan, S., Blaauw, E., Greenhalgh, M., Koontz, A. M., Vegter, R., & Cooper, R. A. (2021). Person transfer assist systems: a literature review. *Disability and Rehabilitation: Assistive Technology*, 16(3), 270-279.

Smith, A. J., & Loder, M. (2019). Safe patient handling: How many people do you need to safely lateral transfer patients?. *Global Journal on Quality and Safety in Healthcare*, 2(2), 40-45.

Smith, S. R., Gibbs, R. L., Rosen, B. S., & Lee, J. T. (2015). The critical lift zone: recognizing the need for safe patient handling equipment across the broader spectrum of patient weights. *Int J SPHM*, 5(3), 108-116.

Taghi Mojeni, M., Najafi, S. A., & Nomali, M. (2015). Introducing a new technique for limb prepping in orthopedic surgeries: designing, construction, and evaluation of limb-lifting assistive device. *Workplace Health & Safety*, 63(5), 196-199.

Tang, K., Diaz, J., Lui, O., Proulx, L., Galle, E., & Packham, T. (2020). Do active assist transfer devices improve transfer safety for patients and caregivers in hospital and community settings? A scoping review. *Disability and Rehabilitation: Assistive Technology*, 15(6), 614-624.

Theou, O., Soon, Z., Filek, S., Brims, M., Leach-MacLeod, K., Binsted, G., & Jakobi, J. (2011). Changing the sheets: a new system to reduce strain during patient repositioning. *Nursing research*, 60(5), 302-308.

Thomas, D. R., & Thomas, Y. L. N. (2014). Interventions to reduce injuries when transferring patients: a critical appraisal of reviews and a realist synthesis. *International journal of nursing studies*, 51(10), 1381-1394.

Vinstrup, J., Jakobsen, M. D., Madeleine, P., & Andersen, L. L. (2020). Biomechanical load during patient transfer with assistive devices: Cross-sectional study. *Ergonomics*, 63(9), 1164-1174.

Safe Patient Handling and Mobility – Section 10

Wanless, S., & Wanless, S. G. (2015). Hoisting a patient: Principles for safer practice. *International Journal of Therapy and Rehabilitation*, 22(8), 390-395.

Waters, T. R., Collins, J., & Castillo, D. (2011). NIOSH Assessment of Risks for 16- and 17-Year Old Workers Using Power-Driven Patient Lift Devices Enclosure, I. National Institute for Occupational Safety and Health (NIOSH). https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/NIOSH_Patientlifts.pdf

Weiner, C., Alperovitch-Najenson, D., Ribak, J., & Kalichman, L. (2015). Prevention of nurses' work-related musculoskeletal disorders resulting from repositioning patients in bed. *Workplace Health & Safety*, 63, 226–232.

Weiner, C., Kalichman, L., Ribak, J., & Alperovitch-Najenson, D. (2017). Repositioning a passive patient in bed: Choosing an ergonomically advantageous assistive device. *Applied ergonomics*, 60, 22-29.

Yuk, S., Hong, B., Song, J., Hwang, I., Cha, G., & Lee, S. (2020). A Study on the Force and Center of Gravity of the Transfer-Lift for the Human Stability of Spine Patients. *International Journal of Mechanical Engineering and Robotics Research*, 612, 617.

Wiggermann, N. (2016). Biomechanical evaluation of a bed feature to assist in turning and laterally repositioning patients. *Human factors*, 58(5), 748-757.

Overhead/Ceiling Lifts

Alamgir, H., Li, O. W., Gorman, E., Fast, C., Yu, S., & Kidd, C. (2009). Evaluation of ceiling lifts in health care settings: patient outcome and perceptions. *AAOHN Journal*, 57(9), 374-380.

Alamgir, H., Yu, S., Fast, C., Hennessy, S., Kidd, C., & Yassi, A. (2008). Efficiency of overhead ceiling lifts in reducing musculoskeletal injury among carers working in long-term care institutions. *Injury*, 39(5), 570-577.

Anyan, W., Faraklas, I., Morris, S., & Cochran, A. (2013). Overhead lift systems reduce back injuries among burn care providers. *Journal of Burn Care & Research*, 34(6), 586-590.

Halbert, J., Pearce, R., Burgess, T., & Zock, R. (2013). Advantages of Using Ceiling Mounted Lifts in Acute Stroke Rehabilitation. *Journal of Acute Care Physical Therapy*, 4(2), 73-83.

Chhokar R, Engst C, Miller A, Robinson D, Tate RB, Yassi A. The three-year economic benefits of a ceiling lift intervention aimed to reduce healthcare worker injuries. *Appl Ergon* 2005; 36(2): 223-9.

Enos, L. (2018). The role of ceiling lifts in a safe patient handling and mobility program. *International Journal of Safe Patient Handling and Movement*, 8(1), 25–45.

Jung, Y.M. & Bridge, C. (2009). The Effectiveness of Ceiling Hoists in Transferring People with Disabilities. Sydney: Home Modification Information Clearinghouse, University of New South Wales. Retrieved from <http://www.homemods.info/Download.ashx?File=0dea3ea1221a81c25de3d9714f7c1e>

Latvala, S., & Masterman, R. (2020). The evolution of the ceiling lift. A glimpse at how a single device has redefined caregiver safety and patient care. *Int J SPMH Vol* 10(3) 91-97.

Miller, A., Engst, C., Tate, R. B., & Yassi, A. (2006). Evaluation of the effectiveness of portable ceiling lifts in a new long-term care facility. *Applied ergonomics*, 37(3), 377-385.

Powers, J., Beaubien, R., Brunner, T., Girardot, K., Rechter, J., & Richardson, J. (2020). Comparing a patient positioning system to an overhead LIFT with pillows for impact on turning effectiveness. *Intensive and Critical Care Nursing*, 59, 102847.

Ronald, L. A., Yassi, A., Spiegel, J., Tate, R. B., Tait, D., & Mozel, M. R. (2002). Effectiveness of installing overhead ceiling lifts: Reducing musculoskeletal injuries in an extended care hospital unit. *AAOHN journal*, 50(3), 120-127.

Safe Patient Handling and Mobility – Section 10

Silverwood, S., & Haddock, M. (2006). Reduction of musculoskeletal injuries in intensive care nurses using ceiling-mounted patient lifts. *Dynamics*, 17, 19-21.

Spiegel, J., Yassi, A., Ronald, L. A., Tate, R. B., Hacking, P., & Colby, T. (2002). Implementing a Resident Lifting System in an Extended Care Hospital: Demonstrating Cost–Benefit. *AAOHN journal*, 50(3), 128-134.

Spritzer, S. D., Riordan, K. C., Berry, J., Corbett, B. M., Gerke, J. K., Hoerth, M. T., ... & Noe, K. H. (2015). Fall prevention and bathroom safety in the epilepsy monitoring unit. *Epilepsy & Behavior*, 48, 75-78.

Tiesman, H. M., Nelson, A. L., Charney, W., Siddharthan, K., & Fragala, G. (2003). Effectiveness of a ceiling-mounted patient lift system in reducing occupational injuries in long term care. *Journal of Healthcare Safety*, 1(1), 34-40.

Thomas-Olson, L., Gee, M., Harrison, D., & Helal, N. (2015). Evaluating the use of ceiling lifts in the operating room/Evaluation de l'utilisation de leve-personnes fixes au plafond en salle d'operation. *ORNAC journal*, 33(1), 13-22.

Vinther, A. C., Mechan, P., & Hansen, A. F. The Case for Using Overhead Hoists in Perioperative Areas.

Weinel, D. (2008). Successful implementation of ceiling-mounted lift systems. *Rehabilitation Nursing*, 33(2), 63-66.

Yassi, A., Paris, N., Kanigan, R., & Watzke, J. (2011). Development and evaluation of models for a home care ceiling lift program in BC.

Floor Lifts

Blaauw, E. R., Greenhalgh, M., Vegter, R., Bass, S., Kulich, H., Grindle, G. G., ... & Cooper, R. A. (2021). Assessment of Muscle Activation of Caregivers Performing Dependent Transfers with a Novel Robotic-Assisted Transfer Device Compared with the Hoyer Advance. *American Journal of Physical Medicine & Rehabilitation*, 100(9), 885-894.

Fields, B. E., Whitney, R. L., & Bell, J. F. (2022). Using a Mechanical Lift at Home: Preparing family caregivers to use lifts for transfers. *Home Healthcare Now*, 40(4), 190-195.

Monaghan, H. (2018). The Role of Mobile Floor-Based Lifts in a Safe Patient Handling and Mobility Program. *Int J SPHM* June 2018 Vol 8, No 2.

Floor Lift – Push Force

De Vito, G., Meroni, R., Riva, M.A., Mauri, R., Giunco, F., Conti, S., Cesana, G.C., 2011. EMG and forces during manoeuvring of ceiling-based and floor-based patient transfer devices]. *G. Ital. Med. Lav. Ergon.* 33, 230–234.

Dutta, T., Holliday, P. J., Gorski, S. M., Baharvandy, M. S., & Fernie, G. R. (2012). A biomechanical assessment of floor and overhead lifts using one or two caregivers for patient transfers. *Applied ergonomics*, 43(3), 521-531.

Lachance, C. C., Korall, A. M., Russell, C. M., Feldman, F., Robinovitch, S. N., & Mackey, D. C. (2016). External hand forces exerted by long-term care staff to push floor-based lifts: effects of flooring system and resident weight. *Human factors*, 58(6), 927-943.

Lee SJ, Rempel D. Comparison of lift use, perceptions, and musculoskeletal symptoms between ceiling lifts and floor-based lifts in patient handling. *Applied Ergonomics*. 2020;82:102954.

Marras, W. S., Knapik, G. G., & Ferguson, S. (2009). Lumbar spine forces during maneuvering of ceiling-based and floor-based patient transfer devices. *Ergonomics*, 52(3), 384–397.

Safe Patient Handling and Mobility – Section 10

Rice, M. S., Woolley, S. M., & Waters, T. R. (2009). Comparison of required operating forces between floor-based and overhead-mounted patient lifting devices. *Ergonomics*, 52(1), 112-120.

Santaguida et al (2005). Comparison of cumulative low back loads of caregivers when transferring patients using overhead and floor mechanical lifting devices. *Clinical Biomechanics*, 20(9), 906-916.

Waters, T. R., Dick, R., Lowe, B., Werren, D., & Parsons, K. (2012). Ergonomic assessment of floor-based and overhead lifts. *American Journal of Safe Patient Handling & Movement*, 2(4), 119-133.

Sit to Stand Technology

Burnfield, J. M., McCrory, B., Shu, Y., Buster, T. W., Taylor, A. P., & Goldman, A. J. (2013). Comparative kinematic and electromyographic assessment of clinician-and device-assisted sit-to-stand transfers in patients with stroke. *Physical Therapy*, 93(10), 1331-1341.

Fray, M., Hignett, S., Reece, A., Ali, S., & Ingram, L. (2019). An evaluation of sit to stand devices for use in rehabilitation. In *Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018) Volume VII: Ergonomics in Design, Design for All, Activity Theories for Work Analysis and Design, Affective Design 20* (pp. 774-783). Springer International Publishing.

Fray, M., & Hignett, S. (2015). Using patient handling equipment to manage immobility in and around a bed. *British Journal of Nursing*, 24(6), 10-14.

Goh, C. H., Muslimah, Y., Ng, S. C., Subramanian, P., & Tan, M. P. (2014). The use of the self-standing turning transfer device to perform bed-to-chair transfers reduces physical stress among caregivers of older patients in a middle-income developing country. *Frontiers in medicine*, 1, 32.

Gray-Miceli, D., Craelius, W., & Li, K. (2018, June). Mobile Technology to Assess Balance During Sit to Stand Manuever Among Older Adults at Risk for Falling. In *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care* (Vol. 7, No. 1, pp. 248-248). Sage CA: Los Angeles, CA: SAGE Publications.

Gucer PW, Gaitens J, Oliver M, McDiarmid MA. Sit-stand powered mechanical lifts in long-term care and resident quality indicators. *J Occup Environ Med*. 2013; 55(1): 36-44.

McWilliams, D., Atkins, G., Hodson, J., & Snelson, C. (2017). The Sara Combilizer® as an early mobilisation aid for critically ill patients: a prospective before and after study. *Australian Critical Care*, 30(4), 189-195.

Potvin, J. (2017). An Ergonomics Simulation Study of a Clinical Recliner, Chair, and Bed During Sit-To-Stand Patient Lifting. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 7(2), 64-73.

Riccoboni, J. B., Monnet, T., Eon, A., Lacouture, P., Gazeau, J. P., & Campone, M. (2021). Biomechanical comparison between manual and motorless device assisted patient handling: sitting to and from standing position. *Applied Ergonomics*, 90, 103284.

Slaughter SE. et al. Mobility of Vulnerable Elders Study: Effect of the Sit-to-Stand Activity on Mobility, Function, and Quality of Life. *JAMDA, Journal of Post Acute and Long Term Care Medicine*. 2015. 16 138e143

Tang, R., Poklar, M., Domke, H., Moore, S., Kapellusch, J., & Garg, A. (2017). Sit-to-stand lift: Effects of lifted height on weight borne and upper extremity strength requirements. *Research in nursing & health*, 40(1), 9-14.

Tang, K., Diaz, J., Lui, O., Proulx, L., Galle, E., & Packham, T. (2020). Do active assist transfer devices improve transfer safety for patients and caregivers in hospital and community settings? A scoping review. *Disability and Rehabilitation: Assistive Technology*, 15(6), 614-624.

Safe Patient Handling and Mobility – Section 10

Washington State Department of Labor and Industries (2000) Frequently asked questions about sit-stand patient-resident devices. https://assets-global.website-files.com/5d710ad86986a61c7247fe82/5dd0b5c0d5c04cdbf46ba5be_Sit-to-Stand-Patient.pdf

Xu, D., Wang, Y., Cui, T., Bao, X., & Duan, X. (2017). Optimized design for sling of stand up lift. In 5th International Conference on Computer-Aided Design, Manufacturing, Modeling, and Simulation (pp. 0300271–0300276).

Friction Reducing Devices

Alperovitch-Najenson, D., Weiner, C., Ribak, J., & Kalichman, L. (2020). Sliding sheet use in nursing practice: an intervention study. *Workplace health & safety*, 68(4), 171-181.

Amini Pay, N., Sommerich, C.M., Lavender, S.A., 2021. Assessment of alternative methods for informal caregivers to perform patient repositioning tasks. *Appl. Ergon.* 93

Bacharach, D. W., Miller, K., & von Duvillard, S. P. (2016). Saving your back: how do horizontal patient transfer devices stack up?. *Nursing2022*, 46(1), 59-64.

Bacastow, L. J. (2007). *Evaluation of Z-Slider for Lateral Patient Transfers, Repositioning, and Staff Musculoskeletal Injuries* (Doctoral dissertation, San Francisco State University).

Baptiste-McKinney, A Halvorson, B.(2018).The use of friction reducing devices in a safe patient handling and mobility program. *Int Journal SPMH Vol 8 (3)* 132-141

Baptiste, A., Boda, S. V., Nelson, A. L., Lloyd, J. D., & Lee III, W. E. (2006). Friction-reducing devices for lateral patient transfers: a clinical evaluation. *Aaohn Journal*, 54(4), 173-180.

Bartnik LM, Rice MS. (2013). Comparison of caregiver forces required for sliding a patient up in bed using an array of slide sheets. *Workplace Health and Safety*. 61(9): 393-400.

Callison MC, Nussbaum MA. (2012). Identification of physically demanding patient handling tasks in an acute care hospital. *International Journal of Industrial Ergonomics*. 42(3): 261-267.

Fray, M., & Holgate, G. (2019). A comparative force assessment of 4 methods to move a patient up a bed. In *Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018) Volume V: Human Simulation and Virtual Environments, Work With Computing Systems (WWCS), Process Control 20* (pp. 631-640). Springer International Publishing.

Higuchi, D., Takahashi, Y., & Tomita, Y. (2023). Effects of Slide Sheet Use and Bed Position on Muscle Activities in the Low Back and Extremities: A Pilot Experimental Simulation Study. *Workplace Health & Safety*, 71(10), 491-498.

Hwang, J., Ari, H., Matoo, M., Chen, J., & Kim, J. H. (2020). Air-assisted devices reduce biomechanical loading in the low back and upper extremities during patient turning tasks. *Applied Ergonomics*, 87, 103121.

Hwang, J., Kuppam, V. A., Chodraju, S. S. R., Chen, J., & Kim, J. H. (2019). Commercially available friction-reducing patient-transfer devices reduce biomechanical stresses on caregivers' upper extremities and low back. *Human factors*, 61(7), 1125-1140.

Kotowski SE, Davis KG, Wiggermann N, Williamson R.(2013). Quantification of patient migration in bed: catalyst to improve hospital bed design to reduce shear and friction forces and nurses' injuries. *Human Factors*. 55(1): 36-47.

Kotowski, S. E., Davis, K. G., & Marras, W. S. (2022). Effectiveness of friction-reducing patient-handling devices on reducing lumbosacral spine loads in nurses: A controlled laboratory simulation study. *American Journal of Safe Patient Handling & Mobility*, 9(2), 77-89.

Safe Patient Handling and Mobility – Section 10

Larson RE, Murtagh EM, Rice MS. Forces involved when sliding a patient up in bed. *Work*. 2018; 59(3): 439-448.

Larson, R.E., Johnson, W., (2020). A Review of Sliding A Patient Up In Bed: Implications For Technique And Effects On The Low Back. *RRJMHS* 9(5)

Larson, R.E., Rice, M.S., (2015). Hand Forces Involved When Completing a Lateral Bed to Plinth Transfer. *American Journal of Safe Patient Handling and Mobility*.

Lloyd JD, Baptiste A. Friction-reducing devices for lateral patient transfers: a biomechanical evaluation. *AAOHN J*. 2006;54(3):113-119.

McCoskey KL. (2007). Ergonomics and Patient Handling. *AAOHN Journal*, 2007, 55(11): 454–62

Meepradit, P., Panyadee, K., & Yingratanasuk, T. (2018). The effectiveness of the lateral patient transfer device to reduce musculoskeletal risk among practical nurses in a hospital, Thailand. *Journal of Biosciences and Medicines*, 6(5), 45-51.

Muona, A., Vartiainen, P., Karjalainen, P. A., & Räsänen, K. (2022). Forces required in repositioning a patient in bed using regular sheet and slide film. *International Journal of Industrial Ergonomics*, 90, 103302.

Pompeii LA et al. Musculoskeletal injuries resulting from patient handling tasks among hospital workers. *AmJ Ind Med*, 2009. 52(7): p. 571-8

Poole Wilson T, Davis KG, Kotowski SE, Daraiseh N. Quantification of patient and equipment handling for nurses through direct observation and subjective perceptions. *Advances in Nursing*. 2015.

Stoddart, C. (2022). Air-Assisted Technology: A Quality Endeavor to Reduce Employee Injury and Hospital-Acquired Pressure Injuries. *Critical Care Nursing Quarterly*, 45(4), 339-351.

Theou, O., Soon, Z., Filek, S., Brims, M., Leach-Macleod, K., Binsted, G., Jakobi, J., 2011. Changing the sheets: a new system to reduce strain during patient repositioning. *Nurs. Res.* 60, 302–308.

Wiggermann, N., Zhou, J., and McGann, N. (2021). Effect of repositioning aids and patient weight on biomechanical stresses when repositioning patients in bed. *Human Factors*, 63(4), 565-577.

Zhou, J., & Wiggermann, N. (2019, November). Physical stresses on caregivers when pulling patients up in bed: Effect of repositioning aids and patient weight. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 63, No. 1, pp. 1057-1061). Sage CA: Los Angeles, CA: SAGE Publications.

Gait Belts

Arnold, M. (2025). The continuing gait belt debate: updates and recommendations for their role in SPHM. *Int J SPHM* March 2025 Vol 15, No 1, 18-27.

Bell, J., Collins, J., Galinsky, T. L., & Waters, T. R. (2008). Preventing back injuries in health care settings. *National Institute for Occupational Safety and Health (NIOSH) Science Blog, Cincinnati, OH*. <https://blogs.cdc.gov/niosh-science-blog/2008/09/22/lifting/>

Broderick, V., Barrett, B., Phillips, S., Cowan, L., Friedman, Y., McKinney, A., ... & Bulat, T. (2023). Staff low back injury risk during assisted falls virtual reality simulations. *Workplace Health & Safety*, 71(6), 304-310.

Cheung, K., Dai, J., Cheung, C. L., Cho, H. K., Chow, Y. L., Fung, K. Y., ... & Szeto, G. (2020). The biomechanical evaluation of patient transfer tasks by female nursing students: With and without a transfer belt. *Applied Ergonomics*, 82, 102940.

Miller, H., Rockefeller, K., & Townsend, P. (2017). International round table discussion: Do gait belts have a role in safe patient handling programs? *International Journal of Safe Patient Handling & Mobility*, 7(3), 116-121.

Safe Patient Handling and Mobility – Section 10

Miller, H., Rockefeller, K., & Townsend, P. (2017). International round table discussion: Do gait belts have a role in safe patient handling programs? *International Journal of Safe Patient Handling & Mobility*, 7(3), 116-121.

Occupational Safety and Health Agency (OSHA). Citation 892308.015/01001 Aug 13, 2013. Incorporate NIOSH's ergonomic recommendations for nursing homes into this program. ... Use gait belts at best for stand-by assists only.

https://www.osha.gov/ords/imis/generalsearch.citation_detail?id=892308.015&cit_id=01001

Potvin, J. (2017). An ergonomics simulation study of a clinical recliner, chair, and bed during sit-to-stand patient lifting. *International Journal of Safe Patient Handling & Mobility*, 7(2), 64-73.

Rockefeller, K., & Proctor, R. B. (2011). Is there a role for gait belts in safe patient handling and movement programs? *American Journal of Safe Patient Handling & Movement*, 1(1), 30-35.

Transfer belts

Cheung, K., Dai, J., Cheung, C. L., Cho, H. K., Chow, Y. L., Fung, K. Y., ... & Szeto, G. (2020). The biomechanical evaluation of patient transfer tasks by female nursing students: With and without a transfer belt. *Applied Ergonomics*, 82, 102940.

Tang, R., Holland, M., Milbauer, M., Olson, E., Skora, J., Kapellusch, J. M., & Garg, A. (2018). Biomechanical evaluations of bed-to-wheelchair transfer: Gait belt versus walking belt. *Workplace Health & Safety*, 66(8), 384-392.

Zakerian, S. A., Afzalinejad, M., Mahmodi, M., & Sheibani, N. (2021). Determining the efficiency of ergonomic belt during patient handling and its effect on reducing musculoskeletal disorders in nurses. *SAGE Open Nursing*, 7, 23779608211057939.

Slideboards for Seated & Supine Transfers

Conrad, B. P., Marchese, D. L., Rehtine, G. R., Prasarn, M., Del Rossi, G., & Horodyski, M. H. (2013). Motion in the unstable cervical spine when transferring a patient positioned prone to a spine board. *Journal of athletic training*, 48(6), 797-803.

D'Souza (2022). Analysis of Low Wheelchair Seat Heights and Transfer Surfaces for Medical Diagnostic Equipment – Final Report. <https://www.access-board.gov/research/human/wheelchair-seat-height/>

Horodyski, M., Conrad, B. P., Del Rossi, G., DiPaola, C. P., & Rehtine, G. R. (2011). Removing a patient from the spine board: is the lift and slide safer than the log roll?. *Journal of Trauma and Acute Care Surgery*, 70(5), 1282-1285.

Hu, C. T., DiPaola, C. P., Conrad, B. P., Horodyski, M., Del Rossi, G., & Rehtine, G. R. (2013). Motion is reduced in the unstable spine with the use of mechanical devices for bed transfers. *The Journal of Spinal Cord Medicine*, 36(1), 58-65.

Katamoto, R., Komiya, M., Arijji, Y., Iwahashi, K., Terashi, Y., Kobayashi, H., ... & Hayashi, T. (2025). Impact of the width and shape of the sliding board on design evaluation.

Sun, C., Buchholz, B., Quinn, M., Punnett, L., Galligan, C., & Gore, R. (2018). Ergonomic evaluation of slide boards used by home care aides to assist client transfers. *Ergonomics*, 61(7), 913-922.

Wheelchair

Gil-Agudo, A., Solís-Mozos, M., Del-Ama, A. J., Crespo-Ruiz, B., de la Peña-González, A. I., & Pérez-Nombela, S. (2013). Comparative ergonomic assessment of manual wheelchairs by paraplegic users. *Disability and Rehabilitation: Assistive Technology*, 8(4), 305-313.

Kulich, H. R., Bass, S. R., Griscavage, J. S., Vijayvargiya, A., Slowik, J. S., & Koontz, A. M. (2020). An ergonomic comparison of three different patient transport chairs in a simulated hospital environment. *Applied Ergonomics*, 88, 103172.

Weston, E. B., Khan, S. N., & Marras, W. S. (2017). Wheelchair pushing and turning: lumbar spine and shoulder loads and recommended limits. *Ergonomics*, 60(12), 1754-1765.

Bathing and Toileting

Graham, P., Knibbe, H., & Turner, R. (2022). International round table discussion: The challenges of providing dignified bathroom care (includes abstract). *International Journal of Safe Patient Handling & Mobility (Sphm)*, 12(1), 14-19.

Health and Safety Executive UK (ND). Moving and handling in health and social care. Manual handling in birthing pools. <https://www.hse.gov.uk/healthservices/moving-handling/birthing-pools.htm>

Knibbe, H., Knibbe, N., (2024). Addressing the challenges of bathing in an ergonomic way. *International Journal of Safe Patient Handling & Mobility*, 14(3), 105-114.

Knibbe, Hanneke J. J.; Matz, Mary W.; Heitink, Diede E. B. L. (2017). Effects Of Using Bathing Gloves On Healthcare Recipients And Caregivers. *International Journal Of Safe Patient Handling & Mobility (Sphm)*, Mar2017; 7(1): 9-19.

Knibbe, N. E., & Waaijerb, E. M. (2021). Biomechanical and Qualitative Study of a Multiple Adjustable Shower Trolley. *Advances in Human Aspects of Healthcare*, 13(13).

Knibbe, N. E., Knibbe, H. J., & Waaijer, E. (2013). How Smart is the Carevo®? Results of a Study on a New Shower Trolley Generation. *The Ergonomics Open Journal*, 6(1).

Potvin, J. (2017). An ergonomics simulation study of a clinical recliner, chair, and bed during sit-to-stand patient lifting. *International Journal of Safe Patient Handling & Mobility*, 7(2), 64-73.

Beds and Stretchers

Adeodu, A. O., Daniyan, I. A., & Adaramola, O. O. (2014). Anthropometry Evaluation Using Analytical Hierarchical Process and Independent Test Method for Hospital Bed Design: A Case Study in Nigeria. *J. Comput. Biosci. Eng*, 1(1), 1-10.

Budarick, A. R., Lad, U., & Fischer, S. L. (2020). Can the use of turn-assist surfaces reduce the physical burden on caregivers when performing patient turning? *Human factors*, 62(1), 77-92.

Capodaglio, E. M. (2013). Electric versus hydraulic hospital beds: Differences in use during basic nursing tasks. *International journal of occupational safety and ergonomics*, 19(4), 597-606.

Daniell, N., Merrett, S., & Paul, G. (2014). Effectiveness of powered hospital bed movers for reducing physiological strain and back muscle activation. *Applied Ergonomics*, 45(4), 849-856.

Davis, K. G., & Kotowski, S. E. (2015b). Role of bed design and head-of-bed articulation on patient migration. *Journal of Nursing Care Quality*, 30(3), E1–E9.

Safe Patient Handling and Mobility – Section 10

Davis, K. G., Kotowski, S. E., & Coombs, M. T. (2017). Stopping the slide. *Journal of Nursing Care Quality*, 32(1), E11–E19.

Fragala, G. (2015). Bed care for patients in palliative settings: Considering risks to caregivers and bed surfaces. *International Journal of Palliative Nursing*, 21, 66–70.

Fray, M., Hignett, S., & Gyi, D. (2022). Impact of ultra-low height healthcare beds on falls and mobility: A systematic review. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 12(1), 21–32.

Guo, Z., Xiao, X., & Yu, H. (2018). Design and evaluation of a motorized robotic bed mover with omnidirectional mobility for patient transportation. *IEEE Journal of Biomedical and Health Informatics*, 22(6), 1775-1785.

Hightower, J., & Sura, L. (2022). A patient post COVID-19 on ECMO as a bridge to a lung transplant and CABG: A brief case report using progressive tilt therapy. *International Journal of Safe Patient Handling & Mobility*, Special Issue: Early Mobility, SI-31–SI-33. Visioning Publishers LLC.

Hignett, S., Sands, G., Fray, M., Xanthopoulou, P., Healey, F., & Griffiths, P. (2013). Which bed designs and patient characteristics increase bed rail use?. *Age and Ageing*, 42(4), 531-535.

Kim, S., Barker, L. M., Jia, B., Agnew, M. J., & Nussbaum, M. A. (2009). Effects of two hospital bed design features on physical demands and usability during brake engagement and patient transportation: A repeated measures experimental study. *International journal of nursing studies*, 46(3), 317-325.

Kotowski, S. E., Davis, K. G., & Marras, W. S. (2022). Patient handling through moving of the beds and stretchers. *International Journal of Industrial Ergonomics*, 87, 103252.

Kotowski, S. E., Davis, K. G., Wiggermann, N., & Williamson, R. (2013). Quantification of patient migration in bed: catalyst to improve hospital bed design to reduce shear and friction forces and nurses' injuries. *Human factors*, 55(1), 36-47.

Kotowski, S., & Davis, K. (2019). Factors impacting the patient migration in hospital beds: Pathway to reduce patient handling injuries. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 9(3), 102–110.

Lustig, M., Wiggermann, N., & Gefen, A. (2020). How patient migration in bed affects the sacral soft tissue loading and thereby the risk for a hospital-acquired pressure injury. *International Wound Journal*, 17(3), 631-640.

Mansfield, B., Shofer, F. S., & Green-McKenzie, J. (2021). The Effect of Introduction of Motorized Stretchers on Hospital-Based Patient Transporter Injuries and Resultant Workers' Compensation Costs. *Journal of Occupational and Environmental Medicine*, 63(12), 1078-1080.

Medicines and Healthcare products Regulatory Agency UK (2023). Medical beds, trolleys, bed rails, bed grab handles and lateral turning devices: risk of death from entrapment or falls Aug 2023.

https://assets.publishing.service.gov.uk/media/64ee06f66bc96d00104ed244/NatPSA_bed_rails_30_8_23.pdf

Mehta, R. K., Horton, L. M., Agnew, M. J., & Nussbaum, M. A. (2011). Ergonomic evaluation of hospital bed design features during patient handling tasks. *International Journal of Industrial Ergonomics*, 41(6), 647-652.

Pretorius, K., Cengiz, A., Geshell, L., Jang, D. E., Prater, T., Wang, Y., ... & Sagna, A. (2018). What Bed Size Does a Patient Need?: The Relationship Between Body Mass Index and Space Required to Turn in Bed. *Nursing Research*, 67(4), 273-274.

Sullivan, R. (2022, May). A prospective, observational study of a novel lift-compatible safe patient handling support surface in the intensive care unit. *Journal of Wound Ostomy and Continence Nursing*, 49, S89.

Safe Patient Handling and Mobility – Section 10

Wiggermann, N. (2016). Biomechanical evaluation of a bed feature to assist in turning and laterally repositioning patients. *Human Factors*, 58, 748–757.

Wiggermann, N. (2016). Biomechanical evaluation of a bed feature to assist in turning and laterally repositioning patients. *Human factors*, 58(5), 748-757.

Wiggermann, N. (2017). Effect of a powered drive on pushing and pulling forces when transporting bariatric hospital beds. *Applied Ergonomics*, 58, 59-65.

Wiggermann, N., & Zhou, J. (2018). Relationships among static strength, dynamic strength, and psychophysically determined levels of acceptable force for a pushing task and foot pedal actuation task. *International Journal of Industrial Ergonomics*, 65, 68-73.

Wiggermann, N., Rempel, K., Zerhusen, R. M., Pelo, T., & Mann, N. (2019). Human-centered design process for a hospital bed: promoting patient safety and ease of use. *Ergonomics in Design*, 27(2), 4-12.

Wiggermann, N., Smith, K., & Kumpar, D. (2017). What bed size does a patient need? The relationship between body mass index and space required to turn in bed. *Nursing Research*, 66, 483–489.

Zhou, J., & Wiggermann, N. (2017). Ergonomic evaluation of brake pedal and push handle locations on hospital beds. *Applied Ergonomics*, 60, 305-312.

Zhou, J., & Wiggermann, N. (2021). The effects of hospital bed features on physical stresses on caregivers when repositioning patients in bed. *Applied Ergonomics*, 90, 103259.

Transport chairs

Kulich, H. R., Bass, S. R., Griscavage, J. S., Vijayvargiya, A., Slowik, J. S., & Koontz, A. M. (2020). An ergonomic comparison of three different patient transport chairs in a simulated hospital environment. *Applied Ergonomics*, 88, 103172.

Slings

Also refer to Standards, Guidelines and the FDA information above and SPHM General Resources

DuBose, J. (2014). Developing a sling management system: learn about key decisions for this segment of an SPHM program. *American Nurse Today*, 9(9), S23-S23

Enos, L. (2019). A comprehensive review of patient slings. *International Journal of Safe Patient Handling and Movement*, 9(1), 15–36.

Enos, L. (2018). Checklist for Choosing and Purchasing Slings. *International Journal for Safe and Handling and Mobility in Volume 8* (4).

Health and Safety Executive. (2012). Getting to grips with hoisting people. Health Services Information Sheet No. 3. <http://www.hse.gov.uk/pubns/hsis3.pdf>

Baptiste, A., McCleery, M., Matz, M., & Evitt, C. P. (2008). Proper sling selection and application while using patient lifts. *Rehabilitation Nursing*, 33(1), 22–32.

Matz M, Celona J, Martin M, McCoskey K, Nelson GG. (2019). Patient Handling and Mobility Assessments (PHAMA) (2nd ed.) Facility Guidelines Institute. https://www.fgiguilines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf

Murray, E., & Monaghan, H. (2012). Sling safety. *American Journal of Safe Patient Handling and Movement*, 2(3), S1–S17.

Enos, L. (2022). Sling and lift compatibility: A brief summary. *International Journal of Safe Patient Handling & Mobility*, 12(4), 117-119.

Safe Patient Handling and Mobility – Section 10

Nagavarapu, S., Lavender, S. A., & Marras, W. S. (2017). Spine loading during the application and removal of lifting slings: The effects of patient weight, bed height and work method. *Ergonomics*, 60(5), 636–648.

Smith, J., Simpson, P., & Fray, M.(Eds) (2023). HOP7: The guide to handling of people. Person-centered practice <https://backcare.org.uk/hop7m/hop-purchase/>

Leaving Slings and other SPHM Devices under a patient

Also refer to Pressure Injury Prevention page 10-126.

Bradley, S. E., Chavez, M., Barrett, B., Lind, J., Cowan, L., Broderick, V., & Bulat, T. (2025). Leaving Slings and Other Transfer Devices Under Patients: A Clinical Decision Support Quality Improvement Project. *Journal of Wound Ostomy & Continence Nursing*, 52(1), 14-22.

Brienza, D., Deppisch, M., Gillespie, C., et al. (2015). Do lift slings significantly change the efficacy of therapeutic support surfaces? National Pressure Ulcer Advisory Panel (NPUAP).

Clark, M., Phillips, L., & Knibbe, H. J. J. (n.d.). Lifting and transfer devices: A bridge between safe patient handling and pressure ulcer prevention. *American Journal of Safe Patient Handling and Mobility*, 5(4), 154–160.

Crane, B., Wininger, M., Strydom, E., & Hulse, J. (2015). The effects of sitting on a mechanical lift sling on interface seat pressure. *Topics in Geriatric Rehabilitation*, 31(1), 67.

DuBose, J. (2014). Developing a sling management system: learn about key decisions for this segment of an SPHM program. *American Nurse Today*, 9(9), S23-S23.

Edger, M. (2017). Effect of a Patient-Repositioning Device in an Intensive Care Unit On Hospital-Acquired Pressure Injury Occurrences and Cost. *Journal of Wound, Ostomy and Continence Nursing*, 44(3), 236-240.

Edupuganti, K., & Price, C. (n.d.). Repositioning slings: The effects on skin pressure, pH and temperature. *American Journal of Safe Patient Handling and Mobility*, 3(2), 48–54.

Lloyd, J. D. (2010). Biomechanical evaluation of pressure distribution during extended use of HoverMatt™ technology.

Mellson, J., et al. (2012). The impact of hoist sling fabrics on gluteal interface pressure while sitting in healthy individuals: A controlled pre- post test study. *American Journal of Safe Patient Handling and Mobility*, 2(3), 79–86.

Nagavarapu, S., Lavender, S. A., & Marras, W. S. (2017). Spine loading during the application and removal of lifting slings: the effects of patient weight, bed height and work method. *Ergonomics*, 60(5), 636-648.

National Pressure Injury Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Repositioning for Preventing Pressure Injuries. In: Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline: Fourth Edition. Emily Haesler (Ed.). 2025. [cited: download date]. <https://internationalguideline.com>

Nelson, K. (2013). Comparative surface analysis of patient care slings and body pressure & temperature. Proceedings of the SPHM Conference East 2013, Southcoast Hospitals Group.

Peterson, M. J., Kahn, J. A., Kerrigan, M. V., Gutmann, J. M., & Harrow, J. J. (2015). Pressure ulcer risk of patient handling sling use. *Journal of Rehabilitation Research & Development*, 52(3).

Sturman-Floyd, M. (2011). Reducing the incidence and risk of pressure sores, manual handling loading and carer costs using “in-bed” systems. MSF Manual Handling and Back Care/Norfolk County Council.

Van Dyck, E., et al. (n.d.). The comparative effects of hoist sling fabrics on gluteal interface pressure in healthy individuals. *American Journal of Safe Patient Handling and Mobility*, 6(1), 25–32.

Safe Patient Handling and Mobility – Section 10

Webb, J. (2018). The impact of hoist sling fabrics on interface pressure whilst sitting in healthy volunteers and wheelchair users: A comparative study. *Journal of Tissue Viability*, 27, 90–94.

Work Practice and Administrative Controls

Unit-Based Champion Programs

Alamgir, H. (2010). A comprehensive evaluation of the ceiling lift coaching project. <https://www.worksafebc.com/en/resources/about-us/research/a-comprehensive-evaluation-of-the-ceiling-lift-coaching-project?lang=en>

Alamgir, H. (2011). Peer coaching and mentoring: A new model of educational intervention for safe patient handling in health care. <https://pubmed.ncbi.nlm.nih.gov/21630297/>

Bruce, R., & Forry, C. (2018). Integrating a mobility champion in the intensive care unit. *Dimensions of Critical Care Nursing*, 37(4), 201-209.

Djen, E., Given, C., O'Connor, T., Murray, K., Rodriguez, M., & Marcarian, T. (2021). Safety champions: an innovative role during an evolving pandemic. *Critical Care Nurse*, 41(5), 72-74.

Edwards, H. E., Chang, A. M., Gibb, M., Finlayson, K. J., Parker, C., O'Reilly, M., ... & Shuter, P. (2017). Reduced prevalence and severity of wounds following implementation of the Champions for Skin Integrity model to facilitate uptake of evidence-based practice in aged care. *Journal of Clinical Nursing*, 26(23-24), 4276-4285.

Elinitsky, S. (n.d.). Implementation of safe patient handling in the U.S. Veterans Health System: A qualitative study of internal facilitators' perceptions. https://www.researchgate.net/publication/280559659_Implementation_of_Safe_Patient_Handling_in_the_US_Veterans_Health_System_A_Qualitative_Study_of_Internal_Facilitators'_Perceptions_doi_101111wvn12098_WVN_2015001-9

Han, J., et al. (2024). The addition of a dedicated mobility team to improve patient ambulation and out of bed rates. *International Journal of Safe Patient Handling & Mobility*, 14(3), 100–104.

Hurtado, D. A., Dumet, L. M., Greenspan, S. A., & Rodriguez, Y. I. (2018). Social network analysis of peer-specific safety support and ergonomic behaviors: An application to safe patient handling. *Applied Ergonomics*, 68, 132-137.

Hurtado, D. A., Dumet, L. M., Greenspan, S. A., Rodríguez, Y. I., & Heinonen, G. A. (2018). Identifying safety peer leaders with social network analysis. *Occupational Health Science*, 2(4), 437-450.

Hurtado, D. A., Greenspan, S. A., Dumet, L. M., & Heinonen, G. A. (2020). Use of champions identified by social network analysis to reduce health care worker patient-assist injuries. *The Joint Commission Journal on Quality and Patient Safety*, 46(11), 608-616.

Hurtado, D. A., Heinonen, G. A., Dumet, L. M., & Greenspan, S. A. (2018). Early career nurses with fewer supportive peers for safe patient handling are likely to quit. *International Nursing Review*, 65(4), 596-600.

Knibbe, H. (n.d.). Safe patient handling program in critical care using peer leaders: Lessons learned in The Netherlands. <https://pubmed.ncbi.nlm.nih.gov/17512476/>

Knibbe, H., Knibb, N. E., & Klassen, A. (2012). Ergo Coaches: Peer leaders promoting ergonomic changes—Exploring their profile and effect. *One Time Download*, 2(3), 93–99.

Marcus, P., et al. (2021). Utilization of a wellness/mobility technician: Interprofessional inpatient oncology population-focused quality improvement project. *International Journal SPHM*, 11(1), 36-43.

Redler, G., & Bauce, K. (2024). Adding a Mobility Champion to an Existing Progressive Mobility Protocol: An Evidence-Based Initiative. *Journal of Gerontological Nursing*, 50(11), 37-43.

Safe Patient Handling and Mobility – Section 10

Schwellnus, H., & Carnahan, H. (2014). Peer-coaching with health care professionals: What is the current status of the literature and what are the key components necessary in peer-coaching? A scoping review. *Medical Teacher*, 36(1), 38-46.

Thompson L, Lin F, Faithfull-Byrne A, Gonzalez J, Naumann A, Geisler K, Moss C. Clinical coaches and patient safety - Just in time: A descriptive exploratory study. *Nurse Educ Pract*. 2021 Jul;54:103134.

Tompa, E., Dolinschi, R., Alamgir, H., Sarnocinska-Hart, A., & Guzman, J. (2016). A cost-benefit analysis of peer coaching for overhead lift use in the long-term care sector in Canada. *Occupational and environmental medicine*, 73(5), 308-314.

Wahlin, Å. (2021). A systematic review of work interventions to promote safe patient handling and movement in the healthcare sector. <https://pubmed.ncbi.nlm.nih.gov/34789085/>

Lift Teams

Anton, D., Mizner, R. L., & Hess, J. A. (2013). The effect of lift teams on kinematics and muscle activity of the upper extremity and trunk in bricklayers. *Journal of Orthopaedic & Sports Physical Therapy*, 43(4), 232-241.

Charney, W. (1997). Lift team method for reducing back injury: A 10 hospital study. *AAOHN Journal*, 45(6), 300-304.

Charney, W. (2000). Reducing back injury in nursing: A case study using mechanical and a hospital transport team as a lift team. *Journal of Healthcare Safety, Compliance & Infection Control*, 4(3), 117-120.

Charney, W. (2003). Preventing back injuries to healthcare workers using lift teams; Data for 18 hospitals. *Journal of Healthcare Safety, Compliance & Infection Control*, 5(3), 21-29.

Charney, W. (2006). Lift teams: A proven method to reduce back injury in healthcare workers. In A. Nelson (Ed.), *Safe patient handling and movement: A practical guide for health care professionals* (pp. 125-137). New York, NY: Springer Publishing Company.

Charney, W., Simmons, B., Lary, M., & Metz, S. (2006). Zero lift programs in small rural hospitals in Washington state: Reducing back injuries among health care workers. *AAOHN Journal*, 54(8), 355-358.

Collins, J. W., Nelson, A., & Sublet, V. (2006). Safe lifting and movement of nursing home residents. DHHS (NIOSH) Publication No. 2006-117. Cincinnati, OH: National Institute for Occupational Safety and Health.

Evanoff, B., Wolf, L., Aton, E., Canos, J., & Collins, J. (2003). Reduction in injury rates in nursing personnel through introduction of mechanical lifts in the workplace. *American Journal of Industrial Medicine*, 44, 451-457.

Gallagher, S. M., Charney, W., McGinley, L. D., Gallagher, M., & Charney, M. (2010). Clinical nursing education series: Rethinking lift teams. *Bariatric Times*, 7(12), 18-23. <https://bariatrictimes.com/clinical-nursing-education-series-rethinking-lift-teams/>

Graulich, B., Labreche, M., Nydahl, P., & Strøm, T. (2018). Is there a need for lift or mobility teams within the ICU and beyond? *International Journal of Safe Patient Handling & Mobility (SPHM)*, 8(4), 182-186.

Haidunen, D. (2003). Lifting teams in health care facilities: a literature review. *AAOHN Journal*, 51(5), 210-218.

Hefti, K. S., Farnham, R. J., Docken, L., Bentaas, R., Bossman, S., & Schaefer, J. (2003). Back injury prevention: A lift team success story. *AAOHN Journal*, 51(6), 246-251.

Hignett, S. (2003). Intervention strategies to reduce musculoskeletal injuries associated with handling patients: A systematic review. *Occupational and Environmental Medicine*, 60, e6.

Safe Patient Handling and Mobility – Section 10

- Hospital Employee Health (April 2002). How to build a case for ergonomic intervention. <https://www.clinician.com/articles/116842-how-to-build-a-case-for-ergonomic-intervention>
- Kutash, M., Short, M., Shea, J., & Martinez, M. (2009). The lift team's importance to a successful safe patient handling program. *JONA: The Journal of Nursing Administration*, 39(4), 170-175.
- Lee, S. J., Lee, J. H., & Gershon, R. R. (2015). Musculoskeletal symptoms in nurses in the early implementation phase of California's safe patient handling legislation. *Research in Nursing & Health*, 38(3), 183-193.
- Meittunen, E. J., Matzke, K., McCormack, H., & Sobczak, S. C. (1999). The effect of focusing ergonomic risk factors on a patient transfer team to reduce incidents among nurses associated with patient care. *Journal of Healthcare Safety, Compliance and Infection Control*, 2(7), 306-312.
- Nelson, A., Matz, M., Chen, F., Siddharthan, K., Lloyd, J., & Fragala, G. (2006). Development and evaluation of a multifaceted ergonomics program to prevent injuries associated with patient handling tasks. *International Journal of Nursing Studies*, 43(6), 717-733.
- O'Malley, P. (2014). Service delivery innovation profile: Patient lift team program reduces injuries and boosts productivity among nurses. *AHRQ Health Care Innovations Exchange*. <http://www.innovations.ahrq.gov/content.aspx?id=1813>
- Schoenfisch, A. L., Lipscomb, H. J., Myers, D. J., Fricklas, E., & James, T. (2011). A lift assist team in an acute care hospital—Prevention of injury or transfer of risk during patient-handling tasks? *AAOHN Journal*, 59(8), 329-334.
- Seidl, K., Bunke, J., Gallagher, S., McGinley, L., Muir, M., Race, E., & Short, M. (2011). Safe patient handling and the lift team concept. *Bariatric Nursing and Surgical Patient Care*, 6(2), 57-64.
- Short, M., & Shea, J. (2011). Lift teams: An effective strategy in safe patient handling. *American Journal of Safe Patient Handling and Movement*, 1(1), 36-41.
- Springer, P. J. (2009). Implementation of a lift team. *AAOHN Journal*, 57(4), 143-148.
- Tampa Bay28. (April 22, 2022). Tampa General Hospital Lift Team celebrates 20 years <https://www.tampabay28.com/news/region-hillsborough/tampa-general-hospital-lift-team-celebrates-20-years>

Mobility Assessment Protocols

- Arnold, M. (2019). Functional assessments for safe patient mobilization across the continuum of care. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 9(3), 111–121.
- Association of periOperative Registered Nurses (AORN) Ergonomic Tools for Perioperative environments. https://www.aorn.org/docs/default-source/aorn/toolkits/safe-patient-handling/safe-patient-handling-pocket-reference-guide.pdf?sfvrsn=36a9944f_0
- Association of periOperative Registered Nurses. (2021). Guideline for safe patient handling and movement. In *Guidelines for perioperative practice*. Denver, CO: AORN, Inc. <https://aornguidelines.org/guidelines/content?sectionid=192587418&view=book>
- Boynton, T. (2024). The Bedside Mobility Assessment Tool (BMAT) embedded in the new Mobility Screening and Solutions Tool (MSST): Addressing inaccuracies. *BMC Health Services Research*, 24(1), 1164.
- Boynton, T., et al. (2020). The Bedside Mobility Assessment Tool 2.0. *American Nurse Today*, 15(7), 18–22. Retrieved from <https://www.myamericannurse.com/wp-content/uploads/2020/06/an7-Mobility-618.pdf>

Safe Patient Handling and Mobility – Section 10

- Boynton, T., Kelly, L., & Perez, A. (2014). Implementing a mobility assessment tool for nurses. *Am Nurse Today*, 9(9), 13-16. https://www.myamericannurse.com/wp-content/uploads/2014/09/ant9-Patient-Handling-Supplement-821a_Implementing.pdf
- Boynton, T., Kelly, L., Perez, A., Miller, M., An, Y., & Trudgen, C. (2014). Banner mobility assessment tool for nurses: Instrument validation. *American Journal of Safe Patient Handling & Mobility*, 4(3), 86–92.
- Center for Engineering & Occupational Safety and Health (CEOSH), Veterans Affairs. (2016). Safe patient handling and mobility guidebook. <http://www.tnpatientsafety.com/pubfiles/Initiatives/workplace-violence/sphm-pdf.pdf>
- Cunanan, S. C. (2025). Enhancing Bedside Mobility Assessment Tool (BMAT 2.0) Competency to Promote Early Mobilization, Ensure Patient Safety, and Maximize Health Outcomes.
- Denehy, L., de Morton, N. A., Skinner, E. H., et al. (2013). A physical function test for use in the intensive care unit: validity, responsiveness, and predictive utility of the Physical Function ICU Test (Scored). *Physical Therapy*, 93(12), 1–10.
- Dionne, M. (2004). Introducing the Egress test: A simple screen tool to predict safety of bariatric patient transfers. *Phys Ther Rehab Med*, 15, 39.
- Hada, A., & Coyer, F. (2021). Shift-to-shift nursing handover interventions associated with improved inpatient outcomes—Falls, pressure injuries and medication administration errors: An integrative review. *Nursing & health sciences*, 23(2), 337-351.
- Hook, M., Dailey, M. S., Singh, M., Schneuker, D., Mitchell, L., Milligan, K., ... & Kelly, L. (2024). Comprehensive Mobility Evaluation Tool (CMET): Confirming validity, reliability, and benefits for guiding nurse-led mobility. *Medsurg Nursing*, 33(6), 277-292.
- Houlihan, S., Fernandez, N., Magnant, C., Levin, A., & Murphy, S. (2018). Evaluating a nurse-driven mobility algorithm for hospitalized general medicine patients: A pilot study. *Journal of Acute Care Physical Therapy*, 9(4), 179–185.
- Ihemere, N., et al. (2022). Implementation of a standard mobility assessment: A quality improvement project to improve early mobilization in hospitalized adult patients. *International Journal of Safe Patient Handling & Mobility*, 12(3), 96–103.
- Jette, D., Stilphen, M., Ranganathan, V., Passek, S., Frost, F., & Jette, A. (2014). Validity of the AM-PAC “6-clicks” inpatient daily activity and basic mobility short forms. *Physical Therapy*, 94(3), 379–391.
- Kumble, S., McLaughlin, K. H., Funk, K., Dekany, S., Ludwig, D., Farley, H., ... & JH-AMP Group. (2024). Development of a new tool to combine the promotion of patient mobility with safe patient handling equipment: The Johns Hopkins Safe Patient Handling Mobility (JH-SPHM) Guide. *Workplace Health & Safety*, 72(11), 503–513.
- Labreche, L., et al. (2021). Progressive mobility of patients supported on ECMO from dependency to ambulation utilizing safe patient handling techniques. *International Journal of Safe Patient Handling & Mobility*, 11(2), 88-97.
- LaVigne, A., & Arnold, M. (2017). Decision making for safe patient handling and mobility technology in an early mobility program: A case report. *American Journal of Safe Patient Handling & Mobility*, 6(2), 65–72.
- Lininger, M. R., Warren, M., Knecht, J., Verheijde, J., Tyler, B., & Tompkins, J. (2021). Clinical instruments for bedside functional assessment: Convergent validity among the AM-PAC ‘6-Clicks’ and BMAT. *Journal of Clinical Nursing*, 30(13–14), 2048–2056.
- Lipsett, A., & White, E. (2019). Decreasing patients falls and increasing communication through the use of patient mobility cards. *International Journal of Safe Patient Handling & Mobility*, 9(1), 37–41.
- McCain, N., Ferguson, T., Hultquist, T. B., Wahl, C., & Struwe, L. (2023). Influencing a culture of quality and safety through huddles. *Journal of Nursing Care Quality*, 38(1), 26–32.

Safe Patient Handling and Mobility – Section 10

McLaughlin KH, Friedman M, Hoyer EH, Kudchadkar S, Flanagan E, Klein L, Daley K, Lavezza A, Schechter N, Young D; (2023). JH-AMP Group. The Johns Hopkins Activity and Mobility Promotion Program: A Framework to Increase Activity and Mobility Among Hospitalized Patients. *J Nurs Care Qual.* Apr-Jun 01;38(2):164-170.

Melillo, C., Rugs, D., Toyinbo, P., Barrett, B., Chavez, M., Cowan, L., ... & Sullivan, S. C. (2022). Reliability and validity of the Veterans Administration Mobility Screening and Solutions Tool. *BMC Health Services Research*, 22(1), 1323.

Melin, J., Parmelund, N., Gottfridsson, M., & Fisher, W. P., Jr. (2021). HMC Transfer Assessment Protocols (HMC-Taps): A multifactorial and communicative tool for safe patient handling and mobility methods in interdisciplinary teams. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 11(4), 173–181.

National Association of Orthopedic Nurses (NAON). (2016). Safe patient handling algorithms. <https://www.orthonurse.org/Portals/0/Docs/Publications/Position%20Statements/NAON%20Safe%20Patient%20Handling%20and%20Mobility%20Algorithms%20for%20the%20Adult%20Orthopaedic%20Patient.pdf?ver=rueoatTtX342xARJCn9kJw%3d%3d>

Rose, A., Carter, N., Vann, C., Lloyd-Penza, M., & Andrusko, M. (2022). Implementing Bedside Mobility Assessment Tool to Improve Patient Outcomes and Staff Communication. *Medsurg Nursing*, 31(1), 32-36.

Sedlak, C. A., Doheny, M. O., Nelson, A., & Waters, T. R. (2009). Development of the National Association of Orthopaedic Nurses guidance statement on safe patient handling and movement in the orthopaedic setting. *Orthopaedic Nursing*, 28(2S), S2-S8.

Shirley Reyan Ability Lab. (2013). “Get up and Go” or “Timed Up and Go”
<https://www.sralab.org/rehabilitation-measures/timed-and-go>

Smith, B. K. (2008). A pilot study evaluating physical therapist-nurse inter-rater reliability of Dionne's Egress Test in morbidly obese patients. *Acute Care Perspectives*, 17(4).

Soubra, R., Chkeir, A., & Novella, J. L. (2019). A systematic review of thirty-one assessment tests to evaluate mobility in older adults. *BioMed research international*, 2019(1), 1354362.

U.S. Department of Veterans Affairs. (n.d.). The VA Safe Patient Handling and Mobility Mobile App for HealthCare Professionals, Veterans, and families. <https://mobile.va.gov/app/safe-patient-handling>

Wald, H. L., Ramaswamy, R., Perskin, M. H., Roberts, L., Bogaisky, M., Suen, W., ... & Quality and Performance Measurement Committee of the American Geriatrics Society. (2019). The case for mobility assessment in hospitalized older adults: American Geriatrics Society white paper executive summary. *Journal of the American Geriatrics Society*, 67(1), 11–16. <https://livengoodmed.com/wp-content/uploads/2019/03/The-Case-for-Mobility-Assessment-in-Hospitalized-Older-Adults.pdf>

Washington State Labor & Industries (L&I), Jan 15, 2021. Client transfers: Safely match abilities with needs. Picture Guide. https://lni.wa.gov/safety-health/_docs/TransferClientsSafely.pdf

Wilson, C., Richards, N., Slavin, B., et al. (2015). Nursing staff perceptions and fall rates with a quality improvement project for mobility screening and written bedside communication: A pretest–posttest design. *American Journal of Safe Patient Handling & Mobility*, 5(2), 55–65.

Wiggermann, N. (2017). Effect of a powered drive on pushing and pulling forces when transporting bariatric hospital beds. *Applied Ergonomics*, 58, 59–65.

Safe Patient Handling and Mobility – Section 10

SPHM and Early Mobility Programs

Also refer to General Patient Safety Information - Early Mobility on page 10-122.

Arnold, M. (2018). Building a foundation of mobility: From the ICU and across the continuum of care. *International Journal of Safe Patient Handling & Mobility*, 7(1), 40–44.

Arnold, M. (2021). Early Mobility During COVID-19. Perspectives from Industry Leaders Around the World. *International Journal SPHM*, 11(1), 46-51.

Arnold, M., Needham, D. M., & Nydahl, P. (2018). International round table discussion: Early mobility. *International Journal of Safe Patient Handling & Mobility*, 8(1), 57–64.

Cunanan, S. C. (2025). Enhancing Bedside Mobility Assessment Tool (BMAT 2.0) Competency to Promote Early Mobilization, Ensure Patient Safety, and Maximize Health Outcomes.

Dang, T., Roberts, D., Murray, A., & Wiggermann, N. (2022). A return-on-investment model using clinical and economic data related to safe patient handling and mobility programs in the ICU. *International Journal of Industrial Ergonomics*, 92, 103372.

<https://www.sciencedirect.com/science/article/pii/S0169814122001135>

Dayton, K., Francis, R., Arnold, M., & Locke, K. (2023). Early patient mobility: These safety practices improve care and ease nurses' workload. *American Nurse Journal*, 18(4), 42-43.

Dickinson, S., Taylor, S., & Anton, P. (2018). Integrating a standardized mobility program and safe patient handling. *Critical Care Nursing Quarterly*, 41(3), 240-252.

Dregne, R., & Koehne, K. (2018). House-wide safe patient handling program to mobilize patients early and often: One organization's journey. *Interdisciplinary Journal of Nursing and Critical Care* 2(1), 1-8

Fessele, K. L., & Syrkin, G. (2024, August). Mobility Assessment Instruments. In *Seminars in Oncology Nursing* (Vol. 40, No. 4, p. 151660). WB Saunders.

Fray, M., Hignett, S., & Gyi, D. (2022). Impact of ultra-low height healthcare beds on falls and mobility: A systematic review. *International Journal of Safe Patient Handling & Mobility*, 12(1), 21-32.

Gabele, D., Mendez, S., & Giuliano, K. K. (2023). Early and progressive mobility in a community hospital: A new interdisciplinary safe patient handling and mobility model. *Nursing Management*, 54(3), 22.

Gallagher, A., Dube, J., & Wawzyniecki, P. (2019). International round table discussion: Engaging patients and family in safe patient handling and early mobility decision-making. (2019). *International Journal of Safe Patient Handling & Mobility*, 9(1), 42–46.

Graulich, B., Labreche, M., Nydahl, P., & Strøm, T. (2018). Is there a need for lift or mobility teams within the ICU and beyond? *International Journal of Safe Patient Handling & Mobility*, 8(4), 182–186.

Growdon, M. E., Shorr, R. I., & Inouye, S. K. (2017). The tension between promoting mobility and preventing falls in the hospital. *JAMA Internal Medicine*, 177(6), 759-760.

Han, J., et al. (2024). The addition of a dedicated mobility team to improve patient ambulation and out of bed rates. *International Journal of Safe Patient Handling & Mobility*, 14(3), 100–104.

Hardin-Wike, B. (2022). *Systematic Review of Physiologic Assessment Measures for Mobility Readiness of Adult Patients in Critical Care* (Doctoral dissertation, Walden University).

<https://www.proquest.com/openview/8ac1ea6fe81e23f68ba2415b848c9d31/1?pq-origsite=gscholar&cbl=18750&diss=y>

Hignett, S., Goodwin, E., & Wolf, L. (2021). Integrated in-patient risk assessment: Moving & handling, falls, pressure ulcers, continence, dementia. *Advances in Human Aspects of Healthcare and Medicine*, 41.

Safe Patient Handling and Mobility – Section 10

- Hook, M., Dailey, M. S., Singh, M., Schneuker, D., Mitchell, L., Milligan, K., ... & Kelly, L. (2024). Comprehensive Mobility Evaluation Tool (CMET): Confirming validity, reliability, and benefits for guiding nurse-led mobility. *Medsurg Nursing*, 33(6), 277–292.
- Jones, D., & Eaferton, G. (2020). Reducing preventable injuries through the Safe Patient Handling and Mobility Program Bundle. *International Journal of Safe Patient Handling & Mobility*, 1(4), 134–138.
- Kayser, S. A., Wiggermann, N. E., & Kumpar, D. (2020). Factors associated with safe patient handling practice in acute care and its relationship with patient mobilization: A cross-sectional study. *International Journal of Nursing Studies*, 104, 103508.
- Kennedy, J. (2024). *Nurse-Driven Early Mobility Impact on Intensive Care Unit Length of Stay* (Doctoral dissertation, Grand Canyon University).
<https://www.proquest.com/openview/9114a8f4b70185b4ad9c9703a4067572/1?pq-origsite=gscholar&cbl=18750&diss=y>
- Klein, L. M., Kumble, S., & Friedman, M. (2021). Incorporating mobility promotion and safe patient handling into nursing staff skills day. *International Journal of Safe Patient Handling & Mobility*, Special Issue: Early Mobility, SI-18–SI-21. Visioning Publishers LLC.
- Kneafsey, R., Clifford, C., & Greenfield, S. (2015). Perceptions of hospital manual handling policy and impact on nursing team involvement in promoting patients' mobility. *Journal of Clinical Nursing*, 24, 289–299.
- Krupp, A. E., Tan, A., Vasilevskis, E. E., Mion, L. C., Pun, B. T., Brockman, A., ... & Balas, M. C. (2024). Patient, practice, and organizational factors associated with early mobility performance in critically ill adults. *American Journal of Critical Care*, 33(5), 324-333.
- Krupp, A., Steege, L., Lee, J., Lopez, K. D., & King, B. (2022). Supporting decision-making about patient mobility in the intensive care unit nurse work environment: Work domain analysis. *JMIR nursing*, 5(1), e41051.
- Kumble, S., McLaughlin, K. H., Funk, K., Dekany, S., Ludwig, D., Farley, H., ... & JH-AMP Group. (2024). Development of a New Tool to Combine the Promotion of Patient Mobility With Safe Patient Handling Equipment: The Johns Hopkins Safe Patient Handling Mobility (JH-SPHM) Guide. *Workplace Health & Safety*, 72(11), 503-513.
- Labreche, M., Tucker, K., & Kleinclaus, T. (2017). Case study: A 600-lb patient journey to walk after 3 years of immobility. *International Journal of Safe Patient Handling & Mobility*, 7(3), 122–128.
- LaVigne, A., & Arnold, M. (2016). Decision making for safe patient handling and mobility technology in an early mobility program. *American Journal of Safe Patient Handling & Mobility*, 6(2), 65–72.
- Marcus, P., et al. (2021). Utilization of a wellness/mobility technician: Interprofessional inpatient oncology population-focused quality improvement project. *International Journal SPHM*, 11(1), 36-43.
- McWilliams, D., Atkins, G., Hodson, J., & Snelson, C. (2017). The Sara Combilizer® as an early mobilisation aid for critically ill patients: A prospective before and after study. *Australian Critical Care*, 30(4), 189-195.
- McWilliams, D., & Cook, S. (2022). An evaluation of the clinical use of an early mobility device to support rehabilitation for patients admitted to ICU. *International Journal of Safe Patient Handling & Mobility*, Special Issue: Early Mobility, SI-10–SI-17. Visioning Publishers LLC.
- Nack, B., Combs, J., & Herron-Foster, B. (2019). An interdisciplinary approach: Answering the how, when, and where of early mobility technology. *International Journal of Safe Patient Handling & Mobility*, 9(2), 57–68.
- Obreja, V., Marcarian, T., & Miller, P. S. (2025). Ambulation Protocol for Adult Patients Receiving Extracorporeal Membrane Oxygenation: A Quality Improvement Initiative. *Critical Care Nurse*, 45(1), 52-60.

Safe Patient Handling and Mobility – Section 10

Pryor, L., Giuliano, K. K., & Gallagher, S. (2021). Creating a culture of worker safety: evidence-based safe mobility in the ICU. *J Assoc Occup Prof Health*, 41(3), 34-37.

Redler, G., & Bauce, K. (2024). Adding a Mobility Champion to an Existing Progressive Mobility Protocol: An Evidence-Based Initiative. *Journal of Gerontological Nursing*, 50(11), 37-43.

Suzuki, G., Kanayama, H., Arai, Y., Iwanami, Y., Kobori, T., Masuyama, Y., ... & Okuni, I. (2024). Early mobilization using a mobile patient lift in the ICU: A randomized controlled trial. *Critical Care Medicine*, 52(6), 920-929.

Turner, R., Agarwal, N., Agarwal, S., & Best, L. (2020). Bringing life to a systemwide early mobility clinical practice: Part 1. *International Journal of Safe Patient Handling & Mobility*, 10(4), 126–133.

Turner, R., Agarwal, N., Agarwal, S., Best, L. (2022). International roundtable discussion: Safe patient handling and movement program development and sustainability. *International Journal of Safe Patient Handling & Mobility*, 12(4), 124–128.

Turner, R., Agarwal, N., Agarwal, S., Best, L., & Noble, J. (2021). Bringing life to a systemwide early mobility clinical practice: Part 2. *International Journal of Safe Patient Handling & Mobility*, 11(1), 190–198.

Wyatt, S., Meacci, K., & Arnold, M. (2020). Integrating safe patient handling and early mobility: Combining quality initiatives. *Journal of Nursing Care Quality*, 35(2), 130–134.

Placing a Patient into a Prone Position using SPHM Technology

Church, M., & Chechile, J. (2020). Evaluation of techniques for prone positioning using safe patient handling equipment. *International Journal of Safe Patient Handling & Mobility*, 10(3), 98-110.

Enos, L. (2021). Safe handling of patients during COVID. Applied Ergonomics Conference 2021. Webinar.

Kumar, J. (2022, March). PSQH Innovation Awards Winner: SCL Health improves process for prone positioning of COVID-19 patients. Patient Safety Awareness Week Special Report.

Labreche, M. (2020). Safe patient handling and mobility plan for the COVID-19 units at a Level 1 trauma center in Florida. *Journal of Safe Patient Handling & Mobility*, 10(2), 59-66.

O'Donoghue, S. C., Church, M., Russell, K., Gamboa, K. A., Hardman, J., Sarge, J., ... & DeSanto-Madeya, S. (2021). Development, implementation, and impact of a proning team during the COVID-19 intensive care unit surge. *Dimensions of Critical Care Nursing*, 40(6), 321-327.

Ryan, P., Fine, C., & DeForge, C. (2021). An evidence-based protocol for manual prone positioning of patients with ARDS. *Critical Care Nurse*, 41(6), 55-60

Age-Friendly Health Systems – CMS Requirements Related to Mobility

- Age-Friendly Health Systems. Institute for Healthcare Improvement (IHI)
<https://www.ihl.org/partner/initiatives/age-friendly-health-systems>
- Medicare and Medicaid Programs and the Children's Health Insurance Program; Hospital Inpatient Prospective Payment Systems for Acute Care Hospitals and the Long-Term Care Hospital Prospective Payment System and Policy Changes and Fiscal Year 2025 Rates; Quality Programs Requirements; and Other Policy Changes. A Rule by the Centers for Medicare & Medicaid Services on 08/28/2024.

Age-Friendly Health Systems – CMS Requirements Related to Mobility

<https://www.federalregister.gov/documents/2024/08/28/2024-17021/medicare-and-medicaid-programs-and-the-childrens-health-insurance-program-hospital-inpatient>

- The John Hartford Foundation Posted August 1, 2024. CMS Approves New 2025 Age-Friendly Hospital Measure. <https://www.johnhartford.org/resources/view/cms-passes-new-2025-age-friendly-hospital-measure>
- The John Hartford Foundation (2024). Overview of Age-Friendly Hospital Measure <https://www.johnhartford.org/images/uploads/resources/Age-Friendly-Hospital-Measure-Domains-2024-Final-Rule-p-1428.pdf>
- Wald, H. L., Ramaswamy, R., Perskin, M. H., Roberts, L., Bogaisky, M., Suen, W., ... & Quality and Performance Measurement Committee of the American Geriatrics Society. (2019). The case for mobility assessment in hospitalized older adults: American Geriatrics Society white paper executive summary. Journal of the American Geriatrics Society, 67(1), 11–16. <https://livengoodmed.com/wp-content/uploads/2019/03/The-Case-for-Mobility-Assessment-in-Hospitalized-Older-Adults.pdf>

SPHM Education and Training

Refer to Section 6 *Tool 6a* for a list of freely available SPHM training resources.

Refer to SPHM General Resources for more training-related information

Alamgir, H., Yu, S., & Gorman, E. (2011). Peer coaching and mentoring: A new model of educational intervention for safe patient handling in health care. American Journal of Industrial Medicine, 54(8), 609–617.

Aljohani, W. A., & Pascua, G. P. (2019). Impacts of manual handling training and lifting devices on risks of back pain among nurses: An integrative literature review. Nurse Media Journal of Nursing, 9(2), 210-230.

American Association of Colleges of Nursing. (2023). Guiding principles for competency-based education and assessment. <https://www.aacnnursing.org/Portals/0/PDFs/Essentials/Guiding-Principles-for-CBE-Assessment.pdf>

Andersen, S. N., & Broberg, O. (2015). Participatory ergonomics simulation of hospital work systems: The influence of simulation media on simulation outcome. Applied Ergonomics, 51, 331–342. 003

Anderson, M. P., Carlisle, S., Thomson, C., Ross, C., Reid, H. J., Hart, N. D., & Clarke, A. (2014). Safe moving and handling of patients: An interprofessional approach. Nursing Standard, 28(46).

Aslam, I., Davis, S. A., Feldman, S. R., & Martin, W. E. (2015). A review of patient lifting interventions to reduce health care worker injuries. Workplace Health & Safety, 63(6), 267-275.

Bartley, C., Webb, J. A., & Bayly, J. (2015). Multidisciplinary approaches to moving and handling for formal and informal carers in community palliative care. International Journal of Palliative Care, 21(1).

Berthelette, D., Leduc, N., Bilodeau, H., Durand, M. J., & Faye, C. (2012). Evaluation of the implementation fidelity of an ergonomic training program designed to prevent back pain. Applied Ergonomics, 43(1), 239-245.

Safe Patient Handling and Mobility – Section 10

- Boucaut, R., & Howson, D. (2018). Teaching safe patient handling skills using a peer approach. *Radiologic Technology*, 90, 20–30.
- Casey, T., Turner, N., Hu, X., & Bancroft, K. (2021). Making safety training stickier: A richer model of safety training engagement and transfer. *Journal of safety research*, 78, 303-313.
- Clarke, N. (2013). Transfer of training: The missing link in training and the quality of adult social care. *Health & Social Care in the Community*, 21, 15–25.
- D'Arcy, L. P., Sasai, Y., & Stearns, S. C. (2012). Do assistive devices, training, and workload affect injury incidence? Prevention efforts by nursing homes and back injuries among nursing assistants. *Journal of Advanced Nursing*, 68(4),
- Daily, M. K. (2014). Evaluation of a continued safe patient and handling program (Doctoral dissertation, University of Massachusetts Amherst) <https://scholarworks.umass.edu/entities/publication/a01f18eb-de23-43c8-83c0-00bb8a4f4b53>
- Demir, O. B., & Yilmaz, F. T. (2024). The effect of posture regulation training on musculoskeletal disorders, fatigue level and job performance in intensive care nurses. *BMC nursing*, 23(1), 778.
- Denis, D., Gonella, M., Comeau, M., & Lauzier, M. (2019). Why Doesn't Training Based on Safe Handling Techniques Work. *A Critical Review of the Literature*.
- El Hussein, M. T., & Hirst, S. P. (2023). High-fidelity simulation's impact on clinical reasoning and patient safety: A scoping review. *Journal of Nursing Regulation*, 13(4), 54–65.
[https://www.journalofnursingregulation.com/article/S2155-8256\(23\)00028-5/fulltext](https://www.journalofnursingregulation.com/article/S2155-8256(23)00028-5/fulltext)
- Eljiz, K., Greenfield, D., Hogden, A., et al. (2020). Improving knowledge translation for increased engagement and impact in healthcare. *BMJ Open Quality*, 9, e000983.
- Enos, L., Eldredge, D., & Rockefeller, K. (2016). Safe patient handling training programs—Measuring transfer of training: A case study. *American Journal of Safe Patient Handling and Movement*, 6(3), September.
- Eustace, R. (2020, August 21). From novice to expert. In P. Benner (Author), *Nursing.net*.
<https://nursology.net/nurse-theories/from-novice-to-expert/>
- Faisting, A. L. R. F., & de Oliveira Sato, T. (2019). Effectiveness of ergonomic training to reduce physical demands and musculoskeletal symptoms-An overview of systematic reviews. *International Journal of Industrial Ergonomics*, 74, 102845.
- Fink, L. D. (2023). Taxonomy of significant learning. York University.
https://www.yorku.ca/teachingcommons/wp-content/uploads/sites/38/2023/11/Food_for_Thought-16-Finks-Taxonomy-of-Significant-Learning.pdf
- Fogstad, L., & Christiansen, B. (2011). Moving the boundaries: Peer learning between nursing and physiotherapy students. *Nordic Journal of Nursing Research*, 31(3), 25–29.
- Fritz, E. A., & Wagner, J. A. R. (2024). Revitalizing and Sustaining a System-Wide Competency Model. *Journal for Nurses in Professional Development*, 40(5), 262-265.
- Gallagher, A., Hares, K., & Wright, D. (2018). International round table discussion: Training and competency in safe patient handling. *International Journal of Safe Patient Handling and Mobility*, 8(3), 142–152. Visioning Publishers LLC.
- Gattinger, H., Stolt, M., Hantikainen, V., Köpke, S., Senn, B., & Leino-Kilpi, H. (2015). A systematic review of observational instruments used to assess nurses' skills in patient mobilisation. *Journal of Clinical Nursing*, 24, 640–661.
- Gentry, I. (2022). Evidence-based best practice for nursing skills competency assessment: A policy development project for standard work utilizing the Donna Wright competency model (Doctoral project, University of St Augustine for Health Sciences). SOAR @ USA: Student Scholarly Projects Collection.

Safe Patient Handling and Mobility – Section 10

- Graham, P. L. (2020). Increasing patient and student nurse safety using safe patient handling. *Clinical Simulation in Nursing*, 45, 24-27.
- Graves, A. (2021). Minimizing Musculoskeletal Injury Risk in Health Care Professionals with Education on Safe Patient Handling.
- Hartvigsen, J., Lauritzen, S., Lings, S., & Lauritzen, T. (2005). Intensive education combined with low tech ergonomic intervention does not prevent low back pain in nurses. *Occupational and environmental medicine*, 62(1), 13-17.
- Harwood, K., Darragh, A. R., Campo, M., Rockefeller, K., & Scalzetti, D. A. (2018). A systematic review of safe patient handling and mobility programs to prevent musculoskeletal injuries in occupational and physical therapists and assistants. *International Journal for Safe Patient Handling and Mobility*, 8(1).
- Hernandez, J. M., Munyan, K., Thompson, K., Wilson, C., Arena, S., & Noack, D. (2021). Interprofessional education safe patient handling and mobility workshop for persons of size. *International Journal of Safe Patient Handling & Mobility*, 11(1), 6–15.
- Hignett, S., & Crumpton, E. (2007). Competency-based training for patient handling. *Applied Ergonomics*, 38(1), 7-17.
- Hodder JN, MacKinnon SN, Ralhan A, Keir PJ. Effects of training and experience on patient transfer biomechanics. *Ergonomics*. 2010; 40(3): 282-288.
- Hogan, D. A. M., Greiner, B.A., & O'Sullivan, L. (2014). The effect of manual handling training on transferring knowledge, employee's behaviour, change and subsequent reduction of work-related musculoskeletal disorders: A systematic review. *Ergonomics*, 5, 93–107.
- Huang, Z., Nagata, A., Kanai-Pak, M., Maeda, J., Kitajima, Y., Nakamura, M., ... Ota, J. (2014). Automatic evaluation of trainee nurses' patient transfer skills using multiple Kinect sensors. *IEICE Transactions on Information and Systems*, E97–D(1), 107–118.
- Hughes, A. M., Zajac, S., Woods, A. L., & Salas, E. (2020). The role of work environment in training sustainment: A meta-analysis. *Human factors*, 62(1), 166-183.
- Iakovou, G. T. (2008). Implementation of an evidence-based safe patient handling and movement mobility curriculum in an associate degree nursing program. *Teaching and Learning in Nursing*, 3(2), 48-52.
- Johnstone, J. (2020). Manual handling: The challenges of different care environments. *British Journal of Nursing*, 29(6), 358-363.
- Kanaskie, M. L., & Snyder, C. (2018). Nurses and nursing assistants decision-making regarding use of safe patient handling and mobility technology: A qualitative study. *Applied Nursing Research*, 39, 141 – 147.
- Kaplan, A. D., Cruik, J., Endsley, M., Beers, S. M., Sawyer, B. D., & Hancock, P. A. (2021). The effects of virtual reality, augmented reality, and mixed reality as training enhancement methods: A meta-analysis. *Human Factors*, 63(4), 706–726.
- Knibbe, H., Knibb, N. E., & Klassen, A. (2012). Ergo Coaches: Peer leaders promoting ergonomic changes—Exploring their profile and effect. *One Time Download*, 2(3), 93–99.
- Knibbe, J. J., Knibbe, N. E., & Waaijer, E. (2012). Flying through the hospital: Efficiency and safety of an ergonomic solution. *Work*, 41(Supplement 1), 5642–5643.
- Kox, J. H., Bakker, E. J., Bierma-Zeinstra, S., Runhaar, J., Miedema, H. S., & Roelofs, P. D. (2020). Effective interventions for physical health complaints in nursing students and novice nurses: A systematic review. *Nurse Education in Practice*, 44, 102772.
- Krill, C., Staffileno, B. A., & Raven, C. (2012). Empowering staff nurses to use research to change practice for safe patient handling. *Nursing Outlook*, 60(3), 157–162.

Safe Patient Handling and Mobility – Section 10

- Kugler, H. L., Taylor, N. F., & Brusco, N. K. (2024). Patient handling training interventions and musculoskeletal injuries in healthcare workers: Systematic review and meta-analysis. *Heliyon*, 10(3).
- Kugler, H. L., Taylor, N. F., Boyd, L., & Brusco, N. K. (2023). Nurses sustain manual handling risk assessment behaviours six-months after a training program to move patients safely: a pre-post study. *Disability and Rehabilitation*, 45(5), 927-935.
- Lavender, S. A., Lorenz, E. P., & Andersson, G. B. (2007). Can a new behaviorally oriented training process to improve lifting technique prevent occupationally related back injuries due to lifting? *Spine*, 32, 487–494.
- Leary, Marion. "Applying Storytelling to Health and Healthcare." American Nurse Journal, 2022. <https://www.myamericannurse.com/applying-storytelling-to-health-and-healthcare>
- Lee, C., Knight, S. W., Smith, S. L., Nagle, D. J., & DeVries, L. (2018). Safe patient handling and mobility: Development and implementation of a large-scale education program. *Critical Care Nursing Quarterly*, 41(3), 253–263.
- Lee, N. P., & Chiang, V. C. (2021). The mentorship experience of students and nurses in pre-registration nursing education: A thematic synthesis of qualitative studies. *Nursing & Health Sciences*, 23(1), 69-86.
- Lee, S. J., Lee, J. H., & Harrison, R. (2019). Impact of California's safe patient handling legislation on musculoskeletal injury prevention among nurses. *American Journal of Industrial Medicine*, 62(1), 50-58.
- Lewis, L. S., Rebesch, L. M., & Hunt, E. (2022). Nursing education practice update 2022: Competency-based education in nursing. *SAGE Open Nursing*, 8, 23779608221140774.
- Lorio, A. K., Florman, T. M., Gore, J. B., Housley, S. N., & Nelson, M. A. (2016). Power of peer-assisted learning: An interdisciplinary mobility laboratory experience. *Journal of Nursing Education*, 55, 83–86.
- Lorio, A., Florman, T., Gore, J., Housley, S., & Nelson, M. (2016). Power of peer-assisted learning: An interdisciplinary mobility laboratory experience. *Journal of Nursing Education*, 55(2), 83–86.
- Martimo, K. P., Verbeek, J., Karppinen, J., Furlan, A. D., Takala, E. P., Kuijer, P. P. F., ... & Viikari-Juntura, E. (2008). Effect of training and lifting equipment for preventing back pain in lifting and handling: Systematic review. *BMJ*, 336(7641), 429-431.
- Martin, F., Sun, T., & Westine, C. D. (2020). A systematic review of research on online teaching and learning from 2009 to 2018. *Computers & Education*, 159, 104009.
- Matz, M., Celona, J., Martin, M., McCoskey, K., & Nelson, G. G. (2019). Patient handling and mobility assessments (2nd ed.). https://www.fgiguideelines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf
- McDermott, H., Haslam, C., Clemes, S., Williams, C., & Haslam, R. (2012). Investigation of manual handling training practices in organisations and beliefs regarding effectiveness. *International Journal of Industrial Ergonomics*, 42(2), 206-211.
- Mechan, P. (2014). Challenging the myth that it takes too long to use safe patient handling and mobility technology: A task time investigation. *American Journal of Safe Patient Handling & Movement*, 4, 46–51.
- Mechan, P. (2016). Recommendations for Teaching and Learning Skills with SPHM Technology. *American Journal of Safe Patient Handling & Mobility*, 6(3), 104-108.
- Melin, J., Parmelund, N., & Johansson, M. (2025). Rehabilitation Professionals' Self-Perceived Competence in Safe Patient Handling and Mobility Methods Before and After Training: A Cohort Study. *Health Science Reports*, 8(4), e70755.
- Mink, J., Mitzkat, A., Krug, K., Mihaljevic, A., Trierweiler-Hauke, B., Götsch, B., ... & Mahler, C. (2021). Impact of an interprofessional training ward on interprofessional competencies—a quantitative longitudinal study. *Journal of Interprofessional Care*, 35(5), 751–759.

Safe Patient Handling and Mobility – Section 10

Monaghan, H. (2011). Effective Training and Education Strategies as Part of a Safe Patient Handling and Movement Program. *American Journal of Safe Patient Handling & Mobility*, 1(4), 17-21.

Monaghan, H. (2020). Making Safe Patient Handling and Mobility Training Effective. Part 2. Assessing Competent Practice. *International Journal of Safe Patient Handling & Mobility*, 10(1), 37-41.

Monaghan, H. M. (2019). Making safe patient handling and mobility training effective. Part 1. What to teach, where and when to teach it and how to teach it. *International Journal Of Safe Patient Handling & Mobility (SPHM)*, 9(4), 143-148.

Moore, G., Parker, S., & Baksh, L. (2021). Generational learning preferences: Target patient teaching to match generational and individual needs. *American Nurse Journal*, 16(12), 33–37.

<https://www.myamericannurse.com/wp-content/uploads/2021/12/an12-Generational-learning-1201.pdf>

Nelson, A. L., Waters, T. R., Menzel, N. N., et al. (2007). Effectiveness of an evidence-based curriculum module in nursing schools targeting safe patient handling and movement. *International Journal of Nursing Education Scholarship*, 4, Article 26.

Nelson, A., Motacki, M. K., & Menzel, N. N. (2009). The illustrated guide to safe patient handling and movement. Springer Publishing Company.

Newton, K., Quinton, A., & Childs, J. (2020). The incidence of Australian private practice sonographers moving patients unassisted and their level of training: A pilot study. *Sonography*, 7(2), 48-54.

Noble, N. L., & Sweeney, N. L. (2018). Barriers to the use of assistive devices in patient handling. *Workplace Health & Safety*, 66, 41–48.

Norris, M. W., Spicer, K., & Byrd, T. (2019). Virtual reality: the new pathway for effective safety training. *Professional Safety*, 64(06), 36-39.

Northwell Health VR SPHM training <https://northwellworkforcesafety.com/virtual-reality-training/>

O'Donnell, J. M., Goode, J. S., Henker, R., Kelsey, S., Bircher, N. G., Peele, P., Bradle, J., Close, J., Engberg, R., & Sutton-Tyrrell, K. (2011). Effect of a simulation educational intervention on knowledge, attitude, and patient transfer skills from the simulation laboratory to the clinical setting. *Simulation in Healthcare*, 6(2), 84-93.

O'Donnell, J. M. (2009). Development of an optimal patient transfer task set and simulation-based intervention to reduce musculoskeletal injury in healthcare workers. *Ann Arbor, University of Pittsburgh*. 3417439: 146-n/a

O'Donnell, J. M., et al. (2011). "Effect of a simulation educational intervention on knowledge, attitude, and patient transfer skills: from the simulation laboratory to the clinical setting." *Simulation in healthcare : journal of the Society for Simulation in Healthcare* 6(2): 84-93.

O'Donnell, J. M., et al. (2012). "An Ergonomic Protocol for Patient Transfer That Can Be Successfully Taught Using Simulation Methods." *Clinical Simulation in Nursing* 8(1): e3-e14 11p.

Olkowski, B. F., & Stolfi, A. M. (2014). Safe patient handling perceptions and practices: A survey of acute care physical therapists. *Physical Therapy*, 94(5), 682-695.

Ollevier, A., Knibbe, N., Sorel, B., Buckens, F., & Goderis, T. (2025). The use of the MK5 Mobility Classes to improve safe patient handling: a reliability study. *British Journal of Nursing*, 34(1), 42-48.

Oosterom, N., Floren, L. C., Ten Cate, O., & Westerveld, H. E. (2019). A review of interprofessional training wards: Enhancing student learning and patient outcomes. *Medical Teacher*, 41(5), 547–554.

Occupational Safety and Health Administration (2021). Resource for Development and Delivery of Training to Workers. OSHA 3824-05R 2021.

<https://www.osha.gov/sites/default/files/publications/osha3824.pdf>

Safe Patient Handling and Mobility – Section 10

Palesy, D. (2018). Developing manual handling skills in relative social isolation: A case study of Australian home care workers. *Journal of Adult and Continuing Education*, 24(1), 37-57.

Palesy, D., & Billett, S. (2017). Learning manual handling without direct supervision or support: A case study of home care workers. *Social Work Education*, 36(3), 273-288.

Palsson, T. S., Boudreau, S., Høgh, M., Herrero, P., Bellosta-Lopez, P., Domenech-Garcia, V., ... & Villumsen, M. (2020). Education as a strategy for managing occupational-related musculoskeletal pain: a scoping review. *BMJ open*, 10(2), e032668.

Patocka, C., Pandya, A., Brennan, E., Lacroix, L., Anderson, I., Ganshorn, H., & Hall, A. K. (2024). The impact of just-in-time simulation training for healthcare professionals on learning and performance outcomes: a systematic review. *Simulation in Healthcare*, 19(1S), S32-S40.

Perez, A. (2016). An evidence-based approach to safe patient handling and mobility education. *American Journal of Safe Patient Handling & Mobility*, 6(3), 113-119.

Perez, A., Rendahl, T., Murray, E., & Monaghan, H. (2012). Safe patient handling & movement: Equipment safety. *American Journal of Patient Handling and Movement*, 2(4, Supplement), S1–S17.

Phillips, J. T. (2017). An online learning module about obesity and bariatric care for occupational therapy practitioners and students (Doctoral dissertation, Boston University).
<https://open.bu.edu/handle/2144/27059>

Powell-Cope, G., Pippins, K. M., & Young, H. M. (2017). Teaching family caregivers to assist safely with mobility. *American Journal of Nursing*, 117(12), 49–53.

Powell-Cope, G., Toyinbo, P., Patel, N., & others. (2014). Effects of a national safe patient handling program on nursing injury incidence rates. *Journal of Nursing Administration*, 44(10), 525–534.

Reid, S. A., & Mirka, G. A. (2007). Learning curve analysis of a patient lift-assist device. *Applied ergonomics*, 38(6), 765-771.

Resnick, M. L., & Sanchez, R. (2009). Reducing patient handling injuries through contextual training. *Journal of Emergency Nursing*, 35(6), 504-508.

Richardson, A., McNoe, B., Derrett, S., & Harcombe, H. (2018). Interventions to prevent and reduce the impact of musculoskeletal injuries among nurses: A systematic review. *International Journal of Nursing Studies*, 82, 58–67.

Roberts, T. (2020). Simulation to teach safe patient handling and mobility for home caregivers. *Home Health Care Management & Practice*, 32, 206–210.

Rolando, J., Wijekumar, K., & Barnes, R. (2018). VR training software: Research shows strong results for learners. *Professional Safety*, 63(12), 35-38.

Roy, A., Joseph, Y., & Bannan, K. (2020). Role of structured safe patient handling training for new-hire nursing staff on reducing musculoskeletal injuries, staff empowerment, and knowledge translation. *International Journal of Safe Patient Handling and Mobility*, 10(4), 121–125.

Schroth, L. A., St Pierre, E. J., & Hody, B. J. (2023). Are my workers competent in EHS? Competency-based training to improve learning. *Professional Safety*, 68(12), 30-37.

Shorey, S., & Ng, E. D. (2021). The use of virtual reality simulation among nursing students and registered nurses: A systematic review. *Nurse Education Today*, 98, 104662.

Simulation-based Experiential Learning Faculty Toolkit. (2021). Queens University.
<https://www.queensu.ca/experientiallearninghub/faculty/simulation-based-el-faculty-toolkit>

Skoglund-Öhman, I., & Kjellberg, K. (2011). Factors that influence the use of safe patient transfer technique in home care service. *International Journal of Occupational Safety and Ergonomics*, 17(4), 433–444.

Safe Patient Handling and Mobility – Section 10

- Smith, J., Simpson, P., & Fray, M.(Eds) (2023). HOP7: The guide to handling of people. Person-centered practice <https://backcare.org.uk/hop7m/hop-purchase/>
- Smolen, P., Zhang, Y., & Byrne, J. H. (2016). The right time to learn: Mechanisms and optimization of spaced learning. *Nature Reviews Neuroscience*, 17(2), 77–88.
- Spaulding, E. M., Marvel, F. A., Jacob, E., Rahman, A., Hansen, B. R., Hanyok, L. A., & Han, H. R. (2021). Interprofessional education and collaboration among healthcare students and professionals: A systematic review and call for action. *Journal of Interprofessional Care*, 35(4), 612–621.
- Stevens, L., Rees, S., Lamb, K. V., & Dalsing, D. (2013). Creating a culture of safety for safe patient handling. *Orthopedic Nursing*, 32, 155–164.
- Stubbs DA, Buckle PW, Hudson MP, Rivers PM. Back pain in the nursing profession. II. The effectiveness of training. *Ergonomics*. 1983;26:767–79.
- Tamminen-Peter, L., & Nygren, K. (2019). Development of an education scheme for improving perioperative nurses' competence in ergonomics. *Work*, 64(3), 661-667.
- Theis, J. L., & Finkelstein, M. J. (2014). Long-term effects of safe patient handling program on staff injuries. *Rehabilitation Nursing Journal*, 39(1), 26–35.
- Thomas, D. R., & Thomas, Y. L. (2014). Interventions to reduce injuries when transferring patients: A critical appraisal of reviews and a realist synthesis. *International Journal of Nursing Studies*, 51(10), 1381–1394.
- Turner, F., Seiger, C., & Devine, N. (2013). Impact of patient and caregiver transfer training provided by a physical therapist in the hospice setting: a case study. *American Journal of Hospice and Palliative Medicine*, 30(2), 204-209.
- Vaona, S. A., Banzi, R., Kwag, K. H., Rigon, G., Cereda, D., Pecoraro, V., ... & Moja, L. (2018). E-learning for health professionals. *Cochrane Database of Systematic Reviews*, 2018(1). <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD011736.pub2/full>
- Vollman, K. M., & Bassett, R. (2014). Transforming the culture: the key to hardwiring early mobility and safe patient handling: culture change requires deliberate focus, staff education, and full engagement. *American Nurse Today*, 9(9), S7-S7.
- Wade, H. C. (2015). A qualitative exploration of community therapists' experiences of applying guidance on safe patient handling (Master's thesis, Coventry University, UK). https://pure.coventry.ac.uk/ws/portalfiles/portal/30459539/Wade_MSc.pdf
- Wanless, S. (2017). Applying theories of health behavior and change to moving and handling practice. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 7(3), 105-109.
- Wanless, S., & Hopper, D. (2015). Moving and Handling Practice: The Challenge for Educators. *Equipment Services Journal*, 7, 44-48.
- Warming, S., Ebbelhøj, N. E., Wiese, N., Larsen, L. H., Duckert, J., and Tønnesen, H. (2008). Little effect of transfer technique instruction and physical fitness training in reducing low back pain among nurses: A cluster randomized intervention study. *Ergonomics*, 51, 1530–1548.
- Wiggermann, N., Francis, R., & Solomon, A. (2024). Individual and organizational factors associated with injury history and patient handling behaviors: Results from a nationwide survey of healthcare workers. *Applied Ergonomics*, 118, 104251.
- Wilson, C. M., Beaumont, M. M., Alberstadt, K. M., Drake, J. M., Ednalino, K. G., Thornsberry, M. M., & Zahringer, S. G. (2011). The effectiveness of a patient handling education program for nursing assistants as taught by physical therapy and nursing educators. *Journal of Acute Care Physical Therapy*, 2(1), 10-19.

Incident Reporting, Response and Management

Refer to SPHM General Resources for more information

Incident Investigation

Agency for Healthcare Research and Quality. (2022, August). System-focused event investigation and analysis guide. Rockville, MD. <https://www.ahrq.gov/patient-safety/settings/hospital/candor/modules/guide4.html>

Dempsey, P. (2021). Accident and incident investigation. In G. Salvendy & W. Karwowski (Eds.), *Handbook of human factors and ergonomics* (5th ed., Chapter 21). John Wiley & Sons.

Edwards, J. J., Wexner, S., & Nichols, A. (2021). Debriefing for clinical learning. *Debriefing for Clinical Learning*.

Lyon, B. K., Popov, G., & Roberts, A. (2018). Causal factors analysis: Uncovering & correcting management system deficiencies. *Professional Safety*, 63(10), 49–59.

Newnam, S., Goode, N., Read, G. J., & Salmon, P. M. (2020). Closing the research-practice gap in healthcare: The development and usability evaluation of a patient handling incident investigation toolkit. *Safety Science*, 129, 104844.

Nova Scotia Health Post Incident Debriefing. Overview, tools and videos
<https://library.nshealth.ca/InjuryPrevention/Managers>

Occupational Safety and Health Agency (OSHA) (2015). Incident investigation Guide for Employers
https://www.osha.gov/sites/default/files/IncInvGuide4Empl_Dec2015.pdf

Sabbath, E. L., Pan, Y., McTernan, M. L., Peters, S. E., Lovett, S. M., Stelson, E. A., ... & Boden, L. I. (2024). Adding injury to insult: Unfair treatment at work and occupational injury among hospital patient-care workers. *American journal of industrial medicine*, 67(7), 667-676.

Safety huddle in healthcare settings: a concept analysis (Ghoul, I., Abdullah, A., Awwad, F., & Dardas, L., n.d.). <https://pmc.ncbi.nlm.nih.gov/articles/PMC1191700>

Spears, J. (2002). Incident investigation, a problem-solving process: Identifying and correcting root causes. *Professional Safety*, 47, 25–30.

The Importance of Root Cause Analysis During Incident Investigation
<https://www.osha.gov/sites/default/files/publications/OSHA3895.pdf>

Wiegmann, D. A., Wood, L. J., Solomon, D. B., & Shappell, S. A. (2021). Implementing a human factors approach to RCA2: Tools, processes and strategies. *Journal of Healthcare Risk Management*, 41(1), 31–46.

World Health Organization. (2019, September). After action review debrief – Facilitators manual.
https://extranet.who.int/sph/sites/default/files/document-library/document/D.02%20Facilitators%20Manual%20Debrief%20AAR_sept2019.pdf

Return to Work Programs

Amick, B. C., Lee, H., Hogg-Johnson, S., Katz, J. N., Brouwer, S., Franche, R. L., & Bültmann, U. (2017). How do organizational policies and practices affect return to work and work role functioning following a musculoskeletal injury? *Journal of Occupational Rehabilitation*, 27(3), 393-404.

Safe Patient Handling and Mobility – Section 10

- Chu, P. C., Chin, W. S., Guo, Y. L., & Shiao, J. S. C. (2019). Long-term effects of psychological symptoms after occupational injury on return to work: A 6-year follow-up. *International Journal of Environmental Research and Public Health*, 16(2), 235.
- Collie, A., Sheehan, L., Lane, T. J., Gray, S., & Grant, G. (2019). Injured worker experiences of insurance claim processes and return to work: A national, cross-sectional study. *BMC Public Health*, 19(1), 1-12.
- Green, M. (2018). Integrated disability management. *Journal: The Official Publication of the Ontario Occupational Health Nurses Association*, 37(1), 16-19.
- The Council of State Governments. (2018). Stay-at-Work/Return-to-Work (SAW/RTW) Toolkit. https://seed.csg.org/wp-content/uploads/2020/06/seed_report_issue.pdf
- Cullen, K. L., Irvin, E., Collie, A., Clay, F., Gensby, U., Jennings, P. A., ... & Amick, B. C. (2018). Effectiveness of workplace interventions in return-to-work for musculoskeletal, pain-related and mental health conditions: An update of the evidence and messages for practitioners. *Journal of Occupational Rehabilitation*, 28, 1-15.
- Dyck, D. (2019). Case management: Where theory meets occupational health nursing practice? *OOHNA Journal*, 38(2), 28-40.
- Etuknwa, A., Daniels, K., & Eib, C. (2019). Sustainable return to work: A systematic review focusing on personal and social factors. *Journal of Occupational Rehabilitation*, 29, 679-700.
- Gross, D. P., Steenstra, I. A., Shaw, W., Yousefi, P., Bellinger, C., & Zaïane, O. (2020). Validity of the work assessment triage tool for selecting rehabilitation interventions for workers' compensation claimants with musculoskeletal conditions. *Journal of Occupational Rehabilitation*, 30, 318-330.
- IAIABC Disability Management and Return to Work Committee. (2016). Return to work: A foundational approach to return to function. <https://dlt.ri.gov/sites/g/files/xkgbur571/files/documents/pdf/wc/Return2WorkFoundation.pdf>
- Jansen, J., van Ooijen, R., Koning, P. W. C., Boot, C. R., & Brouwer, S. (2021). The role of the employer in supporting work participation of workers with disabilities: a systematic literature review using an interdisciplinary approach. *Journal of Occupational Rehabilitation*, 31(4), 916-949.
- Jetha, A., LaMontagne, A. D., Lilley, R., Hogg-Johnson, S., Sim, M., & Smith, P. (2018). Workplace social system and sustained return-to-work: A study of supervisor and co-worker supportiveness and injury reaction. *Journal of Occupational Rehabilitation*, 28, 486-494.
- Job Accommodation Network. (n.d.). Stay at Work (SAW)/Return to Work (RTW). Retrieved from <https://askjan.org/topics/return.cfm>
- Kurnianto, A. A., Kovács, S., Ágnes, N., & Kumar, P. (2025, May). Economic Evaluations of Rehabilitation Interventions: A Scoping Review with Implications for Return to Work Programs. In *Healthcare* (Vol. 13, No. 10, p. 1152). MDPI.
- Kurowski, A., Pransky, G., & Punnett, L. (2019). Impact of a safe resident handling program in nursing homes on return-to-work and re-injury outcomes following work injury. *Journal of Occupational Rehabilitation*, 29, 286-294.
- Lee, J., Green, B. M., Palmarella, G., McNamara, K., & Wachholtz, A. (2022). Negative impact of chronic pain: The role of locus of control and perceived family validation of chronic pain. *Health Psychology Open*, 9(2), 20551029221125170.
- Liberty Mutual (2024, September 24). Trauma-informed care: A paradigm in healthcare delivery. <https://business.libertymutual.com/insights/trauma-informed-care-an-approach-to-healing-through-sensitivity-and-understanding/>
- Liberty Mutual (2011). Best Practices in Return to Work. <https://cosstraining.org/wp-content/uploads/2023/11/BestPracticesinReturntoWork.pdf>

Safe Patient Handling and Mobility – Section 10

- Li, W., & Wolbring, G. (2019). Analysis of engagement between ethics and return-to-work discourses in respective academic literature. *Work*, 64(1), 3-19.
- Løchting, I., Grotle, M., Storheim, K., Foldal, V., Standal, M. I., Fors, E. A., & Eik, H. (2020). Complex return to work process—caseworkers' experiences of facilitating return to work for individuals on sick leave due to musculoskeletal disorders. *BMC Public Health*, 20(1), 1-10.
- Mullen, K., Gillen, M., Kools, S., & Blanc, P. (2015). Hospital nurses working wounded: Motivations and obstacles to return to work as experienced by nurses with injuries. *Work*, 50(2), 295-304.
- National Institutes of Health (NIH) National Library of Medicine. Selected Health Conditions and Likelihood of Improvement with Treatment 2020. Chapter 5 - Musculoskeletal Disorders <https://www.ncbi.nlm.nih.gov/books/NBK559512/>
- Newnam, S., Goode, N., Read, G. J., & Salmon, P. M. (2020). Closing the research-practice gap in healthcare: The development and usability evaluation of a patient handling incident investigation toolkit. *Safety Science*, 129, 104844.
- Newnam, S., Goode, N., Read, G. J., Salmon, P. M., & Gembarovski, A. (2021). Systems-thinking in action: Results from implementation and evaluation of the patient handling injuries review of systems toolkit. *Safety Science*, 134, 105086.
- New York State Workers' Compensation Board (2025). Employers: Best Practices for Helping Employees Return to Work. <https://www.wcb.ny.gov/returntowork/employer-business-owner.jsp>
- Occupational Safety and Health Agency (OSHA) (2020). Guidance on returning to work. OSHA 4045-06 2020. <https://www.osha.gov/sites/default/files/publications/OSHA4045.pdf>
- Prall, J., & Ross, M. (2019). The management of work-related musculoskeletal injuries in an occupational health setting: the role of the physical therapist. *Journal of exercise rehabilitation*, 15(2), 193
- Robichaud, M. M., Truchon, M., St-Arnaud, L., & Nastasia, I. (2019). Insurers' perspective on barriers and facilitators for return to work after occupational injuries. *Work*, 63(1), 81-97.
- Russell, E., & Kosny, A. (2019). Communication and collaboration among return-to-work stakeholders. *Disability and Rehabilitation*, 41(22), 2630-2639.
- Shaw, W. S., Nelson, C. C., Woiszwilllo, M. J., Gaines, B., & Peters, S. E. (2018). Early return to work has benefits for relief of back pain and functional recovery after controlling for multiple confounds. *Journal of Occupational and Environmental Medicine*, 60(10), 901.
- Souza, A. C., & Alexandre, N. M. (2012). Musculoskeletal symptoms, work ability, and disability among nursing personnel. *Workplace Health & Safety*, 60(8), 353-360.
- Sundstrup, E., Seeberg, K. G. V., Bengtsen, E., & Andersen, L. L. (2020). A systematic review of workplace interventions to rehabilitate musculoskeletal disorders among employees with physically demanding work. *Journal of Occupational Rehabilitation*, 30(4), 588-612.
- US Dept.of Labor. Office of Disability Employment Policy (ND). Stay at Work/Return to Work research and Publications. <https://www.dol.gov/agencies/odep/initiatives/saw-rtw/research-pubs>
- van Vilsteren, M., van Oostrom, S. H., de Vet, H. C., Franche, R. L., Boot, C. R., & Anema, J. R. (2015). Workplace interventions to prevent work disability in workers on sick leave. *Cochrane Database of Systematic Reviews*, (10).
- Venning, A., Oswald, T. K., Stevenson, J., Tepper, N., Azadi, L., Lawn, S., & Redpath, P. (2021). Determining what constitutes an effective psychosocial 'return to work' intervention: a systematic review and narrative synthesis. *BMC Public Health*, 21, 1-25.
- Villotti, P., Kordsmeyer, A. C., Roy, J. S., Corbière, M., Negrini, A., & Larivière, C. (2024). Systematic review and tools appraisal of prognostic factors of return to work in workers on sick leave due to musculoskeletal and common mental disorders. *Plos one*, 19(7), e0307284.

Safe Patient Handling and Mobility – Section 10

White, C., Green, R. A., Ferguson, S., Anderson, S. L., Howe, C., Sun, J., & Buys, N. (2019). The influence of social support and social integration factors on return to work outcomes for individuals with work-related injuries: A systematic review. *Journal of Occupational Rehabilitation*, 29, 636-659.

Aanesen, F., Berg, R., Løchting, I., Tingulstad, A., Eik, H., Storheim, K., ... & Øiestad, B. E. (2021). Motivational interviewing and return to work for people with musculoskeletal disorders: a systematic mapping review. (2021). *Journal of Occupational Rehabilitation*, 31, 63-71.

SPHM and Specialty Care Areas in Acute Care

Critical Care

Also refer to SPHM and Early Mobility on page 10-72.

Dickinson, S., Taylor, S., & Anton, P. (2018). Integrating a standardized mobility program and safe patient handling. *Critical Care Nursing Quarterly*, 41(3), 240–252.

Labreche, L., et al. (2021). Progressive mobility of patients supported on ECMO from dependency to ambulation utilizing safe patient handling techniques. *International Journal of Safe Patient Handling & Mobility*, 11(2), 88-97.

Lee, S. J., Faucett, J., Gillen, M., & Krause, N. (2013). Musculoskeletal pain among critical-care nurses by availability and use of patient lifting equipment: An analysis of cross-sectional survey data. *International Journal of Nursing Studies*, 50, 1648–1657.

Lee, S.-J., Faucett, J., Gillen, M., Krause, N., & Landry, L. (2013). Risk perception of musculoskeletal injury among critical care nurses. *Nursing Research*, 62, 36–44.

O'Byrne, N. (2014). Safe handling of patients in a surgical intensive care unit. *Critical Care Nurse*, 34(2), e27–e28.

Knibbe, H. J., Knibbe, N. E., & Klaassen, A. J. (2007). Safe patient handling program in critical care using peer leaders: Lessons learned in the Netherlands. *Critical Care Nursing Clinics of North America*, 19(2), 205–211.

Sezgin, D., & Esin, M. N. (2015). Predisposing factors for musculoskeletal symptoms in intensive care unit nurses. *International Nursing Review*, 62, 92–101.

Silverwood, S., & Haddock, M. (2006). Reduction of musculoskeletal injuries in intensive care nurses using ceiling-mounted patient lifts. *Dynamics*, 17, 19-21.

Totzkay, D. L. (2018). Multifactorial strategies for sustaining safe patient handling and mobility. *Critical Care Nursing Quarterly*, 41(3), 340–344.

Waters, T. R., Nelson, A., & Proctor, C. (2007). Patient handling tasks with high risk for musculoskeletal disorders in critical care. *Critical care nursing clinics of North America*, 19(2), 131-143.

Perioperative

Association of periOperative Registered Nurses. (2021). Guideline for Safe Patient Handling and Movement. In *Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc; 2021. (For purchase) <https://aornguidelines.org/guidelines/content?sectionid=192587418&view=book>

Association of PeriOperative Registered Nurses. (2015). Pocket reference guide: Safe patient handling and movement in the perioperative setting. <https://www.aorn.org/docs/default->

Safe Patient Handling and Mobility – Section 10

[source/aorndocuments/toolkits/safe-patient-handling/safe-patient-handling-pocket-reference-guide.pdf?sfvrsn=36a9944f_0](https://www.aorn.org/docs/default-source/guidelines-resources/evidence-rating-and-tables/evidence-table-safe-patient-handling-and-movement-020824.pdf?sfvrsn=2aa44a90_1)

Association of Perioperative Registered Nurses. AORN Guideline for Safe Patient Handling: Evidence Table 2024. https://www.aorn.org/docs/default-source/guidelines-resources/evidence-rating-and-tables/evidence-table-safe-patient-handling-and-movement-020824.pdf?sfvrsn=2aa44a90_1

Abdollahi, T., Pedram Razi, S., Pahlevan, D., Yekaninejad, M. S., Amaniyan, S., Leibold Sieloff, C., & Vaismoradi, M. (2020). Effect of an ergonomics educational program on musculoskeletal disorders in nursing staff working in the operating room: A quasi-randomized controlled clinical trial. *International Journal of Environmental Research and Public Health*, 17(19), 7333.

Apple, B., & Letvak, S. (2021). Ergonomic challenges in the perioperative setting. *AORN Journal*, 113(4), 339–348.

Choobineh, A., Movahed, M., Tabatabaie, S. H., & Kumashiro, M. (2010). Perceived demands and musculoskeletal disorders in operating room nurses of Shiraz city hospitals. *Industrial Health*, 48(1), 74–84.

Clari, M., Godono, A., Garzaro, G., Voglino, G., Gualano, M. R., Migliaretti, G., ... & Dimonte, V. (2021). Prevalence of musculoskeletal disorders among perioperative nurses: A systematic review and meta-analysis. *BMC Musculoskeletal Disorders*, 22(1), 1–12.

Clifford, T. (2016). Ergonomics in the perianesthesia setting. *Journal of PeriAnesthesia Nursing*, 31(4), 358–359.

Coleman Wood, K. A., Lowndes, B. R., Buus, R. J., & Hallbeck, M. S. (2018). Evidence-based intraoperative microbreak activities for reducing musculoskeletal injuries in the operating room. *Work*, 60(4), 649–659.

Crockett, S., Dellon, E. S., Biggers, L., & Ernst, D. A. (2021). Use of patient abdominal compression device reduces staff musculoskeletal pain associated with supporting colonoscopy: Results from a randomized controlled trial. *Gastroenterology Nursing*, 44(2), 136.

Hauk, L. (2018). Guideline for safe patient handling and movement. *AORN Journal*, 107(6), P10–P12.

Kraft, S. J., Lowndes, B. R., & Hallbeck, M. S. (2020). Defining best practices for patient safety in positioning and transferring patients with the surgical spine table. *Orthopaedic Nursing*, 39(1), 7–20.

Letvak, S., Apple, B., & Jenkins, M. (2024). Factors affecting perioperative nurse adherence to ergonomic safety measures. *AORN Journal*, 119(3), 210–221.

Letvak, S., Apple, B., Jenkins, M., Doss, C., & McCoy, T. P. (2023, February). At risk safety behaviors of the perioperative nursing team: A direct observational study. In *Healthcare* (Vol. 11, No. 5, p. 698). MDPI.

Link, T. (2018). Guideline implementation: safe patient handling and movement: 1.8. *AORN Journal*, 108(6), 663–674.

Mhlaba, J. M., Christianson, L. W., Davidson, S. J., Graves, S. N., Still, B. R., Silas, M. R., ... & Langerman, A. J. (2016). Field research in the operating room. *Ergonomics in Design*, 24(4), 10–19.

Park, A. E., et al. (2017). Intraoperative “micro breaks” with targeted stretching enhance surgeon physical function and mental focus. *Annals of Surgery*, 265(2), 340–346.

Speth, J. (2024). Guidelines in practice: Safe patient handling and movement. *AORN Journal*, 120(2), 82–89.

Spruce, L. (2020). Safe Patient Handling and Movement. *AORN journal*, 112(1), 63-71. https://www.upstate.edu/hr/document/safe_patient_handling.pdf

Taghi Mojeni, M., Najafi, S. A., & Nomali, M. (2015). Introducing a new technique for limb prepping in orthopedic surgeries: designing, construction, and evaluation of limb-lifting assistive device. *Workplace Health & Safety*, 63(5), 196-199.

Safe Patient Handling and Mobility – Section 10

- Tamminen-Peter, L., & Nygren, K. (2019). Development of an education scheme for improving perioperative nurses' competence in ergonomics. *Work*, 64(3), 661–667.
- Thomas-Olson, L., Gee, M., Harrison, D., & Helal, N. (2015). Evaluating the use of ceiling lifts in the operating room. *ORNAC Journal*, 33(1), 13–22.
- Van Wicklin, S. A. (2018). Challenges in the operating room with obese and extremely obese surgical patients. *International Journal of Safe Patient Handling & Mobility*, 8(3), 120–131.
- Wu, K., Yang, X., & Dai, H. (2021). Risks faced by nurses and mitigation strategies for the daytime operating room: A review. *Alternative Therapies in Health & Medicine*, 27(4).

Emergency Department

- Emergency Nurses Association (2016). Avoiding the Log Roll Maneuver: Alternative Methods for Safe Patient Handling. <https://enau.ena.org/>
- Havey R, Aebersold C, Terrasi J. "Add It to the Parking Lot": Safe Patient Handling and Mobility in the Emergency Department. *Critical Care Nursing Quarterly*. 2018 Jul/Sep;41(3):302-311.
- Hu, C. T., DiPaola, C. P., Conrad, B. P., Horodyski, M., Del Rossi, G., & Rechtine, G. R. (2013). Motion is reduced in the unstable spine with the use of mechanical devices for bed transfers. *The Journal of Spinal Cord Medicine*, 36(1), 58-65.
- Jones, D. W. (2012). Development of a bariatric patient readiness assessment tool for the emergency department. *Advanced Emergency Nursing Journal*, 34(3), 238-249.
- Osborne, A. R., Connell, C., & Morphet, J. (2021). Investigating emergency nurses' beliefs and experiences with patient handling in the emergency department. *Australasian Emergency Care*, 24(1), 49-54.
- Perhats, C., Keough, V., Fogarty, J., Hughes, N. L., Kappelman, C. J., Scott, M., & Moretz, J. (2012). Non-violence-related workplace injuries among emergency nurses in the United States: implications for improving safe practice, safe care. *Journal of Emergency Nursing*, 38(6), 541-548.
- Thomas-Olson, L., Cloutier, M., Helal, N., & Hutchison, A. (2016). Creating a Safe Client Handling Culture in Emergency Departments. *American Journal of Safe Patient Handling & Movement*, 6(2), 73-82.

Diagnostic Imaging

- Augner, C., & Kaiser, G. (2019). Predictors of musculoskeletal symptoms in radiology technologists in Austria, Europe. *Work*, 64(4), 853-858.
- Bi, G., Sah, N. K., Kumar, R., & Boora, N. S. (n.d.). Knowledge about safe patient handling in radiology department among radiography students.
- Bos E, Krol B, van der Star L, Groothoff J. (2007). Risk factors and musculoskeletal complaints in non-specialized nurses, IC nurses, operation room nurses, and x-ray technologists. *Int Arch Occup Environ Health*. 80(3):198-206
- Boucalt, R., & Howson, D. (2018). Teaching safe patient handling skills using a peer approach. *Radiologic Technology*, 90, 20–30.
- Canadian Association of Medical Radiation Technologists (CAMRT). (2018). Safe patient handling. <https://camrt-bpg.ca/ohs/general-safety-at-work/safe-patient-handling/>
- DeRoo, K., Rau, S., Smith, B., Stevenson, J., Hollenbeck, J., & Pawloski, B. (2011). Effect of patient handling education on radiation therapy students. *Radiologic Technology*, 82(5), 396-407.

Safe Patient Handling and Mobility – Section 10

- Evans, K. D., Sommerich, C. M., Stigall-Weikle, A. N., Stokes, A. D., & Klatt, M. D. (2021). Work-related musculoskeletal disorders among radiographers: An exploration of self-reported symptoms. *Radiologic Technology*, 93(2).
- Evans, K. D., Sommerich, C. M., Klatt, M. D., Griffin, H., & Pan, X. (2019). Self-reported symptoms of work-related musculoskeletal disorders among radiation therapists. *Radiation Therapist*, 28(2).
- Gemark Simonsen, J., & Gard, G. (2016). Swedish sonographers' perceptions of ergonomic problems at work and their suggestions for improvement. *BMC Musculoskeletal Disorders*, 17(1), 1-10.
- Hanania, A. N., Cook, A., Threadgill, M. P., Conway, S. H., & Ludwig, M. (2020). Prevalence of musculoskeletal work-related injuries among radiation therapists. *Radiologic Technology*, 91(5), 414-421.
- Hart, P., & Penner, C. (2010). Safe patient handling: A report based on quantitative research among nurses and radiology technicians.
- Macavei, D. A., & Clark, K. R. (2020). Occupational injuries involving medical imaging and radiation therapy professionals. *Radiologic Technology*, 91(5), 422-430.
- Murphey SL. Safe patient handling in diagnostic imaging. *Radiol Manage*. 2010 July-Aug;32(4):46-52.
- Ngo, M., Schneider-Kolsky, M., & Baird, M. (2013). The attitudes of Australian radiography students towards the use of assistive transfer devices to reduce biomechanical stress in the clinical setting. *Radiography*, 19(2), 125–129.
- Penner, C., et al. (2016). "Safe patient handling and movement program implementation and initial outcomes." *Journal of Medical Imaging and Radiation Sciences* 47(1): S22. :
- Rizzi, L. (2021). Medical device for patient immobilization and repositioning during proton therapy treatment. *Advances in Human Aspects of Healthcare*, 13(13).
- Society of Radiographers (2013).Bariatric Patients: Guidance and Advice for the Radiography Workforce Published on Society of Radiographers https://www.sor.org/getmedia/339ffca7-dbb2-465d-b91f39b8e5b26f69/Bariatric%20Patients_%20Guidance%20and%20Advice%20for%20the%20Radiography%20Workforce
- Story, M. F., Luce, A. C., Leung, A., Omiatek, E. M., Lemke, M. R., & Rempel, D. M. (2008). Accessibility of radiology equipment for patients with mobility disabilities. *Human Factors*, 50(5), 801-810.
- Werderman, D. S. (2020). Reducing work-related musculoskeletal disorders in radiologic technologists. *Radiologic Technology*, 92(1), 33-48.
- Woodhouse, K. D., Hashemi, D., Betcher, K., Doucette, A., Weaver, A., Monzon, B., ... & Vapiwala, N. (2018). Safety practices, perceptions, and behaviors in radiation oncology: A national survey of radiation therapists. *Practical Radiation Oncology*, 8(1), 48-57.

Pediatrics

- Bagnasco, A., Rossi, S., Dasso, N., Catania, G., Zanini, M., Aleo, G., ... & Sasso, L. (2022). Exploring care left undone in pediatric nursing. *Journal of Patient Safety*, 10-1097.
- Benning, S., & Webb, T. (2019). Taking the fall for kids: a journey to reducing pediatric falls. *Journal of Pediatric Nursing*, 46, 100-108.
- Cameron, S., Ball, I., Cepinkas, G., et al. (2015). Early mobilization in the critical care unit: A review of adult and pediatric literature. *Journal of Critical Care*, 30, 664-672.
- Dickinson, C. J. (2018). An introduction to pediatric safe patient handling: The case for a safe pediatric mobility protocol. *Critical Care Nursing Quarterly*, 41(3), 312-313.

Safe Patient Handling and Mobility – Section 10

- Fink, A., Merkeley, K., Tolliver, C., McLeese, R., Mason, J. J., Mantasas, N., ... & Shah, R. K. (2021). Reducing employee injury rates with a hospital-wide employee safety program. *Pediatric Quality & Safety*, 6(2), e387.
- Foster, C., Doud, L., Palangyo, T., Wood, M., Majzun, R., Bargmann-Losche, J., & Donnelly, L. F. (2021). Healthcare worker serious safety events: applying concepts from patient safety to improve healthcare worker safety. *Pediatric Quality & Safety*, 6(4), e434.
- Haglund, K., Kyle, J., & Finkelstein, M. (2010). Pediatric safe patient handling. *Journal of Pediatric Nursing*, 25(2), 98-107.
- Huffman, G. M., Crumrine, J., Thompson, B., Mobley, V., Roth, K., & Roberts, C. (2014). On SHiPs and safety: A journey of safe patient handling in pediatrics. *Journal of Pediatric Nursing*, 29, 641–650.
- Intensive Care NSW (2022). Early mobilisation and rehabilitation of paediatric intensive care patients: Clinical practice guide Oct 2022 <https://aci.health.nsw.gov.au/networks/icnsw/clinicians/early-mobilisation-paediatric>
- Joseph, L., Nithis Dhas, B., Solomon, V., Francisco, H. E., Jacob Uy, R., Subramanian, S., & Johnson, J. S. (2021). Interprofessional education for safe patient handling during mobilization. *Journal of Emergency Medicine, Trauma & Acute Care*, 2022(1), 6.
- Knibbe, N. E., Knibbe, H. J., & Crist, J. (2008). Special approaches for safe handling of disabled children in The Netherlands. *Rehabilitation Nursing*, 33(1), 18-21.
- LaRosa, J. M., Lenker, H., Azamfirei, R., Morgenstern, S., Hajnik, K., Mennie, C., ... & Kudchadkar, S. R. (2025). Development and evaluation of a simulation-based early-mobility curriculum for paediatric intensive care nurses. *Nursing in critical care*.
- Michmizos, K. P., & Krebs, H. I. (2017). Pediatric robotic rehabilitation: Current knowledge and future trends in treating children with sensorimotor impairments. *NeuroRehabilitation*, 41(1), 69-76.
- Motacki, K., & Motacki, L. M. (2009). Safe patient handling and movement in a pediatric setting. *Pediatric Nursing*, 35(4). Chapter 7 Pediatrics.
- Noone, C. E., Franck, L. S., Staveski, S. L., & Rehm, R. S. (2023). Overcoming patient safety concerns and integrating early mobility into pediatric intensive care unit nursing practice. *Journal of Pediatric Nursing*, 73, e107-e115.
- Owens, T., & Tapley, C. (2018). Pediatric mobility: The development of standard assessments and interventions for pediatric patients for safe patient handling and mobility. *Critical Care Nursing Quarterly*, 41(3), 314-322.
- Parchem, K., Peck, A., & Tales, K. (2018). A multidisciplinary approach to equipment use in pediatric patient mobilization. *Critical Care Nursing Quarterly*, 41(3), 330-339.
- Parks, R., Douthcheva, N., Umachandran, D., Singhe, N., Noejovich, S., Ehlenbach, M., ... & Werner, N. E. (2021, September). Identifying tools and technology barriers to in-home care for children with medical complexity. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 65, No. 1, pp. 510-514). Sage CA: Los Angeles, CA: SAGE Publications.
- Rasooly, I. R., Kern-Goldberger, A. S., Xiao, R., Ponnala, S., Ruppel, H., Luo, B., ... & Bonafide, C. P. (2021). Physiologic monitor alarm burden and nurses' subjective workload in a children's hospital. *Hospital Pediatrics*, 11(7), 703-710.
- Smith, H. A., Moore, Z., & Tan, M. H. (2019). Cohort study to determine the risk of pressure ulcers and developing a care bundle within a paediatric intensive care unit setting. *Intensive and Critical Care Nursing*, 53, 68-72.
- Smith, T. J. (2012). A comparative study of occupancy and patient care quality in four different types of intensive care units in a children's hospital. *Work*, 41(Supplement 1), 1961-1968.

Safe Patient Handling and Mobility – Section 10

Stang, A., Thomson, D., Hartling, L., Shulhan, J., Nuspl, M., & Ali, S. (2018). Safe care for pediatric patients: a scoping review across multiple health care settings. *Clinical pediatrics*, 57(1), 62-75. Townsend, P. (2021). Promoting a safer handling culture to caregivers working in nursery/daycare and other childcare settings. *International Journal of Safe Patient Handling & Mobility*, 11(4), 182-186.

Townsend, P. (2021). Promoting a safer handling culture to caregivers working in nursery/daycare and other childcare settings. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 11(4), 182-186.

Van Damme, D., Flori, H., & Owens, T. (2018). Development of medical criteria for mobilizing a pediatric patient in the PICU. *Critical Care Nursing Quarterly*, 41(3), 323-329.

Rehabilitation & Therapy

Professional Association SPHM Position Statements

The American Occupational Therapy Association. (2022). POLICY E.14 Subject: Safe Patient Handling and Mobility. RA Motion 11/21. <https://www.aota.org/-/media/corporate/files/aboutaota/officialdocs/policies/policy-e14-20211115.pdf>

The American Occupational Therapy Association. Standards of Practice for Occupational Therapy. *The American Journal of Occupational Therapy*, 2021:75 (Supplement_3). Accessed February 11, 2023. https://research.aota.org/ajot/article/75/Supplement_3/7513410030/23113/Standards-of-Practice-for-Occupational-Therapy

American Physical Therapy Association. (2019). Physical Therapists and Physical Therapist Assistants in Safe Patient Handling and Mobility. HOD P06-19-24-10: Describes APTA's position on safe patient handling and mobility <https://www.apta.org/apta-and-you/leadership-and-governance/policies/pt-and-pta-safe-patient-handling>

The American Physical Therapy Association. Standards of Practice for Physical Therapy. HOD S06-20-35-29: The Standards of Practice for Physical Therapy. 2020. Accessed February 11, 2023. <https://www.apta.org/apta-and-you/leadership-and-governance/policies/standards-of-practice-pt>

Incidence of WMSDs - Physical and Occupational Therapists

Alghadir, A., Zafar, H., Iqbal, Z. A., & Al-Eisa, E. (2017). Work-related low back pain among physical therapists in Riyadh, Saudi Arabia. *Workplace Health & Safety*, 65(8), 337-345.

Alperovitch-Najenson, D., Treger, I., & Kalichman, L. (2014). Physical therapists versus nurses in a rehabilitation hospital: comparing prevalence of work-related musculoskeletal complaints and working conditions. *Archives of Environmental & Occupational Health*, 69(1), 33-39.

Bhimani, R. (2016). Prevention of work-related musculoskeletal injuries in rehabilitation nursing. *Rehabilitation Nursing*, 41, 326–335.

Bhimani, R. (2016). Understanding Work-related Musculoskeletal Injuries in Rehabilitation from a Nursing Perspective. *Rehabilitation Nursing*, 41(2), 91-100.

Bork, B. E., Cook, T. M., Rosecrance, J. C., Engelhardt, K. A., Thomason, M. E. J., Wauford, I. J., & Worley, R. K. (1996). Work-related musculoskeletal disorders among physical therapists. *Physical Therapy*, 76(8), 827-835.

Campo, M. A., Weiser, S., & Koenig, K. L. (2009). Job strain in physical therapists. *Physical Therapy*, 89(9), 946-956.

Safe Patient Handling and Mobility – Section 10

Campo, M., & Darragh, A. R. (2012). Work-related musculoskeletal disorders are associated with impaired presenteeism in allied health care professionals. *Journal of Occupational and Environmental Medicine*, 64-70.

Campo, M., & Darragh, A. R. (2017). Health-related quality of life associated with severity and age in occupational and physical therapists with musculoskeletal disorders. *Journal of Safe Patient Handling & Mobility*, 7(1), 31-41.

Campo, M., Weiser, S., Koenig, K. L., & Nordin, M. (2008). Work-related musculoskeletal disorders in physical therapists: a prospective cohort study with 1-year follow-up. *Physical Therapy*, 88(5), 608-619.

Cornwell, L., Doyle, H., Stohner, M., & Hazle, C. (2021). Work-related musculoskeletal disorders in physical therapists attributable to manual therapy. *Journal of Manual & Manipulative Therapy*, 29(2), 92-98.

Cromie, J. E., Robertson, V. J., & Best, M. O. (2000). Work-Related Musculoskeletal Disorders in Physical Therapists: Prevalence, Severity, Risks and Responses. *Physical Therapy*, 80(4), 336-351.

Cromie, J. E., Robertson, V. J., & Best, M. O. (2002). Work-related musculoskeletal disorders and the culture of physical therapy. *Physical Therapy*, 82(5), 459-472.

Darragh, A. R., Campo, M., & King, P. (2012). Work-related activities associated with injury in occupational and physical therapists. *Work*, 42(3), 373-384.

Evans, K. W., Myers, D., & Rockefeller, K. (2024). Work-related injury or work-related pain? A qualitative investigation of work-related pain and injury management among rehabilitation professionals. *Work*, 78(1), 99-109.

Holder, N. L., Clark, H. A., DiBlasio, J. M., Hughes, C. L., Scherpf, J. W., Harding, L., & Shepard, K. F. (1999). Cause, prevalence, and response to occupational musculoskeletal injuries reported by physical therapists and physical therapist assistants. *Physical Therapy*, 79(7), 642-652.

Kotejoshyer, R., Punnett, L., Dybel, G., & Buchholz, B. (2019). Claim costs, musculoskeletal health, and work exposure in physical therapists, occupational therapists, physical therapist assistants, and occupational therapist assistants: a comparison among long-term care jobs. *Physical Therapy*, 99(2), 183-193.

Milhem, M., Kalichman, L., Ezra, D., & Alperovitch-Najenson, D. (2016). Work-related musculoskeletal disorders among physical therapists: A comprehensive narrative review. *International Journal of Occupational Medicine and Environmental Health*, 29(5), 735-747.

Vieira ER, Svoboda S, Belniak A, et al. Work-related musculoskeletal disorders among physical therapists: an online survey. *Disability and rehabilitation*. 2016; 38(6): 552-557.

SPHM and Rehabilitation Practices

Alizakhova, G., Kasyan-Howe, P., Domville, K., & Schubert, L. (2021). Culture Change for Occupational Therapists on Safe Patient Handling and Mobility (SPHM): Advocacy for SPHM Policies for a National Organization.

Alnaser, M. Z. (2015). Occupational therapy practitioners with occupational musculoskeletal injuries: prevalence and risk factors. *Journal of Occupational Rehabilitation*, 25, 763-769.

Arnold, M., Radawiec, S., Campo, M., & Wright, L. R. (2011). Changes in functional independence measure ratings associated with a safe patient handling and movement program. *Rehabilitation Nursing*, 36(4), 138-144.

Bakewell, J. (2007). Which hoist and why? A product guide. *International Journal of Therapy & Rehabilitation*, 14(9).

Safe Patient Handling and Mobility – Section 10

- Bansal, N., & Sharma, P. C. (2016). Attitude & beliefs of physiotherapists towards low back pain: A review of literature. *Indian Journal of Physiotherapy and Occupational Therapy*, 10(1).
- Black, L. L., Jensen, G. M., Mostrom, E., Perkins, J., Ritzline, P. D., Hayward, L., & Blackmer, B. (2010). The first year of practice: an investigation of the professional learning and development of promising novice physical therapists. *Physical Therapy*, 90(12), 1758-1773.
- Blasco, P., Deere, C., McGann, N., Hopewell, N., & Brown, B. (2017). A progressive physical and occupational therapy plan of care for a 970-lb patient in the acute care setting: A case report. *International Journal of Safe Patient Handling & Mobility*, 7(3), 11-114.
- Bumfield, J. et al. (2013). Comparative kinematic and electromyographic assessment of clinician- and device-assisted sit-to-stand transfers in patients with stroke. *Physical Therapy*, 93(10), 1331-1341.
- Campo, M. et al. (2013). Effect of a safe patient handling program on rehabilitation outcomes. *Archives of Physical Medicine and Rehabilitation*, 94(1), 17-22.
- Covinsky, K., Peirluissi, E., & Johnston, C. (2011). Hospitalization-associated disability: "She was probably able to ambulate, but I'm not sure". *JAMA*, 306(16), 1782-1793.
- Darragh, A. R., Hines, E., Wengerd, L., & Basso, D. M. (2016). The Effect Of An Overhead Gait And Balance Training Device On Transfer And Balance Activities. *American Journal Of Safe Patient Handling & Movement*, 6(4), 151-159.
- Darragh, A. R., Shiyko, M., Margulis, H., & Campo, M. (2014). Effects of a safe patient handling and mobility program on patient self-care outcomes. *The American Journal of Occupational Therapy*, 68(5), 589-596.
- Darragh, A., Campo, M., & Olson, D. (2009). Therapy practice within a minimal lift environment: perceptions of therapy staff. *Work*, 33(3), 241-253.
- Darragh, A., Campo, M., Frost, L., Miller, M., Pentico, M., & Margulis, H. (2013). Safe patient handling equipment in therapy practice: Implications for rehabilitation. *American Journal of Occupational Therapy*, 67(1), 45-53.
- Decoyna, J. A. A., McLiesh, P., & Salamon, Y. M. (2018). Nurses and physiotherapists' experience in mobilising postoperative orthopaedic patients with altered mental status: A phenomenological study. *International Journal of Orthopaedic and Trauma Nursing*, 29, 32-40.
- Dilulio, R. (2007). Patient Transfer Equipment: Lift systems and products that improve PT and patient safety. *Physical Therapy Products*, March 2007.
- Driver, C., Lovell, G. P., & Oprescu, F. (2021). Psychosocial strategies for physiotherapy: A qualitative examination of physiotherapists' reported training preferences. *Nursing & Health Sciences*, 23(1), 136-147.
- Engel, H. J., Talebe, S., Alonzo, P. B., Mustille, R. L., & Rivera, M. J. (2013). Physical therapist-established intensive care unit early mobilization program: Quality improvement project for critical care at the University of California San Francisco Medical Center. *Physical Therapy*, 93(7), 1-12.
- Evans, K. W., Myers, D., Rockefeller, K., Rauscher, K., & Allen, A. (2021). A qualitative exploration of the lift equipment uses and needs of physical and occupational therapists and assistants participating in safe patient handling and mobility programs. *International Journal of Safe Patient Handling & Mobility*, 11(2), 76-85.
- Fisher, T. F. (2019). Occupational therapy's work and industry area of practice: Content in entry-level professional occupational therapy curricula: A survey. *The Open Journal of Occupational Therapy*, 7(4), 1-10.

Safe Patient Handling and Mobility – Section 10

- Gee, M., & Adejumo, R. (2021, May). Mitigation of risk of patient handling during rehabilitation tasks. In *Proceedings of the 21st Congress of the International Ergonomics Association (IEA 2021) Volume IV: Healthcare and Healthy Work* (pp. 314-321). Springer International Publishing.
- Geiger, J. S. (2013). Establishing a physical therapist-driven model of safe patient handling and movement programs in a general hospital. *Work*, 45(2), 147-160.
- Gonzalez, C. M., Howe, C. M., Waters, T. R., & Nelson, A. (2009). Recommendations for turning patients with orthopaedic impairments. *Orthopaedic Nursing*, 28(2S), S9-S12.
- Gonzalez, C. M., Howe, C. M., Waters, T. R., Nelson, A., & Hughes, N. (2009). Recommendations for vertical transfer of a postoperative total hip replacement patient (bed to chair, chair to toilet, chair to chair, or car to chair). *Orthopaedic Nursing*, 28(2S), S13-S17.
- Gray-Miceli, D., Craelius, W., & Li, K. (2018, June). Mobile Technology to Assess Balance During Sit to Stand Manuever Among Older Adults at Risk for Falling. In *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care* (Vol. 7, No. 1, pp. 248-248). Sage CA: Los Angeles, CA: SAGE Publications.
- Halbert, R., Pearch, T., Burgess, R., et al. (2013). Advantages of using ceiling mounted lifts in acute stroke rehabilitation. *Journal of Acute Care Physical Therapy*, 4(2), 73-83.
- Harwood, K., Darragh, A. R., Campo, M., Rockefeller, K., & Scalzetti, D. A. (2018). A systematic review of safe patient handling and mobility programs to prevent musculoskeletal injuries in occupational and physical therapists and assistants. *International Journal of Safe Patient Handling & Mobility*, 8(1), 46-56.
- Harwood KJ, Scalzitti DA, Campo M, Darragh A. Systematic Review of Safe Patient Handling and Mobility Programs to Improve Patient Outcomes in Rehabilitation. *Am J SPHM*. 2016; 6(4): 141-150
- Johnson, K., Swinton, P., Pavlova, A., & Cooper, K. (2023). Manual patient handling in the healthcare setting: a scoping review. *Physiotherapy*, 120, 60-77.
- Johnston, V., & Shaw, W. S. (2013). Helping workers help themselves: Empowering physiotherapy clients to manage musculoskeletal problems at work. *Physical Therapy Reviews*, 18, 373–378.
- Kairalla, J. A., Winkler, S. L., & Feng, H. (2016). Understanding the provision of assistive mobility and daily living devices and service delivery to veterans after stroke. *American Journal of Occupational Therapy*, 70(1), 1-10.
- McCrary, B., Ma, J., Irons, S. L., & Burnfield, J. M. (2022). Occupational injuries and patient lift usage among physical rehabilitation therapists. *Journal of Back and Musculoskeletal Rehabilitation*, 35(1), 195-205.
- McIlvaine, J. et al. (2011). Integrating patient handling equipment into a physical therapy activities in a rehabilitation setting. *American Journal of Safe Patient Handling and Movement*, 1(3), 16-22.
- McWilliams, D., & Cook, S. (2022). An evaluation of the clinical use of an early mobility device to support rehabilitation for patients admitted to ICU. *International Journal of Safe Patient Handling & Mobility*, Special Issue: Early Mobility, SI-10–SI-17. Visioning Publishers LLC.
- Melin, J., Parmelund, N., & Johansson, M. (2025). Rehabilitation Professionals' Self-Perceived Competence in Safe Patient Handling and Mobility Methods Before and After Training: A Cohort Study. *Health Science Reports*, 8(4),
- Mutch, K. (2004). Changing manual-handling practice in a stroke rehabilitation unit. *Professional Nurse (London, England)*, 19(7), 374-378.
- Nelson, A. (2008). Promoting safe patient handling. *Rehabilitation Nursing Journal*, 33(1), 2.
- Nelson, A., Harwood, K. J., Tracle, C., & Dunn, K. L. (2007). Nurse staffing and patient outcomes in inpatient rehabilitation settings. *Rehabilitation Nursing*, 32(5), 179-202.

Safe Patient Handling and Mobility – Section 10

- Nelson, A., Harwood, K. J., Tracle, C., & Dunn, K. L. (2008). Safe Patient Handling in Rehabilitation. *Rehabilitation Nursing*, 33(1), 10-17.
- Nolan, D., O'Sullivan, K., Stephenson, J., O'Sullivan, P., & Lucock, M. (2018). What do physiotherapists and manual handling advisors consider the safest lifting posture, and do back beliefs influence their choice? *Musculoskeletal Science and Practice*, 33, 35-40.
- Nolan, D., O'Sullivan, K., Stephenson, J., O'Sullivan, P., & Lucock, M. (2019). How do manual handling advisors and physiotherapists construct their back beliefs, and do safe lifting posture beliefs influence them? *Musculoskeletal Science and Practice*, 39, 101-106.
- Olkowski, B. F., & Stolfi, A. M. (2014). Safe patient handling perceptions and practices: a survey of acute care physical therapists. *Physical Therapy*, 94(5), 682-695.
- Patterson, M., Mehan, P., Hughes, N., & Nelson, A. (2009). Safe vertical transfer of patient with extremity cast or splint. *Orthopaedic Nursing*, 28(2S), S18-S23.
- Perlow, E., Tunney, N., & Lucado, A. (2016). Integrating safe patient handling into physical therapist education: Reducing the incidence of physical therapist injury and improving patient outcomes. *Journal of Physical Therapy Education*, 30(2), 32-37.
- Radawiec, S. M., Howe, C., Gonzalez, C. M., Waters, T. R., & Nelson, A. (2009). Safe ambulation of an orthopaedic patient. *Orthopaedic Nursing*, 28(2S), S24-S27.
- Ravnik, D., Lovrinčević, K. M., & Bittner, V. (2024). Ergonomic implementation of movement interventions in healthcare from the point of view of the physiotherapist. *AUC KINANTHROPOLOGICA*, 60(1), 37-48.
- Rockefeller, K. (2008). Using technology to promote safe patient handling and rehabilitation. *Rehabilitation Nursing*, 33(1), 3-9.
- Rockefeller, K., & Proctor, R. (2011). Is there a role for gait belts in safe patient handling and movement programs? *American Journal of Safe Patient Handling and Movement*, 1(1), 30-34.
- Rockefeller, K., & Weaver, J. (2016). Physical therapists and safe patient handling and mobility in states with and without legislation. *American Journal of Safe Patient Handling & Movement*, 6, 98-103.
- Rothmore, P., Hewitt, T., Dickson, C., & Nguyen, T. (2023). Manual handling amongst physiotherapists: Analysis of intra-shift variations in pain, fatigue and movement. *Work*, 75(4), 1255-1264.
- Rugs, D., Powell-Cope, G., Campo, M., Darragh, A., Harwood, K., Kuhn, J., & Rockefeller, K. (2020). The use of safe patient handling and mobility equipment in rehabilitation. *Work*, 66(1), 31-40.
- Saracino, S., Schwartz, S., & Pilch, E. (2009). Implementing a safe patient handling and movement program in a rehabilitation setting. *Pennsylvania Patient Safety Authority*, 6(4), 126-132.
- Satusky, M. J. (2021). Safe Patient Handling and Mobility in the Orthopaedic Setting. *Orthopaedic Nursing*, 40(2), 60-63.
- Smith, M. C., O'May, F., Tropea, S., & Berg, J. (2016). Framing moving and handling as a complex healthcare intervention within the acute care of older people with osteoporosis: a qualitative study. *Journal of Clinical Nursing*, 25(19-20), 2906-2920.
- Stevenson, J., Hinsch, C., Bartold, K., Briggs, L., & Tyler, L. (2015). Exploring the influence of clinical and classroom training on advocacy for safe patient handling practices among student physical therapists. *Journal of Physical Therapy Education*, 29(1), 60-69.
- Sundstrup, E., Seeberg, K. G. V., Bengtsen, E., & Andersen, L. L. (2020). A systematic review of workplace interventions to rehabilitate musculoskeletal disorders among employees with physically demanding work. *Journal of Occupational Rehabilitation*, 30(4), 588-612.

Safe Patient Handling and Mobility – Section 10

Tang, K., Diaz, J., Lui, O., Proulx, L., Galle, E., & Packham, T. (2020). Do active assist transfer devices improve transfer safety for patients and caregivers in hospital and community settings? A scoping review. *Disability and Rehabilitation: Assistive Technology*, 15(6), 614-624.

Taylor, D., Merryweather, A., & Morse, J. (2018, June). Biomechanical Characterization of the Hand Touch Corrective Behavior in the Frail Elderly During Bed Egress. In *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care* (Vol. 7, No. 1, pp. 237-239). Sage CA: Los Angeles, CA: SAGE Publications.

Theis, J. L., & Finkelstein, M. J. (2014). Long-term effects of safe patient handling program on staff injuries. *Rehabilitation Nursing*, 39(1), 26-35.

Thomson, D. D. (2008). An ethnographic study of physiotherapists' perceptions of their interactions with patients on a chronic pain unit. *Physiotherapy Theory and Practice*, 24(6), 408-422.

Wade, H. C. (2015). A qualitative exploration of community therapists' experiences of applying guidance on safe patient handling.

Waters, T. R., & Rockefeller, K. (2010). Safe patient handling for rehabilitation professionals. *Rehabilitation Nursing*, 35(5), 216-222.

Webb, J., Harrison, D., & Deborah, R. (2016, August). Is technology the manual handling keystone for occupational therapists? In *British Journal of Occupational Therapy*, 79, 25-26. Sage Publications Ltd.

Williams, R. M., Alikhademi, K., Drobina, E., Gilbert, J. E., & Sutor, T. (2019, November). Augmented reality for rehabilitative therapy: patient experiences and practitioner perspectives. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 63, No. 1, pp. 748-752). Sage CA: Los Angeles, CA: SAGE Publications.

Zhang, Q., Xie, Q., Liu, H., Sheng, B., Xiong, S., & Zhang, Y. (2022). A pilot study of biomechanical and ergonomic analyses of risky manual tasks in physical therapy. *International Journal of Industrial Ergonomics*, 89, 103298.

Bariatrics/Patients of Size

Books & Toolkits

Alberta Health Services (2022). Guidelines for the Care of Hospitalized Patients with Bariatric Care Needs Version 1.4 March 8, 2022. <https://www.albertahealthservices.ca/assets/about/scn/ahs-scn-don-guidelines-for-hospitalized-patients-bariatric-needs.pdf>

Alberta Health Services and Canadian Obesity Network. Resource videos on how to safely handle for bariatric clients in different situations.

- [A Fall in Acute Care](#)
- [A Fall at Home](#)
- [Bed to Wheelchair Transfer Using a Total Lift](#)
- [Lift Supported Ambulation Using a Walking Sling](#)
- [Lift Supported Repositioning and Log Rolling](#)
- [Panniculus and Limb Lifting](#)

Center for Engineering & Occupational Safety and Health (CEOSH). Veterans Affairs. 2016. Rev 2025. Bariatric Safe Patient Handling and Mobility Guidebook: A Resource Guide for Care of Persons of Size.. <https://www.asphp.org/wp-content/uploads/2011/05/Baraiatrice-SPHM-guidebook-care-of-Person-of-Size.pdf>

Safe Patient Handling and Mobility – Section 10

- Cookson, R. (2011). *The guide to the handling of people: A systems approach* (6th ed.). <https://www.asphp.org/wp-content/uploads/2011/06/HOP6-Cookson-Chapter-12.pdf>
- Dionne, M. (2006). *Among Giants: Courageous Stories of Those Who Are Obese and Those Who Care for Them*. Lulu Press.
- Gallagher, S. (2015). *A Practical Guide to Bariatric Safe Patient Handling & Mobility*. Visioning Publishers LLC.
- Gallagher, S. M. (2012). Special patient populations. In W. Charney (Ed.), *Epidemic of Medical Errors and Hospital-Acquired Infections*. CRC Press.
- FGI (2016) Clearances for Providing Safe Care for Patients of Size Determination of Minimum Design Standards for Safe Patient Handling and Transportation. https://www.fgiguideguidelines.org/wp-content/uploads/2018/11/FGI_BF_ClearancesPatientsOfSize_March2016.pdf
- Hales, C., Amankwaa, I., Gray, L., & Rook, H. (2019). ARC Extreme: Aged residential care needs of older adults with extreme obesity. Victoria University of Wellington, Wellington. Published, 3. https://www.wgtn.ac.nz/_data/assets/pdf_file/0011/1780085/2019-ARC-Extreme-Report_Final.pdf
- Interior Health (2020). Staff Safety Guidelines For Interior Health Facility Design Projects Created November 24, 2017 Revised March 6, 2020. <https://www.interiorhealth.ca/sites/default/files/PDFS/staff-safety-guidelines-for-healthcare-facility-design-projects.pdf>
- Grey, L., Parker, G., & Carr, T. (2024). Body Size Language in Healthcare Guide. <https://lanewaysrehab.com.au/resource/body-size-language-in-healthcare-guide/>
- Matz M, Celona J, Martin M, McCoskey K, Nelson GG. (2019). Patient Handling and Mobility Assessments (PHAMA) (2nd ed.) Facility Guidelines Institute. https://www.fgiguideguidelines.org/wp-content/uploads/2019/10/FGI-Patient-Handling-and-Mobility-Assessments_191008.pdf
- National Health and Safety Function (2020) Guidance on Managing the Manual Handling Issues of Service Users with Bariatric Needs. The Health Service Executive (HSE)Ireland https://assets.hse.ie/media/documents/ncr/guidance-on-managing-the-manual-handling-issues-of-service-users-with-bari_JIs9OwF.pdf
- NBE 2008. Complex admission and discharge situations – bariatric patients. The Column, National Back Exchange. <https://www.asphp.org/wp-content/uploads/2011/06/Complex-Admission-of-Bariatric-Patients-Cookson.pdf>
- NHS South East Coast Ambulance Service (2024) UK. Bariatric Patient Treatment Policy and Procedure. <https://www.secamb.nhs.uk/wp-content/uploads/2024/08/Bariatric-Patient-Treatment-Policy-and-Procedure-.pdf>
- Safe work Australia (2009). Manual handling risks associated with the care, treatment and transportation of bariatric (severely obese) patients in Australia 2009. https://www.safeworkaustralia.gov.au/system/files/documents/1702/manualhandlingrisks_caretreatmenttransportation_fbariatricseverelyobesepatients_australia_2009_.pdf.pdf
- Safe work Australia (2009). The bariatric journey in Australia: Funeral Case study https://www.safeworkaustralia.gov.au/system/files/documents/1702/thebariatricjourneyaustraliafuneralcasestudy_2009_.pdf.pdf
- Society of Radiographers (2013). Bariatric Patients: Guidance and Advice for the Radiography Workforce Published on Society of Radiographers https://www.sor.org/getmedia/339ffca7-dbb2-465d-b91f39b8e5b26f69/Bariatric%20Patients_%20Guidance%20and%20Advice%20for%20the%20Radiography%20Workforce
- Victoria General Hospital (2014). Special Considerations for Care of Obese Patients https://professionals.wrha.mb.ca/old/professionals/safety/files/SafePatientHandling/VGH_SpecialConsiderationsforCareofObesePatientfinalApril42014.pdf

Safe Patient Handling and Mobility – Section 10

WorkSafe Victoria (2007). A guide to designing workplaces for safer handling of people for health, aged care, rehabilitation and disability facilities (3rd ed.). <https://www.worksafe.vic.gov.au/resources/guide-designing-workplaces-safer-handling-people>

Journal

Bariatric Solutions Inc. Journal for Bariatric Solutions <https://barisolutions.com/Journal.aspx>

Statistics

Centers for Disease Control and prevention (CDC) Overweight & Obesity CDC. <https://www.cdc.gov/obesity/index.html>

National Heart, Lung and Blood Institute. Overweight and Obesity. National Heart, Lung and Blood Institute. [Online] [Cited: December 20, 2018.] <https://www.nhlbi.nih.gov/health-topics/overweight-and-obesity>.

World Health Organization (WHO) Obesity. 2024. https://www.who.int/health-topics/obesity#tab=tab_1

Articles

Arnold, M., Combs, J., Gach, R., & Labreche, M. (2015). Overcoming barriers to mobilizing bariatric patients: Three case studies. *American Journal of Safe Patient Handling and Mobility*, 5(2), 47-54.

Arnold, M., Roe, E., & Williams, D. (2014). A pictorial overview of technology-assisted care options for bariatric patients: one hospital's experience. *Ostomy/Wound Management*, 60(1), 36-42.

Arzouman, J., Lacovara, J. E., Blackett, A., McDonald, P. K., Traver, G., & Bartholomeaux, F. (2006). Developing a comprehensive bariatric protocol: A template for improving patient care. *Medsurg Nursing*, 15(1), 21-27.

Beitz, J. M. (2014). Providing quality skin and wound care for the bariatric patient: An overview of clinical challenges. *Ostomy/Wound Management*, 60(1), 12-21.

Bejci-Spring, S. M. (2008). RESPECT: A model for the sensitive treatment of the bariatric patient. *Bariatric Nursing and Surgical Patient Care*, 3(1), 47-56.

Berrios, L. A. (2016). The ABCDs of managing morbidly obese patients in intensive care units. *Critical Care Nurse*, 36(5), 17-26.

Blackett, A., Gallagher, S., Dugan, S., et al. (2011). Caring for persons with bariatric health issues: a primer for the WOC nurse. *Journal of Wound, Ostomy and Continence Nursing*, 38(2), 133-138.

Blasco, P., Deere, C., McGann, N., Hopewell, N., & Brown, B. (2017). A progressive physical and occupational therapy plan of care for a 970-lb patient in the acute care setting: A case report. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 7(3), 110-115.

Bradway, C., DiResta, J., Fleshner, I., & Polomano, R. C. (2008). Obesity in nursing homes: A critical review. *Journal of the American Geriatrics Society*, 56(8), 1528-1535.

Brenchley, A. (2023). Graphic paper: Moving and handling care of bariatric patients: A survey of clinical nurse managers. *Journal of Research in Nursing*, 28(4), 255-258.

Broome, C. A., et al. (2015). Nursing care of the super bariatric patient: Challenges and lessons learned. *Rehabilitation Nursing*, 40(2), 92-99.

Safe Patient Handling and Mobility – Section 10

Buss, J. (2012). Associations between obesity and stress and shift work among nurses. *Workplace Health & Safety*, 60(10), 453-458.

Choi, S. D., & Brings, K. (2016). Work-related musculoskeletal risks associated with nurses and nursing assistants handling overweight and obese patients: A literature review. *Work*, 53(2), 439-448.

Cimolin, V., Cau, N., Tacchini, E., Galli, M., Rigoldi, C., Rinolfi, M., ... & Capodaglio, P. (2016). Spinal load in nurses during emergency lifting of obese patients: Preliminary results. *Medicina Del Lavoro*, 107, 356–363.

Cookson (2007) Large but unseen: bariatric patients and manual handling <https://asphp.org/wp-content/uploads/2011/06/Large-but-unseen-bariatric-patient-Cookson.pdf>

Delmore, B., Stolfi, A., Garritan, S. L., et al. (2011). The safe patient handling needs of a bariatric patient: One size does not fit all. *American Journal of Safe Patient Handling and Movement*, 1(4), 31-36.

Dikareva, A., et al. (2016). Exploring Perceptions of Barriers, Facilitators, and Motivators to Physical Activity Among Female Bariatric Patients: Implications for Physical Activity Programming. *American Journal of Health Promotion*, 30(7), 536-544.

Dionne, M. (2004). Introducing the Egress test: A simple screen tool to predict safety of bariatric patient transfers. *Phys Ther Rehab Med*, 15, 39.

Dockrell, S., & Hurley, G. (2021). Moving and handling care of bariatric patients: a survey of clinical nurse managers. *Journal of Research in Nursing*, 26(3), 194-204.

Ewens, B., Kemp, V., Towell-Barnard, A., & Whitehead, L. (2022). The nursing care of people with class III obesity in an acute care setting: A scoping review. *BMC Nursing*, 21(1), 1-13.

Fusco, K. L., Robertson, H. C., Galindo, H., Hakendorf, P. H., & Thompson, C. H. (2017). Clinical outcomes for the obese hospital inpatient: An observational study. *SAGE Open Medicine*, 5, 1-6.

Galinsky, T., Deter, L., Krieg, E., Feng, H. A., Battaglia, C., Bell, R., ... & Shaw, S. (2021). Safe patient handling and mobility (SPHM) for increasingly bariatric patient populations: Factors related to caregivers' self-reported pain and injury. *Applied Ergonomics*, 91, 103300.

Gallagher, S. (2011). Exploring the relationship between obesity, patient safety, and caregiver injury. *American Journal of Safe Patient Handling & Mobility*, 1(2), 8-12.

Gallagher, S. (2011). Women's health, size, and safe patient handling: What are the ethical issues? *Bariatric Nursing and Surgical Patient Care*, 6(2), 69-72.

Gallagher, S., Alexandrowiz, M., Fritz, R., Kumpar, D., Miller, M., McNaughton, C., & Nowicki, T. (2020). Bariatric Space, Technology, and Design: A Round Table. *Workplace Health & Safety*, 68(7), 313-319.

Gallagher, S., Hilton, T., Monaghan, H. M., Muir, M., & Dye, A. (2014). Safe patient handling and movement: Bariatric considerations. *American Journal of Safe Patient Handling and Movement*, 4(2), S1-S16.

Gillespie, T., & Lane, S. (2018). Moving the bariatric patient. *Critical Care Nursing Quarterly*, 41(3), 297-301.

Gyi, D., Masson, A., & Hignett, S. (2019). Plus size and obese workers: Anthropometry estimates to promote inclusive design. *Ergonomics*, 62(9), 1234-1242.

Hales, C., Amankwaa, I., Gray, L., & Rook, H. (2019). The care of older adults with extreme obesity in nursing homes: A collective case study. *MedRxiv*, 19013326.

Hebert, G. R. (2015). Providing skin care for bariatric patients: Specialized knowledge of common conditions and their treatments can help clinicians meet this challenge. *Wound Care Advisor*, 4(6), 27-31.

Heidarimoghadam, R., Mosaferchi, S., Ray, P. K., Saednia, H., Najafi Ghobadi, K., & Morteza pour, A. (2023). The differences between normal and obese patient handling: Re-structural analysis of two questionnaires. *BMC Musculoskeletal Disorders*, 24(1), 359.

Safe Patient Handling and Mobility – Section 10

- Hernandez, J. M., Munyan, K., Thompson, K., Wilson, C., Arena, S., & Noack, D. (2011). Interprofessional Education Safe Patient Handling And Mobility Workshop For Persons Of Size. *International Journal Of Safe Patient Handling & Mobility (SPHM)*, 11(1), 6-15.
- Hignett, S., & Griffiths, P. (2009). Manual handling risks in the bariatric (obese) patient pathway in acute sector, community and ambulance care and treatment. *Work*, 33(2), 175-180.
- Hignett, S., & Griffiths, P. (2009). Risk factors for moving and handling bariatric patients. *Nursing Standard*, 24(11).
- Huang, S. L., Cheng, H., Duffield, C., & Denney-Wilson, E. (2021). The relationship between patient obesity and nursing workload: An integrative review. *Journal of clinical nursing*, 30(13-14), 1810-1825.
- Jones, D. W. (2012). Development of a bariatric patient readiness assessment tool for the emergency department. *Advanced Emergency Nursing Journal*, 34(3), 238-249.
- Klaeb, M., & Walters, B. (2019). Turning and repositioning patients who are morbidly obese. *American Nurse Today*, 14(4). Retrieved from <https://www.americannursetoday.com/turning-and-repositioning-patients-who-are-morbidly-obese/>
- Kyle, T., & Puhl, R. (2014). Putting people first in obesity. *Epidemiology/Genetics*, 1(1).
- Labreche, M., Tucker, K., & Kleinclaus, T. (2017). Case Study: A 600-Lb Patient Journey To Walk After 3 Years Of Immobility. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 7(3), 122-128.
- Magazine, M., Murphy, M., Schauer, D. P., & Wiggermann, N. (2021). Determining the number of bariatric beds needed in a US acute care hospital. *HERD: Health Environments Research & Design Journal*, 14(3), 14-26
- Marshall, V., Team, V., & Weller, C. (2021). Hospital-acquired pressure injury prevention in people with a BMI of 30.0 or higher: A scoping review protocol. *Wound Practice & Research: Journal of the Australian Wound Management Association*, 29(3), 133-139.
- McClean, K., Cross, M., & Reed, S. (2021). Risks to healthcare organizations and staff who manage obese (bariatric) patients and use of obesity data to mitigate risks: A literature review. *Journal of Multidisciplinary Healthcare*, 14, 577-588.
- Mcmahon, A., Plambech, L., & Rush, A. (2019). International Round Table Discussion: Are Bariatric Patients The New Normal? *International Journal Of Safe Patient Handling & Mobility (SPHM)*, 9(2), 90-94.
- Mechan, P., Stanfield, J., Kabrick, A., & Brumbeloe, S. (2017). Ergonomic Strategy for Successful Pannus Care. *International Journal Of Safe Patient Handling & Mobility (SPHM)*, 7(4), 147-151.
- Monaghan, H. M. (2009). Bariatric considerations in safe patient handling and movement. (SPHM). 17(4), 11-13.
- Morley, S. (2019). Management Of The Deceased Bariatric/Obese Patient. *International Journal Of Safe Patient Handling & Mobility (SPHM)*, 9(1), 9-14.
- Muir, M., & Archer-Heese, G. (2009). Essentials of a bariatric patient handling program. *Online Journal of Issues in Nursing*, 14(1). <https://ojin.nursingworld.org/table-of-contents/volume-14-2009/number-1-january-2009/bariatric-patient-handling-program/>
- National Academies of Sciences, Engineering, and Medicine. (2021). Integrating Systems and Sectors Toward Obesity Solutions: Proceedings of a Workshop. Retrieved from [<http://nap.edu/25766>].
- Ortiz, V. E., Ottolino, R. J., Matz, M. W., Uppot, R. N., & Winters, B. (2021). Infrastructure design: A critical element in the care of the patient with obesity. *Journal of Patient Safety*, 17(8), e1522-e1529.
- Ostomy/Wound Management. (2014). A pictorial overview of technology-assisted care options for bariatric patients: One hospital's experience. *Ostomy/Wound Management*, 60(1), 12-21.

Safe Patient Handling and Mobility – Section 10

- Pagels, J. L. (2016). Care of a homebound super obese patient: A case study. *Home Healthcare Now*, 34, 140-145.
- Pritts, W. (2020). Confidently caring for critically ill overweight and obese adults. *Nursing2020 Critical Care*, 15(1), 16-22.
- Réminiac, F., Jouan, Y., Cazals, X., Bodin, J.-F., Dequin, P.-F., & Guillon, A. (2014). Risks associated with obese patient handling in emergency prehospital care. *Prehospital Emergency Care*, 18(4), 555-557.
- Sauceda, T., & Falco, K. (2014). The bariatric patient and the unsupportive healthcare environment: An ethics analysis. *American Journal of Safe Patient Handling and Movement*, 4(1), 52-56.
- Schub, T., & Woton, M. (2015). Bariatric Patients: Performing Patient-Handling Tasks Requiring Access to Body Parts.
- Seida, J. C., et al. (2018). Hospital rehabilitation for patients with obesity: A scoping review. *DISABIL REHABIL*, 40(2), 125-134.
- Setchell, J., Watson, B. M., Gard, M., & Jones, L. (2016). Physical therapists' ways of talking about overweight and obesity: Clinical implications. *Physical Therapy*, 96(2).
- Shippy, R., & Arena, S. (2021). Care of Patients with Obesity: Addressing Clinician Bias. *Home Healthcare Now*, 39(2), 109-110.
- Smith, S. R., Gibbs, R. L., Rosen, B. S., & Lee, J. T. (2015). The critical lift zone: Recognizing the need for safe patient handling equipment across the broader spectrum of patient weights. *International Journal of Safe Patient Handling and Mobility (SPHM)*, 5(3), 108-116.
- Tamminen-Peter, L., Nygren, K., & Moilanen, A. (2016). Ergonomic criteria and good practices for bariatric patients' care. *Reports and Studies in Health Sciences*, 50.
- Thiele, et al. (2011). Caring for your Bariatric Patient: A Resource Guide to Literature on the Morbidly Obese. *Bariatric Nursing and Surgical Patient Care*, 6(1).
- Towell-Barnard, A. (2019). Weight bias and stigma: How do we really feel about the obese patient? *Journal of Stomal Therapy Australia*, 39(3), 8-10.
- Van Wicklin, S. A. (2018). Challenges In The Operating Room With Obese And Extremely Obese Surgical Patients. *International Journal of Safe Patient Handling & Mobility (SPHM)*, 8(3), 120-131.
- Walden, C. M., Bankard, S. B., Cayer, B., Floyd, W. B., Garrison, H. G., Hickey, T., ... Pories, W. J. (2013). Mobilization of the obese patient and prevention of injury. *Annals of Surgery*, 258, 646–651.
- Whipple, K. L. (2008). Maximizing healthcare provider safety while rehabilitating the bariatric patient. *Bariatr Nurs Surg Patient Care*, 3(1), 41.
- Wiggermann, N. (2017). Effect of a powered drive on pushing and pulling forces when transporting bariatric hospital beds. *Applied Ergonomics*, 58, 59–65.
- Wiggermann, N., Smith, K., & Kumpkar, D. (2017). What bed size does a patient need? The relationship between body mass index and space required to turn in bed. *Nursing Research*, 66, 483–489.
- Williamson, K. (2020). Nursing people with bariatric care needs: More questions than answers. *Wounds UK*, 16(1). <https://wounds-uk.com/wp-content/uploads/2023/02/87b73c65448c220931916317d9ac18f1.pdf>

SPHM and Workplace Violence Prevention

The Bureau of Health Workforce (BHW). (n.d.). Train Health Care Workers About Dementia. <https://bhw.hrsa.gov/alzheimers-dementia-training>

Safe Patient Handling and Mobility – Section 10

Collins, J. W., & Nelson, A. (2006). Safe lifting and movement of nursing home residents (DHHS (NIOSH) Publication No. 2006-117). Cincinnati, OH: National Institute for Occupational Safety and Health. <https://www.cdc.gov/niosh/docs/2006-117/default.html>

CMS(ND). Guiding an Improved Dementia Experience (GUIDE) Model. <https://www.cms.gov/priorities/innovation/innovation-models/guide>

Ede, S., Chohan, A., Jonathan, S., Reynolds, L., & Dickinson, M. (2025). Challenges and Optimized Approaches in Manual Handling Practice for Patient Positioning Among UK-based Health Care Staff. *Archives of Physical Medicine and Rehabilitation*, 106(4), e123-e124.

Häikiö, K., Sagbakken, M., & Rugkåsa, J. (2019). Dementia and patient safety in the community: a qualitative study of family carers' protective practices and implications for services. *BMC health services research*, 19(1), 635.

Handley, M., Bunn, F., & Goodman, C. (2019). Supporting general hospital staff to provide dementia sensitive care: A realist evaluation. *International Journal of Nursing Studies*, 96, 61–71.

Jensen, A. M., Pedersen, B. D., Wilson, R. L., Bang Olsen, R., & Hounsgaard, L. (2019). Nurses' experiences of delivering acute orthopaedic care to patients with dementia. *International Journal of Older People Nursing*, 14(4), e12271.

Karrer, M., Schnell, A., Zeller, A., & Mayer, H. (2021). A systematic review of interventions to improve acute hospital care for people with dementia. *Geriatric Nursing*, 42(3), 657–673.

Kurowski, A., & El Ghaziri, M. (2019). The role of safe handling and mobilization in reducing type II workplace violence in healthcare settings. *CPH News and Views*, (62), UMass Lowell. <https://www.uml.edu/Research/CPH-NEW/News/emerging-topics/News-views-62.aspx>

Larson, E. B., & Stroud, C. (2021). Meeting the challenge of caring for persons living with dementia and their care partners and caregivers: A report from the National Academies of Sciences, Engineering, and Medicine. *JAMA*, 325(18), 1831–1832.

Miranda, H., Punnett, L., Gore, R., & Boyer, J. (2011). Violence at the workplace increases the risk of musculoskeletal pain among nursing home workers. *Occupational and Environmental Medicine*, 68(1), 52–57.

Monaghan, H.M. (2011). Safe Patient Handling Equipment Challenges in Inpatient Psychiatric Units: Design Recommendations and Potential Solutions.

Najafi, F., Fallahi-Khoshknab, M., Ahmadi, F., Dalvandi, A., & Rahgozar, M. (2018). Antecedents and consequences of workplace violence against nurses: A qualitative study. *Journal of clinical nursing*, 27(1-2), e116-e128

Osborne, A. R., Connell, C., & Morphet, J. (2021). Investigating emergency nurses' beliefs and experiences with patient handling in the emergency department. *Australasian emergency care*, 24(1), 49-54.

Parveen, S., Mehra, A., Kumar, K., & Grover, S. (2022). Knowledge and attitude of caregivers of people with dementia. *Geriatrics & gerontology international*, 22(1), 19-25.

Pihl-Thingvad, J., Brandt, L. P., & Andersen, L. L. (2018). Consistent use of assistive devices for patient transfer is associated with less patient-initiated violence: Cross-sectional study among health care workers at general hospitals. *Workplace Health & Safety*, 66(9), 453–461.

Risør, B. W., Casper, S. D., Andersen, L. L., & Sørensen, J. (2017). A multi-component patient-handling intervention improves attitudes and behaviors for safe patient handling and reduces aggression experienced by nursing staff: A controlled before-after study. *Applied Ergonomics*, 60, 74–82.

Røsvik, J., & Rokstad, A. M. M. (2020). What are the needs of people with dementia in acute hospital settings, and what interventions are made to meet these needs? A systematic integrative review of the literature. *BMC Health Services Research*, 20, 1–20.

Safe Patient Handling and Mobility – Section 10

Sabbath, E. L., Hurtado, D. A., Okechukwu, C. A., Tamers, S. L., Nelson, C., Kim, S. S., ... & Sorenson, G. (2014). Occupational injury among hospital patient-care workers: What is the association with workplace verbal abuse? *American Journal of Industrial Medicine*, 57(2), 222–232.

Said, C. M., Delahunt, M., Ciavarella, V., Al Maliki, D., Boys, A. M., Vogrin, S., & Berney, S. (2021). Factors impacting early mobilization following hip fracture: an observational study. *Journal of Geriatric Physical Therapy*, 44(2), 88-93.

Stubbs, B. (2009). The manual handling of the aggressive patient: A review of the risk of injury to nurses. *Journal of Psychiatric and Mental Health Nursing*, 16(4), 395–400.

Sturman-Floyd, M. (2013). Moving and handling: Support for residents with dementia. *Nursing & Residential Care*, 15(5), 276–280.

WorksafeBC (ND). Working with Dementia: Safe Work Practices for Caregivers – video training. <https://www.worksafebc.com/en/health-safety/industries/health-care-social-services/topics/working-with-people-with-dementia>

Xidous, D., Grey, T., Kennelly, S. P., McHale, C., & O'Neill, D. (2020). Dementia friendly hospital design: Key issues for patients and accompanying persons in an Irish acute care public hospital. *HERD: Health Environments Research & Design Journal*, 13(1), 48-67.

Ye, H. M. Y., Xiao, L. D., Ullah, S., & Chang, R. H. C. (2024). Hospital nurses perceived challenges and opportunities in the care of people with dementia: A mixed-methods systematic review. *Journal of Clinical Nursing*.

Yous, M. L., Ploeg, J., Kaasalainen, S., & Martin, L. S. (2019). Nurses' experiences in caring for older adults with responsive behaviors of dementia in acute care. *SAGE Open Nursing*, 5, 2377960819834127.

Other Health Care Settings

Ambulatory Care

ADA National Network. Accessible Medical Examination Tables and Chairs. 2017. <https://adata.org/factsheet/accessible-medical-examination-tables-and-chairs>

Fragala G. Reducing occupational risk to ambulatory caregivers. *Workplace Health Saf.* 2016;64:414-9.

Fragala, G., Labreche, M., & Wawzynieki, P. (2017). Benefits Achieved for Patients Through Application of Height-Adjustable Examination Tables. *Journal of Patient Experience*, 4, 138 - 143.

Gatton L., & Scott, K. Assessing Ambulatory Care Settings for Safe Patient Handling Resources and Training webinar Stanford Healthcare.American Academy of Ambulatory Care Nursing. 2024 <https://library.aaacn.org/p/s/assessing-ambulatory-care-settings-for-safe-patient-handling-resources-and-training-14063>

Mudrick NR, Breslin ML, Liang M, Yee S. Physical accessibility in primary health care settings: results from California on-site reviews. *Disabil Health J.* 2012;5:159-67.

Pharr, J. R. (2013). Accessible Medical Equipment for Patients with Disabilities in Primary Care Clinics: Why is it Lacking?. *Disability and Health Journal*, 6(2), 124-132. http://digitalscholarship.unlv.edu/env_occ_health_fac_articles/60

U.S. Dept of Justice Civil Rights Division. Access to Medical Care for Individuals with Mobility Disabilities. Last updated: June 26, 2020. <https://www.ada.gov/resources/medical-care-mobility/>

U.S. Dept of Justice Civil Rights Division. Department of Health and Human Services Office for Civil Rights (HHS OCR), 2010. Americans With Disabilities (ADA) Access to Medical Care for Individuals With Mobility

Safe Patient Handling and Mobility – Section 10

Disabilities—Use of SPH Equipment in Clinics.

<https://www.hhs.gov/sites/default/files/ocr/civilrights/understanding/disability/adamobilityimpairmentsguidance.pdf>

Yeung, Y. (2015). Increase access to healthcare services with safe patient handling and mobility equipment. *American Journal of Safe Patient Handling & Mobility*, 5(4), 104–147.

Long Term Care

Guidelines, Tools, and Training

Collins, J.W., Nelson, A, and Sublet, V. (2006). Safe lifting and movement of nursing home residents. DHHS (NIOSH) Publication No. 2006-117. Cincinnati, OH: National Institute for Occupational Safety and Health. <http://www.cdc.gov/niosh/docs/2006-117/>

Fraser health BC. Resources for Assisted Living and Community Care including falls prevention <https://www.fraserhealth.ca/health-topics-a-to-z/resources-for-assisted-living-providers/clinical-resources/falls-prevention-and-safe-client-handling>

Kurnoff, J., & Lazarus. *Provincial safe resident handling standards for musculoskeletal injury prevention in British Columbia*. <https://safecarebc.ca/resources/assorted/provincial-safe-resident-handling-standards-for-musculoskeletal-injury-prevention-in-bc/>

Minnesota OSHA Workplace Safety Consultation. (2017). Recommendations for successful safe-patient-handling committees. Best practices, suggested activities for skilled nursing care facilities. https://www.dli.mn.gov/sites/default/files/pdf/sph_committee_recommendations.pdf

NIOSH. (ND). Ergonomics Best Practices for Extended-Care Facilities Adapted from the Ohio Bureau of Workers' Compensation <https://www.cdc.gov/niosh/media/pdfs/BWC-Extended-Care.pdf>

OSHA Guidelines for Nursing Homes: Ergonomics for the Prevention of Musculoskeletal Disorders. OSHA Publication 3182, (2003, Revised March 2009). https://www.osha.gov/sites/default/files/publications/final_nh_guidelines.pdf

Occupational Safety and Health Agency (OSHA). Nursing Homes and Personal Care Facilities. <https://www.osha.gov/nursing-home>

OSHA vs. Beverly Enterprises Stipulation and Settlement Agreement. OSHA, 2002. <https://www.osha.gov/enforcement/cwsa/beverly-enterprises-inc-02262002>

Registered Nurses Association of Ontario (RNAO) 2018. Long-Term Care Best Practices Toolkit. (2nd ed.). *Implementing and sustaining evidence-based practices in long-term care*. <https://ltctoolkit.rnao.ca/>

U Mas – Lowell, 2018. Ergonomics in Healthcare: A Continuing Education Program for Nurses, Nursing Assistants and Healthcare Managers. <https://www.uml.edu/Research/CPH-NEW/education-training/ergonomics/>

Articles

Incident Rates and Costs of Resident Handling Related Injuries

Alperovitch-Najenson, D., Sheffer, D., Treger, I., Finkels, T., & Kalichman, L. (2015). Rehabilitation versus nursing home nurses' low back and neck-shoulder complaints. *Rehabilitation Nursing*, 40, 286–293.

Bláfoss, R., Vinstrup, J., Skovlund, S. V., López-Bueno, R., Calatayud, J., Clausen, T., & Andersen, L. L. (2021). Musculoskeletal pain intensity in different body regions and risk of disability pension among

Safe Patient Handling and Mobility – Section 10

female eldercare workers: Prospective cohort study with 11-year register follow-up. *BMC Musculoskeletal Disorders*, 22(1), 1-9.

Caponecchia, C., Coman, R. L., Gopaldasani, V., Mayland, E. C., & Campbell, L. (2020). Musculoskeletal disorders in aged care workers: A systematic review of contributing factors and interventions. *International Journal of Nursing Studies*, 110, 103715.

Cheung, K., Ma, K. Y., Cheung, H. H., Lee, C. H., Chan, I. M. M., Cheung, S. T., ... & Lo, W. C. (2021). Predictors of work-related musculoskeletal symptoms in shoulders among nursing assistants working in nursing homes. *PeerJ*, 9, e11152.

Cheung, K., Szeto, G., Lai, G. K. B., & Ching, S. S. (2018). Prevalence of and factors associated with work-related musculoskeletal symptoms in nursing assistants working in nursing homes. *International Journal of Environmental Research and Public Health*, 15(2), 265.

Choi, S. S., Szeto, G., Lai, G. K. B., Lai, X. B., Chan, Y. T., & Cheung, K. (2018). Exploring the synergic effects of nursing home work on work-related musculoskeletal disorders among nursing assistants. *Workplace Health & Safety*, 66(3), 129-135.

Davis, K. G., & Kotowski, S. E. (2015). Prevalence of musculoskeletal disorders for nurses in hospitals, long-term care facilities, and home health care: A comprehensive review. *Human Factors*, 57(5), 754-792.

Davis, K. G., Freeman, A. M., Ying, J., & Huth, J. R. (2021). Workers' compensation costs for healthcare caregivers: Home healthcare, long-term care, and hospital nurses and nursing aides. *American Journal of Industrial Medicine*, 64(5), 369-380.

Gucer, P. W., Oliver, M., Parrish, J. M., & McDiarmid, M. (2009). Work productivity impairment from musculoskeletal disorder pain in long-term caregivers. *Journal of Occupational and Environmental Medicine*, 51(6), 672-681.

Miranda, H., Punnett, L., Gore, R., & Boyer, J. (2011). Violence at the workplace increases the risk of musculoskeletal pain among nursing home workers. *Occupational and Environmental Medicine*, 68(1), 52-57.

Qin, J., Kurowski, A., Gore, R., & Punnett, L. (2014). The impact of workplace factors on filing of workers' compensation claims among nursing home workers. *BMC Musculoskeletal Disorders*, 15(1), 22-29.

Pieretti, L. F., Sylvester, R. A., & Siegfried, K. V. (2020). Medical cost of workers' compensation claims related to patient handling and mobility tasks within skilled nursing facilities, continuing care retirement communities and assisted living facilities: An exploratory analysis. *Journal of Occupational and Environmental Medicine*, 62(12), e738.

Rosebush, C. E., Zaidman, B., Schofield, K. E., Erickson, D. J., Ramirez, M., Tschida, B., & McGovern, P. M. (2020). Occupational differences in workers' compensation indemnity claims among direct care workers in Minnesota nursing homes, 2005-2016. *American Journal of Industrial Medicine*, 63(6), 517-526.

Sharma, H., & Xu, L. (2024). Occupational injuries in the US nursing homes. *Medical Care*, 62(5), 346-351.

Walton, A. L., & Rogers, B. (2017). Workplace hazards faced by nursing assistants in the United States: A focused literature review. *International Journal of Environmental Research and Public Health*, 14(5), 544.

Safe Resident Handling Programs Outcomes

Asuquo, E. G., Tighe, S. M., & Bradshaw, C. (2021). Interventions to reduce work-related musculoskeletal disorders among healthcare staff in nursing homes: An integrative literature review. *International Journal of Nursing Studies Advances*, 3, 100033.

Safe Patient Handling and Mobility – Section 10

Brusco, N. K., Graven, C., Boyd, L., Kugler, H., Dawes, H., Rawson, H., ... & Taylor, N. F. (2023). Feasibility of implementing an innovative manual handling risk assessment training program for staff working in long-term care. *Archives of Public Health*, 81(1), 53.

Campaneria, N., & Enos, L. (2022). Round table discussion: The challenges of introducing safe resident handling and mobility in an assisted living environment. *International Journal of Safe Patient Handling and Mobility*, 12(3), 87-92.

Coman, R. L., Caponecchia, C., & McIntosh, A. S. (2018). Manual handling in aged care: Impact of environment-related interventions on mobility. *Safety and Health at Work*, 9(4), 372-380.

D'Arcy, L. P., Sasai, Y., & Stearns, S. C. (2012). Do assistive devices, training, and workload affect injury incidence? Prevention efforts by nursing homes and back injuries among nursing assistants. *Journal of Advanced Nursing*, 68(4), 836-845.

Engst, C., Chhokar, R., Robinson, D., Earthy, A., & Yassi, A. (2004). Implementation of a scheduled toileting program in a long term care facility: Evaluating the impact on injury risk to caregiving staff. *AAOHN Journal*, 52(10), 427-435.

Fagerström, V., & Tamminen-Peter, L. (2010). Ergonomics and usability of patient lifts in elderly care. *Hoitotiede*, 22(2), 118-128.

Fraserhealth Device Safety Checklists for Assisted Living (2019). <https://www.fraserhealth.ca/-/media/Project/FraserHealth/FraserHealth/Health-Topics/Resources-for-Assisted-Living-Providers/Device-Safety-Checklists-for-Assisted-Living.pdf>

Garg, A. (1999). Long-term effectiveness of “Zero-Lift Program” in seven nursing homes and one hospital. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health (NIOSH), Cincinnati, OH. Contract No. U60/CCU512089-02.

Garg, A., & Kapellusch, J. M. (2012). Long-term efficacy of an ergonomics program that includes patient-handling devices on reducing musculoskeletal injuries to nursing personnel. *Human Factors*, 54(4), 608-625.

Gold, J. E., Punnett, L., & Gore, R. J. (2017). Predictors of low back pain in nursing home workers after implementation of a safe resident handling program. *Occupational and Environmental Medicine*, 74, 389–395.

Gucer, P. W., Gaitens, J., Oliver, J. M., & McDiarmid, M. A. (2013). Sit-stand mechanical lifts in long-term care and resident quality indicators. *Journal of Occupational and Environmental Medicine*, 55(1), 36-44.

Heather, M., Murray, E., Severson, L., & Kissing, J. (2013). Safe patient handling & movement: Long term care. *American Journal of Safe Patient Handling & Movement*, Sep2013 Supplement, 3, S1-S19.

Hodder, J. N., Holmes, M. W., & Kier, P. J. (2010). Continuous assessment of work activities and posture in long term care nurses. *Ergonomics*, 53(9), 1097-1107.

Hodgson, M., Matz, M. W., & Nelson, A. (2013). Patient handling in the Veterans Health Administration: Facilitating change in the health care industry. *Journal of Occupational and Environmental Medicine*, 55(10), 1230-1237.

Holtermann, A. (2017). Implementation of a resident handling programme and low back pain in elder care workers. *Occupational and Environmental Medicine*, 74(6), 387-388.

Kurowski, A., Buchholz, B., ProCare Research Team, & Punnett, L. (2014). A physical workload index to evaluate a safe resident handling program for nursing home personnel. *Human Factors*, 56(4), 669-683.

Joliff, J. (2006). The miracle of lifting technology. *Nursing Homes*.
<https://www.thefreelibrary.com/The+miracle+of+lifting+technology%3A+retired+administrator+Joe+Joliff...-a0162791508>

Safe Patient Handling and Mobility – Section 10

- Koppelaar, E., Knibbe, H. J., Miedema, H. S., & Burdorf, A. (2012). The influence of ergonomic devices on mechanical load during patient handling activities in nursing homes. *Annals of Occupational Hygiene*, 56(6), 708-718.
- Kurowski, A., & El Ghaziri, M. (2019). The role of safe handling and mobilization in reducing type II workplace violence in healthcare settings. CPH News and Views, Issue #62. UMass Lowell. Retrieved from <https://www.uml.edu/Research/CPH-NEW/News/emerging-topics/News-views-62.aspx>
- Kurowski, A., Boyer, J., Fulmer, S., Gore, R., & Punnett, L. (2012). Changes in ergonomic exposures of nursing assistants after the introduction of a safe resident handling program in nursing homes. *International Journal of Industrial Ergonomics*, 42(6), 525-532.
- Kurowski, A., Gore, R., Buchholz, B., & Punnett, L. (2012). Differences among nursing homes in outcomes of a safe resident handling program. *Journal of Healthcare Risk Management*, 32(1), 35-51.
- Kurowski, A., Gore, R., Roberts, Y., Kincaid, K. R., & Punnett, L. (2017). Injury rates before and after the implementation of a safe resident handling program in the long-term care sector. *Safety Science*, 92, 217-224.
- Kurowski, A., Pransky, G., & Punnett, L. (2019). Impact of a safe resident handling program in nursing homes on return-to-work and re-injury outcomes following work injury. *Journal of Occupational Rehabilitation*, 29, 286-294.
- Kyung M, Lee SJ, Wagner LM, Hong O. Use of patient- handling devices and coworker assistance in long-term care settings: A cross-sectional study. *Int J Nurs Stud Adv*. 2025 Mar 17;8:100317. doi: 10.1016/j.ijnsa.2025.100317. Erratum in: *Int J Nurs Stud Adv*. 2025 Apr 30;8:100323.
- Lachance, C. C., Korall, A. M., Russell, C. M., Feldman, F., Robinovitch, S. N., & Mackey, D. C. (2016). External hand forces exerted by long-term care staff to push floor-based lifts: effects of flooring system and resident weight. *Human factors*, 58(6), 927-943.
- Lahiri, S., Latif, S., Punnett, L., & ProCare Research Team. (2013). An economic analysis of a safe resident handling program in nursing homes. *American Journal of Industrial Medicine*, 56(4), 469-478.
- McCloskey, R., Donovan, C., & Donovan, A. (2017). Linking incidents in long-term care facilities to worker activities. *Workplace Health & Safety*, 65(10), 457-466.
- Miller, A., Engst, C., Tate, R. B., & Yassi, A. (2006). Evaluation of the effectiveness of portable ceiling lifts in a new long-term care facility. *Applied Ergonomics*, 37(3), 377-385.
- Monaghan, H. (2024). Using assistive devices in assisted living. What can be used to promote staff and resident safety. *International Journal of Safe Patient Handling and Mobility*, 12(3), 82-86.
- Monaghan, H. M., et al. (2013). Long term care. *Safe Patient Handling and Mobility*, September 2013.
- Moskowitz, A. F. (2024). Patient Handling, Workplace Violence, and Contact-Related Occupational Injury Among Residential Care Workers (Doctoral dissertation, University of Minnesota). <https://www.proquest.com/openview/f70ccaf353823f72d0e932bdedf70b81/1?pq-origsite=gscholar&cbl=18750&diss=y>
- Nelson, A., Collins, J., Siddharthan, K., Matz, M., & Waters, T. (2008). The link between safe patient handling and patient outcomes in long-term care. *Rehabilitation Nursing*, 33(1), 33-43.
- Oakman, J., Stevens, M., Karstad, K., Hallman, D. M., Rugulies, R., & Holtermann, A. (2020). Do organisational and ward-level factors explain the variance in multi-site musculoskeletal pain in eldercare workers? A multi-level cross-sectional study. *International Archives of Occupational and Environmental Health*, 93(7), 891-898.
- Occupational Safety and Health Agency (OSHA). Citation 892308.015/01001 Aug 13 , 2013. Incorporate NIOSH's ergonomic recommendations for nursing homes into this program. ... Use gait belts at best for

Safe Patient Handling and Mobility – Section 10

stand-by assists only.

https://www.osha.gov/ords/imis/generalsearch.citation_detail?id=892308.015&cit_id=01001

Owen, B. D., Garg, A., & Jensen, R. C. (1992). Four methods for identification of most back-stressing tasks performed by nursing assistants in nursing homes. *International Journal of Industrial Ergonomics*, 9(3), 213-220.

Park, R. M., Bushnell, P. T., Bailer, A. J., Collins, J. W., & Stayner, L. T. (2009). Impact of publicly sponsored interventions on musculoskeletal injury claims in nursing homes. *American Journal of Industrial Medicine*, 52(9), 683-697.

Park, S., Lavender, S. A., Sommerich, C. M., & Patterson, E. S. (2018). Increasing the use of patient lifting devices in nursing homes: Identifying the barriers and facilitators affecting the different adoption stages for an ergonomics intervention. *International Journal of Safe Patient Handling and Mobility*, 8, 9-24.

Powell-Cope, G., Toyinbo, P., Patel, N., Rugs, D., Elnitsky, C., Hahm, B., ... & Hodgson, M. (2014). Effects of a national safe patient handling program on nursing injury incidence rates. *The Journal of Nursing Administration*, 44(10), 525-534.

Restrepo, T. E., Schmid, F. A., Gucer, P. W., Shuford, H. L., Shyong, C. J., & McDiarmid, M. A. (2013). Safe lifting programs at long-term care facilities and their impact on workers' compensation costs. *Journal of Occupational and Environmental Medicine*, 55(1), 27-35.

Ronald, L. A., Yassi, A., Spiegel, J., Tate, R., Tait, D., & Mozel, M. R. (2002). Effectiveness of installing overhead ceiling lifts: Reducing musculoskeletal injuries in an extended care hospital unit. *AAOHN Journal*, 50(3), 120-127.

Ryan, D., Anderson, C., Connolly, A. M., Veety, L., Villavicencio, T., & Parks, L. (2023). An evaluation on the effects of safe person handling program implementation at long term care facilities for persons with complex intellectual, developmental, and medical conditions. *American Journal of Industrial Medicine*, 66(4), 320-332.

Silverstein et al., (2003) Getting to Zero in Washington State Nursing Homes: Final Report on Intervention Effectiveness SHARP Technical Report 61-05-2003 April 2003 <https://lni.wa.gov/safety-health/safety-research/files/2003/GettingZero.pdf>

Slaughter, S. E., Wagg, A. S., Jones, C. A., Schopflocher, D., Ickert, C., Bampton, E., ... & Estabrooks, C. A. (2015). Mobility of vulnerable elders study: Effect of the sit-to-stand activity on mobility, function, and quality of life. *Journal of the American Medical Directors Association*, 16(2), 138-143.

Spiegel, J., Yassi, A., Ronald, L. A., Tate, R. B., Hacking, P., & Colby, T. (2002). Implementing a resident lifting system in an extended care hospital: Demonstrating cost-benefit. *AAOHN Journal*, 50(3), 128-134.

Stanev, S., Bailer, A. J., Straker, J. K., Mehdizadeh, S., Park, R. M., & Li, H. (2012). Worker injuries and safety equipment in Ohio nursing homes. *Journal of Gerontological Nursing*, 38(6), 47-56.

Stevens, M. L., Boyle, E., Hartvigsen, J., Mansell, G., Sogaard, K., Jørgensen, M. B., ... & Rasmussen, C. D. (2019). Mechanisms for reducing low back pain: A mediation analysis of a multifaceted intervention in workers in elderly care. *International Archives of Occupational and Environmental Health*, 92(1), 49-58.

Sturman-Floyd, M. (2013). Moving and handling: Assessment of the resident. *Nursing & Residential Care*, 15(3), 150-156.

Thomas, D. R., Thomas, Y. L., Ashton, T., Wallaart, J., Armstrong, D., & McMahon, A. (2012). Assessing the costs and benefits of moving and handling programmes.

Tiesman, H. M., Nelson, A. L., Charney, W., Siddharthan, K., & Fragala, G. (2003). Effectiveness of a ceiling-mounted patient lift system in reducing occupational injuries in long term care. *Journal of Healthcare Safety*, 1(1), 34-40.

Safe Patient Handling and Mobility – Section 10

Tompa, E., Dolinschi, R., Alamgir, H., Sarnocinska-Hart, A., & Guzman, J. (2016). A cost-benefit analysis of peer coaching for overhead lift use in the long-term care sector in Canada. *Occupational and Environmental Medicine*, 73(5), 308-314.

Zhang, Y., Flum, M., Kotejshyer, R., Fleishman, J., Henning, R., & Punnett, L. (2016). Workplace participatory occupational health/health promotion program: facilitators and barriers observed in three nursing homes. *Journal of Gerontological Nursing*, 42(6).

Other

Bertoncello, C., Sperotto, M., Bellio, S., Pistellato, I., Fonzo, M., Bigolaro, C., ... & Baldo, V. (2021). Effectiveness of individually tailored exercise on functional capacity and mobility in nursing home residents. *British Journal of Community Nursing*, 26(3), 144-149.

Boakye-Dankwa, E., Teeple, E., Gore, R., Punnett, L., & Procare Research Team. (2017). Associations among health care workplace safety, resident satisfaction, and quality of care in long-term care facilities. *Journal of Occupational and Environmental Medicine*, 59(11), 1127.

Bradway, C., DiResta, J., Fleshner, I., & Polomano, R. C. (2008). Obesity in nursing homes: A critical review. *Journal of the American Geriatrics Society*, 56(8), 1528-1535.

Bradway, C., DiResta, J., Miller, E., Edmiston, M., Fleshner, I., & Polomano, R. C. (2009). Caring for obese individuals in the long-term care setting. *Annals of Long-Term Care: Clinical Care and Aging*, 17(7), 17-21.

Clarke, N. (2013). Transfer of training: The missing link in training and the quality of adult social care. *Health & Social Care in the Community*, 21, 15–25.

Coatsworth-Puspoky, R., Duggleby, W., Dahlke, S., & Hunter, K. (2021). Unplanned readmission for older persons: A concept analysis. *Journal of Advanced Nursing*, 77(11), 4291-4305.

Doherty-King, B., Yoon, J. Y., Pecanac, K., Brown, R., & Mahoney, J. (2014). Frequency and duration of nursing care related to older patient mobility. *Journal of Nursing Scholarship*, 46(1), 20-27.

Fatolitis, P. G. (2020). COVID-19. Human Factors and Patient Safety in Long-Term Care Facilities. *Journal of Ergonomics*, 10, 267.

Felix, H. C., Bradway, C., Ali, M. M., & Li, X. (2016). Nursing home perspectives on the admission of morbidly obese patients from hospitals to nursing homes. *Journal of Applied Gerontology*, 35(3), 286-302.

Haas, A. D., Hunter, D. A., & Howard, N. L. (2018). Bringing a structural perspective to work: Framing occupational safety and health disparities for nursing assistants with work-related musculoskeletal disorders. *Work*, 59(2), 211-229.

Hales, C., Amankwaa, I., Gray, L., & Rook, H. (2019). The care of older adults with extreme obesity in nursing homes: A collective case study. *MedRxiv*, 19013326.

Hales, C., Amankwaa, I., Gray, L., & Rook, H. (2020). Providing care for older adults with extreme obesity in aged residential care facilities: An environmental scan. *Nursing Praxis in New Zealand*, 36(3), 24-37.

Hebrew Senior Life (2015). Improving the quality of life and outcomes for residents. Poster <https://asphp.org/wp-content/uploads/2014/04/Poster-LTC-Committee-May-27-2015-ExecTeamRecommendations-final-for-Board.pdf>

Hogh, A., Baernholdt, M., & Clausen, T. (2018). Impact of workplace bullying on missed nursing care and quality of care in the eldercare sector. *International Archives of Occupational and Environmental Health*, 91(8), 963-970.

Safe Patient Handling and Mobility – Section 10

- Homola, J., et al. (2024). Embracing early mobility: Enhancing the well-being of residents and staff in long term care and in diagnostic imaging. *International Journal of Safe Patient Handling and Mobility*, 14(1), 43-50.
- Huang, T., et al. (2025). Enhanced fall prevention in nursing facilities: Assisting caregivers through data-driven selective monitoring and notification. *Healthcare and Medical Devices*, 171, 21–31.
- Kanaskie, M. L., & Snyder, C. (2018). Nurses and nursing assistants' decision-making regarding use of safe patient handling and mobility technology: A qualitative study. *Applied Nursing Research*, 39, 141-147.
- Kapoor, A., Field, T., Handler, S., Fisher, K., Saphirak, C., Crawford, S., ... & Gurwitz, J. H. (2019). Adverse events in long-term care residents transitioning from hospital back to nursing home. *JAMA Internal Medicine*, 179(9), 1254-1261.
- Knibbe, H., Knibbe, N., (2024). Time for incontinence care assessment of time necessary for toileting and containment care. *International Journal of Safe Patient Handling & Mobility*, 14(1), 31-42
- Kurowski, A., Gore, R., Mpolla, N., & Punnett, L. (2016). Use of resident handling equipment by nursing aides in long-term care: Associations with work organization and individual level characteristics. *American Journal of Safe Patient Handling and Movement*, 6(1), 16-24.
- Lapane, K. L., Dubé, C. E., & Jesdale, B. M. (2016). Worker injuries in nursing homes: is safe patient handling legislation the solution? *The Journal of Nursing Home Research Sciences*, 2, 110.
- McArthur, C., & Giangregorio, L. M. (2018). Improving strength and balance for long-term care residents at risk for falling: Suggestions for practice. *Journal of Clinical Outcomes Management*, 25, 28-38.
- McBride, S. E., & Rogers, W. A. (2013, June). Optimizing resident care in assisted living communities. In *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care* (Vol. 2, No. 1, pp. 92-98). Sage CA: Los Angeles, CA: SAGE Publications.
- McGrath, B. (2016). Integrating aged care in the nursing curriculum. *Kai Tiaki: Nursing New Zealand*, 22(10), 20.
- Nazare, S., Or, C., Li, K., & Xu, J. (2013, June). What makes the implementation of clinical information systems difficult in nursing homes? A qualitative case study. In *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care* (Vol. 2, No. 1, pp. 38-42). Sage CA: Los Angeles, CA: SAGE Publications.
- Olson, D. L., & King, P. M. (2012). Estimated energy expenditure of nursing assistants in long term care. *Work*, 42(3), 331-340.
- Plaku-Alakbarova, B., Punnett, L., Gore, R. J., & Procare Research Team. (2018). Nursing home employee and resident satisfaction and resident care outcomes. *Safety and Health at Work*, 9(4), 408-415.
- Popejoy, L. L., Vogelsmeier, A. A., Wang, Y., Wakefield, B. J., Galambos, C. M., & Mehr, D. R. (2021). Testing re-engineered discharge program implementation strategies in SNFs. *Clinical Nursing Research*, 30(5), 644-653.
- Severson, L. (2024). The need for safe resident handling and mobility in an assisted living setting. Where are we now? *International Journal of Safe Patient Handling and Mobility*, 12(3), 76-81.
- Smith, M. C., O'May, F., Tropea, S., & Berg, J. (2016). Framing moving and handling as a complex healthcare intervention within the acute care of older people with osteoporosis: A qualitative study. *Journal of Clinical Nursing*, 25(19-20), 2906-2920.
- Spilsbury, K., Hewitt, C., Stirk, L., & Bowman, C. (2011). The relationship between nurse staffing and quality of care in nursing homes: a systematic review. *International Journal of Nursing Studies*, 48(6), 732-750.
- Sworn, K., & Booth, A. (2020). A systematic review of the impact of 'missed care' in primary, community and nursing home settings. *Journal of Nursing Management*, 28(8), 1805-1829.

Safe Patient Handling and Mobility – Section 10

- Taylor, J., Sims, J., & Haines, T. P. (2014). Quality mobility care in nursing homes. *Research in Gerontological Nursing*, 7, 284–291.
- Taylor, J., Sims, J., & Haines, T. P. (2014). The emergent relevance of care staff decision-making and situation awareness to mobility care in nursing homes: An ethnographic study. *Journal of Advanced Nursing*, 70, 2767–2778.
- Van Eerd, D., D'Elia, T., Ferron, E. M., Robson, L., & Amick III, B. (2021). Implementation of participatory organizational change in long term care to improve safety. *Journal of Safety Research*.
- Xiao, C., Winstead, V., Townsend, C., & Jablonski, R. A. (2021). Certified nursing assistants' perceived workplace violence in long-term care facilities: A qualitative analysis. *Workplace Health & Safety*, 69(8), 366-374.
- Yoder, C. L. M., Kyoshi-Teo, H., & Ochoa-Cosler, O. (2023). Fall prevention care management: Implementation and outcomes of a project to reduce fall risks of older adults in assisted living facilities. *Journal of Nursing Care Quality*, 38(4), 374-380.
- Zhang, N., Field, T., Mazor, K. M., Zhou, Y., Lapane, K. L., & Gurwitz, J. H. (2019). The increasing prevalence of obesity in residents of US nursing homes: 2005–2015. *The Journals of Gerontology: Series A*, 74(12), 1929-1936.
- Zhang, Y., Punnett, L., & Gore, R. (2019). Predictors of nursing staff voluntary termination in nursing homes: A case-control study. *Journal of Applied Gerontology*, 38(11), 1518-1536.
- Zhang, Y., Punnett, L., & Nannini, A. (2017). Work-family conflict, sleep, and mental health of nursing assistants working in nursing homes. *Workplace Health & Safety*, 65(7), 295-303.
- Zhang, Y., Punnett, L., Gore, R., & CPH-New Research Team. (2014). Relationships among employees' working conditions, mental health, and intention to leave in nursing homes. *Journal of Applied Gerontology*, 33(1), 6-23.

Home Health & Community Care

Books, Web Based Resources, Training

- American Industrial Hygiene Association. (2021). Home Health Care Aides: Occupational Health and Safety Challenges and Opportunities [White Paper]. <https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/White-Papers/Home-Health-Care-Aides-Occupational-Health-and-Safety-Challenges-and-Opportunities-White-Paper.pdf>
- Bien E., & Smith R. (2020). The Unique Occupational Environment of the Home Healthcare Worker <https://blogs.cdc.gov/niosh-science-blog/2020/09/29/hhcws/>
- Department of Veterans Affairs Office of Construction & Facilities Management. Small House Model Design Guide January 2017. <https://www.cfm.va.gov/til/dGuide/dgSHModel.pdf>
- Food and Drug Administration (FDA) Home Healthcare Medical Devices: A Checklist. <https://www.fda.gov/medical-devices/home-health-and-consumer-devices/brochure-home-healthcare-medical-devices-checklist>
- Gallagher, A., & Small, E. (2021). SmartCare: How in-home aged care providers can mitigate risk, maximise their workforce and deliver quality care. ISBN: 1922553484, 9781922553485. <https://riskmanaged.com.au/>
- National Institute for Occupational Safety and Health (NIOSH). (2015). *Training Curriculum for Homecare Workers. Caring for Yourself While Caring for Others DHHS (NIOSH) Publication Number 2015-102*. <https://www.cdc.gov/niosh/docs/2015-102/default.html>

Safe Patient Handling and Mobility – Section 10

NIOSH (2010). NIOSH Hazard Review: Occupational Hazards in Home Healthcare DHHS (NIOSH) Publication Number 2010-125 <https://www.cdc.gov/niosh/docs/2010-125/>

Occupational Safety and Health Administration (OSHA). Home Healthcare. *Website with Multiple Resources*. <https://www.osha.gov/home-healthcare>

Royal College of Occupational Therapists UK. (2019). Care homes and equipment . Guiding principles for assessment and provision. <https://www.rcot.co.uk/explore-resources/rcot-publications/care-homes-equipment>

Safecare BC Home care and community health support workers pocketbook. <https://safecarebc.ca/resources/toolkits/home-care-and-community-health-support-pocketbook/>

SWEP Home Modifications Prescriber Manual 2017 Ballarat Health Services Australia https://www.aidacare.com.au/globalassets/contracts/contract-vic/swep-home-mods/swep_home_modifications_prescriber_manual.pdf

Thomas, D., & Thomas Y. (2012). Guidelines for Moving and Handling People in Home Care: New Zealand. https://www.researchgate.net/publication/266675152_Guidelines_for_Moving_and_Handling_People_in_Home_Care_New_Zealand

Worksafe Western Australia Rev. 2024. Manual Tasks Guide for Carers Tips for Carers on Preventing Musculoskeletal Injuries from Performing Manual Tasks https://www.worksafe.wa.gov.au/system/files/documents/2024-12/GL_ManualTask_Carers.pdf

Articles

Incident Rates and Costs of Patient Handling Related Injuries

Arlinghaus, A., Caban-Martinez, A. J., Marino, M., & Reme, S. E. (2013). The role of ergonomic and psychosocial workplace factors in the reporting of back injuries among US home health aides. *American Journal of Industrial Medicine*, 56(10), 1239-1244.

Boniface, G., Ghosh, S., & Robinson, L. (2016). District nurses' experiences of musculoskeletal wellbeing: a qualitative study. *British Journal of Community Nursing*, 21(7), 350-355.

Davis, K. G., & Kotowski, S. E. (2015). Prevalence of musculoskeletal disorders for nurses in hospitals, long-term care facilities, and home health care: a comprehensive review. *Human Factors*, 57(5), 754-792.

Davis, K. G., Freeman, A. M., Ying, J., & Huth, J. R. (2021). Workers' compensation costs for healthcare caregivers: Home healthcare, long-term care, and hospital nurses and nursing aides. *American Journal of Industrial Medicine*, 64(5), 369-380.

Hamadi, H., Probst, J. C., Khan, M. M., Bellinger, J., & Porter, C. (2016). Home-based direct care workers: Their reported injuries and perceived training knowledge. *Workplace Health & Safety*, 64(6), 249-261.

Hansell, A. K., Knaster, E. S., & Phillips, L. E. (2018). Injury among home care workers in Washington State. *New Solutions: A Journal of Environmental and Occupational Health Policy*, 27(4), 543-558.

Howard, N., & Marcum, J. (2020). Comparison of BRFSS data between home-based care providers and health care support workers in clinical environments in Washington State. *Workplace Health & Safety*, 68(2), 92-102.

Quinn, M. M., Markkanen, P. K., Galligan, C. J., Sama, S. R., Kriebel, D., Gore, R. J., et al. (2016). Occupational health of home care aides: results of the safe home care survey. *Occupational and Environmental Medicine*, 73(4), 237-245.

Risk Factors for Injury

- Baron, S. L., Tsui, E. K., & Quinn, M. M. (2022). Work as a Root Cause of Home Health Workers' Poor Health. *American Journal of Public Health*, 112(1), 9-11.
- Beauvais, A., & Frost, L. (2014). Saving our backs: Safe patient handling and mobility for home care. *Home Healthcare Now*, 32(7), 430-434.
- Beer, J. M., McBride, S. E., Mitzner, T. L., & Rogers, W. A. (2014). Understanding challenges in the front lines of home health care: a human-systems approach. *Applied Ergonomics*, 45(6), 1687-1699.
- Bien, E., & Smith, R. (2020, September 29). The Unique Occupational Environment of the Home Health care Worker. *NIOSH Science Blog*. <https://blogs.cdc.gov/niosh-science-blog/2020/09/29/hhcws/>
- Carneiro, P., Martins, J., & Torres, M. (2015). Musculoskeletal disorder risk assessment in home care nurses. *Work*, 51, 657–665.
- Chang, J., Hilton, T., Kajaks, T., Love, J., & Parmelund, N. (2018). International Round Table Discussion: Home Health. *International Journal of Safe Patient Handling & Mobility*, 8(2), 100-109.
- Czuba, L. R., Sommerich, C. M., & Lavender, S. A. (2012). Ergonomic and safety risk factors in home health care: Exploration and assessment of alternative interventions. *Work*, 42(3), 341-353.
- De Jong, T., Bos, E., Pawlowska-Cypriak, K., et al. (2014). Current and emerging issues in the healthcare sector, including home and community care. European Agency for Safety and Health at Work. <https://op.europa.eu/en/publication-detail/-/publication/3e538d87-18e7-4880-9660-9e4d092692ed/language-en>
- Dondi, A. C., Bellacov, R., Fray, M., & Davis, K. G. (2024). Assessment of the occupational exposures within homes for home healthcare workers in the United Kingdom. *Human Factors in Healthcare*, 6, 100080.
- Grasmo, S. G., Liaset, I. F., & Redzovic, S. E. (2021). Home care workers' experiences of work conditions related to their occupational health: a qualitative study. *BMC Health Services Research*, 21(1), 1-13.
- Häikiö, K., Sagbakken, M., & Rugkåsa, J. (2019). Dementia and patient safety in the community: a qualitative study of family carers' protective practices and implications for services. *BMC health services research*, 19(1), 635.
- Harrison, D., & Webb, J. (2020). Moving and handling solutions in response to the COVID-19 pandemic in the UK: Exploring the impact of COVID-19 on a caregiver's ability to carry out their role in home care. *International Journal of Safe Patient Handling & Mobility*, 10(2), 55-58.
- Hignett, S., Otter, M. E., & Keen, C. (2016). Safety risks associated with physical interactions between patients and caregivers during treatment and care delivery in home care settings: A systematic review. *International Journal of Nursing Studies*, 59, 1-14.
- Howard, N. (2016). Identifying the risks of the working environment of home-based care workers. *American Journal of Safe Patient Handling & Mobility*, 6(4), 166-170.
- King, E. C., Boscart, V. M., Weiss, B. M., Dutta, T., Callaghan, J. P., & Fernie, G. R. (2019). Assisting frail seniors with toileting in a home bathroom: approaches used by home care providers. *Journal of Applied Gerontology*, 38(5), 717-749.
- King, E. C., Holliday, P. J., & Andrews, G. J. (2018). Care challenges in the bathroom: The views of professional care providers working in clients' homes. *Journal of Applied Gerontology*, 37(4), 493-515.
- King, E. C., Weiss, B. M., Boscart, V. M., Dutta, T., Callaghan, J. P., & Fernie, G. R. (2020). Bathing frail seniors at home: Home care providers' approaches. *Work*, 66(3), 499-517.

Safe Patient Handling and Mobility – Section 10

- Levine, D. M., Ouchi, K., Blanchfield, B., Diamond, K., Licurse, A., Pu, C. T., & Schnipper, J. L. (2018). Hospital-level care at home for acutely ill adults: a pilot randomized controlled trial. *Journal of General Internal Medicine*, 33(5), 729-736.
- Markkanen, P. K., Gore, R. J., Sama, S. R., Lindberg, J. E., Galligan, C. J., & Quinn, M. M. (2024). Coaching home care clients to prepare their homes for safe care visits: A mixed-methods study to evaluate a nurse-led educational intervention process. *International Journal of Environmental Research and Public Health*, 21(3), 360.
- McLean, H. (2018). Home care and home support worker safety: A scoping review. *Perspectives*, 40(1), 18-26.
- Morley, S. (2021). Manual Handling in Our Community and Home Care. *International Journal of Safe Patient Handling & Mobility*, 11(4), 169.
- Olson, R., Elliot, D., Hess, J., Thompson, S., Luther, K., Wipfli, B., ... & Buckmaster, A. M. (2014). The Community of Practice and Safety Support (COMPASS) total worker health™ study among home care workers: study protocol for a randomized controlled trial. *Trials*, 15(1), 1-13.
- Pagels, J. L. (2016). Care of a homebound super obese patient: A case study. *Home Healthcare Now*, 34, 140-145.
- Pay, N. A., Sommerich, C. M., & Lavender, S. A. (2021). Assessment of alternative methods for informal caregivers to perform patient repositioning tasks. *Applied Ergonomics*, 93, 103360.
- Marrelli, T., & Rennell, N. (April 29, 2020). Home care safety. *American Nurse Clinical Journal*. <https://www.myamericannurse.com/home-care-safety/>
- Sama, S. R., Quinn, M. M., Galligan, C. J., Karlsson, N. D., Gore, R. J., Kriebel, D., ... & Lindberg, J. E. (2021). Impacts of the COVID-19 pandemic on home health and home care agency managers, clients, and aides: a cross-sectional survey, March to June, 2020. *Home Health Care Management & Practice*, 33(2), 125-129.
- Sama, S. R., Quinn, M. M., Gore, R. J., Galligan, C. J., Kriebel, D., Markkanen, P. K., ... & Fallon, P. J. (2024). The safe home care intervention study: Implementation methods and effectiveness evaluation. *Journal of Applied Gerontology*, 43(11), 1595-1604.
- Sterling, M. R., Li, J., Cho, J., Ringel, J. B., & Silver, S. R. (2021). Prevalence and predictors of home health care workers' general, physical, and mental health: Findings from the 2014–2018 Behavioral Risk Factor Surveillance System. *American Journal of Public Health*, 111(12), 2239-2250.
- Szeto, G. P. Y., Wong, T. K. T., Law, R. K. Y., Lee, E. W. C., Lau, T., So, B. C. L., & Law, S. W. (2013). The impact of a multifaceted ergonomic intervention program on promoting occupational health in community nurses. *Applied Ergonomics*, 44, 414-422.
- Szeto, G. P. Y., Wong, K. T., Law, K. Y., & Lee, E. W. C. (2013). A study of spinal kinematics in community nurses performing nursing tasks. *International Journal of Industrial Ergonomics*, 43, 203-209.
- Terry, D., Lê, Q., Nguyen, U., & Hoang, H. (2015). Workplace health and safety issues among community nurses: a study regarding the impact on providing care to rural consumers. *BMJ Open*, 5(8), e008306.

Safe Client Handling Interventions

- Bartley, C., Webb, J. A., & Bayly, J. (2015). Multidisciplinary approaches to moving and handling for formal and informal carers in community palliative care.
- Capewell, R. A., Brown, D. A., & Rockefeller, K. (2011). Evaluation of a Toolkit for Safe Patient Handling in the Home Care Setting. *American Journal of Safe Patient Handling & Movement*, 1(1), 22-29.
- Fields, B. E., Whitney, R. L., & Bell, J. F. (2021). Using a Mechanical Lift at Home. *AJN The American Journal of Nursing*, 121(2), 57-62.

Safe Patient Handling and Mobility – Section 10

- Fields, B. E., Whitney, R. L., & Bell, J. F. (2022). Using a Mechanical Lift at Home: Preparing family caregivers to use lifts for transfers. *Home Healthcare Now*, 40(4), 190-195.
- Douglas, B., Fitzpatrick, D., Golub-Victor, A., & Lowe, S. M. (2014). Should my patient use a mechanical lift? Part 2. *Home Healthcare Nurse*, 32, 172–180.
- Lowe, S. M., Douglas, B., Fitzpatrick, D., & Golub-Victor, A. (2013). Should my patient use a mechanical lift? A review of the literature. *Home Healthcare Nurse*, 31, 427–432.
- Palesy, D. (2018). Developing manual handling skills in relative social isolation: A case study of Australian home care workers. *Journal of Adult and Continuing Education*, 24(1), 37-57.
- Palesy, D., & Billett, S. (2017). Learning manual handling without direct supervision or support: a case study of home care workers. *Social Work Education*, 36(3), 273-288.
- Parsons, K. S., Galinsky, T. L., & Waters, T. (2006). Suggestions for preventing musculoskeletal disorders in home healthcare workers: part 1: lift and transfer assistance for partially weight-bearing home care patients. *Home Healthcare Now*, 24(3), 158-164.
- Parsons, K. S., Galinsky, T. L., & Waters, T. (2006). Suggestions for preventing musculoskeletal disorders in home healthcare workers: part 2: lift and transfer assistance for non-weight-bearing home care patients. *Home Healthcare Now*, 24(4), 227-233.
- Piccenna, L., Lannin, N. A., Scott, K., Bragge, P., & Gruen, R. (2017). Guidance for community-based caregivers in assisting people with moderate to severe traumatic brain injury with transfers and manual handling: Evidence and key stakeholder perspectives. *Health and Social Care in the Community*, 25, 458–465.
- Powell-Cope, G., Pippins, K. M., & Young, H. M. (2017). Teaching family caregivers to assist safely with mobility. *AJN The American Journal of Nursing*, 117(12), 49-53.
- Powell-Cope, G., Pippins, K. M., & Young, H. M. (2022). Teaching family caregivers to assist safely with mobility: Methods for safe patient handling can and should be used in the home. *Home Healthcare Now*, 40(3), 133-138.
- Roberts, T. (2020). Simulation to teach safe patient handling and mobility for home caregivers. *Home Health Care Management & Practice*, 32(4), 206-210.
- Skoglund-Öhman, I., & Kjellberg, K. (2011). Factors that influence the use of safe patient transfer technique in home care service. *International Journal of Occupational Safety and Ergonomics*, 17(4), 433-444.
- Sun, C. (2018). Ergonomic evaluation of slide boards used by home care aides to assist client transfers. *Ergonomics*, 61(7), 913.
- Tang, K., Diaz, J., Lui, O., Proulx, L., Galle, E., & Packham, T. (2020). Do active assist transfer devices improve transfer safety for patients and caregivers in hospital and community settings? A scoping review. *Disability and Rehabilitation: Assistive Technology*, 15(6), 614-624.
- Yassi, A., Paris, N., Kanigan, R., & Watzke, J. (2011). Development and evaluation of models for a home care ceiling lift program in BC.
- Whitehead, P. J., Rooney, L., Adams-Thomas, J., Bailey, C., Greenup, M., Southall, C., & Whittington, S. (2022). 'Single-handed care' initiatives and reviews of double-handed homecare packages: A survey of practices in English local authorities with adult social care responsibilities. *Health & Social Care in the Community*, 30 (6), e5560–e5569. <https://pubmed.ncbi.nlm.nih.gov/36047083/>

Emergency Medical Services (EMS)

- Armstrong, D. P., Ferron, R., Taylor, C., McLeod, B., Fletcher, S., MacPhee, R. S., & Fischer, S. L. (2017). Implementing powered stretcher and load systems was a cost effective intervention to reduce the incidence rates of stretcher related injuries in a paramedic service. *Applied Ergonomics*, 62, 34-42.
- Armstrong, D. P., Makhoul, P. J., Sinden, K. E., & Fischer, S. L. (2020). Ranking stretcher and backboard related paramedic lifting tasks based on their biomechanical demand on the low back. *IIE Transactions on Occupational Ergonomics and Human Factors*, 8(1), 9-19.
- Broniecki, M., Esterman, A., May, E., & Grantham, H. (2010). Musculoskeletal disorder prevalence and risk factors in ambulance officers. *Journal of Back and Musculoskeletal Rehabilitation*, 23(4), 165-174.
- Coffey, B., MacPhee, R., Socha, D., & Fischer, S. L. (2016). A physical demands description of paramedic work in Canada. *International Journal of Industrial Ergonomics*, 53, 355-362.
- Conrad, K. M., Reichelt, P. A., Lavender, S. A., Gacki-Smith, J., & Hattle, S. (2008). Designing ergonomic interventions for EMS workers: Concept generation of patient-handling devices. *Applied Ergonomics*, 39(6), 792-802.
- Davies, K., Weale, V., & Oakman, J. (2023). A participatory ergonomics intervention to re-design work and improve the musculoskeletal health of paramedics: protocol for a cluster randomised controlled trial. *BMC Musculoskeletal Disorders*, 24(1), 716.
- Dropkin, J., Moline, J., Power, P. M., & Kim, H. (2015). A qualitative study of health problems, risk factors, and prevention among emergency medical service workers. *Work*, 52(4), 935-951.
- Ferreira, J., & Stanley, L. (2005). Evaluation of manual handling tasks involving the use of carry chairs by UK ambulance personnel. HSE Books.
- Fischer, S. L., Sinden, K. E., & MacPhee, R. S. (2017). Identifying the critical physical demanding tasks of paramedic work: Towards the development of a physical employment standard. *Applied Ergonomics*, 65, 233-239.
- Hayden, M. A., Reichard, A. A., Lowe, B. D., Naber, S. J., & Wurzelbacher, S. J. (2025). Review of powered, safe patient-handling equipment for emergency medical services via an insurance safety intervention grant program. *Prehospital and Disaster Medicine*, 40(2), 64-72.
- Hignett, S., & Griffiths, P. (2009). Manual handling risks in the bariatric (obese) patient pathway in acute sector, community and ambulance care and treatment. *Work*, 33(2), 175-180.
- Kincl, L., Hess, J., & Hecker, S. (2005). Firefighter and emergency medical services ergonomics curriculum. Oregon OSHA. <https://osha.oregon.gov/edu/grants/train/pages/firefighter-and-emergency-medical-services-ergonomics-curriculum.aspx>
- Lad, U., Oomen, N. M., Callaghan, J. P., & Fischer, S. L. (2018). Comparing the biomechanical and psychophysical demands imposed on paramedics when using manual and powered stretchers. *Applied Ergonomics*, 70, 167-174.
- Larouche, D., Bellemare, M., Prairie, J., Hegg-Deloye, S., & Corbeil, P. (2019). Overall risk index for patient transfers in total assistance mode executed by emergency medical technician-paramedics in real work situations. *Applied Ergonomics*, 74, 177-185.
- Larouche, D., Corbeil, P., Bellemare, M., Authier, M., Prairie, J., & Hegg-Deloye, S. (2019). To what extent do paramedics apply safe handling principles when transferring patients from stair chairs to stretchers? *Ergonomics*, 62(10), 1313-1326.
- Lavender, S. A., Conrad, K. M., Reichelt, P. A., Johnson, P. W., & Meyer, F. T. (2000). Biomechanical analyses of paramedics simulating frequently performed strenuous work tasks. *Applied Ergonomics*, 31(2), 167-177.

Safe Patient Handling and Mobility – Section 10

- Lavender, S. A., Conrad, K. M., Reichelt, P. A., Gacki-Smith, J., & Kohok, A. K. (2007). Designing ergonomic interventions for EMS workers, part I: Transporting patients down the stairs. *Applied Ergonomics*, 38(1), 71-81.
- Lavender, S. A., Conrad, K. M., Reichelt, P. A., Kohok, A. K., & Gacki-Smith, J. (2007). Designing ergonomic interventions for EMS workers—Part II: Lateral transfers. *Applied Ergonomics*, 38(2), 227–236.
- Lavender, S. A., Conrad, K. M., Reichelt, P. A., Kohok, A. K., & Gacki-Smith, J. (2007). Designing ergonomic interventions for emergency medical services workers—Part III: Bed to stairchair transfers. *Applied Ergonomics*, 38(5), 581–589.
- Lavender, S. A., Sommerich, C. M., Bigelow, S., Weston, E. B., Seagren, K., Pay, N. A., ... & Marras, W. S. (2020). A biomechanical evaluation of potential ergonomic solutions for use by firefighter and EMS providers when lifting heavy patients in their homes. *Applied ergonomics*, 82, 102910.
- Lawn, S., Roberts, L., Willis, E., Couzner, L., Mohammadi, L., & Goble, E. (2020). The effects of emergency medical service work on the psychological, physical, and social well-being of ambulance personnel: A systematic review of qualitative research. *BMC Psychiatry*, 20(1), 1-16.
- Leggatt, L., Van Aarsen, K., Columbus, M., Dukelow, A., Lewell, M., Davis, M., & McLeod, S. (2017). Morbidity and mortality associated with prehospital “lift-assist” calls. *Prehospital Emergency Care*, 21, 556–562.
- Marsh, E., Orr, R., Canetti, E. F., & Schram, B. (2025). Profiling paramedic job tasks, injuries, and physical fitness: A scoping review. *Applied ergonomics*, 125, 104459.
- NHS South East Coast Ambulance Service (2024) UK. Bariatric Patient Treatment Policy and Procedure. <https://www.secamb.nhs.uk/wp-content/uploads/2024/08/Bariatric-Patient-Treatment-Policy-and-Procedure.pdf>
- Paul, G., & Hoy, B. (2015). An exploratory ergonomic study of musculoskeletal disorder prevention in the Queensland Ambulance Service. *Journal of Health, Safety and Environment*, 31(3), 1-13.
- Plamondon, A., Hegg-Deloye, S., Larouche, D., & Corbeil, P. (2016). Biomechanical risk assessment during field loading of hydraulic stretchers into ambulances. *International Journal of Industrial Ergonomics*, 54, 1-9.
- Potvin, J. R., & Potvin, A. W. (2019). Ergonomics demands associated with combinations of manual and powered emergency medical service cots and ambulance loading systems: A work simulation study. *International Journal of Industrial Ergonomics*, 73., 102831.
- Prairie, J., Plamondon, A., Hegg-Deloye, S., Larouche, D., & Corbeil, P. (2016). Biomechanical risk assessment during field loading of hydraulic stretchers into ambulances. *International Journal of Industrial Ergonomics*, 54, 1–9.
- Prairie, J., Plamondon, A., Larouche, D., Hegg-Deloye, S., & Corbeil, P. (2017). Paramedics' working strategies while loading a stretcher into an ambulance. *Applied Ergonomics*, 65, 112–122.
- Réminiac, F., Jouan, Y., Cazals, X., Bodin, J.-F., Dequin, P.-F., & Guillon, A. (2014). Risks associated with obese patient handling in emergency prehospital care. *Prehospital Emergency Care*, 18, 555–557.
- Safe work Australia (2009). Manual handling risks associated with the care, treatment and transportation of bariatric (severely obese) patients in Australia 2009. https://www.safeworkaustralia.gov.au/system/files/documents/1702/manualhandlingrisks_caretreatmenttransportation_fbariatricseverelyobesepatients_australia_2009_pdf.pdf
- Yahyaee, K., Yazdi, M., Kalagari, Y., & Rahmani, S. (2019). Effect of patient transfer training on low back pain in pre-hospital emergency medical services personnel. *Journal of Clinical and Basic Research*, 3(4), 31–36.

Health Care Education Institutions

Resources related to integration of SPHM into curricula.

SPHM and Students

Association of Safe Patient Handling Professionals, Inc. (2023, March). Safe patient handling and mobility (SPHM) education in health care student curriculum: A white paper. Warrendale, PA.

<https://asphp.org/wp-content/uploads/2023/03/SPHM-Curriculum-White-Paper-March-2023.pdf>

Interprofessional

Almhdawi KA, Mathiowetz V, Al-Hourani Z, Khader Y. Musculoskeletal pain symptoms among allied health professions' students: Prevalence rates and associated factors. *Journal of Back and Musculoskeletal Rehabilitation*. 2017; 30: 1291-1301.

Enos, L. (2023). Safe patient handling and mobility and preparing healthcare students for survival in the post pandemic healthcare environment. *International Journal of Safe Patient Handling & Mobility*, 13(4), 103-107.

Jacobs, R., Beyer, E., & Carter, K. (2017). Interprofessional simulation education designed to teach occupational therapy and nursing students complex patient transfers. *Journal of Interprofessional Education & Practice*, 6, 67–70.

Karppi, M., Jerez-Roig, J., Naamanka, K., Mimoso, T., Sormunen, E., Dudoniene, V., ... & Tamminen-Peter, L. (2022). Safe patient handling education: analysis from European higher education institutions. *International Journal of Occupational Medicine and Environmental Health*, 35(5), 615.

Kneafsey R, Ramsay J, Edwards H, Callaghan H. An exploration of undergraduate nursing and physiotherapy students' views regarding education for patient handling. *J Clin Nurs*. 2012; 21(23-24): 3493-3503.

McCrorie P, Roberts PA, Sainsbury D, Boldy D, Gower S. Perceptions of Nursing and Physical Therapy Students Toward Peer-Led Interprofessional Education in Manual Handling. *Nurse Educ*. 2017; 42(1): E1-E6.

Oosterom, N., Floren, L. C., Ten Cate, O., & Westerveld, H. E. (2019). A review of interprofessional training wards: Enhancing student learning and patient outcomes. *Medical Teacher*, 41 (5), 547–554.

Spaulding EM, Marvel FA, Jacob E, Rahman A, Hansen BR, Hanyok LA, Han HR. Interprofessional education and collaboration among healthcare students and professionals: a systematic review and call for action. *Journal of Interprofessional Care*. 2021; 35(4): 612-621.

Von der Lancken S, Levenhagen K. Interprofessional teaching project with nursing and physical therapy students to promote caregiver and patient safety. *Journal of Nursing Education*. 2014; 53(12): 704-709.

Wong, A. Y., Chan, L. L., Lo, C. W., Chan, W. W., Lam, K. C., Bao, J. C., ... & Armijo-Olivo, S. (2021). Prevalence/incidence of low back pain and associated risk factors among nursing and medical students: a systematic review and meta-analysis. *Pm&r*, 13(11), 1266-1280.

Radiation Therapy

DeRoo K, Rau S, Smith B, Stevenson J, Hollenbeck J, Pawloski B. Effect of patient handling education on radiation therapy students. *Radiologic technology*, 2011; 82(5): 396-407.

Safe Patient Handling and Mobility – Section 10

Ngo M, Schneider-Kolsky M, Baird M. The attitudes of Australian radiography students towards the use of assistive transfer devices to reduce biomechanical stress in the clinical setting. *Radiography*. 2013; 19(2): 125-129.

Nursing

Backåberg S, Rask M, Brunt D, Gummesson C. Impact of musculoskeletal symptoms on general physical activity during nursing education. *Nurse Educ Pract*. 2014; 14(4): 385-390.

Boucaut R, Knobben L. Occupational health and safety incidents at a university school of nursing: A retrospective, descriptive appraisal. *Nurse Educ Pract*. 2020; 44: 102776.

Duffett-Leger, L., Beck, A. J., Siddons, A., Bright, K. S., & Alix Hayden, K. (2022). What do we know about interventions to prevent low back injury and pain among nurses and nursing students? A scoping review. *Canadian Journal of Nursing Research*, 54(4), 392-439.

Graham PL. Increasing Patient and Student Nurse Safety Using Safe Patient Handling. *Clinical Simulation in Nursing*. 2020; 45: 24-27.

Huang, Z., Nagata, A., Kanai-Pak, M., Maeda, J., Kitajima, Y., & Nakamura, M. (2014). Automatic evaluation of trainee nurses' patient transfer skills using multiple kinect sensors. *IEICE Transactions on Information and Systems*, E97-D(1), 107-118.

Lee, N. P., & Chiang, V. C. (2021). The mentorship experience of students and nurses in pre-registration nursing education: A thematic synthesis of qualitative studies. *Nursing & Health Sciences*, 23(1), 69-86.

Menzel N, Feng D, Doolen J. Low Back Pain in Student Nurses: Literature Review and Prospective Cohort Study. *Int J Nurs Educ Scholarsh*. 2016; 13:/j/ijnes.2016.13.issue-1/ijnes-2015-0057/ijnes-2015-0057.xml. Published 2016 May 13.

Mitchell T, O'Sullivan PB, Burnett AF, Straker L, Rudd C. Low back pain characteristics from undergraduate student to working nurse in Australia: a cross-sectional survey. *Int J Nurs Stud*. 2008; 45(11): 1636-1644.

Mulyadi M, Tonapa SI, Rompas SSJ, Wang RH, Lee BO. Effects of simulation technology-based learning on nursing students' learning outcomes: a systematic review and meta-analysis of experimental studies. *Nurse Education Today*. 2021; 107: 105-127.

Nelson AL, Waters TR, Menzel NN, et al. Effectiveness of an evidence-based curriculum module in nursing schools targeting safe patient handling and movement. *Int J Nurs Educ Scholarsh*. 2007; 4: Article 26.

Powell-Cope, G., Rugs, D., Ialynychev, A., et al. (2018). Original Research: Patient Handling and Mobility Course Content: A National Survey of Nursing Programs. *American Journal of Nursing*, 118(11), 22-31.

Powell-Cope, G., Hughes, N., Sedlak, C., Nelson, A., (August 18, 2008) "Faculty Perceptions of Implementing an Evidence-Based Safe Patient Handling Nursing Curriculum Module" *OJIN: The Online Journal of Issues in Nursing*. Vol. 13 No. 3.

Shorey S, Ng ED. The use of virtual reality simulation among nursing students and registered nurses: A systematic review. *Nurse education today*. 2021; 98: 104662.

Solomon A, Wilson S, Meyer M, Sharma N. Prevalence of low back pain among nursing students compared to physical therapy and engineering students in the United States. *International Journal of Nursing Education*. 2017; 9(3): 115-121.

Taylor N, Wyres M, Green A, Hennessy-Priest K, Phillips C, Daymond E, Wright J. Developing and piloting a simulated placement experience for students. *British Journal of Nursing*. 2021; 30(13): S19-S24.

Safe Patient Handling and Mobility – Section 10

Physical Therapy

Haines J, Arnold M, Cheng C. Safe Patient Handling and Mobility Principles in Doctor of Physical Therapy Students: Intentions for Future Practice. *Int Journal SPHM*. 2021; 11(2): 61-75.

Haines J, Arnold M. Integration of Safe Patient Handling and Mobility Principles in Professional Physical Therapist Education: a case report. *Journal of Physical Therapy Education*. 2019, 33(2):113-125.

Haines J, Kirschling D, Demeuse S, Arnold M. From Classroom to Clinic: Doctorate of Physical Therapy Students' Experiences Putting Safe Patient Handling and Mobility Knowledge into Practice. *Int J SPHM*, March, 14(1),116.2024.

Johnston V, Nitz JC, Isles R, Chipchase L, Gustafsson L. Using technology to enhance physical therapy students' problem-solving skills around safe patient handling. *Phys Ther Rev*. 2013; 18(6): 407–415.

Nitz JC, Johnston V. Self-rated confidence versus examined competency of safe patient handling from a physiotherapy student perspective. *American Journal of Safe Patient Handling and Movement*. 2012; 2(3): 72-78.

Stevenson J, Hecksel K, Deneau K, Dudley D. Do student physical therapists learn and practice safe patient handling in entry-level physical therapy education programs. *Am J SPHM*, 2011; 1(4): 8-16.

Stevenson, J, Hinsch, C, Bartold, K, Briggs, L, Tyler, L. Exploring the influence of clinical and classroom training on advocacy for safe patient handling practices among student physical therapists. *Journal of Physical Therapy Education*. 2015; 29(1): 60-69.

Tautonico, M., Voltmer, C., Lee, T., DiCandia, E., & Silberman, N. (2024). A Novel Approach to Safe Patient Handling and Mobility Training in Physical Therapist Education. *Journal of Acute Care Physical Therapy*, 15(3), 77-88.

Thomas EM, Rybski MF, Apke TL, Kegelmeyer DA, Kloos AD. An acute interprofessional simulation experience for occupational and physical therapy students: key findings from a survey study. *Journal of Interprofessional Care*. 2017; 31(3): 317-324.

Occupational Therapy

Aghaipoor N, Gonin A, Duncan A, Hebert D. The occupational therapy students moving and handling residency: program evaluation. *Am J SPHM*. 2012; 2(3): 102-110.

Alnaser, M. Z., & Richard, L. (2023). Evaluation of MSOT students' didactic knowledge and practice vs. real-time performance in manual patient transfers. *Work*, 76(1), 369-379.

Gallagher AM, Gilligan R, McGrath M, Taylor T. The effect of DVD training on the competence of occupational therapy students in manual handling: A pilot study. *International Journal of Therapy and Rehabilitation*. 2014; 21(12): 575-583.

Mc Grath M, Taaffe C, Gallagher A. An exploration of knowledge and practice of patient handling among undergraduate occupational therapy students. *Disability and Rehabilitation*. 2015; 37(25): 2375-2381.

Morabito, J, Penkala, S, Coxon, K. Workplace musculoskeletal problems in occupational therapy students. *BMC Public Health*, 2021; 21(1): 1-12.

Santorufu, K., & Roy, A. (2025). From Theory to Practice: Integrating Safe Patient Handling and Mobility into Occupational Therapy Curriculum (Part 1/2). *The Open Journal of Occupational Therapy*, 13(1), 1-9. <https://scholarworks.wmich.edu/ojot/vol13/iss1/12/>

Santorufu, K., & Roy, A. (2025). From Theory to Practice: Integrating Safe Patient Handling and Mobility into Occupational Therapy Curriculum (Part 2/2). *The Open Journal of Occupational Therapy*, 13(1), 1-11. <https://scholarworks.wmich.edu/ojot/vol13/iss1/13/>

Exoskeletons & Robotics and Patient Handling

American Industrial Hygiene Association. (2020). Exoskeletons [White Paper].
<https://www.aiha.org/education/white-papers/exoskeletons>

Blaauw, E. R., Greenhalgh, M., Vegter, R., Bass, S., Kulich, H., Grindle, G. G., ... & Cooper, R. A. (2021). Assessment of muscle activation of caregivers performing dependent transfers with a novel robotic-assisted transfer device compared with the Hoyer Advance. *American Journal of Physical Medicine & Rehabilitation*, 100(9), 885-894.

Chen, Y., Yin, W., Zheng, L., Mehta, R., & Zhang, X. (2023, September). Biodynamic modeling and analysis of human-exoskeleton interactions during assisted manual handling. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 67, No. 1, pp. 803-806). Sage CA: Los Angeles, CA: SAGE Publications.

Chen, Y., Zheng, L., Yin, W., & Zhang, X. (2024, September). Flexible Sensor-based Whole-body Biomechanics of Exoskeleton-assisted Patient Handling. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 68, No. 1, pp. 651-654). Sage CA: Los Angeles, CA: SAGE Publications.

Flor-Unda, O., Casa, B., Fuentes, M., Solorzano, S., Narvaez-Espinoza, F., & Acosta-Vargas, P. (2023). Exoskeletons: Contribution to Occupational Health and Safety. *Bioengineering*, 10(9), 1039.

Greenhalgh, M., Blaauw, E., Deepak, N., St. Laurent, C. L. M., Cooper, R., Bendixen, R., ... & Cooper, R. A. (2022). Usability and task load comparison between a robotic assisted transfer device and a mechanical floor lift during caregiver assisted transfers on a care recipient. *Disability and Rehabilitation: Assistive Technology*, 17(7), 833-839.

Grindle, G. G., Wang, H., Jeannis, H., Teodorski, E., & Cooper, R. A. (2015). Design and user evaluation of a wheelchair mounted robotic assisted transfer device. *BioMed Research International*, 2015.

Huang, Z., Lin, C., Kanai-Pak, M., Maeda, J., Kitajima, Y., Nakamura, M., ... & Ota, J. (2016). Impact of using a robot patient for nursing skill training in patient transfer. *IEEE Transactions on Learning Technologies*, 10(3), 355-366.

Hwang, J., Yerriboina, V. N. K., Ari, H., & Kim, J. H. (2021). Biomechanical evaluation of back-support exoskeletons during patient transfers. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 65, No. 1, pp. 408-412). Sage CA: Los Angeles, CA: SAGE Publications.

Hwang, J., Yerriboina, V. N. K., Ari, H., & Kim, J. H. (2021). Effects of passive back-support exoskeletons on physical demands and usability during patient transfer tasks. *Applied Ergonomics*, 93, 103373.

Kozinc, Ž., Baltrusch, S., Houdijk, H., & Šarabon, N. (2021). Short-term effects of a passive spinal exoskeleton on functional performance, discomfort and user satisfaction in patients with low back pain. *Journal of Occupational Rehabilitation*, 31(1), 142-152.

Krishnan, R. H., Devanandh, V., Brahma, A. K., & Pugazhenth, S. (2016). Estimation of mass moment of inertia of human body, when bending forward, for the design of a self-transfer robotic facility. *Journal of Engineering Science and Technology*, 11(2), 166-176.

Kulich, H. R., Wei, L., Crytzer, T. M., Cooper, R. A., & Koontz, A. M. (2021). Preliminary evaluation of an automated robotic transfer assist device in the home setting. *Disability and Rehabilitation: Assistive Technology*, 1-8.

Logsdon, M. C., Kondaurava, I., Zhang, N., Das, S., Edwards, B. D., Mitchell, H., ... & Popa, D. O. (2024). Perceived usefulness of robotic technology for patient fall prevention. *Workplace Health & Safety*, 72(12), 542-549.

Safe Patient Handling and Mobility – Section 10

- Lu, M. L., Barim, M. S., Feng, S., Hughes, G., Hayden, M., & Werren, D. (2020, July). Development of a wearable IMU system for automatically assessing lifting risk factors. In *International Conference on Human-Computer Interaction* (pp. 194-213). Springer, Cham.
- Manchanda, E., Gottumukkala, V., Vale, T. G. X. D., Abburu, M., Mukherjee, T. R., Tyagi, O., & Mehta, R. K. (2023, September). Performance, Perceived Impacts, and Perceived Use of Low-back Exoskeletons for EMS Work. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 67, No. 1, pp. 799-800). Sage CA: Los Angeles, CA: SAGE Publications.
- Rayssiguie, E., & Erden, M. S. (2022). A review of exoskeletons considering nurses. *Sensors*, 22(18), 7035.
- Sivakanthan, S., Blaauw, E., Greenhalgh, M., Koontz, A. M., Vegter, R., & Cooper, R. A. (2021). Person transfer assist systems: a literature review. *Disability and Rehabilitation: Assistive Technology*, 16(3), 270-279.
- Sivaprakasam, A., Wang, H., Cooper, R. A., & Koontz, A. M. (2017). Innovation in transfer assist technologies for persons with severe disabilities and their caregivers. *ROBOTICS? Institute of Electrical and Electronics Engineers (IEEE) Potentials*, 36(1), 34-41.
- Tröster, M., Wagner, D., Müller-Graf, F., Maufroy, C., Schneider, U., & Bauernhansl, T. (2020). Biomechanical model-based development of an active occupational upper-limb exoskeleton to support healthcare workers in the surgery waiting room. *International Journal of Environmental Research and Public Health*, 17(14), 5140.
- Turja, T., Saurio, R., Katila, J., Hennala, L., Pekkarinen, S., & Melkas, H. (2022). Intention to use exoskeletons in geriatric care work: Need for ergonomic and social design. *Ergonomics in Design*, 30(2), 13-16.
- Vallée, A. (2024). Exoskeleton technology in nursing practice: assessing effectiveness, usability, and impact on nurses' quality of work life, a narrative review. *BMC nursing*, 23(1), 156.
- Van Aerschot, L., & Parviainen, J. (2020). Robots responding to care needs? A multitasking care robot pursued for 25 years, available products offer simple entertainment and instrumental assistance. *Ethics Inf Technol*, 22, 247-256.
- Wang, T., Mendes, B. C., Hallbeck, M. S., Tetteh, E., Smith, T., & Norasi, H. (2021, September). Introducing exoskeletons into the operating room: A pilot study with vascular surgeons. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 65, No. 1, pp. 1376-1380). Sage CA: Los Angeles, CA: SAGE Publications.
- Wu, X., Adams, A. E., Komsky, J. C., Saint, S. E., Mackin, T. E., Zamer, J. P., ... & Beer, J. M. (2021, September). Socially assistive robots for dementia care: Exploring caregiver perceptions of use cases and acceptance. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 65, No. 1, pp. 6-10). Sage CA: Los Angeles, CA: SAGE Publications.
- Zheng, L., (2020, November 4). Can exoskeletons reduce musculoskeletal disorders in healthcare workers? *NIOSH Science Blog*. National Institute for Occupational Safety and Health (NIOSH). <https://blogs.cdc.gov/niosh-science-blog/2020/11/04/exoskeletons-hc/>
- Zheng, L., Hawke, A. L., & Evans, K. (2022). Critical review on applications and roles of exoskeletons in patient handling. *International Journal of Industrial Ergonomics*, 89, 103290.
- Zheng, L., Robertson, L. D., & Evans, K. (2020, December 14). Exoskeletons and occupational health equity. *NIOSH Science Blog*. National Institute for Occupational Safety and Health (NIOSH). <https://blogs.cdc.gov/niosh-science-blog/2020/12/14/exoskeletons-health-equity/>

General Patient Safety Information - Early Mobility, Pressure Injury and Fall Prevention, and Missed Nursing Care

Selected general patient safety Information to support broader patient safety initiatives within SPHM programs.

Patient Safety Data

Agency for Healthcare Research and Quality

Action Planning Tool Infographic for the AHRQ Surveys on Patient Safety Culture® (SOPS®). (2024, February). Prepared by Westat, Rockville, MD, under Contract No. GS-00F-009DA/75Q80123F80005). AHRQ Publication No. 24-M004. <https://www.ahrq.gov/sops/resources/planning-tool/index.html>

AHRQ National Scorecard on Hospital-Acquired Conditions Updated Baseline Rates and Preliminary Results 2014–2017. (2019). <https://www.ahrq.gov/hai/pfp/index.html>

Estimating the Additional Hospital Inpatient Cost and Mortality Associated With Selected Hospital-Acquired Conditions (2017, November). <https://www.ahrq.gov/hai/pfp/haccost2017-results.html>

Toolkit for Using the AHRQ Quality Indicators. (2017, March). <http://www.ahrq.gov/professionals/systems/hospital/qitoolkit/index.html>

Yount N, Edelman S, Sorra J, Gray L. Action Planning Tool for the AHRQ Surveys on Patient Safety Culture® (SOPS®). (Prepared by Westat, Rockville, MD, under Contract No. HHSP2332015000261/HHSP23337004T). Rockville, MD: Agency for Healthcare Research and Quality; November 2022. AHRQ Publication No. 23-0011. <https://www.ahrq.gov/sites/default/files/wysiwyg/sops/sops-action-planning-tool.pdf>

Centers for Medicare and Medicaid. (2023) Hospital Consumer Assessment of Healthcare Providers and Systems Patients' Perspectives of Care Survey. Page Last Modified: 09/10/2024. <https://www.cms.gov/medicare/quality/initiatives/hospital-quality-initiative/hcahps-patients-perspectives-care-survey>

Gamble, M. Average hospital expenses per inpatient day across 50 states. Becker's Hospital CFO Report. May 14th, 2025 <https://www.beckershospitalreview.com/finance/hospital-expenses-per-inpatient-day-across-50-states-2025/>

Hasan B, Bechenati D, Bethel HM, Cho S, Rajjoub NS, Murad ST, Kabbara Allababidi A, Rajjo TI, Yousufuddin M. A Systematic Review of Length of Stay Linked to Hospital-Acquired Falls, Pressure Ulcers, Central Line-Associated Bloodstream Infections, and Surgical Site Infections. Mayo Clin Proc Innov Qual Outcomes. 2025 Apr 8;9(3):100607.

Hospital Consumer Assessment of Healthcare Providers and Systems or HCAHPS survey. Patient satisfaction surveys <https://www.hcahpsonline.org/>

Early Mobilization General Information (Selected)

Toolkits

Agency for Healthcare Research and Quality. (2017, January). Nurse-driven early mobility protocols: Facilitator guide. Rockville, MD. <https://www.ahrq.gov/hai/tools/mvp/modules/technical/nurse-early-mobility-protocols-fac-guide.html>

Safe Patient Handling and Mobility – Section 10

Agency for Healthcare Research and Quality. The Four Es of Early Mobility: Facilitator Guide. Content last reviewed February 2017. Agency for Healthcare Research and Quality, Rockville, MD.

<https://www.ahrq.gov/hai/tools/mvp/modules/technical/4es-early-mobility-facguide.html>

Agency for Healthcare Research and Quality. (2016). Early Mobility Guide for Reducing Ventilator-Associated Events in Mechanically Ventilated Patients (AHRQ Publication No. 16[17]-0018-4-EF).

<https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/hais/tools/mvp/modules/technical/early-mobility-mvpguide.pdf>

Intensive Care NSW (2025). Physical activity and mobilisation for critically ill adults Aug 2025

<https://aci.health.nsw.gov.au/networks/icnsw/clinicians/physical-activity-and-movement>

Intensive Care NSW (2022). Early mobilisation and rehabilitation of paediatric intensive care patients:

Clinical practice guide Oct 2022 <https://aci.health.nsw.gov.au/networks/icnsw/clinicians/early-mobilisation-paediatric>

Minnesota Hospital Association. (2018). Early Mobility Toolkit.

https://www.mnhospitals.org/Portals/0/Documents/patientsafety/Falls/Early_Mobility_Toolkit_FINAL.pdf

Articles

Benjamin, E., Roddy, L., & Giuliano, K. K. (2022). Management of patient tubes and lines during early mobility in the intensive care unit. *Human Factors in Healthcare*, 2, 100017.

Brissie, M. A., Zomorodi, M., Soares-Sardinha, S., & Jordan, J. D. (2017). Development of a neuro early mobilization protocol for use in a neuroscience intensive care unit. *Intensive and Critical Care Nursing*, 42, 30–35.

Bruce, R., & Forry, C. (2018). Integrating a mobility champion in the intensive care unit. *Dimensions of Critical Care Nursing*, 37(4), 201-209.

Castelino, T., Fiore, J. F., Niculiseanu, P., Landry, T., Augustin, B., & Feldman, L. S. (2016). The effect of early mobilization protocols on postoperative outcomes following abdominal and thoracic surgery: A systematic review. *Surgery*, 159, 991–1003.

Chan, G. K., Guo, N., Goyena, J. P., Schmidt, K., & Shannon, A. (2021). Improving patients' early mobility through innovative interprofessional education using educational neuroscience theory. *The Journal of Continuing Education in Nursing*, 52(8), 362-366.

Claytor, K. (2020). Improving patient mobility. *Medsurg Nursing*, 29(6).

Corcoran, J. R., Herbsman, J. M., Bushnik, T., Van Lew, S., Stolfi, A., Parkin, K., ... & Flanagan, S. R. (2017). Early rehabilitation in the medical and surgical intensive care units for patients with and without mechanical ventilation: An interprofessional performance improvement project. *Physical Medicine & Rehabilitation*, 9, 113–119.

Dijkstra, F., Van Der Sluis, G., Jager-Wittenaar, H., Hempenius, L., Hobbelen, J. S. M., & Finnema, E. (2022). Facilitators and barriers to enhancing physical activity in older patients during acute hospital stay: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 19(1), 99.

Dirkes, S. M., & Kozlowski, C. (2019). Early mobility in the intensive care unit: Evidence, barriers, and future directions. *Critical Care Nurse*, 39(3), 33-42.

Dubb, R., et al. (2016). Barriers and strategies for early mobilization of patients in intensive care units. *Annals of the American Thoracic Society*, 13(5), 724-730.

Safe Patient Handling and Mobility – Section 10

- Falkenstein, B. A., Skalkowski, C. K., Lodise, K. D., Moore, M., Olkowski, B. F., & Rojavin, Y. (2020). The economic and clinical impact of an early mobility program in the trauma intensive care unit: A quality improvement project. *Journal of Trauma Nursing*, 27(1), 29–36.
- Fessele, K. L., & Syrkin, G. (2024, August). Mobility Assessment Instruments. In *Seminars in Oncology Nursing* (Vol. 40, No. 4, p. 151660). WB Saunders.
- Gonzalez, C. M., Howe, C. M., Waters, T. R., & Nelson, A. (2009). Recommendations for turning patients with orthopedic impairments. *Orthopedic Nursing*, 28(2S), S9–S12.
- Growdon, M. E., Shorr, R. I., & Inouye, S. K. (2017). The tension between promoting mobility and preventing falls in the hospital. *JAMA Internal Medicine*, 177(6), 759–760.
- Hashem, M. D., Nelliott, A., & Needham, D. M. (2016). Early mobilization and rehabilitation in the ICU: moving back to the future. *Respiratory care*, 61(7), 971–979.
- Hastings, S. N., Sloane, R., Morey, M. C., Pavon, J. M., & Hoenig, H. (2014). Assisted early mobility for hospitalized older veterans: Preliminary data from the STRIDE program. *Journal of the American Geriatrics Society*, 62(11), 2180–2184.
- Hodgson, C., et al. (2018). Early Mobilization of Patients in Intensive Care: Organization, communication and safety factors that influence translation into clinical practice. *Critical Care*, 22:77.
- Houlihan, S., Fernandez, N., Magnant, C., Levin, A., & Murphy, S. (2018). Evaluating a nurse-driven mobility algorithm for hospitalized general medicine patients: A pilot study. *Journal of Acute Care Physical Therapy*, 9(4), 179–185.
- Hoyer, E. H., Friedman, M., Lavezza, A., Flanagan, E., Kumble, S., D'Alessandro, M., ... & Young, D. L. (2023). A unit-based, multi-center evaluation of adopting mobility measures and daily mobility goals in the hospital setting. *Applied Nursing Research*, 70, 151655.
- Hoyer, E. H., Friedman, M., Lavezza, A., Wagner-Kosmakos, K., Lewis-Cherry, R., Skolnik, J. L., ... & Needham, D. M. (2016). Promoting mobility and reducing length of stay in hospitalized general medicine patients: A quality-improvement project. *Journal of Hospital Medicine*, 11(5), 341–347.
- Hunter, O. O., George, E. L., Ren, D., Morgan, D., Rosenzweig, M., & Klinefelter Tuite, P. (2017). Overcoming nursing barriers to intensive care unit early mobilization: A quality improvement project. *Intensive and Critical Care Nursing*, 40, 44–50.
- Jones, R. A., Merkle, S., Ruvalcaba, L., Ashton, P., Bailey, C., & Lopez, M. (2020). Nurse-led mobility program: driving a culture of early mobilization in medical-surgical nursing. *Journal of nursing care quality*, 35(1), 20–26.
- Jordahl, D., Laitsch, M., Coto, J., Variava, F., Suda, E., & Justice, S. R. (2024). Evidence-based practice project to decrease falls through implementation of a nurse-driven mobility program. *Medsurg Nursing*, 33(5), 228–232.
- Kairalla, J. A., Winkler, S. L., & Feng, H. (2016). Understanding the provision of assistive mobility and daily living devices and service delivery to veterans after stroke. *American Journal of Occupational Therapy*, 70(1), 1–10.
- Kalisch, B. J., Lee, S., & Dabney, B. W. (2012). Missed Nursing Care, Staffing, and Patient Falls. *Journal of Nursing Care Quality*, 27(1), 6–12.
- Kalisch, B. J., Lee, S., & Dabney, B. W. (2013). Outcomes of inpatient mobilization: A literature review. *Journal of Clinical Nursing*, 23(11-12), 1486–1501.
- Kappel, S. E., Larsen-Engelkes, T. J., Barnett, R. T., Alexander, J. W., Klinkhammer, N. L., Jones, M. J., ... & Ye, P. (2018). Creating a culture of mobility: Using real-time assessment to drive outcomes. *AJN The American Journal of Nursing*, 118(12), 44–50.

Safe Patient Handling and Mobility – Section 10

- Klein, K., Mulkey, M., Bena, J. F., & Albert, N. M. (2015). Clinical and psychological effects of early mobilization in patients treated in a neurologic ICU: A comparative study. *Critical Care Medicine*, 43(4), 865–873.
- LaRosa, J. M., Lenker, H., Azamfirei, R., Morgenstern, S., Hajnik, K., Mennie, C., ... & Kudchadkar, S. R. (2025). Development and evaluation of a simulation-based early-mobility curriculum for paediatric intensive care nurses. *Nursing in critical care*.
- Manojlovich, M., Ratz, D., Miller, M. A., & Krein, S. L. (2017). Use of daily interruption of sedation and early mobility in US hospitals. *Journal of Nursing Care Quality*, 32(1), 71-76.
- Marcarian, T., Obreja, V., Murray, K., Meltzer, J. S., & Miller, P. S. (2023). Success in supporting early mobility and exercise in a cardiothoracic intensive care unit. *JONA: The Journal of Nursing Administration*, 53(3), 161-167.
- Needham, D. M., et al. (2009). Technology to enhance physical rehabilitation of critically ill patients. *Critical Care Medicine*, 37(15 Suppl.), S1-S6.
- Pacheco, R. G., Pereira, J., Ferreira, R., Vieira, J., Oliveira, H., & Goes, M. (2020). Early mobilization of the critically ill patient: literature systematic review.
- Pandullo, S. M., Spilman, S. K., Smith, J. A., Kingery, L. K., Pille, S. M., Rondinelli, R. D., & Sahr, S. M. (2015). Time for critically ill patients to regain mobility after early mobilization in the intensive care unit and transition to a general inpatient floor. *Journal of Critical Care*, 30, 1238–1242. [Z](#)
- Parry, S. M., Remedios, L., Denehy, L., Knight, L. D., Beach, L., Rollinson, T. C., ... & Granger, C. L. (2017). What factors affect implementation of early rehabilitation into intensive care unit practice? A qualitative study with clinicians. *Journal of Critical Care*, 38, 137-143.
- Patel, B. K., Wolfe, K. S., Patel, S. B., Dugan, K. C., Esbrook, C. L., Pawlik, A. J., ... & Kress, J. P. (2023). Effect of early mobilisation on long-term cognitive impairment in critical illness in the USA: a randomised controlled trial. *The Lancet Respiratory Medicine*, 11(6), 563-572.
- Potter, K., Miller, S., & Newman, S. (2021). Environmental factors affecting early mobilization and physical disability post-intensive care: An integrative review through the lens of the World Health Organization International Classification of Functioning, Disability, and Health. *Dimensions of Critical Care Nursing*, 40(2), 92-117.
- Pun, B. T., Balas, M. C., Barnes-Daly, M. A., Thompson, J. L., Aldrich, J. M., Barr, J., ... & Ely, E. W. (2019). Caring for critically ill patients with the ABCDEF bundle: Results of the ICU liberation collaborative in over 15,000 adults. *Critical Care Medicine*, 47(1), 3.
- Rindsland S (2021). Clinical Collection Early Mobilisation, *Nursing Times*; 117: 4, 22-42
<https://cdn.ps.emap.com/wp-content/uploads/sites/3/2021/09/Mobilisation-supplement.pdf>
- Rupich, K., Missimer, E., O'Brien, D., Shafer, G., Wilensky, E. M., Pierce, J. T., ... & Welch, W. C. (2018). The benefits of implementing an early mobility protocol in postoperative neurosurgical spine patients. *AJN The American Journal of Nursing*, 118(6), 46-53.
- Santos, P. M. R., Ricci, N. A., Suster, É. A. B., Paisani, D. M., & Chiavegato, L. D. (2017). Effects of early mobilization in patients after cardiac surgery: A systematic review. *Physiotherapy*, 103(1), 1–12.
- Schaller, S. J., Anstey, M., Blobner, M., Edrich, T., Grabitz, S. D., Gradwohl-Matis, I., ... & Eikermann, M. (2016). Early, goal-directed mobilization in the surgical intensive care unit: A randomized controlled trial. *Lancet*, 388, 1377–1388.
- Schujmann, D. S., Lunardi, A. C., & Fu, C. (2018). Progressive mobility program and technology to increase the level of physical activity and its benefits in respiratory, muscular system, and functionality of ICU patients: Study protocol for a randomized controlled trial. *Trials*, 19(1), 274.

Safe Patient Handling and Mobility – Section 10

- Singam, A. (2024). Mobilizing progress: A comprehensive review of the efficacy of early mobilization therapy in the intensive care unit. *Cureus*, 16(4).
- Slaughter, S. E., Wagg, A. S., Jones, C. A., Schopflocher, D., Ickert, C., Bampton, E., ... & Estabrooks, C. A. (2015). Mobility of vulnerable elders study: Effect of the sit-to-stand activity on mobility, function, and quality of life. *Journal of the American Medical Directors Association*, 16(2), 138-143.
- Smart, D. A., Dermody, G., Coronado, M. E., & Wilson, M. (2018). Mobility programs for the hospitalized older adult: A scoping review. *Gerontology and Geriatric Medicine*, 4, 2333721418808146.
- Soubra, R., Chkeir, A., & Novella, J. L. (2019). A systematic review of thirty-one assessment tests to evaluate mobility in older adults. *BioMed research international*, 2019(1), 1354362.
- Tipping, Claire J., Meg Harrold, Anne Holland, Lorena Romero, Travis Nisbet, and Carol L. Hodgson. "The effects of active mobilisation and rehabilitation in ICU on mortality and function: a systematic review." *Intensive care medicine* 43, no. 2 (2017): 171-183.
- Wang, J., Ren, D., Liu, Y., Wang, Y., Zhang, B., & Xiao, Q. (2020). Effects of early mobilization on the prognosis of critically ill patients: A systematic review and meta-analysis. *International Journal of Nursing Studies*, 103708.
- Workman, C. A., Davies, C. C., Ogle, K. C., Arthur, C., & Tussey, K. J. (2020). Evaluation of a multisite nurse-led mobility plan. *JONA: The Journal of Nursing Administration*, 50(12), 649-654.
- Zisberg, A., Agmon, M., Gur-Yaish, N., Rand, D., Hayat, Y., Gil, E., & WALK-FOR team. (2018). No one size fits all—the development of a theory-driven intervention to increase in-hospital mobility: The “WALK-FOR” study. *BMC Geriatrics*, 18, 1-9.

Pressure Injury Prevention – General (Selected)

- Agency for Healthcare Research and Quality. (2024, February). Preventing pressure ulcers in hospitals. Rockville, MD <https://www.ahrq.gov/patient-safety/settings/hospital/resource/pressureulcer/tool/index.html>
- Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. (2019). The International Guideline (3rd ed.). European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Injury Advisory Panel (NPIAP), & Pan Pacific Pressure Injury Alliance (PPPIA). <http://www.internationalguideline.com/>
- National Guideline Clearing House for Pressure Ulcer Prevention. <http://www.guideline.gov/syntheses/synthesis.aspx?id=25078>
- National Pressure Injury Advisory Panel (2016). Pressure Injury Prevention Points <https://npiap.com/page/PreventionPoints>
- Avsar, P., Budri, A., Patton, D., Walsh, S., & Moore, Z. (2022). Developing algorithm based on activity and mobility for pressure ulcer risk among older adult residents: implications for evidence-based practice. *Worldviews on Evidence-Based Nursing*, 19(2), 112-120.
- Broderick, V. V., & Cowan, L. J. (2021). Pressure injury related to friction and shearing forces in older adults. *Journal of Dermatology and Skin Science*, 3(2).
- Clark, M., Jones, N., Kettley, K., & Taylor, J. (2023). Interactions between pressure redistributing mattresses and transfer devices: a laboratory study. *Wounds UK*, 19(1).
- Ferguson, A., Bradywood, A., Williams, B., & Blackmore, C. C. (2020). Association of use of contract nurses with hospitalized patient pressure injuries and falls. *Journal of Nursing Scholarship*, 52(5), 527–535.

Safe Patient Handling and Mobility – Section 10

Hada, A., & Coyer, F. (2021). Shift-to-shift nursing handover interventions associated with improved inpatient outcomes—Falls, pressure injuries and medication administration errors: An integrative review. *Nursing & Health Sciences*, 23(2), 337–351.

Hommel A, Santy-Tomlinson J. Pressure Injury Prevention and Wound Management. 2018 Jun 16. In: Hertz K, Santy-Tomlinson J, editors. *Fragility Fracture Nursing: Holistic Care and Management of the Orthogeriatric Patient* [Internet]. Cham (CH): Springer; 2018. Chapter

7. <https://www.ncbi.nlm.nih.gov/books/NBK543831/>

Kayser, S. A., VanGilder, C. A., & Lachenbruch, C. (2019). Predictors of superficial and severe hospital-acquired pressure injuries: A cross-sectional study using the International Pressure Ulcer Prevalence™ survey. *International Journal of Nursing Studies*, 89, 46-52.

Lustig, M., Wiggermann, N., & Gefen, A. (2020). How patient migration in bed affects the sacral soft tissue loading and thereby the risk for a hospital-acquired pressure injury. *International Wound Journal*, 17(3), 631-640.

Marshall, V., Team, V., & Weller, C. (2021). Hospital-acquired pressure injury prevention in people with a BMI of 30.0 or higher: A scoping review protocol. *Wound Practice & Research: Journal of the Australian Wound Management Association*, 29(3), 133-139.

McInnes, E., Jammali-Blasi, A., Bell-Syer, S. E., & Leung, V. (2018). Support surfaces for treating pressure ulcers. *Cochrane Database of Systematic Reviews*, (10).

Phillips, L. (2021). Pressure Ulcer Prevention: keep it Safe, Keep it Simple. *Advances in Human Aspects of Healthcare and Medicine. AHFE International*, 19-24.

Pittman, J., Beeson, T., Dillon, J., Yang, Z., & Cuddigan, J. (2019). Hospital-acquired pressure injuries in critical and progressive care: avoidable versus unavoidable. *American journal of critical care*, 28(5), 338-350.

Portoghese, C., Deppisch, M., Sonenblum, S., Samson, B., Munro, C., Capasso, V., ... & Brienza, D. (2024). The Role of Shear Stress and Shear Strain in Pressure Injury Development. *Advances in Skin & Wound Care*, 37(1), 20-25.

Portoghese, C., Deppisch, M., Sonenblum, S., Samson, B., Munro, C., Capasso, V., ... & Brienza, D. (2024). The role of shear stress and shear strain in pressure injury development. *Advances in Skin & Wound Care*, 37(1), 20-25.

Rondinelli, J., Zuniga, S., Kipnis, P., Kavar, L. N., Liu, V., & Escobar, G. J. (2018). Hospital-acquired pressure injury: Risk-adjusted comparisons in an integrated healthcare delivery system. *Nursing Research*, 67(1), 16.

Rondinelli, J., Zuniga, S., Kipnis, P., Kavar, L. N., Liu, V., & Escobar, G. J. (2018). Hospital-acquired pressure injury: risk-adjusted comparisons in an integrated healthcare delivery system. *Nursing research*, 67(1), 16.

Smith, H. A., Moore, Z., & Tan, M. H. (2019). Cohort study to determine the risk of pressure ulcers and developing a care bundle within a paediatric intensive care unit setting. *Intensive and Critical Care Nursing*, 53, 68-72.

Stephens, M., Bartley, C.A, Chester Bessell, D.S, Greenwood, C., Marshall, A., Neill, S., Rooney, S., Rose, S., Scattergood, S A., Worsley, P.R. (2025). Understanding the association between pressure ulcers and sitting in adults: What does it mean for all of us? Seating guidelines for people, carers, health and social care professionals. Society of Tissue Viability, UK.

Woodhouse, M., Worsley, P. R., Voegeli, D., Schoonhoven, L., & Bader, D. L. (2019). How consistent and effective are current repositioning strategies for pressure ulcer prevention? *Applied Nursing Research*, 48, 58-62.

Fall Prevention – General (Selected)

Agency for Healthcare Research and Quality. (2021). Preventing falls in hospitals: A toolkit for improving quality of care. (AHRQ Publication No. 13-0015-EF, Page last reviewed February 2024).

<https://www.ahrq.gov/patient-safety/settings/hospital/fall-prevention/toolkit/index.html>

Administration for Community Living Falls Prevention Resources for Older Adults and Caregivers

<https://acl.gov/FallsPrevention>

Centers for Disease Control(CDC).(July 28, 2025). Fall Prevention Resources.

<https://www.cdc.gov/falls/communication-resources/index.html>

National Falls Prevention Resource Center. <https://www.ncoa.org/professionals/health/center-for-healthy-aging/national-falls-prevention-resource-center/>

Allen, C., & Wiggermann, N. (2021). Falling short: Adverse events related to patient height. *Patient Safety*, 3(1), 42-47.

Benning, S., & Webb, T. (2019). Taking the fall for kids: A journey to reducing pediatric falls. *Journal of Pediatric Nursing*, 46, 100-108.

Chavez, M., Bradley, S. E., Lind, J., Broderick, V., Barrett, B., Cowan, L., ... & Bulat, T. (2023). What health care staff who experienced assisted patient falls can teach us: Implications for fall and fall injury risk. *AJN The American Journal of Nursing*, 123(11), 24-33.

Ferguson, A., Bradywood, A., Williams, B., & Blackmore, C. C. (2020). Association of use of contract nurses with hospitalized patient pressure injuries and falls. *Journal of Nursing Scholarship*, 52(5), 527–535.

Fridman, V. (2019). Redesigning a fall prevention program in acute care: Building on evidence. *Clinics in Geriatric Medicine*, 35(2), 265-271.

Hada, A., & Coyer, F. (2021). Shift-to-shift nursing handover interventions associated with improved inpatient outcomes—Falls, pressure injuries and medication administration errors: An integrative review. *Nursing & Health Sciences*, 23(2), 337–351.

Health Research & Educational Trust. (2016). Preventing patient falls: A systematic approach from the Joint Commission Center for Transforming Healthcare Project.

Huang, T., et al. (2025). Enhanced fall prevention in nursing facilities: Assisting caregivers through data-driven selective monitoring and notification. *Healthcare and Medical Devices*, 171, 21–31.

Kim, J., Lee, E., Jung, Y., Kwon, H., & Lee, S. (2022). Patient-level and organizational-level factors influencing in-hospital falls. *Journal of Advanced Nursing*, 78(11), 3641-3651.

Monaghan, H. (2023). Older woman's experience of falling. *International Journal of Safe Patient Handling & Mobility*, 13(1), 7-13.

Venema, D. M., Skinner, A. M., Nailon, R., Conley, D., High, R., & Jones, K. J. (2019). Patient and system factors associated with unassisted and injurious falls in hospitals: An observational study. *BMC Geriatrics*, 19, 1-10.

Wallace, M., & Vonnies, C. (2024). Implementation of stopping elderly accidents, deaths and injuries (STEADI) fall risk screening in the ambulatory oncology setting: A pilot project incorporating fear of falling. *International Journal of Safe Patient Handling & Mobility*, 14(3), 90-99.

Yoder, C. L. M., Kyoshi-Teo, H., & Ochoa-Cosler, O. (2023). Fall prevention care management: Implementation and outcomes of a project to reduce fall risks of older adults in assisted living facilities. *Journal of Nursing Care Quality*, 38(4), 374-380.

Safe Patient Handling and Mobility – Section 10

Dykes, P. C., Burns, Z., Adelman, J., Benneyan, J., Bogaisky, M., Carter, E., ... & Bates, D. W. (2020). Evaluation of a patient-centered fall-prevention tool kit to reduce falls and injuries: A nonrandomized controlled trial. *JAMA Network Open*, 3(11), e2025889-e2025889.

<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2773051>

King, B., Pecanac, K., Krupp, A., Liebrecht, D., & Mahoney, J. (2018). Impact of fall prevention on nurses and care of fall risk patients. *The Gerontologist*, 58(2), 331-340.

LeLaurin, J. H., & Shorr, R. I. (2019). Preventing falls in hospitalized patients: State of the science. *Clinics in Geriatric Medicine*, 35(2), 273-283.

Fridman, V. (2019). Redesigning a fall prevention program in acute care: Building on evidence. *Clinics in Geriatric Medicine*, 35(2), 265-271.

Hendrich, A. L. (2021). Reimagining injurious falls and safe mobility. *AJN The American Journal of Nursing*, 121(9), 34-44.

Rochon, R., & Salazar, L. (2019). Partnering with the patient to reduce falls in a medical-surgical unit. *International Journal of Safe Patient Handling & Mobility*, 9(4), 135-142.

Lipsett, A., & White, E. (2019). Decreasing patient falls and increasing communication through the use of patient mobility cards. *International Journal of Safe Patient Handling & Mobility*, 9(1), 37-41.

Missed Nursing Care

Books

Kalisch, B. J. (2015). Errors of omission: How missed nursing care imperils patients. American Nurses Association.

Papastavrou, E., & Suhonen, R. (Eds.). (2021). *Impacts of rationing and missed nursing care: Challenges and solutions: RANCARE Action*. Springer Nature.

Articles

Alsubhi, H., Meskell, P., Shea, D. O., & Doody, O. (2020). Missed nursing care and nurses' intention to leave: An integrative review. *Journal of Nursing Management*, 28(8), 1830-1840.

Antoszewska, A., & Gutysz-Wojnicka, A. (2024). Rationing nursing care and organizational factors in intensive care units. *PLoS ONE*, 19(7), e0306313.

Ball, J., Griffiths, P., & Target, S. (2018). Missed nursing care: A key measure for patient safety. Agency for Healthcare Research and Quality, PSNet. <https://psnet.ahrq.gov/perspective/missed-nursing-care-key-measure-patient-safety>

Bragadóttir, H., Kalisch, B. J., & Tryggvadóttir, G. B. (2017). Correlates and predictors of missed nursing care in hospitals. *Journal of Clinical Nursing*, 26(11-12), 1524-1534.

Chaboyer, W., Harbeck, E., Lee, B. O., & Grealish, L. (2021). Missed nursing care: An overview of reviews. *The Kaohsiung Journal of Medical Sciences*, 37(2), 82–91. <https://pubmed.ncbi.nlm.nih.gov/33022855/>

Chiappinotto, S., Papastavrou, E., Efstathiou, G., Andreou, P., Stemmer, R., Ströhm, C., ... & Palese, A. (2022). Antecedents of unfinished nursing care: a systematic review of the literature. *BMC nursing*, 21(1), 137

Dhaini, S. R., Simon, M., Ausserhofer, D., Abed Al Ahad, M., Elbejjani, M., Dumit, N., & Abu-Saad Huijjer, H. (2020). Trends and variability of implicit rationing of care across time and shifts in an acute care hospital: A longitudinal study. *Journal of Nursing Management*, 28(8), 1861-1872.

Safe Patient Handling and Mobility – Section 10

- Griffiths, P., Recio-Saucedo, A., Dall'Ora, C., Briggs, J., Maruotti, A., Meredith, P., ... & Missed Care Study Group. (2018). The association between nurse staffing and omissions in nursing care: A systematic review. *Journal of Advanced Nursing*, 74(7), 1474-1487.
- Gustafsson, N., Leino-Kilpi, H., Prga, I., Suhonen, R., & Stolt, M. (2020). Missed care from the patient's perspective—a scoping review. *Patient Preference and Adherence*, 14, 383.
- Hessels, A. J., Flynn, L., Cimiotti, J. P., Cadmus, E., & Gershon, R. R. (2015). The impact of the nursing practice environment on missed nursing care. *Clinical Nursing Studies*, 3(4), 60.
- Hessels, A. J., Paliwal, M., Weaver, S. H., Siddiqui, D., & Wurmser, T. A. (2018). Impact of Patient Safety Culture on Missed Nursing Care and Adverse Patient Events. *Journal of Nursing Care Quality*, 34(4), 287-294.
- Hogh, A., Baernholdt, M., & Clausen, T. (2018). Impact of workplace bullying on missed nursing care and quality of care in the eldercare sector. *International Archives of Occupational and Environmental Health*, 91(8), 963–970.
- Jones, T. L., Hamilton, P., & Murry, N. (2015). Unfinished nursing care, missed care, and implicitly rationed care: State of the science review. *International journal of nursing studies*, 52(6), 1121-1137.
- Kalánková, D., Kirwan, M., Bartoníčková, D., Cubelo, F., Žiaková, K., & Kurucová, R. (2020). Missed, rationed or unfinished nursing care: A scoping review of patient outcomes. *Journal of Nursing Management*, 28(8), 1783-1797.
- Kalisch, B. (2006). Missed nursing care: A qualitative study. *Nursing Care Quality*, 21(4), 306-313.
- Kalisch, B. (2010, July 26). Missed nursing care: View from the hospital bed (Part Two). *Reflections of Nursing Leadership Sigma Theta Tau*, 36(3).
- Kalisch, B. J., & Lee, K. H. (2010). The impact of teamwork on missed nursing care. *Nursing Outlook*, 58(5), 233-241.
- Kalisch, B. J., & Lee, K. H. (2012). Missed nursing care: Magnet versus non-Magnet hospitals. *Nursing Outlook*, 60(5), e32-e39.
- Kalisch, B. J., & Williams, R. A. (2009). Development and psychometric testing of a tool to measure missed nursing care. *JONA: The Journal of Nursing Administration*, 39(5), 211-219.
- Kalisch, B. J., & Xie, B. (2014). Errors of omission: Missed nursing care. *Western Journal of Nursing Research*, 36(7), 875–890.
- Kalisch, B. J., et al. (2009). Missed nursing care: A concept analysis. *Journal of Advanced Nursing*, 65(7), 1509–1517.
- Kalisch, B. J., Gosselin, K., & Choi, S. H. (2012). A comparison of patient care units with high versus low levels of missed nursing care. *Health Care Management Review*, 37 (4), 320–328.
- Kalisch, B. J., Landstrom, G., & Williams, R. A. (2009). Missed nursing care: Errors of omission. *Nursing Outlook*, 57(1), 3-9.
- Kalisch, B. J., Lee, S., & Dabney, B. W. (2012). Missed Nursing Care, Staffing, and Patient Falls. *Journal of Nursing Care Quality*, 27(1), 6–12.
- Kalisch, B. J., Lee, S., & Dabney, B. W. (2013). Outcomes of inpatient mobilization: A literature review. *Journal of Clinical Nursing*, 23(11-12), 1486-1501.
- Kalisch, B. J., Tschannen, D., Lee, H., & Friese, C. R. (2011). Hospital variation in missed nursing care. *American Journal of Medical Quality*, 26 (4), 291–299.
- Kalisch, B. J., Xie, B., & Dabney, B. W. (2014). Patient-reported missed nursing care correlated with adverse events. *American Journal of Medical Quality*, 29(5), 415–422.

Safe Patient Handling and Mobility – Section 10

- Lake, E. T., de Cordova, P. B., Barton, S., et al. (2017). Missed Nursing Care in Pediatrics. *Hospital Pediatrics*, 7(7), 378-384.
- Lake, E. T., French, R., O'Rourke, K., Sanders, J., & Srinivas, S. K. (2020). Linking the work environment to missed nursing care in labour and delivery. *Journal of Nursing Management*, 28(8), 1901-1908.
- Lake, E. T., Germack, H. D., & Viscardi, M. K. (2016). Missed nursing care is linked to patient satisfaction: a cross-sectional study of US hospitals. *BMJ Quality & Safety*, 25(7), 535-543.
- Lake, E. T., Riman, K. A., & Sloane, D. M. (2020). Improved work environments and staffing lead to less missed nursing care: A panel study. *Journal of Nursing Management*, 28(8), 2157-2165.
- McCauley, L., Kirwan, M., Riklikiene, O., & Hinno, S. (2020). A SCOPING REVIEW: The role of the nurse manager as represented in the missed care literature. *Journal of Nursing Management*, 28(8), 1770-1782.
- Missed Nursing Care. PSNet [internet]. Rockville (MD): Agency for Healthcare Research and Quality, US Department of Health and Human Services. 2024. <https://psnet.ahrq.gov/primer/missed-nursing-care>
- Park, S. H., Hanchett, M., & Ma, C. (2018). Practice environment characteristics associated with missed nursing care. *Journal of Nursing Scholarship*, 50(6), 722-730.
- Schubert, M., Ausserhofer, D., Bragadóttir, H., Rochefort, C. M., Bruyneel, L., Stemmer, R., ... & RANCARE Consortium COST Action–CA 15208. (2021). Interventions to prevent or reduce rationing or missed nursing care: A scoping review. *Journal of Advanced Nursing*, 77(2), 550-564.
- Schubert, M., Clarke, S. P., Aiken, L. H., & De Geest, S. (2012). Associations between rationing of nursing care and inpatient mortality in Swiss hospitals. *International Journal for Quality in Health Care*, 24(3), 230-238.
- Senek, M., Robertson, S., Ryan, T., Sworn, K., King, R., Wood, E., & Tod, A. (2020). Nursing care left undone in community settings: Results from a UK cross-sectional survey. *Journal of Nursing Management*, 28(8), 1968-1974.
- Smith, S., Lapkin, S., Sim, J., & Halcomb, E. (2020). Nursing care left undone, practice environment and perceived quality of care in small rural hospitals. *Journal of Nursing Management*, 28(8), 2166-2173.
- Sworn, K., & Booth, A. (2020). A systematic review of the impact of 'missed care' in primary, community and nursing home settings. *Journal of Nursing Management*, 28(8), 1805-1829.
- Wieczorek-Wojcik, B., Gaworska-Krzemińska, A., Owczarek, A. J., & Kilańska, D. (2020). In-hospital mortality as the side effect of missed care. *Journal of Nursing Management*, 28(8), 2240-2246.
- Zhao, Y., Ma, D., Wan, Z., Sun, D., Li, H., & Sun, J. (2020). Associations between work environment and implicit rationing of nursing care: A systematic review. *Journal of Nursing Management*, 28(8), 1841-1850.