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Safe Patient Handling and Mobility (SPHM):

A Process to Protect Health Care Workers and Recipients

White Paper

In partnership with:

ANA
AMERICAN NURSES ASSOCIATION

The Association of Safe Patient Handling Professionals™
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WHY YOU SHOULD CARE: DECODING THE IMPORTANCE OF THIS WHITE PAPER

A Call to Transform Health Care: Prioritizing Health Workers and Patient Safety

In the vast landscape of health care, a critical transformation beckons—a transformation that hinges on our ability to attract and retain dedicated health care workers (HCWs) while simultaneously enhancing patient safety. This paper serves as a resounding "call to action," urging us to address urgent needs and pave the way for a healthier future.

The Alarming Reality: HCW Injuries

Health care workers bear the brunt of a staggering injury rate within their own domain. For decades, manual patient handling has been the silent culprit behind career-ending injuries suffered by those who provide direct patient care across the entire health care spectrum.

The Pandemic's Impact: A Bleak Reality

The pandemic cast a harsh spotlight on this issue, particularly affecting nurses, and nursing aides. The situation remains grim, with no signs of improvement. The Centers for Disease Control and Prevention (CDC) reports a surge in burnout, harassment, and poor mental health among HCWs, leading many to leave their current positions and for some leave health care entirely.

Aging Patients, Growing Challenges

As our patient population ages and faces increasingly complex health conditions that can impact their mobility, maintaining the physical and psychological well-being of HCWs to be able to provide safe care becomes paramount. Increasing levels of obesity, diabetes, and other related illnesses will increase injury risks to both HCWs and their patients. Their tireless efforts deserve recognition and protection.

The Power of Safe Patient Handling and Mobility (SPHM)

Evidence supports the implementation of SPHM programs. Not only do these programs reduce injuries to HCWs, but they also elevate the quality of patient care. Moreover, they yield substantial cost savings for health care organizations through reduced injuries to both HCWs and patients.

A Stalled Progress: The Quest for Standardization

Despite commendable efforts by professional and government bodies over the past two decades, SPHM has yet to become the gold standard of patient care in the United States. We stand at a crossroads, where action is imperative.

Our Blueprint for Change

This paper distills the current evidence supporting SPHM and underscores its essential role for the well-being of HCWs, employers, and patients alike. It outlines a strategic roadmap—a set of recommendations—to propel SPHM forward in the U.S.

Your Role: Advocate for Change

Regardless of your professional background or practice setting, you hold the power to effect change. Educate your colleagues, engage with health care organizations, and rally legislators. Together, we can build a resilient, thriving workforce—one that ensures a healthier future for all.

Let's inspire change and champion the well-being of our health care heroes!

EXECUTIVE SUMMARY

In our lifetimes, we all have the potential to be on either side of care—receiving it in various settings like hospitals and homes, or providing it to relatives, friends, or clients. The American populace is facing a decline in physical condition, marked by aging, obesity, and overall deconditioning—a trend that affects both caregivers and those in their care. This decline is leading to significant risks and injuries to caregivers in diverse care environments, where exposure levels and control measures vary greatly.

This white paper aims to outline the dangers associated with manual patient handling, propose methods to mitigate these risks, and introduce a health and safety management system designed to protect all parties involved. When implemented effectively, this system can prevent harm to caregivers while ensuring high-quality outcomes for patients and benefits for health care organizations that can include workforce retention.

It is important to recognize that manual patient handling is one of several occupational exposures (along with workplace violence, infectious diseases, psychosocial hazards, and others) that can work synergistically to adversely impact the well-being of caregivers. The resulting fatigue, burnout and disability, not only negatively impacts patient safety but contributes to the increasing shortage of health care workers and thus threatens the future ability of the US health care system to provide safe and accessible healthcare.

The target readership of this document is wide-ranging, reflecting the diverse group impacted by these issues. It encompasses caregivers, employers, patients, regulatory bodies, and the general public, all of whom can benefit from the shared knowledge and its application.

This white paper presents evidence supporting the need for a systematic Safe Patient Handling and Mobility (SPHM) approach that ensures SPHM is a standard of care across the health care continuum and thus, is a fundamental aspect of health care services.

Finally, this white paper offers detailed guidance on how to best integrate these recommendations within the US health care system, including alignment with recent national and international standards and directives.

ABOUT THE COLLABORATIVE MEMBERS

American Industrial Hygiene Association (AIHA)

The American Industrial Hygiene Association (AIHA) is the association for scientists and professionals committed to preserving and ensuring occupational and environmental health and safety (OEHS) in the workplace and community. Founded in 1939, we support our members with our expertise, networks, comprehensive education programs, and other products and services that help them to maintain the highest professional and competency standards. More than half of AIHA's nearly 8,500 members are Certified Industrial Hygienists, and many of them hold other professional designations. AIHA serves as a resource for those employed across the public and private sectors and the communities in which they work.

AIHA has long been a supporter of the effort to develop standards and legislation which can help to reduce the presence of the risk factors associated with musculoskeletal disorders, including work-related musculoskeletal disorders (WMSD) arising from the manual handling of patients and residents. AIHA first adopted an ergonomics position statement in 1997 and has amended this position statement numerous times since that time. AIHA first offered a position statement in support of national safe patient handling and mobility (SPHM) standards in 2009.

American Nurses Association (ANA)

The American Nurses Association (ANA) is the premier organization representing the interests of the nation's 4.2 million registered nurses. ANA advances the profession by fostering high standards of nursing practice, promoting a safe and ethical work environment, bolstering the health and wellness of nurses, and advocating on health care issues that affect nurses and the public. ANA is at the forefront of improving the quality of health care for all. For more information visit www.nursingworld.org.

The ANA has long been advocating for national safe patient handling and mobility standards. This has included the release of the *Safe Patient Handling and Mobility: International Standards Across the Care Continuum and Implementation Guide to the Safe Patient Handling and Mobility: International Standards* in 2013. ANA representatives followed this up by participating in US congressional briefings in 2014 and 2015. The 2nd Edition of these standards were released in 2021. In these efforts, they drew upon a wide mix of subject matter experts from other organizations, including the AIHA and ASPHP.

Association of Safe Patient Handling Professionals, Inc. (ASPHP)

The Association of Safe Patient Handling Professionals, Inc. (ASPHP) was formed in 2011 as a non-profit corporation by a group of industry experts to provide a collaborative connection among individuals interested in the science of safe patient handling and mobility (SPHM). ASPHP's mission is to advance the science and practice of SPHM by empowering caregivers and their patients to maximize their wellbeing and quality of life. This mission is achieved by offering opportunities to share experiences, gain knowledge through education, and access the most up-to-date information. The members of ASPHP work together with affiliate Certified Safe Patient Handling Professionals (CSPHP)™ to build a credentialed profession dedicated to the safety and comfort of caregivers and their patients worldwide. The work to accomplish the mission and vision of the association is conducted through a number of committees and is led by a board of volunteers with extensive knowledge and education in SPHM.

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We would like to recognize the members from the three professional organizations and other individuals listed below who contributed to the development of this document.

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Introduction

For over four decades, work-related musculoskeletal disorders (WMSDs) associated with manual patient* handling have been a leading cause of injury for health care workers (HCWs) in the US (Cohen-Mansfield et al, 1996; Edlich et al., 2004; Garg, 1999; Owen, 2000).

Nurses, aides, and allied health professionals (such as physical and occupational therapists, emergency medical technicians, and radiation technologists) suffer the highest rates of injuries associated with manual patient handling.

Over 40 years of research has demonstrated why manual patient handling is hazardous and has clearly defined that the use of 'proper body mechanics' is not sufficient to mitigate the risk to HCWs. (Matz et al., 2019; Martimo, et al., 2008; Stubbs et al. 1982).

Injuries sustained by HCWs due to manual patient handling are often disabling and result in life altering career change. They are extremely costly to health care organizations in terms of workers compensation insurance costs, HCW fatigue, absenteeism, and turnover which contributes to decreased quality of care, and poorer patient outcomes.

Safe Patient Handling and Mobility (SPHM) programs have been shown to decrease HCW injuries associated with patient handling tasks, facilitate cost savings to health care organizations, and improve patient safety by reducing skin tears, pressure injuries, and falls. The use of SPHM technology and a systems approach to patient handling has been shown to improve patient dignity and comfort during transfers and enable early and safe mobilization of patients thus improving functional outcomes and quality of life (ANA, 2021; Matz et al., 2019; Dennerlein et al., 2017; OSHA 2013; Powell-Cope et al., 2014; Teeple et al., 2017; Gibson, 2017; The Joint Commission, 2012; Harwood et al., 2016).

The Covid-19 pandemic has accelerated global recognition that the physical and psychological health of HCWs is inextricably linked to patient safety (Nashwan et al., 2023; Søvold et al., 2022; World Health Organization, 2020).

HCWs face burnout, harassment, and poor mental health at rates that have increased significantly since the pandemic (Office of the Surgeon General (2022). This in turn has led to the serious shortage of HCWs that health care organizations across the continuum are facing now and in the foreseeable future. In 2022, 44% of HCWs intended to look for a new job (CDC, 2023), and almost one-fifth of registered nurses in the US intend to leave the workforce by 2027 (NCSBN, 2023).

Understaffing, high workload and turnover rates, fatigue, and burnout are associated with an increased incidence of WMSDs among nurses and nurse assistants (OSHA 2013, Han et al., 2014; Bernal 2015, Oakman and Macdonald, 2019; Vinstrup ,2020; Wåhlin et al., 2021).

By protecting the health, safety, and wellbeing of their employees, health care organizations can provide safer, higher quality of care to their patients as well as recruit and retain HCWs. SPHM programs play a crucial role in achieving this goal (ANA, 2021; Emory et al., 2021; IHI, 2022).

However, despite extensive evidence on the benefits of SPHM programs and its potential role to facilitate a culture of worker and patient safety, SPHM does not appear to be widely adopted and integrated into routine clinical practice across the health care continuum in the United States (US) (Kayser et al., 2020; Sampath et al., 2019).

This white paper provides the evidence base that supports the value of SPHM for health care organizations, their employees, and their patients.

It discusses why SPHM is not used commonly, consistently, or competently as a tool to improve HCW and patient safety within health care systems; the urgent need for SPHM programs to be integrated into health care across the continuum in the US as an accepted standard of care; and how this can be achieved.

*In the context of this document, the term 'patients' applies to all health care recipients receiving care in hospitals, outpatient, long term care and community-based settings.

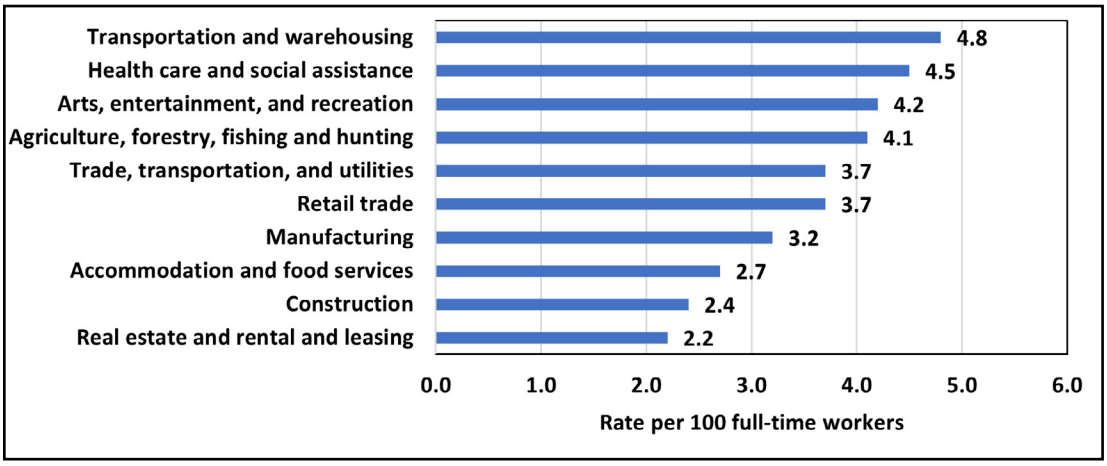
Why Safe Patient Handling and Mobility Is So Important

Injury Rates Associated with Manual Patient Handling

In 2022, health care and social assistance had the 2nd highest rate of nonfatal occupational injuries and illnesses (Figure 1). Together with agriculture, forestry, fishing, and hunting, health care and social assistance also had the 2nd highest rate nonfatal occupational injuries and illnesses with days away from work, job restriction, or transfer (DART) per 100 full-time workers out of all private US industries (BLS, 2023a).

Figure 1.

Top 10 industries with highest incidence rates of nonfatal occupational injuries and illnesses per 100 full-time workers in 2022 (BLSa, 2023).



Within health care 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).

A significant number of these injuries are work-related musculoskeletal disorders (WMSDs) including manual patient handling, are a leading occupational injury to workers across the health care continuum in the US (OSHA a and b, ND).

Musculoskeletal disorders are defined as soft-tissue injuries or disorders of one or more of the following: muscles, nerves, tendons, joints, cartilage, or spinal discs. 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).

Health care workers (HCWs) suffer high rates of WMSDs as a result of overexertion when performing manual transferring, repositioning, lifting, and mobilization of patients (BLS, 2020). In fact, 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 and Kotowski, 2015; Gomaa et al., 2015; Przybysz and Levin, 2017; Van Hoof et al., 2018).

Overexertion related injuries are the costliest cause of disabling injuries in the US health care industry. From 2017 to 2020, overexertion injuries with more than five days away from work accounted for approximately 30% of workers compensation costs and cost the health care industry between 1.54 and 2.06 billion dollars (Liberty Mutual, 2020-2023).

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 and 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).

In the 2018–2019 Healthy Nurse Healthy Nation® (HNHN) survey conducted by the American Nurses Association (ANA), 58% of nurse respondents

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 large 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, 2021b).

indicated they had experienced musculoskeletal pain at work during the past year (ANA, 2019). In the 2020–2021 HNHN 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).

Nursing aides (NAs) are reported to experience twice the injury rate of nurses related to patient handling (Graham and Dougherty, 2012; Gomaa et al., 2015). Over 50 percent of injuries and illnesses reported in 2020 among nursing assistants were musculoskeletal disorders (OSHA, 2023/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 and occupational therapists, 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 (Graham and Dougherty, 2012; Haines et al, 2021; Vieira et al., 2016; Darragh et al., 2012; Harwood et al., 2016; Mc Grath et al., 2015; Quinn et al, 2016; McLean, 2018; AIHA, 2021; Dropkin et al., 2015; Evans et al., 2019; Hanania et al., 2020; Davis et al., 2021).

Unfortunately, health care students performing patient care tasks during clinical rotation also experience WMSDs due to manual patient handling which may prevent them from performing direct patient care after graduation (Backåberg et al., 2014; Almhdawi et al., 2017; Solomon et al., 2017; Boucaut and Knobben, 2020; Morabito et al., 2021).

Figures 2 and 3 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. They also show injuries that occurred as a result of overexertion during tasks requiring lifting and lowering for health care occupations whose work involves direct patient care patient handling and mobility, private industry.

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

Figure 2

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

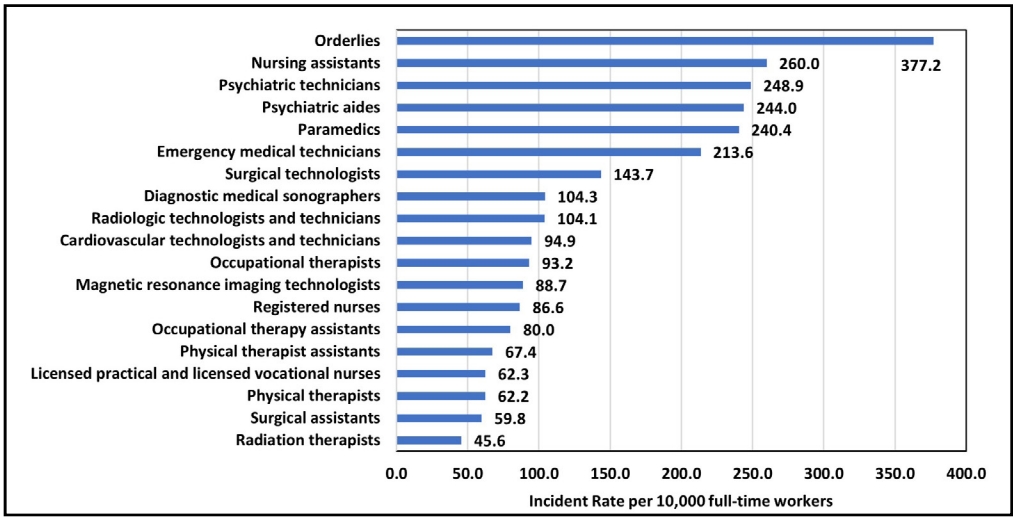
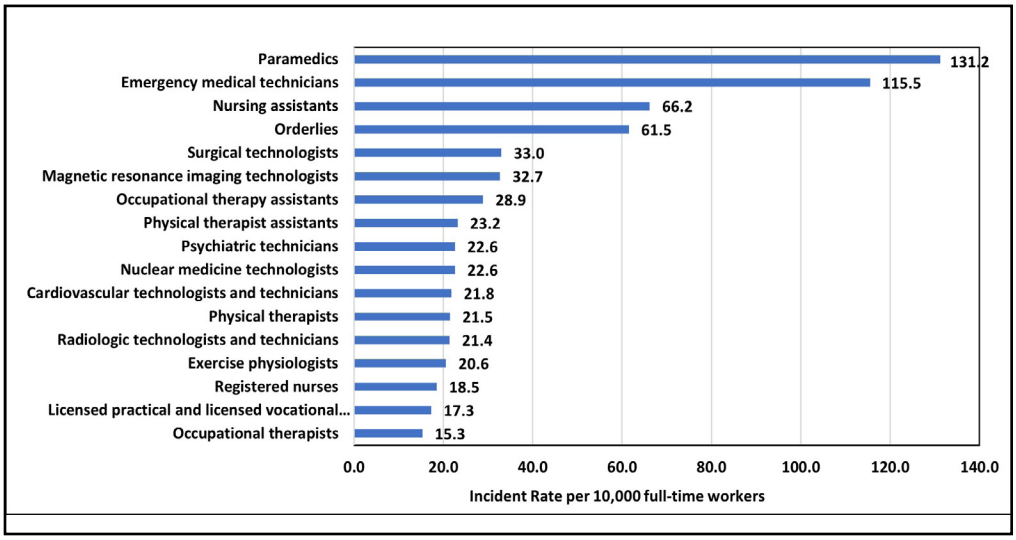


Figure 3

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



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

WMSDs are associated with higher levels of anxiety, sleeping problems, lower levels of mental wellbeing and overall fatigue of workers. (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 (Tariq et al., 2018; CDC, 2020).

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 2018, the 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 are the most frequently performed tasks that resulted in a claim, averaging a total cost of $20,600 to $25,400 per claim. The patient handling related event with the highest average cost of $27,700 involved 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 averaged $49,838 (The National Safety Council 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 severity (OSHA, 2013). The cost of replacing a single nurse can range from $11,000 to $103,000 (Richardson et al., 2019; OSHA 2013; OSHA, ND; AOHP 2020).

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 (Von der Lancken and Levenhagen, 2014; Tariq et al., 2018; CDC, 2020; Grimaud, 2012; Aslam et al., 2015).

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

Historically, burnout has been a leading cause of the high turnover rates in nursing however, the increased workloads experienced during the pandemic has resulted in extraordinary levels of burnout in nursing and other patient care related professions (Martin et al., 2023; Rotenstein et al., 2023; ANA, 2021).

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

The consequence of high physical and psychological demands in health care 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 (Galizzi et al., 2010; Menzel, 2008; Capponecchia et al., 2020; Anderson and Oakman, 2016). 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).

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; Nigam et al., 2023).

Patients

Not surprisingly, health care worker fatigue and burnout are associated with poorer patient outcomes (Cho and Steege, 2021; Yellowlees and 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 health care (Kiymaz and 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. 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 turn every two hours were only turned 27% of the time (Missar et al., 2018).

Barriers to ambulation of patients are multifactorial and 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). Overall, James Reason, a renowned expert in health care systems safety, argues that 'missed nursing care is the most common cause of quality problems in health care' (AHRQ, 2018).

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).

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).

Observation and Personal/Professional Perspective.

Observation can be a powerful tool especially when applied to research as a type of nonexperimental and qualitative research method that involves documenting behavior in its natural setting (ATLAS.ti,ND). The researcher, in this case (one of the co-authors of this white paper) does not manipulate any variables but simply watches and describes what is happening. The objective of the illustrative example below and the two examples in the appendices is to describe the characteristics of individuals, groups, behaviors, and attitudes, in this case HCWs up close and personal from a professional perspective.

Life's learnings are often best conveyed through the telling of stories, sharing real life experiences. Co-author, Colin Brigham shares three (3) illustrative examples about patient handling related events in which he was involved at various times as: 1.) a patient/care recipient; 2.) as a care provider; 3.) as a family member; and 4.) as a SPHM professional. All of us have the potential to assume one or all the first three (3) roles during our lives. Those of us who are fortunate can serve in the 4th role!

The following is his story about the cost of manual patient handling to care recipients. The remaining case stories are described in *Appendix A*.

Illustrative Example #1: My Mother's Story

Now, I'd like to tell you my mother's (Fay Louise Brigham) story. It is a story about how poor patient handling practices can negatively impact patient recovery, particularly with the elderly. Prior to this incident, my mom was ambulatory, walking to the mailbox each day to get her paper and mail. She was 84, had diabetes, prior heart surgery, and arthritis. Despite these conditions, she was generally in very good spirits, often heard singing while working, loved by her 7 children, many grandchildren, and friends.

My mother was admitted to a hospital with a urinary tract infection (UTI), high fever, and some cognitive impairment on Saturday, July 30, 2011. The impairment was apparently due to her UTI. During her initial assessment at that hospital, it was determined that she may have suffered mini strokes, affecting her right side. It was decided that a higher level of care would be better provided at an affiliated hospital.

Figure 4

My mother, about 2 years before her death

My sister accompanied my mother to the second hospital where she was admitted to a room in the cardiac care unit (CCU). My sister was in that room but had the curtain drawn between her and my mother. The attending nurse attempted to move my mother (with a weight of 151 pounds) to a chair by herself. During this transfer, my sister heard my mother fall and groan. The nurse then summoned the aid of two additional staff members who assisted with the movement of my mother. My sister questioned and was told, almost indignantly, that my mother failed to provide any assistance during the transfer. My sister told the nurse that my mother had no strength in her right side because of her illness and asked the nurse if she had read my mother's chart. The nurse that she had not and stated that she normally doesn't work in the CCU.

My mother was later transferred to a dual occupancy room. My wife and I arrived and visited my mother about a week after her hospitalization. We live over 300 miles from my mother and sister. During that day and the next two days, I observed three transfers, two of which were poorly performed. The first involved the movement of my mother from a bed to stretcher in her room by a two-person team. A transfer board (like that shown in Figure 5) was used.

Two people performed the transfer. They didn't appear to work well as a team, with the board left partially under my mother. She was in discomfort. I discussed with them the use and benefits of air-assisted lateral transfer devices (like that shown in Figure 6) as one transfer option that is easier to use and less likely to cause harm. They were not familiar with those devices.

The next day my mother was transferred again from bed to stretcher. In the interim, my mother had been placed on a brown inflated mattress that had an air cylinder attached to it. The transfer was from a bed to a stretcher. The stretcher did not have a sheet on it. There was a gap of a few inches between the bed and stretcher. Again, a two-person team was involved in the transfer.

During the transfer, the mattress on the stretcher buckled and the mattress deflated. My mother's buttocks were hanging partially between the bed and stretcher. My mother was in discomfort. I spoke to the nurses, telling them that I would assist, reach across, and help complete the transfer. We asked them if they had been trained in safe patient handling and mobility and one nurse said she had not. I was extremely disturbed by the staff's lack of knowledge and the impact it had on my mother.

Figure 5

A Transfer Board

After first hearing of my mother being dropped, I started asking questions regarding what safe patient handling and mobility (SPHM) equipment was available and approaches used. One nurse replied that there was some equipment around, but it was not readily available. At a minimum, the facility needed better horizontal transfer equipment and approaches. There was no evidence of mobility assessments being performed. The list of other shortcomings was long.

Figure 6

Air-Assisted Lateral Transfer Device

When I first arrived at the hospital, I was telling my family about the good reputation that this medical center had for safe patient transfer, in part due to the involvement of a professional that I had known since at least 1995. Obviously, my opinion changed dramatically since my mother was admitted. Without a process for sustainability, even the best programs fail.

There was bruising, discoloration, and discomfort caused by the initial dropping incident with my mother. She was in pain on one side during much of her stay. I believe that the patient handling incident negatively impacted her eventual outcome. She was much less willing to try to move because she knew it would hurt, and the less she moved, the stiffer she became, and the more she

hurt. This made her depressed, which also inhibited her ability to recover.

During the subsequent months my mother had some good periods and some bad periods, moving several times back and forth to rehab facilities. She had periods when she was lucid and hopeful to return home, with her family members and friends also hopeful. Unfortunately, that never happened. My mother died on October 19, 2011.

Reference: Personal story first provided by Colin J. Brigham, Past President of the Association of Safe Patient Handling Professionals (ASPHP) at a U.S. Congressional Briefing on May 28, 2014.

Figure 7

Continuing Care

Why is Manual Patient Handling So Hazardous?

Biomechanical Risk Factors

Manual patient handling tasks require HCWs to exert excessive force when lifting, pushing, and pulling, and to work in extreme awkward postures such as bending forward for long durations, lateral bending, and twisting of the trunk and reaching. HCWs also maintain awkward body postures without movement for a period of time, i.e., static postures (Figures 8 and 9).

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, shearing, and torsional forces, or spinal loading, which significantly increase the risk of low back injuries (Marras, 2008; Theilmeier et al., 2010; Gallagher and Marras, 2012; Wiggermann et al., 2021) (Figure 10).

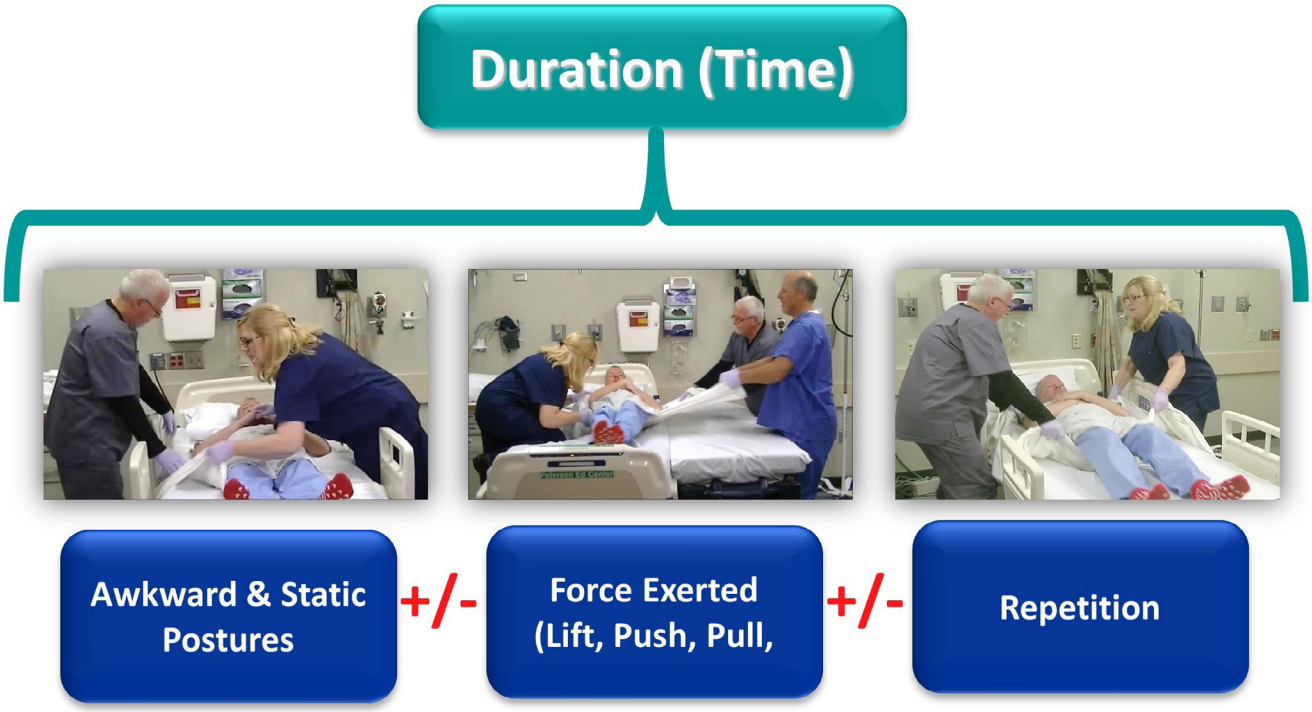
Even patient care activities involving activities of daily living (ADLs), i.e., bathing, feeding, and dressing, have been found to produce large cumulative spine loads (Hodder et al., 2010).

Tasks involving pushing and pulling often involve high shear forces (in addition to compressive force). The amount of spinal loading is dependent on the weight of the patient and the coefficient of friction between the sliding surfaces which HCWs often have to overcome by using rapid jerking motions when starting to move the patient, e.g., pulling a patient up in bed or transferring a patient between two surfaces in a supine position from bed to stretcher (Waters et al., 2007; Wiggerman et al., 2021).

Figure 8.

Primary Risk Factors that Can Contribute to the Development of WMSDs Associated with Manual Patient Handling.

Source: L. Enos, HumanFit, LLC. Reproduced with permission



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

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.

Biomechanical tolerance to shear force is much lower than tolerance to compressive force, thus creating a higher risk for back injury (McGill, 1997; Marras et al., 1999; Hoozemans et al., 2008).

Sudden, unexpected, forceful exertion, e.g., when patients move unpredictably during a handling task, or when cognitively impaired patients become combative, and resist efforts to move them further, increases the loading on the spine (Anderson, 2001; McGill, 2002; Pedersen, 2007; Shahvarpour et al., 2015; Zhou, 2014).

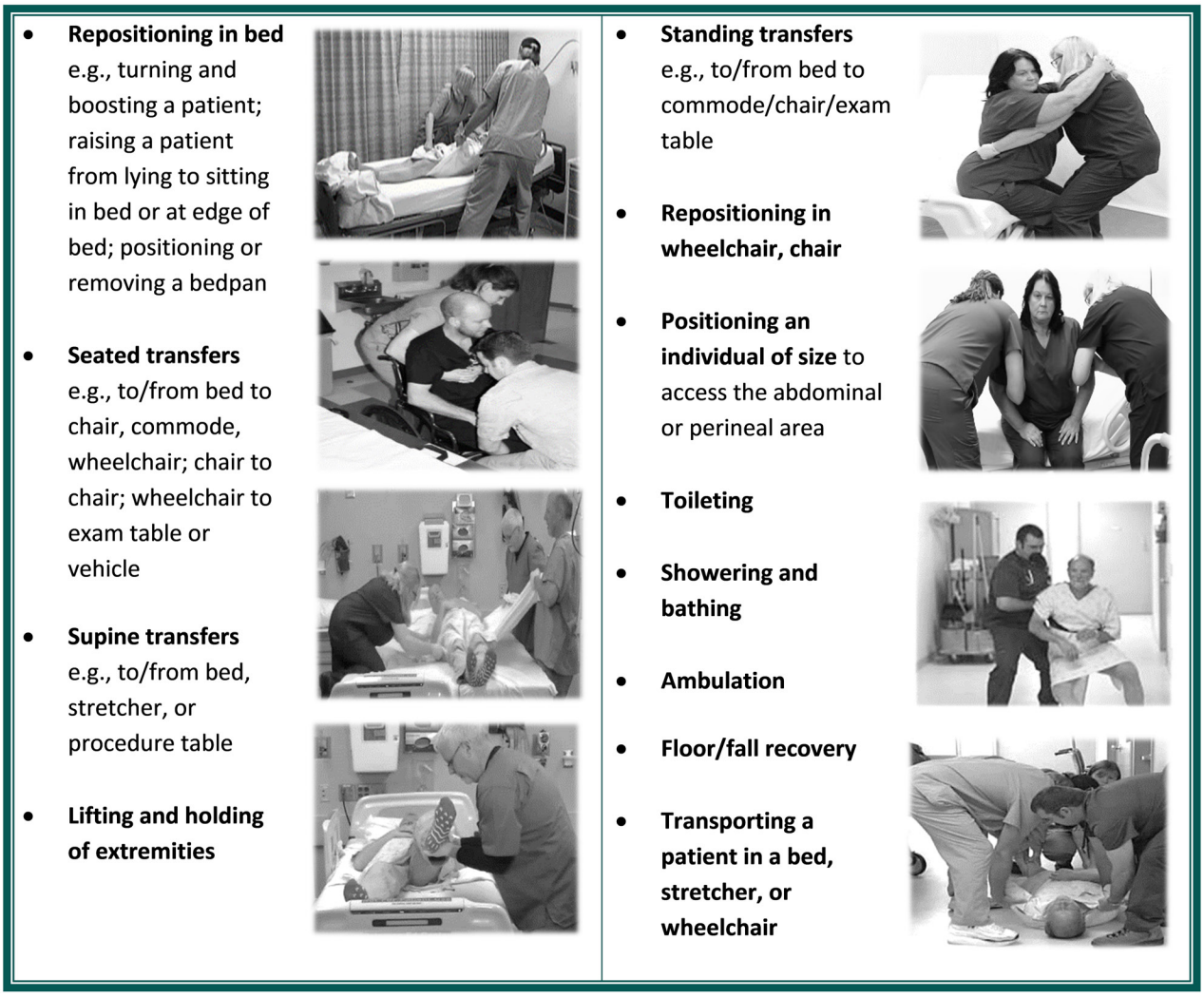
Several other factors can increase the level of exertion and resulting loading on the spine and support structures when performing manual patient handling tasks and significantly increase the risk of WMSDs.

Figure 9.

High Risk Manual Patient Handling Tasks - as Supported by Research

(Callison and Nussbaum, 2012; Daynard, 2001; Hignett et al., 2003; Jäger et al., 2013; Marras et al., 1999; Nelson and Baptiste, 2004; Nelson et al., 2003; Pompeii et al., 2009; Skotte et al., 2002; Ulin et al., 1997; Waters et al., 2007; Zhuang et al., 1999).

Source: L. Enos, HumanFit, LLC. Reproduced with permission



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; restricted physical workspace; the transfer distance; the speed of the transfer; and/or the number of HCWs who can assist (Village et al., 2005; Frey and Hignett, 2015; Choi and Brings, 2016; Matz et al., 2019; Galinsky et al., 2021).

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 11.

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 (Tariq, 1997; Waters, 2007; Davis and Jorgensen, 2005).

Figure 10

The Direction of Forces on the Spine when Manually Lifting Patients

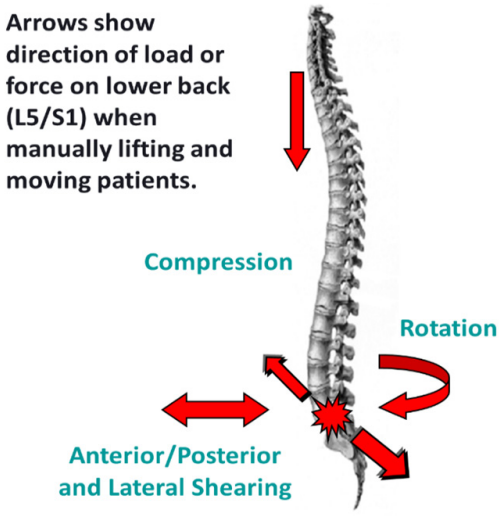
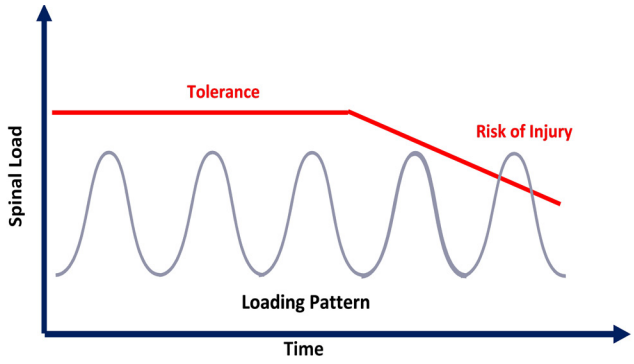


Figure 11

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. Some of these tasks include carrying linen bags, moving and handling medical equipment, and pushing patients in wheelchairs or on stretchers. Exposure to these tasks, together with patient handling tasks, may significantly increase risk of WMSDs in HCWs.

Other Risk Factors that contribute to WMSDs in HCWs

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

Therefore, for SPHM programs to successfully achieve and sustained desired goals, it is not only necessary to address the physical risk factors for WMSDs associated with patient handling tasks but to also consider to all other risk factors HCWs are exposed to in their specific work environment.

Oakman and Macdonald 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' (2019). Figure 12.

Organizational Risk Factors

HCWs often work long and unpredictable hours with few work breaks and inadequate staffing levels; thus, work organization-related factors compound the exposure to physical risk factors and increase the likelihood of low back injury (Choi and Brings, 2016; Ribeiro et al., 2017; Dennerlien et al., 2017; Richardson et al., 2019).

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, lack of clarity over role, and a hostile work environment (e.g., bullying is allowed), have also been associated with an increased likelihood of WMSDs in HCWs (Han et al., 2014; Kim et al., 2014; Sabbath, et al., 2014; Bernal 2015, Vignoli, et a., 2015; Oakman and Macdonald, 2019; Andersen et al., 2019; Wåhlin et al., 2021; Zare et al., 2021; Graveling 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. Time pressure to meet work demands could cause HCWs to increase the number of repetitive movements and facilitate awkward postures increasing biomechanical load (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 an WMSD (Graveling et al., 2021).

Individual Risk 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 (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 (Rogers, 2013). 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 another risk factor for low back pain (Vinstrup, 2020).

Relationship between Risk Factors, Traditional Work Practices and MSDs.

It should be noted that causative factors of low back injuries associated with manual patient handling is 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.

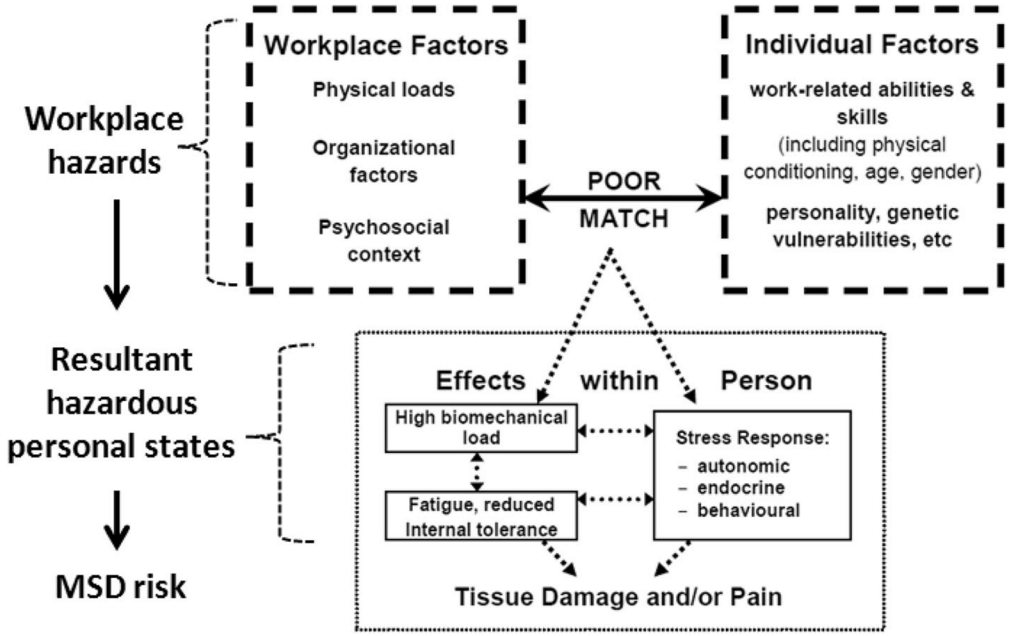
Belbecka et al., found that out of five commonly performed manual patient handling tasks, stand pivot transfers from bed to chair sit-to-chair and turning a patient in bed toward the HCW, were the most demanding tasks for the shoulder (Belbecka et al., 2014).

Wiggerman et al, found that overall risk of upper extremities may increase when boosting a patient using a drawsheet. Boosting a patient weighing 77Kgs 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)

Figure 12.

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://doi.org/10.1186/s12891-019-2828-1



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

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).

Waters proposed that the maximum weight limit for manual patient handling is 35lbs. based on the use of the Revised NIOSH lifting equation 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).

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 (Marras, 2008; Hu et al., 2013; Marras, 2015).

Thus, there is no safe method to manually handle patients or manually assist with patient mobilization.

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).

More information about how much a health care worker can lift manually can be found in Appendix B.

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

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 (Przybysz, 2017; Dennerlein et al., 2017; Hodgson et al., 2013; Rogers, 2013; Powell-Cope et al., 2014; White-Heisel et al., 2017; Stevens et al., 2013; Mayeda-Letourneau, 2014; Humrickhouse and Knibbe, 2016; Sorensen et al., 2016; Thomas and Thomas, 2014; Nelson et al., 2006; Siddharthan et al., 2005; Lee and Rempel, 2020; Jones and Eaferton, 2020; Wåhlin et al., 2022; Miller al., 2022; Halim, 2023; Richarz et al., 2023).

At the core of these programs is the use of SPHM technology such as powered mobile mechanical patient lifts, ceiling-mounted 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.

Appendix F provides examples of commonly used SPHM technology.

The use of SPHM technology has been shown to reduce the biomechanical loading of the musculoskeletal system associated with manual patient handling to varying degrees.

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

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

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

Research supports the use of SPHM technology to reduce the forces exerted on the spine 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 SPHM technology is used, e.g., bending over a bed that is not raised to place a sling or friction reducing sheet. Reducing exposure to poor posture requires that HCWs adopt ergonomics best practices when performing their work, i.e., 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 (Wiggerman et al., 2021; Wahlen et al., 2022).

Therefore, for programs to be successful and sustainable, e.g., 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 must be addressed.

Thus, SPHM programs should be designed and implemented using a system-oriented approach and includes the following elements: (Przybysz, 2017; Dennerlein et al., 2017; Stevens et al., 2013; Olinski and Norton, 2017; Adamczyk, 2018; Kurowski et al., 2017; Huffman et al., 2014; Rugs et al., 2013; Hurtado et al., 2018; ANA, 2021; Teeple et al., 2017; Hegewald et al., 2018; Totzkay, 2018; McMillan et al., 2018; King Jensen, 2023; Matz et al., 2019).

- Visible ongoing leadership support
- Active ongoing involvement of HCWs in all facets of the program
- SPHM policies that promote minimal manual lifting and handling of patients who cannot move independently, e.g., manual patient handling is performed only in an emergency
- SPHM patient assessment protocols or decision-making algorithms
- 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 are readily accessible, well maintained, and 'fit' the physical, cognitive, clinical, and rehabilitative needs of the patient population, the task to be performed, and physical design of the workspace
- Defined processes for storage, cleaning, maintaining, and inspecting SPHM technology and slings with replacement plans based on lifespan of lifts, batteries, slings, etc.
- Facility champions (program coordinators)
- Unit-based peer leaders or SPHM coaches to reinforce safe use of SPHM technology and work practices
- Ongoing competency based hands-on SPHM education and training

- 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

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

The American Nurses Association's (ANA) *Safe Patient Handling and Mobility: Interprofessional National Standards Across the Continuum* provides a multifaceted evidence-based framework for implementing and sustaining successful SPHM programs. Health care facilities who have used the Standards to implement and evaluate SPHM programs have seen reduced HCW injuries and associated workers compensation costs. Refer to *Legislative Aspects of Safe Patient Handling and Patient Mobility* below for more information.

Culture of Safety in Health Care and SPHM Programs

Competing business and service demands together with changing health care reimbursement rules and staff recruitment and retention challenges in this post-pandemic era, can make sustainability of comprehensive worker safety programs such as SPHM challenging.

Health care 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, 2017, NIOSH, 2023, OSHA, ND).

Typical attributes of a culture of safety include:

- Staff and leaders who value transparency, accountability, and mutual respect
- Safety as everyone's first 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
- 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.

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.

Appendix F lists resources that provide further information about a safety culture in health care and change management.

The role of SPHM programs in creating a safety culture that supports physical and psychological well-being of HCWs and patient safety is discussed later in *Recommendations to move SPHM forward in US Health Care across the continuum*.

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 during the past 15 years in the US: (Matz et al., 2019; Dennerlein et al., 2017; OSHA 2013; Powell-Cope et al., 2014; Stevens et al., 2013; Mayeda-Letourneau, 2014; Thomas and Thomas, 2014; Olinski and Norton, 2017; Walker, et al., 2017; Garg and Kapellusch, 2012; Theis and Finkelstein, 2014; Celona, 2014; Restrepo, 2013; Kennedy and Kopp, 2015; Kurowski et al., 2017; Huffman et al., 2014; Rugs et al., 2013; BLS, 2018).

- 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 health care staff 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 (Hallmark et al., 2015; Aslam et al., 2015; HFES, 2023).

SPHM equipment also reduces 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 (2017). These include:

- Reduced risk of health-facility acquired pressure injury by up to 17%.

SPHM and Workplace Violence Prevention

Violence by patients against HCWs has increased significantly over the past decade with serious and sometimes deadly consequences for workers (Kurowski and Ghaziri, 2019).

In the 2018 Aon Health Care Workers Compensation Barometer, managing patients who are uncooperative or have aggressive behavior was the second leading task reported for all patient handling claims (Jones, et al., 2018).

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 (Kurowski and Ghaziri, 2019; Collins et al., 2006; Pihl-Thingvad et al., 2018; Risør et al., 2017).

- Improved patient mobility by 12%.
- Improved patient comfort and safety (Gibson, 2017; Garg and Kapellusch, 2012).

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 (Kurowski and Ghaziri, 2019; The Joint Commission, 2012; Kennedy, et al, 2015, Spritzer, et al, 2015; Walden et al., 2013; Gucer 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 (Kayser et al., 2020; Wyatt et al., 2020; Bassett et al., 2012).

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 (Darragh et al., 2012; Arnold et al., 2011; Campo et al., 2013; Darragh et al., 2013; 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, low-

The Value Strategy (Business Case) for SPHM Interventions

The AIHA® Value Strategy Manual (2008) outlines the processes and procedures that may be used to evaluate environmental, health and safety (EHS) programs and initiatives to determine their impact on worker health on an organization's business. Step 1 is to identify that organization's key business objective. The figure below shows areas of potential impact of a SPHM program on a health care organization's business.

The AIHA Business Case in EHS Tool can be accessed free of charge at:

https://www.aiha.org/public-resources/consumer-resources/apps-and-tools-resource-center/business-case-tool

The blocks under that top block identify necessary components, methods, and measures to meet a health care organization's mission to provide high quality care.

The Value Strategy® Process

1. Identify Key Business Objectives and Hazards
2. Conduct Risk Assessments
3. Align Value Opportunities
4. Identify Impacts
5. Measure Impacts
6. Determine Value
7. Value Presentation

Source: Brigham, 2015

er 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 Employers/Organizations

The benefits of fewer HCW injuries, improved job satisfaction, and decreased employers' overall work injury costs have potentially positive long-term implications for 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)

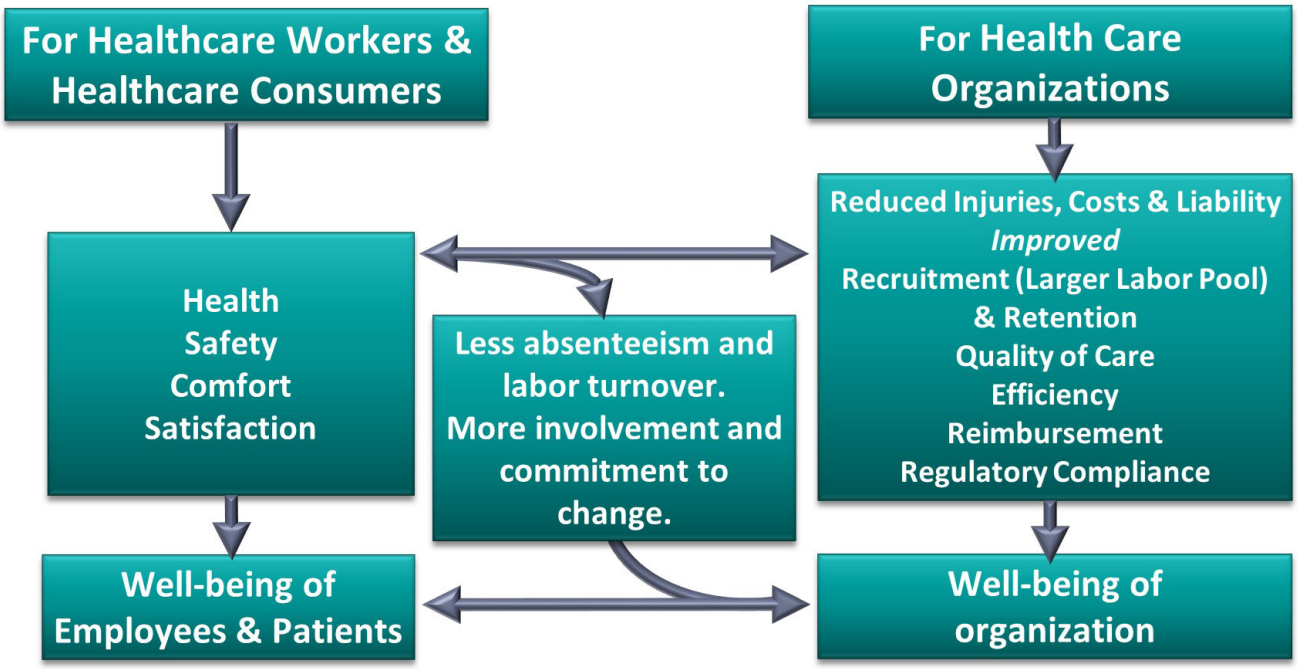
SPHM plays an integral role in the safety and health of health care workers, patients and in the wellbeing of health care organizations. Well-designed SPHM programs not only reduce the incidence and severity and costs of health care worker injuries associated with manual handling and lifting of patients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

Figure 13 summarizes the overall benefits of SPHM programs for HCWs, patients and health care organizations.

Figure 13

Goals and Benefits of SPHM Programs.

Source: Adapted from Enos, 2012; Wilson and Corlett, 2005; Nelson et al., 2008; Occupational Safety and Health Administration (OSHA), 2013a; and OSHA, 2013b.



There are many measures (also called key performance indicators, or KPI) that may be used to evaluate SPHM program performance. Below is a compilation.

SPHM Programs Key Performance Indicators

HCWs' Patient-Handling Related Injuries

- Injury/incident rate per 100 clinical area FTEs
- Lost workday 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) to replace one injured worker per shift, can be permanent or temporary replacement costs, i.e., HCW who is injured and away from work and/or modified duty per shift
- Non-OSHA recordable cases/incidents

Patient-related

As related to mobility and use of SPHM to promote patient mobility

- Hospital acquired conditions:
  - Pressure injuries
  - Ventilator acquired pneumonia
  - Venous thromboembolisms
  - Falls
- Goals for ambulation per shift/missed repositioning and ambulation
- Length of stay
- Functional Independent Mobility scores (rehab-related)

Organization-related

- Nursing turnover rate
- HCW satisfaction surveys
- Patient satisfaction surveys
- 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.

(Brigham and Patick, 2016; Dang et al., 2022 Enos, 2011 and 2012; Matz et al., 2019)

While the role that OSHA can play in impacting SPHM programs is becoming fairly well-understood, the role of other regulators is not. Below is a quick synopsis.

The Role CMS Can Play in SPHM

The Center for Medicare and Medicaid Services (CMS) holds health care organizations accountable for care outcomes using a quality rating system (QRS) measure set (Participation Options Overview (cms.gov). Since 2017, they have established a merit-based performance improvement system (MIPS). Performance versus these benchmarks can result in overall compensation from -9% penalty to +8% increase of all Part B payments from CMS to providers, a very large financial swing for a health care organization.

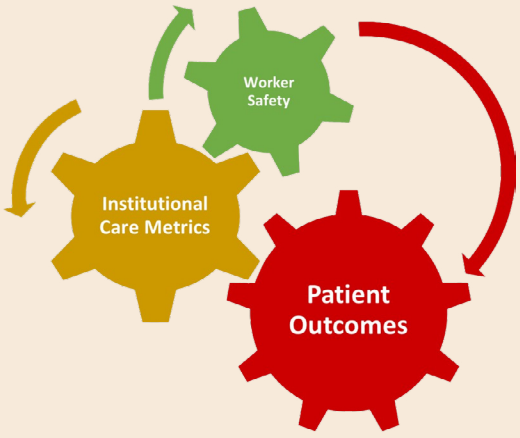
MIPS is composed of four (4) components, three of which are in some way tied to SPHM:

1. Quality: This measures the quality of care provided and is based on specific quality metrics.
2. Cost: This assesses the cost of care provided to patients.
3. Improvement Activities: This looks at how health care providers improve their care practices and engage with patients.
4. Promoting Interoperability: This measures how well clinicians use certified electronic health records (EHR) to manage patient care.

CMS allows for the establishment of registries to track these metrics. Once submitted and approved, health care organizations need to collect and submit data showing performance outcomes versus these benchmark metrics. The figures below show some performance measures relative to patient handling that may be used.

In addition, most providers that work in a health care facility (e.g., acute care, long-term care, rehabilitation, etc.) will see a cost score that includes the total cost of episodes. Obviously, if there are incidents in the care provision that results in patients requiring additional care, the cost rises and the score for that provider/facility is negatively impacted.

The interrelationship between worker safety, patient outcomes, and institutional care metrics are shown. The process of using a registry is described below.



Key Business Objectives Registry Reporting:

How can we utilize a registry to assist?

- Measure and monitor safety and harm
- Assessing incidence/prevalence rate and trends
- Measuring/improvement quality of care on a population basis
- Drive better decisions
- Institute quality improvement programs
- Measure impact of quality initiatives
- Compare results across organization(s)
- Create dataset for research and innovations
- Benchmark against peers
- Report to pay-for-reporting/pay-for- performance programs/ insurance discounts
- Certifications of individuals and teams

(Brigham and Patrick, 2016)

Legislative Aspects of Safe Patient Handling and Mobility

Legislation and Standards: Several international organizations and countries have introduced guidelines, legislation, and regulations to promote safe patient handling.

Efforts to Pass a Federal Standard

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. However, this standard was repealed by President George W. Bush and Congress in 2001 because of the perceived economic burden for employers and tension 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 in specific industries. 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 WMSDs in health care.

In 2015, the Nurse and Health Care Worker Protection Act was proposed for passage (H.R. 4266 and S 1788). Similar bills were introduced in Congress in 2006, 2009 and 2013. The goal of these bills was to require the Department of Labor to establish a standard on safe patient handling, mobility, and injury prevention to prevent musculoskeletal disorders for health care workers.

That standard would have required the use of engineering and safety controls to handle patients. 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. While there are no specific U.S. Standards for SPHM by OSHA, this agency can cite health care institutions under the General Duty clause (5a1).

State Standards for SPHM

In lieu of a federal standard, 10 states (CA, IL, MD, MN, MO, NJ, NY, RI, TX, and WA) have passed SPHM legislation between 2006 and 2014 in an effort to prevent patient handling injuries among health care workers. Hawaii and Ohio passed a resolution 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.

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 at al., examined the impact of the law on workers' compensation claims for musculoskeletal disorders (MSDs) in hospital workers. The study revealed that of the 199,547 MSD claims that occurred during

2007–2016 in acute care hospitals (62.8%) and nursing and residential care facilities (37.2%), MSDs accounted for 42.8% of all claims. Of these, 81.0% were strains or sprains, and 33.5% of MSDs were related to patient handling activities. From 2011 to 2016, MSD claim rates showed significant reductions among both hospital and nursing/residential care workers. However, the MSD to patient handling injury claim rate showed a significant reduction only among hospital workers (7.3% per year, incidence rate ratio [IRR] = 0.927, 95% confidence interval [CI] 0.903–0.952). There was no significant change among nursing/residential care workers (IRR = 0.990, 95% CI 0.976–1.005). The study identified significant reductions of patient handling-related claims among California hospital workers after the passage of the SPHM legislation, suggesting that the legislation played a crucial role in reducing the risk of injury among health care workers (Lee et al., 2022).

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 (Lee et al., 2021; Silverstein and Schurke, 2011; Kayser et al., 2020; Rosebush et al., 2022; Lapane et al., 2016; Weinmeyer, 2016).

SPHM Standards from Professional Organizations

In 2013, the American Nurses Association (ANA) published the *Safe Patient Handling and Mobility: Interprofessional National Standards Across the Continuum*. 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.

This groundbreaking document was developed by an interdisciplinary group of SPHM experts and in lieu of federal SPHM regulation, is considered the 'gold standard' for SPHM programs in the US (Hallmark et al., 2015; ANA, 2013).

In a meta review of workers' compensation claim data in 50 states in 2016 and 2018, health care systems using the ANA SPHM standards demonstrated a *significant decrease* in the average total cost of a workers' compensation claim. For example, a 2016 report from Aon, a global insurance brokerage firm, indicated that for health care systems implementing the ANA SPHM standards, the average total cost of a workers' compensation claim was reduced by 23% ($6,000 versus $7,800) compared with systems not using the standards (Jones et al., 2016). Repeating the analysis in 2018, Aon found increased validation for implementing the ANA standards. In a larger

dataset of $3.0 billion incurred loss dollars, the average total cost of a workers' compensation claim was 36% lower per cost claim ($5,900 versus $9,200) for health care systems using the standards (Jones et al., 2018). The evidence from the 2016 and 2018 reports shows that the standards may be a positive influence on the overall culture of safety and an effective cost mitigation strategy (ANA, 2021).

Overall, the historical efforts for safe patient handling have been driven by research, legislation, education, equipment development, and collaboration among various stakeholders. These efforts aim to improve the well-being of both patients and health care workers, minimize the risk of injuries, and enhance the quality of patient care.

Appendix C *lists those organizations engaged in advancing safe handling and mobility of patients and residents.*

Recommendations to Move SPHM Forward in US Health Care Across the Continuum

Over four decades of global research and published injury data have demonstrated that manually lifting and assisting patients who have limited mobility is a leading cause of work-related injury to HCWs in environments across the health care continuum in the US.

Multifaceted, well-designed SPHM programs that include the use of SPHM technology, such as powered lifts and stand assist devices, have been shown to reduce the incidence, severity, and costs of WMSDs associated with manual patient handling, reduce HCW turnover and facilitate improved patient outcomes associated with 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 TM 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.

Internal Barriers That Influence 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, have been researched and 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" (2019).

Addressing internal barriers relies on ensuring the elements of SPHM programs described earlier are incorporated into a program that is continuously and visibly supported by leadership and actively fosters

employee involvement within an organization culture that embraces HCW and patient safety as interrelated and equally important.

A list of primary evidence based internal barriers to implementing and sustaining SPHM programs is provided in Table 1.

Table 1.

Internal barriers or factors that can prevent successful implementation and/or sustainability of SPHM programs (not all inclusive).

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

SPHM Technology; Physical Environment	Organizational	Health Care Worker (HCW)	Patient
1. 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 2. Lack of ceiling or overhead lifts 3. 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 and 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 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/ uncooperative • 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 • Patient urgency to use the bathroom

Other Drivers That Influence Implementation and Sustainability of SPHM Programs

Whether a health care facility will implement and continuously support an SPHM program relies greatly on the influence of external factors or drivers.

The following needs to occur to ensure SPHM is an accepted standard of care in US health care thereby protecting the current and future health care work force and assisting to facilitate better patient outcomes thus, positively impacting economic and quality indicators for health care organizations.

The following drivers that influence adoption and sustainability of SPHM into health care organizations are:

1. ***The Need for National SPHM Regulation, e.g., A Federal Standard Enforced by OSHA***

   A national standard for SPHM developed and implemented by OSHA and CMS is needed. A standard should require that all health care facilities and organizations that are responsible for moving and assisting patients to implement an SPHM program. The program should prioritize the use of SPHM technology and processes to facilitate safe and consistent use of technology by HCWs that will ensure injury risk to HCWs is mitigated and patient mobility goals are optimized.

   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. There is variability in prevalence and scope of SPHM programs within acute care facilities and across the health care continuum (Sampath et al., 2019). For example, each of the nine state laws vary in scope and applicability to health care settings such as hospitals and nursing homes, or both. None of the laws apply to other health care settings such as home health.

   Legislation would assist in promoting SPHM as an accepted standard of care in health care in the US.

   In lieu of national regulation for SPHM, more needs to be done to raise awareness about other standards and regulation related to SPHM such as, the ANA *Safe Patient Handling and Mobility: Interprofessional National Standards* and The Americans with Disabilities Act (ADA) requirements for outpatient settings.

   Although the ANA standards are open voluntary standards, they are considered by many SPHM professionals and safety organizations as the evidence-based *gold standard* for SPHM and have been shown to reduce HCW injuries and associated costs.

   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 providing SPHM technology, such as powered floor or ceiling lifts, as needed to facilitate patient accessibility to and from exam surfaces. Not providing this access can be costly for a health care organization. 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 and pay $950,000 to patients and prospective patients who were harmed by its policies and a civil penalty of $50,000 (DOJ, 2023).

Appendix C, SPHM Legislation and Guidelines, provides more information about the accrediting agencies, International Standards Organization (ISO) standards for design or SPHM technology, and building standards related to SPHM that are relevant that health care organizations should be aware and/or comply with.

2. ***Embracing Worker and Patient Safety: Promoting SPHM as a Critical Tool in Creating a Health Care Safety Culture in the US.***

Historically health care culture in the US has prioritized patient safety over HCW safety. Loeppke et al., stated that "since the publication of the Institute of Medicine's groundbreaking report *To Err is Human* in 2000, patient safety has become a key health care issue, driving decision-making and policy formulation in virtually every sector of health care" (Loeppke et al., 2017). The Triple Aim Initiative, launched in 2007 by the Institute for Healthcare Improvement (IHI), helped to further entrench a patient-centric culture in an effort to improve the US health care system.

In the past decade, there has been a realization that, for the Triple Aim to be successful, the safety and health of HCWs, primarily related to preventing fatigue and burnout, must also be addressed. In 2014, the Quadruple Aim was developed, incorporating HCW wellbeing as a key factor to the success of the Triple Aim (Bodenheimer and Sinsky, 2014).

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" (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 enough HCWs to provide quality care and achieve patient safety goals (ANA, 2021; Emory et al., 2021; IHI, 2022).

There appears to be an incremental shift toward the goal of integrating a culture of HCW and patient safety within health care organizations in the US. For example, in 2020, IHI published *Safer Together: A National Action Plan to Advance Patient Safety*.

This National Action Plan, which was developed with 27 national health care-related organizations, presents a total systems approach to safety. The plan includes 17 specific recommendations for advancing safe and highly reliable care by driving improvement in four foundational areas:

- Culture, leadership, and governance
- Patient and family engagement
- Workforce safety
- Learning system

The foundational areas are prioritized as essential to create total systems safety and establish the necessary

conditions for delivering safe care and preventing harm (IHI, 2022 and 2020).

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 (IHI, 2020).

Figure 13 lists resources from other government and science-based groups that assist health care organizations to create a culture of worker and patient safety.

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 as related to retention of 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).

An example of the integration of HCW and patient safety is the role of SPHM within programs that promote safe, early, and progressive patient mobility. 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 (Dennerlein et al., 2017; Gabele et al., 2023; Turner et al., 2021a and 2021b; Wyatt et al., 2020). Although early mobility programs are usually promoted in the hospital setting, the role of SPHM is to maintain resident or client function and independence in long term and home care settings.

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

Other reported benefits of SPHM programs related to patient outcomes have already been discussed in this paper.

3. ***Improve Access to SPHM Technology in Home Care Settings and Expand Community Health Care Providers' Knowledge of SPHM Technology and Related Benefits***

In 1994, overexertion was reported to be a leading cause of injuries to home care workers. One of the highest risk tasks reported was those that 'involves maneuvering patients singlehandedly, often without the use of mechanical lifting devices available in some institutional settings (BLS, 1997).

Unfortunately, this statistic has not changed for home care workers. According to an AIHA 2021 white paper, strains, sprains, and tears mostly attributed to manual patient handling activities are still the most frequent injury type among home health care aides (AIHA, 2021).

The aging US population together with the increasing cost of hospital and nursing home care, and the

significant increase in use of telemedicine and virtual care to provide patient care are some of the reasons why delivery of health care is moving to the home (Koonin et al., 2020; Association of Medical Colleges, 2020). Benefits of home care include increased access to care especially in underserved communities, improved mortality rates, reduced hospital readmissions, and decreased costs (Zimbroff et al., 2021).

As in the acute care and long-term care settings, the use of SPHM technology can assist to prevent the complications of immobility and to improve and/or maintain a patient's physical functional abilities in their home (ANA, 2021). Access to SPHM technology in the home may facilitate patient discharge from hospital and prevent readmission due to the complications of immobility. This is of special importance when planning home care for obese patients and for children with severe and long-term disabilities.

Unfortunately, unlike other countries such as the UK, Australia, New Zealand, the use of SPHM technology in the home setting is sparse.

Patients who receive Medicare or Medicaid funding are rarely prescribed powered lift equipment or other SPHM technology, i.e., Durable Medical Equipment (DME) that is available to hospitals and long-term care facilities. DME reimbursement for such equipment is limited and there is no DME reimbursement for many types of SPHM technology to facilitate in-bed repositioning and standing mobility and independence. Unless a patient is in the Veterans Health System or can afford to purchase their own SPHM equipment, access to SPHM technology is extremely limited for home care patients in the US.

Figure 13

Resources from other government and science-based groups that assist health care organizations to create a culture of worker and patient safety

Other Resources that Assist Health Care Organizations to Create a Culture of Worker and Patient Safety

The National Academy of Medicine (NAM)

https://nam.edu/action-collaborative-on-clinician-well-being-and-resilience-network-organizations/

In 2017, the National Academy of Medicine (NAM) launched the Action Collaborative on Clinician Well-Being and Resilience, a network of now more than 200 organizations committed to reversing trends in clinician burnout. Clinicians include doctors, nurses and others involved in providing health care to care recipients. At that time, suicide rates amongst clinicians were twice the industry average for all workers with a high percentage of clinicians leaving the profession citing burnout. The Clinician Well-Being Collaborative has three goals:

- Raise the visibility of clinician anxiety, burnout, depression, stress, and suicide.
- Improve baseline understanding of challenges to clinician well-being.
- Advance evidence-based, multidisciplinary solutions to improve patient care by caring or the caregiver.

Refer to Figure 14

In October 2022, the NAM released the National Plan for Health Workforce Well-Being to drive collective action to strengthen health workforce well-being and restore the health of the nation, as more nurses, physicians, and public health employees than ever are poised to leave their professions (NAM 2022).

IHI Framework for Improving Joy in Work. IHI White Paper, 2017
This framework provides proven methods for creating a positive work environment. http://www.ihi.org/Topics/Joy-In-Work/Pages/default.aspx

Addressing Health Worker Burnout: The U.S. Surgeon General's Advisory on Building a Thriving Health Workforce May 2022 https://www.hhs.gov/sites/default/files/health-worker-wellbeing-advisory.pdf

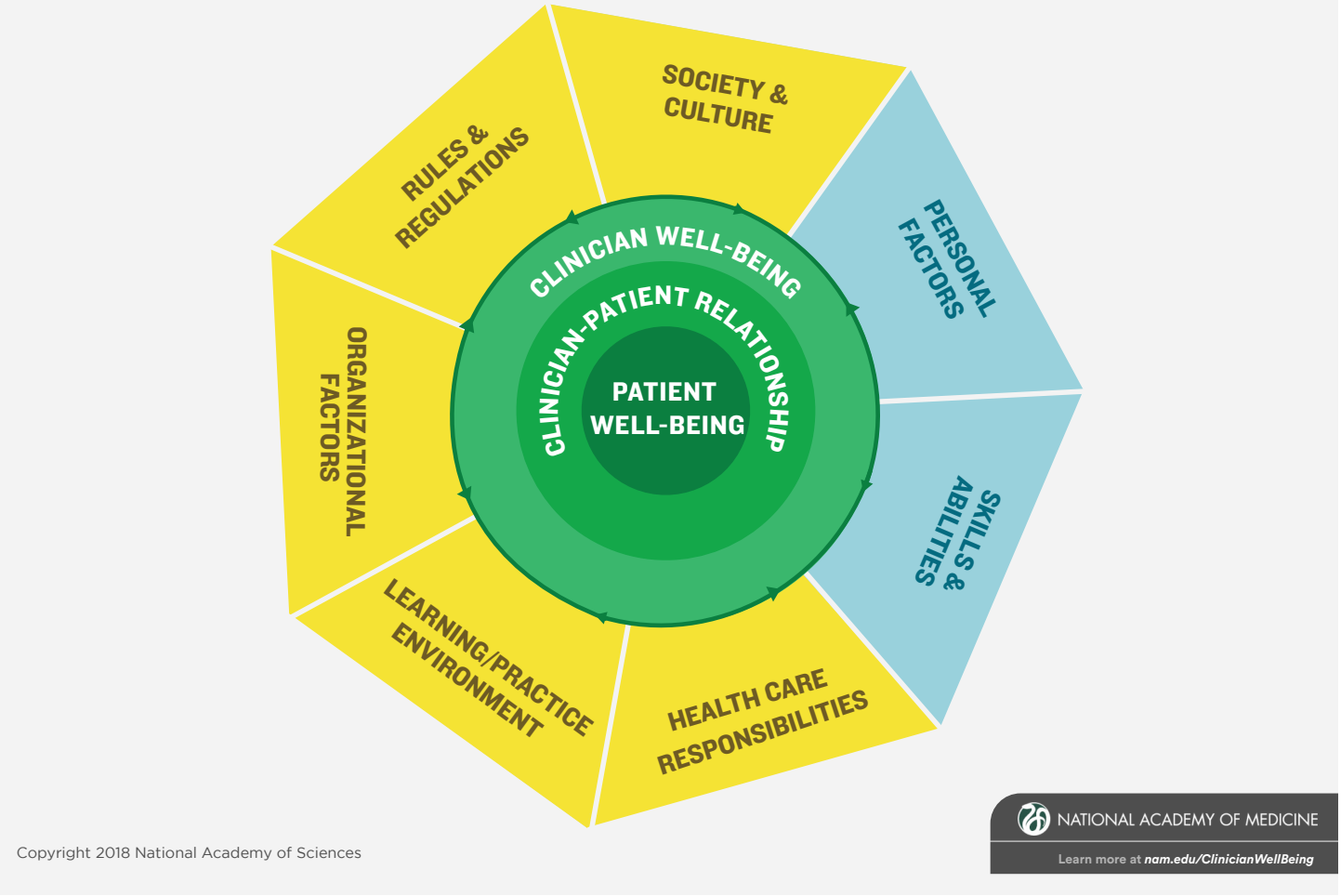
Total Worker Health®(TWH) https://www.cdc.gov/niosh/twh/default.html
TWH not only incorporates traditional safety principles to prevent and reduce risk of occupational injury or illness to workers through design and organization of work, tasks performed and organizational culture, but also considers the overall well-being of the worker. TWH considers other factors such as, the impact of shift work, wages, access to benefits, interactions with coworkers, nutrition, and fitness (NIOSH, 2016).

WHO - Global Patient Safety Action Plan 2021-2030 and Health Worker Safety: a Priority for Patient Safety https://www.who.int/

Figure 14

Factors Affecting Clinician Well-Being and Resilience (Brigham et al., 2018)

Source: NAM Perspectives Discussion Paper "A Journey to Construct an All-Encompassing Conceptual Model of Factors Affecting Clinician Well-Being and Resilience" NAM Perspectives. Discussion Paper, National Academy of Medicine, Washington, DC. https://doi.org/10.31478/201801b. Adapted and reproduced with permission from the National Academy of Sciences, Courtesy of the National Academies Press, Washington, D.C.



Appendix I offers more information about this model.

Compounding the issue is the lack of awareness by community health care providers about safer methods to move and rehabilitate patients in the home setting using powered and non-powered SPHM technology.

With a future emphasis on improving access to health care through the medical home model, it is essential that SPHM is seen as a solution to facilitate safe care and rehabilitation for home care patients and to attract and retain home care and other community-based HCWs. It will be vital that policy makers are educated on the role that SPHM plays in community-based care, especially as it relates to funding allocated to improving accessibility to a greater variety of SPHM equipment for home-based patients and SPHM training for home care and community HCWs.

4. ***Integrate Evidence Based SPHM Education and Training into Health Care Student Curriculum in the US***

Despite the evidence about the dangers of manual patient handling and the benefits of SPHM for caregivers and patients, most health care education programs for nursing, physical and occupational therapists, nursing assistants, and other allied professionals 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.

Without exposure to SPHM techniques and training, students are also 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 in the US.

Given the growing demand for health care workers 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 while maximizing the well-being of their patients (ASPHP, 2023).

5. ***Enhancing Patient Safety: Leveraging Technology in Safe Patient Handling and Mobility Programs***

Sensor Technology

Sensors have an increasing role to play in safe patient handling and mobility programs. Sensors may benefit both the patient and those who manually handle patients by minimizing injuries and ensuring patient safety.

There are sensors that can help prevent patient falls, and thereby reduce the risk of injury to both patients and health care providers and improve overall patient safety.

One common application of sensors in safe patient handling is in bed exit alarms. These alarms are activated when a patient tries to leave the bed without assistance. The sensors can be placed under the patient's mattress or integrated into the bed frame, and when the patient's weight is no longer detected, an alarm is activated. Examples of bed exit alarms include pressure-sensitive pads, cords and garment clips, patient-worn alarms, floor mats, and bedside infrared beam detectors. This allows health care providers to respond quickly and prevent potential falls or injuries. Another application is an alarm or signaling device on when

to rotate a patient to avoid pressure sores (Pennsylvania Patient Safety Authority, 2004; Mileski et al., 2019).

Sensors can be placed on the patient for fall detection. These systems utilize sensors placed on the patient's body to detect sudden changes in position or movement. For example, when a fall is detected, an alert is sent to health care providers, enabling quick response for the patient.

Sensor technology (wearable and non-wearable) is also being deployed to prevent and detect patient falls in community settings including home care (Oh-Park et al., 2021; Pech et al., 2021).

Types of fall detection devices are:

- Wearable sensor devices: Worn by the individual and use sensors to detect falls.
- Sensors embedded in garments that are used for fall detection (Tang et al., 2023)
- Accelerometer Sensors: Embedded in wearables, these sensors monitor changes in movement speed and abrupt changes in position.
- Gyroscopes: Measure orientation and rotation.
- Pressure sensors: Detect pressure changes (e.g., when someone falls).
- Electromyography (EMG): Measures muscle activity.
- Ambient sensor devices: Detect falls without being worn by the person when placed in the environment (e.g., home).

(National Council on Aging, 2024)

It should be noted that manually lifting a patient from the floor following a fall is one of the highest risk tasks for HCW injury and potential harm to a patient (Hignett et al., 2003, Baptiste 2011). Thus, SPHM technology should be used for patient fall recovery.

Lift-assist devices that are used in patient rehabilitation settings have sensors to detect the patient's weight and movement, assisting health care providers in safely lifting and transferring patients. The sensors benefit both the patient and health care provider by providing real-time feedback on the patient's weight distribution and needed adjustments to meet therapy goals and reduce the risk of musculoskeletal injuries.

Sensor technology can also be used to conduct direct biomechanical evaluation of body posture and movements used during patient handling and care tasks and to determine work design modifications and potential teaching interventions that will promote for improvements in body mechanics (Callihan et al., 2023; Kitagawa, 2024; Owlia et al., 2020).

Sensor technology can potentially be used in the design and development of new SPHM technology to test the effectiveness of a device to reduce biomechanical risk factors for HCW injury during high-risk patient movements.

Patient Assessment and Care Planning for Safe Patient Handling and Mobility and Fall Prevention

SPHM patient assessment protocols or decision-making tools are an important component of a multifaced SPHM program. HCWs need to be able to evaluate a patient's physical, cognitive, clinical, and rehabilitative needs to determine how to safely mobilize the patient using SPHM technology as appropriate.

The *ANA Safe Patient Handling and Mobility: Interprofessional National Standards Across the Continuum* state that a SPHM patient assessment is conducted 'both initially and on an ongoing basis and that the outcome of the assessment, evaluation, or scoring system will be incorporated within the individual plan of care' (ANA, 2021).

A SPHM assessment may be conducted when they are admitted to a health care facility, as part of a periodic assessment each shift, and when the patient's clinical status changes. However, a patient's ability to mobilize may change frequently within a shift or day to day. These changes may be due to changes in clinical condition and/or medical treatment, level of pain, medication, and fatigue. Therefore, SPHM patient assessment is also used by HCWs to identify these changes prior to attempting to mobilize a patient.

There are a few validated SPHM patient assessment tools that are designed to identify a patient's cognitive and physical abilities and prompt HCWs to select the most appropriate equipment to safely mobilize the patient early and often (Matz, 2019). Two of the commonly used and validated tools are the Bedside Mobility Tool (BMAT) 2.0 (Boynton et al., 2020) and the Veterans Administration (VA) Mobility Screening and Solutions Tool (VA MSST) (Melillo et al., 2022).

These tools can be used as part of an early, progressive mobility and fall prevention program with good results (Matz, 2019; Turner et al., 2021). They can be used together with fall prevention sensor technology to improve patient outcomes and HCW safety.

Overall, the use of sensors in safe patient handling has significantly enhanced patient safety and reduced the risk of injuries. These sensors provide real-time data and alerts that allow health care providers to intervene promptly, preventing falls and ensuring the well-being of patients during transfers and movements. Some examples of sensors used in patient handling and mobility are listed below:

Load Cells: Load cells are used to measure the weight of patients during lifting and transferring processes. They provide real-time feedback to caregivers, allowing them to ensure that they are within safe weight limits and preventing the risk of overexertion.

Pressure Sensors: Pressure sensors are used in assistive devices such as lift chairs, beds, and mattresses. They detect changes in pressure and movement, alerting caregivers to potential hazards or improper positioning that may cause discomfort or harm to the patient.

Motion Sensors: Motion sensors are utilized in devices to detect movement and monitor patient activity. They are often integrated into patient lift systems and help caregivers assess the patient's motor function during transfers, ensuring proper assistance and reducing the risk of falls.

Proximity Sensors: Proximity sensors are used to detect the presence or proximity of objects or individuals. They are employed in patient handling equipment to prevent collisions or entrapments and enhance patient safety during transfers.

Real-Time Location Systems: These systems include Radio Frequency Identification (RFID) wireless tracking systems that can be used to track SPHM technology within a facility. This includes washable RFID tags that can be sewn into patient lift slings to enable tracking and management of washable slings

Strain Gauges: Strain gauges are utilized in patient lift slings and harnesses to measure the tension exerted on straps and determine load distribution during lifting. This information helps prevent incorrect or unbalanced lifting, reducing the risk of injury to both patients and caregivers.

Technological advances for sensors are increasing very quickly for an ever-larger population of patients who need assistance for movement. Future applications include:

- **Increased sensor precision:** Sensors will become more accurate and reliable, ensuring optimal detection and monitoring of patient movements and conditions. This improved precision can enhance patient safety and help identify potential risks or discomfort.
- **Wearable sensor technology:** Advancements in wearable sensors can provide real-time monitoring of patient movements, body posture, and vital signs. By embedding sensors into garments or using wearable devices such as a wristwatch or waistbelt, health care providers can obtain continuous patient data, enabling early detection of issues and more responsive care.
- **Integration with artificial intelligence (AI):** Sensor data can be combined with AI algorithms to facilitate predictive analytics and personalized care. AI systems can help health care providers analyze sensor readings to develop more accurate patient care plans and adapt safe handling strategies based on individual needs and conditions.
- **Robotics and automation:** Sensing technologies will likely play a crucial role in the development of robotic devices for safe patient handling. Sensors can enable robots to understand patients' movements, weight distribution, and muscle activity, ensuring smooth and safe transfers.
- **Remote patient monitoring:** Sensors embedded in patient care equipment, such as beds or wheelchairs, can facilitate remote patient monitoring. This technology allows health care providers to monitor patients' movements and conditions from a distance, enhancing patient safety and reducing the need for constant physical presence. They may also allow visual or verbal communication, reassuring the patient and potentially improving outcomes.
- **Data-driven insights:** With the integration of sensor data into electronic health records (EHRs), health care providers can gain valuable insights into patient mobility patterns and trends. Analyzing this data

can help identify areas for improvement, optimize workflows, and enhance patient outcomes.

- **Privacy and security considerations:** As sensor use expands, it is crucial to address privacy and security concerns related to the collection and storage of patient data (Kaur et al., 2024). Future advancements should prioritize robust data protection measures to ensure patient confidentiality.

The pace and extent of adoption of this technology may vary depending on factors such as cost, regulatory requirements, and technological feasibility. That said, the integration of sensors into safe patient handling and mobility solutions holds the potential to greatly improve patient care and reduce the risk of injury.

Exoskeleton technology

Research into the use of exoskeletal technology in health care is expanding, including the application of this technology in health care consumer handling.

Currently exoskeletal technology has mostly been 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 the use of SPHM technology cannot be used due to physical space limitations 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 HCW injuries related to patient handling.

These include the need to custom fit the device for each individual worker, to be light weight and ability to be used for variable tasks performed by HCWs that involve lifting, pushing, carrying etc. and easily disinfected.

Research is also lacking on use of these devices to determine if they interfere with the healing process when worn by workers who are recovering from WMSDs. The effect of prolonged exoskeleton use in areas near the joints they support is also unknown.

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

The ASTM International Technical Committee on Exoskeletons and Exosuits (ASTM F48) is currently developing consensus standards for exoskeletons (Lowe, 2019). For more information go to https://www.astm.org/COMMITTEE/F48.htm

6. ***Educate the General Public about the Benefits of Safe Patient Handling and Mobility Technology in Their Lives.***

The need in all environments of care (acute, long-term, rehabilitation, outpatient, EMT, schools, the home,

and others) should be shown. The role of mobility assessment, care environment design and maintenance, equipment availability and condition, training, and communication should be detailed.

The benefits for the general public would include:

a. Knowing what to look for when they and/or their loved ones are to receive health care, how they can assure the best quality of care. Quality outcome indicators include prevention of additional harm (i.e., falls, pressure ulcers, slowed or lack of recovery, etc.).

b. Knowing what to look for when they are going to provide health care. Particularly in the home environment, what design and maintenance factors will assure the best ability to provide care, what equipment and training might be helpful.

7. Increasing Funding for SPHM-Related Research

Increase funding for NIOSH to:

a. Develop programs that allow facilities with well-developed SPHM programs to share resources and best practices with other organizations in order to expedite the broad implementation of SPHM.

b. Expand research efforts on the etiology of MSDs in health care workers.

c. Research methods to improve the accuracy of injury reporting for MSDs.

d. Research the most effective training methods for SPHM in both nursing schools, rehabilitation and allied health colleges and health care facilities.

e. Research the effectiveness of new and emerging SPHM technologies.

f. Research the relationship of SPHM to patient safety related outcomes to expand the current evidence base.

g. Support NIOSH, NIOSH Education Research Centers (ERC) and Training Project Grants (TPG) to ensure a pipeline of investigators skilled at performing research to reduce MSDs in health care workers.

8. Activity by OSHA to:

a. Support legislation to implement grant programs that provide incentives for the purchase of SPHM equipment (including training in its use) in (i) health care facilities, and (ii) schools and colleges that train health care workers.

b. Promote the accurate measurement of musculoskeletal disorders (MSDs) by adding a corresponding category to the current list of injury and illness types on the OSHA 300 form which is used for reporting work-related injuries.

c. Update and expand resources for health care facilities that provide the latest best practices for SPHM.

d. Develop training for OSHA investigators to be used by the OSHA Training Institute that allows inspectors to identify opportunities and recommend best practices related to patient handling.

Recommendations '7' and '8' reflect recommendations by the Human Factors and Ergonomics Society in *'Prevention of Musculoskeletal Disorders in Healthcare Workers: Safe Patient Handling and Mobility Programs, 2023'* to prevent pain and injury in health care workers and preserve the availability of the U.S. health care workforce.

In Conclusion

Information provided in this paper 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. SPHM programs can not only reduce Workers' Compensation costs, but also may improve absenteeism rates, reduce turnover, and improve efficiency.

This need is more urgent than ever in the post pandemic world if organizations across the health care continuum are to attract and retain HCWs and offer safe, quality patient care.

Work-related musculoskeletal disorders (WMSDs) associated with manual transferring, repositioning, lifting, and mobilization of patients are a leading cause of injury and disability for HCWs 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.

WMSDs have a significant physical and psychological impact on the quality of life of injured HCWs and can be career-ending for HCWs.

They are also associated with high costs to employers such as, absenteeism, burnout, higher employee turnover, reduced workforce efficiency, and higher than average workers' compensation claims costs.

Patients may not receive essential care, such as repositioning in bed and ambulation, when HCWs have to perform these tasks manually. Manual patient handling can be painful, increase the risk of skin tears and bruising, and be undignified for the patient.

The true costs of patient handling related injuries are likely much worse than currently realized due to high rates of underreporting by HCWs and misclassification of MSDs on injury reports by health care employers. Non-insured costs may increase the total cost of patient handling injuries by two to four times due to turnover, overtime, reduced morale, incident investigation, and developing/implementing corrective actions to prevent recurrence (OSHA, 2014).

Over 40 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 patients who cannot move

independently, play the most significant role in development of low back pain and injury.

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 (SPHM). Such programs, if they are to be successful, must consider and address organizational, psychosocial, and individual risk factors that can also contribute to the development of WMSDs where possible.

Evidence supports that comprehensive participatory SPHM programs can be effective in reducing HCW injuries associated with patient handling and can also be beneficial for patients. Fewer patient falls, skin tears, pressure ulcers, and improved mobility and function lead to significant savings for hospitals and improve patient experience and satisfaction. The benefits of fewer HCW injuries, improved job satisfaction, and decreased overall work injury costs have potentially positive long-term implications for HCW retention, satisfaction, and recruitment for health care organizations.

Despite the prevalence and cost of WMSDs associated with manual patient handling, there is no federal SPHM standard. Several efforts to pass federal legislation have been attempted and currently there only nine states have their own unique SPHM legislation. In lieu of federal SPHM regulation, the American Nurses Association (ANA) Safe Patient Handling and Mobility: Interprofessional National Standards is considered the gold standard for SPHM programs in the US.

Despite 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.

Internal barriers or factors that hinder implementation and sustainability of successful SPHM programs in acute and long-term care are well defined and related to patient, worker, technology, and situational/organizational factors. These must be identified and addressed if a program is to be effective and sustainable.

Some of the internal barriers identified in this paper are influenced by external drivers which must be addressed if SPHM is be accepted as a standard of care in US thereby protecting the current and future health care work force and assisting to facilitate better patient outcomes thus, positively impacting economic and quality indicators for health care organizations.

Drivers that influence adoption and sustainability of SPHM into health care organizations (illustrated in Figure 15) are:

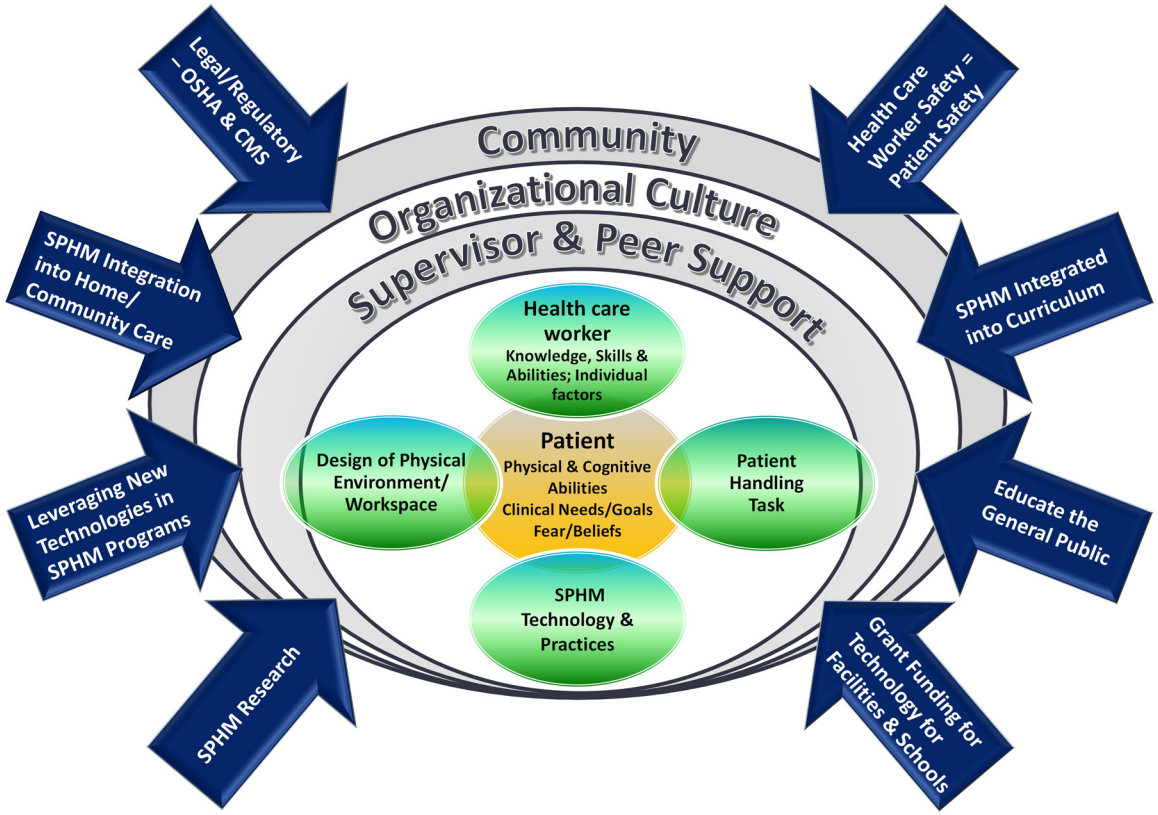
- The need for national SPHM regulation, e.g., a federal standard enforced by OSHA and CMS.
- Embracing worker and patient safety: Promoting SPHM as a critical tool in creating a health care safety culture in the US.
- Improving access to SPHM technology in home care settings and education of community health care providers.

- Integrating evidence based SPHM education and training into health care student curriculum in the US.
- Using technology, e.g., sensors, to promote HCW and patient safety within SPHM programs.
- Educating the general public about the benefits of SPHM design in the environment of care, technology, and practices.
- Increasing funding for SPHM related research by NIOSH.
- Activity by OSHA to support a grant system for access to SPHM technology by health care facilities and health care schools, update and expand SPHM resources, improve recordkeeping for MSDs, and expand knowledge of OSHA investigators related to SPHM best practices.

Figure 15

Recommendations to move SPHM forward in US health care across the continuum – A Systems Approach

Source: L. Enos, HumanFit, LLC. Reproduced with permission



Appendix A: Illustrative Examples 2 and 3

Life's learnings are often best conveyed through the telling of stories, sharing real life experiences. The following are two more illustrative examples are stories of patient handling related events in which one of our authors was involved at various times.

Illustrative Example #2: My Personal Story

In 2008, I had a skiing accident that resulted in the need for cervical spinal surgery including having instrumentation added to the spine. In 2014, I aggravated that injury, requiring additional surgery which was planned for August 14, 2014. Upon admission, I shared a room with a male patient who had surgery a day before me. I spoke with him and his wife before I was brought in for surgery. He had several vertebrae fused and was in significant pain early in the day but had been successfully ambulated. The room was equipped with a ceiling lift as can be seen in the photo below. It had an "H" ceiling rail configuration that allowed fairly complete room travel. The curtain needed to be positioned out of the way (Figure 1).

Figure 1

Ceiling Lift, Sling and Support Configuration

I was sent for surgery later in the day, returning to the room in the evening. Around 4 am, a nurse came in and provided medication to my roommate. It was also decided to take him to the toilet. She asked if he would be able to use the walker. He was uncertain. She decided to assist him in getting to the toilet with the use of a walker. He was close to my weight, approximately 200 pounds. His bed was by the window with my bed closer to our room door and the toilet room.

The nurse was successful in assisting him to the toilet using the walker, asking him to call for her when he was ready to be helped up and out. She responded when called and was able to get him part way through the bathroom door when he started to fall. She yelled for assistance, but none came for the first couple of minutes. I was awake, nearer to the room door, and called out along with using my call button. Another nurse responded within a minute or so. Both nurses struggled mightily to get my roommate through the door, across the room, and back into bed. All were visibly overexerted and shaken by this incident which was close to resulting in a fall.

What could have been done differently? Figure 2 shows the ceiling lift and bathroom frame interface. While the room had a ceiling lift, it did not extend into the bathroom. This would preclude its use for the full transfer into and out of the bathroom. If the ceiling lift had extended into the bathroom, a walking harness could have been used to support a patient who is weight bearing to ambulate (Figure 3). Alternatively, a non-powered stand assist device would likely have enabled the transfer to be done safely by one nurse (Figure 4).

Figure 2

Ceiling Lift and Bathroom Frame interface

Figure 3

A ceiling lift with ambulation harness

Figure 4

A non-powered stand assist transfer device

Reference: Personal story provided by Colin J. Brigham, Past President of the Association of Safe Patient Handling Professionals (ASPHP) in an ASPHP webinar on March 22, 2017.

Illustrative Example #3: Patient Handling Incident Investigation

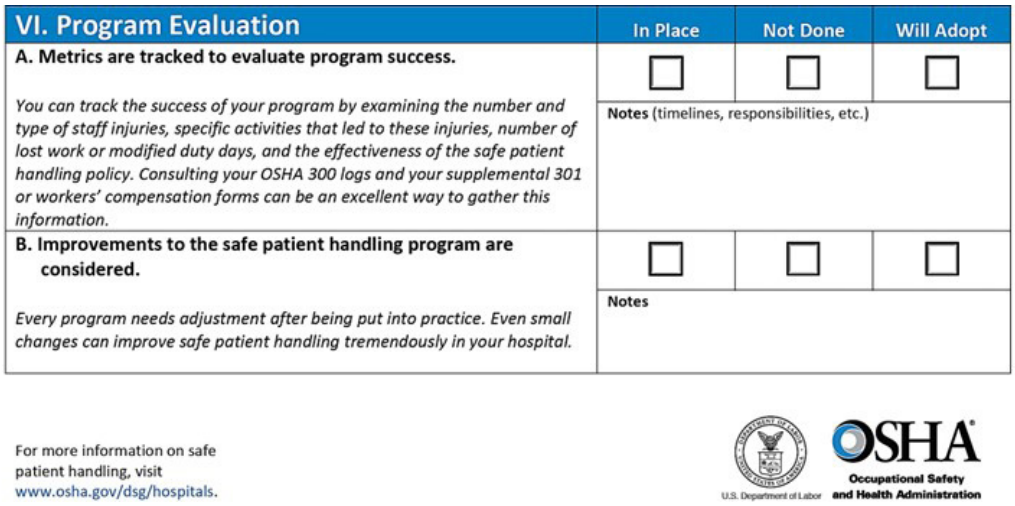
One critical component in preventing patient handling (PH) incidents is to learn from prior ones. As an occupational and environmental health and safety (OEHS) professional who has dealt with health care facilities for over 30 years at well over 100 facilities, I have seen the lack of effective PH incident investigation processes as a major deterrent to having an effective safe patient handling and mobility (SPHM) program.

Figure 1 below is a snapshot of the program evaluation section of the OSHA Safe Patient Handling Program Checklist. This section specifically addresses incident investigation and response, which OSHA and others term hazard abatement. The prior sections of this checklist address other program needs.

OSHA, the Joint Commission (TJC), THE Center for Medicare and Medicaid Services (CMS), and many state departments of workers' compensation require that incident investigations be performed under certain circumstances. One difficulty is that those involved in performing the investigations don't know what questions to ask. They often haven't been trained in incident investigation itself or the specific questions to ask.

Figure 1

OSHA SPHM Program Evaluation



VI. Program Evaluation	In Place	Not Done	Will Adopt
A. Metrics are tracked to evaluate program success. *You can track the success of your program by examining the number and type of staff injuries, specific activities that led to these injuries, number of lost work or modified duty days, and the effectiveness of the safe patient handling policy. Consulting your OSHA 300 logs and your supplemental 301 or workers' compensation forms can be an excellent way to gather this information.*	☐	☐	☐
	Notes (timelines, responsibilities, etc.)		
B. Improvements to the safe patient handling program are considered. *Every program needs adjustment after being put into practice. Even small changes can improve safe patient handling tremendously in your hospital.*	☐	☐	☐
	Notes		

An incident investigation should be effective, efficient, and exemplary (E3). It needs to go beyond asking what happened and determining why it happened. The National Safety Council and others have guides for performing accident/incident investigations. A common term used is to do a root cause analysis.

The investigation form/format should ask detailed questions specific to typical causal factors of patient handling-related injuries. It should ask what happened, where it happened, was a mobility assessment performed, what did it prescribe for equipment and practices to be used, whether they used and the reasons why if not, had worker training been provided, and many more questions. The goal is fact finding, not fault finding.

The form/format should be made specific to the facilities where the employees work. Types of patient handling equipment available for use could be listed. The form could be incorporated as part of the electronic medical record.

The investigation is part of an overall process for protection of your care providers and recipients. This process consists of the full reporting, recording, and responding to occupational injuries, illnesses, and incidents. Using it will result in a strong return on investment (ROI).

The results of investigations need to be incorporated into a performance improvement plan, abating hazards, improving protection, and improving quality of care.

Reference: Personal experience provided by Colin J. Brigham, Past President of the Association of Safe Patient Handling Professionals (ASPHP).

Source: Safe Patient Handling Program Checklist OSHA 2013 https://www.osha.gov/sites/default/files/3.2_SPH_checklist_508.pdf

Appendix B: How Much Patient Weight Can a Health Care Worker Lift Manually?

One way to illustrate how much force an 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 (Wiggermann et al., 2021; Kotowski et al., 2013; Callison and Nussbaum, 2012, Pompeii, 2009, McCoskey, 2007).

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

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

So, is there a safe lift limit for manually lifting patients?

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), workers are at an increased risk of low back injury (Waters et al., 1993). Shear force limits are recommended not to exceed 1000 N for occasional exposure to shear (under 100 loadings/day), and 700 N for frequent exposure to shear (100–1000 loadings per day) (Gallagher and Marras, 2012).

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).

Based on this research, 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:

- Patient can follow directions and is not combative/unlikely to move suddenly during the task
- Patient is kept close to the HCW's body.
- Lift is smooth and slow, i.e., there are no unexpected or sudden movements
- HCW does not have to twist.
- HCW does not have to reach with extended arms
- Shift worked is no longer than eight hours (Waters, 2007).

In reality, very 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:

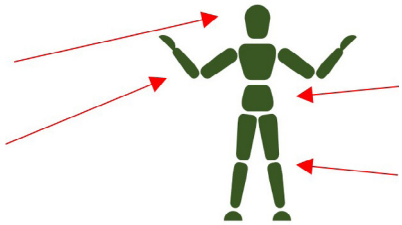
- If two HCWs are helping a patient who weighs 180 lbs. to stand from a chair and the patient can only partially assist by supporting about half of their own body weight, the HCWs would have to support 90 lbs. of weight. That is 45 lbs. each, which exceeds the recommended 35-lb. limit.

- Even if four 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).

How much does each body segment weigh (approximately) on a patient weighing 200 lbs.? (Krishnan et al., 2016; Plagenhoef et al., 1983; Chaffin, 2006).

Head – 8% = 16 lbs.

One Arm – 5.3% = 10.6 lbs.



Whole Trunk – 54% = 108 lbs.

One Leg - 17.5% = 35 lbs.

Other recommended safe weight limits for specific patient handling tasks

- Logrolling or turning a patient is 78 lbs. (35 kg) by one person and 156 lbs. (70 kg) by two 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, such as:

  - Not working for longer than one 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 two minutes or weighing more than 8 lbs. with both hands for longer than one 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, they should not exceed 245 N at a frequency of 30 minutes for female workers (Snook and Ciriello, 1991; Zhou and Wiggerman, 2019).

Appendix C: SPHM Legislation and Guidelines

International, National, and State Agencies engaged in Safe Handling and Mobility of Patients and Residents (not all inclusive).

Agency	What They Do
United States	
OSHA	Occupational Safety and Health Administration (OSHA): OSHA has published guidelines for preventing musculoskeletal disorders (MSDs) in health care through safe patient handling programs. Although these guidelines are not specific standards, they provide recommendations for preventing injuries related to patient handling. • Safe Patient Handling Resources – https://www.osha.gov/healthcare/safe-patient-handling – https://www.osha.gov/sites/default/files/3.2_SPH_checklist_508.pdf – Guidelines for Nursing Homes Ergonomics for the Prevention of Musculoskeletal Disorders 3182-3R 2009. https://www.osha.gov/sites/default/files/publications/final_nh_guidelines.pdf • OSHA and Worker Safety Handling with Care Practicing Safe Patient Handling. EC NEWS. August 2017. https://www.jointcommission.org/-/media/jcr/jcr-documents/about-jcr/osha-alliance/pages_from_ecn_20_2017_08-2.pdf • Worker Safety in Hospitals webpage. https://www.osha.gov/hospitals • Incident investigation Guide for Employers https://www.osha.gov/sites/default/files/IncInvGuide4Empl_Dec2015.pdf • The Importance of Root Cause Analysis During Incident Investigation https://www.osha.gov/sites/default/files/publications/OSHA3895.pdf

NIOSH	The National Institute for Occupational Safety and Health (NIOSH) provides research-based guidance on safe patient handling and focuses on reducing work-related injuries among health care workers. They offer resources such as the NIOSH Patient Handling and Movement Assessment Tool and publications on safe patient handling practices. • Safety Culture in Health Care Settings. https://www.cdc.gov/niosh/learning/safetyculturehc/healthcare-workers.html • Can Exoskeletons Reduce Musculoskeletal Disorders in Healthcare Workers? https://blogs.cdc.gov/niosh-science-blog/2020/11/04/exoskeletons-hc/ • Critical review on applications and roles of exoskeletons in patient handling. (May 2022). https://www.sciencedirect.com/science/article/pii/S0169814122000312?via%3Dihub • National Occupational Research Agenda (NORA). https://www.cdc.gov/nora/default.html • NIOSH Fast Facts on Home Health Care Workers. https://www.cdc.gov/niosh/docs/2012-120/pdfs/2012-120.pdf?id=10.26616/NIOSHPUB2012120 • The Unique Occupational Environment of the Home Health Care Worker. https://blogs.cdc.gov/niosh-science-blog/2020/09/29/hhcws/ • NIOSH Health Care and Social Assistance Program (HCSA) • Safe Patient Handling Nursing School Curriculum Module. National Institute for Occupational Safety and Health (NIOSH). 2009. http://www.cdc.gov/niosh/docs/2009-127/
CDC	The Centers for Disease Control and Prevention (CDC) offers guidelines for preventing health care-associated infections (HAIs) and ensuring patient safety in health care facilities. Though not specifically focused on safe patient handling, these guidelines include recommendations for proper hand hygiene, use of personal protective equipment (PPE), and infection prevention measures. https://www.cdc.gov/niosh/topics/safepatient/ https://www.cdc.gov/hai/patientsafety/patient-safety.html
ANA	American Nurses Association (ANA) • Safe Patient Handling and Mobility: Interprofessional National Standards Across the Care Continuum. 2nd edition. Silver Spring, MD, 2021. • Implementation guide to safe patient handling and mobility provide guidance on implementing safe practices to reduce the risk of patient and health care worker injuries. https://www.nursingworld.org/
ASPHP	The Association of Safe Patient Handling Professionals (ASPHP) is a professional association that focuses on advancing safe patient handling practices. The mission of the Association of Safe Patient Handling Professionals (ASPHP) is to improve the safety of caregivers and their patients by advancing the science and practice of safe patient handling and mobility. Inherent in our mission statement is the close link between care giver and care recipient (patient) safety and well-being. They provide resources, recommendations, and training to improve the safety of caregivers and their patients by advancing the science and practice of safe patient handling." https://asphp.org/ • 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. https://asphp.org/wp-content/uploads/2023/03/SPHM-Curriculum-White-Paper-March-2023.pdf

AIHA	• Quick Tips for Safe Patient Handling and Mobility. American Industrial Hygiene Association (AIHA) and The Occupational Safety and Health Administration (OSHA). 2014. See *Appendix H*. English https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/OSHA-Quick-Tips-on-SPHM_Final-Mar2014.pdf Spanish https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/Quick-Tips-on-SPHM-Spanish-OSHA-review-6-27-14_FINAL.pdf • Home Health Care Aides: Occupational Health and Safety Challenges and Opportunities: A White Paper. AIHA in collaboration with HFES. https://www.hfes.org/Portals/0/Documents/Home-Health-Care-Aides-Occupational-Health-and-Safety-Challenges-and-Opportunities-White-Paper.pdf
Human Factors and Ergonomics Society (HFES) www.HFES.org	The goal of ergonomics and human factors is to reduce human error, increase productivity, and enhance safety and comfort with a specific focus on the interaction between a human and the thing of interest (i.e., process, product, system). The field is a combination of numerous disciplines, such as psychology, sociology, engineering, biomechanics, industrial design, physiology, anthropometry, interaction design, visual design, user experience, and user interface design, so the exact definition of HF/E varies. In the field of human factors and ergonomics, safe patient handling refers to the careful and ergonomic movement and transfer of patients to prevent injuries to both patients and health care workers. (HFES, 2024) https://www.hfes.org/About-HFES/What-is-Human-Factors-and-Ergonomics • Home Health Care Aides: Occupational Health and Safety Challenges and Opportunities: A White Paper. AIHA in collaboration with HFES. https://www.hfes.org/Portals/0/Documents/Home-Health-Care-Aides-Occupational-Health-and-Safety-Challenges-and-Opportunities-White-Paper.pdf • Prevention of Musculoskeletal Disorders in Health Care Workers: Safe Patient Handling and Mobility Programs. Policy Statement (2023). https://www.hfes.org/Portals/0/Safe%20Patient%20Handling%20and%20Mobility.pdf
Accreditation Agencies	• Det Norske Veritas (DNV) • Health Care Facilities Accreditation Program (HFAP) • Utilization review accreditation commission (URAC) • Commission on Accreditation of Rehabilitation Facilities (CARF International) and The Joint Commission (TJC) are accrediting organizations that are recognized as deeming authorities from the Centers for Medicaid and Medicare Services (CMS). However, they all do different things and are enforced in different ways. • OSHA and Worker Safety Handling with Care Practicing safe patient handling. EC NEWS August 2017. https://www.jointcommission.org/-/media/jcr/jcr-documents/about-jcr/osha-alliance/pages_from_ecn_20_2017_08-2.pdf • The Joint Commission has no specific standards related to SPHM programs, but through its Environment of Care standard: EC.02.06.05 #1, it does require facilities that are building new edifices 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, such construction should abide by the PHAMA (Matz, 2019). *See below*. In 2012, TJC published "Improving Patient and Worker Safety: Opportunities for Synergy, Collaboration, and Innovation," which informs health care organizations about the risks of manual patient handling to HCWs and patients and how SPHM programs to decrease these risks and facilitate safer patient care. https://www.patientcarelink.org/wp-content/uploads/2021/02/6-TJC-ImprovingPatientAndWorkerSafety-Monographpdf.pdf • DNV vs. HFAP vs. Joint Commission: What Do They Do For Hospitals? https://vanguard-fire.com/dnv-vs-hfap-vs-joint-commission/

CMS	Centers for Medicare and Medicaid Services (CMS) The U.S. Center for Medicare and Medicaid Services (CMS) had an interagency agreement with USDOL OSHA issued in August 2012. It was issued to address: developing a health care injury and illness factbook, health and safety management systems, and safe patient handling. Several products were developed as a result of that agreement, benefiting both care providers and care recipients. Since 2017, CMS has had a Quality Payment Program (QPP) that includes a Merit-based Improvement System (MIPS) that can provide a wide range of penalties and/or incentives. Patient handling-related metrics can be part of this system. • Participation Options Overview. https://qpp.cms.gov/mips/overview
FDA	Food and Drug Administration • Patient Lifts Safety Guide (PDF). http://www.fda.gov/downloads/MedicalDevices/ProductsandMedicalProcedures/HomeHealthandConsumer/HomeUseDevices/UCM386178.pdf • General Hospital Devices and Supplies – Patient Lifts. http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/GeneralHospitalDevicesandSupplies/ucm308622.htm
ANSI	ANSI/ASSP Z10 Occupational Health and Safety Management Systems 2017 Provide guidelines for effective safety and management programs. Elements in these standards may be applied when establishing any safety and health program, including SPHM. • https://www.assp.org/standards/standards-topics/osh-management-z10
International	
The European Agency for Safety and Health at Work	European Safe Handling Recommendations: The European Agency for Safety and Health at Work has established guidelines for safe patient handling across European countries. These recommendations focus on risk assessment, prevention measures, and training programs for health care professionals. • https://osha.europa.eu/en • E-fact 28 - Patient handling techniques to prevent MSDs in health care https://osha.europa.eu/sites/default/files/E-fact_28_-_Patient_handling_techniques_to_prevent_MSDs_in_health_care.pdf

Australian/ New Zealand Standards	This organization has released standards related to safe patient handling and mobility. These standards provide guidance on equipment requirements, staff training, and risk management processes. Both countries have their own independent standards. **Australia** National Code of Practice for the Prevention of Musculoskeletal Disorders from Performing Manual Tasks at Work. https://www.safeworkaustralia.gov.au/system/files/documents/1702/nationalcodeofpractice_preventionofmusculoskeletaldisordersfromperformingmanualtasksatwork_2007_pdf.pdf Australian Nursing and Midwives Federation Safe Patient Handling https://www.anmfvic.asn.au/~/media/files/anmf/guidancenotes-policies-positionstatements/safe%20patient%20handling.pdf#:~:text=Safe%20Patient%20Handling%3A%20refers%20to,a%20nurse%2C%20midwife%20or%20carer. *Resources* Worksafe Victoria Transferring People Safely https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Transferring-people-safely-handbook-2009-07.pdf A Guide to Designing Workplaces for Safer Handling of People https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Designing-workplaces-for-safer-handling-of-people-guide-2007-09.pdf **New Zealand** Code of Practice for Manual Handling https://www.worksafe.govt.nz/dmsdocument/971-code-of-practice-for-manual-handling *Resources* Worksafe New Zealand Moving and Handling People in the Health Care Industry https://www.worksafe.govt.nz/dmsdocument/3726-moving-and-handling-people-in-the-healthcare-industry Accident Compensation Corporation The Moving and Handling People: The New Zealand Guidelines. https://www.acc.co.nz/assets/provider/1d98940288/acc6075-moving-and-handling-people-guidelines.pdf

Canada	This association has developed Best Practice Guidelines for safe patient handling in Canada. These guidelines outline strategies for assessing patient needs, selecting equipment, and implementing safe handling practices. There are many other Canadian government-related entities that have published guidelines (e.g., BC, Nova Scotia, Ontario, etc.). Canadian Centre for Occupational Health and Safety https://www.ccohs.ca/oshanswers/hsprograms/patient_handling.html Worksafe BC Patient Handling https://www.worksafebc.com/en/health-safety/industries/health-care-social-services/topics/patient-handling?origin=s&returnurl=https%3A%2F%2Fwww.worksafebc.com%2Fen%2Fsearch%23sort%3DRelevancy%26q%3Dpatient%2520handling%2520%26f%3Alanguage-facet%3D%5BEnglish%5D&highlight=patient%20handling Registered Nurses Association of Ontario (RNAO) Guide to Implementation of Best Practice Guidelines (2nd ed.) https://rnao.ca/sites/rnao-ca/files/RNAO_ToolKit_2012_rev4_FA.pdf RNAO Leading Change Toolkit https://rnao.ca/leading-change-toolkit
United Kingdom (UK) Health and Safety Executive	This organization published guidance on Safe Patient Handling and Mobility (SPHM) to help employers meet the 'Manual handling - Manual Handling Operations Regulations 1992' which includes gen industry and HC Inc. patient handling. Moving and handling in health and social care. https://www.hse.gov.uk/healthservices/moving-handling.htm

ISO	The International Organization for Standardization (ISO) www.iso.org There are several ISO standards related to health care and ergonomics that can help inform safe patient handling practices and one technical report specific to patient handling. Some relevant standards and the technical report include: • 10535:2021 Assistive products — Hoists for the transfer of persons — Requirements and test methods • 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 patient lifts and slings, thus, manufacturers of such devices should at a minimum, meet ISO 10535 design and testing criteria. • ISO 9241-210:2019 - Ergonomics of human-system interaction: Part 210 - Human-centered design for interactive systems: This standard provides guidance on the human-centered design process for interactive systems, including health care technology. • ISO 9241-11:2018 - Ergonomics of human-system interaction: Part 11 - Usability: This standard outline general principles and guidelines for usability in interactive systems, which can indirectly contribute to safe patient handling through design considerations. • ISO 14971:2019 - Medical devices - Application of risk management to medical devices: This standard provides guidance on the application of risk management to medical devices. It can indirectly address safe patient handling by considering potential risks associated with medical devices used during patient handling. • 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 The purpose of this document is to provide organizations with requirements to deliver high quality health care and specifies requirements for management systems for quality in health care organizations when an organization desires to: a. demonstrate its ability to consistently meet service user, stakeholder, and applicable statutory and regulatory requirements; b. enhance service user experience during the continuum of care and continually improve health care quality; and c. create and maintain processes that ensure timely, safe, effective, efficient, equitable, and people-centred care. The requirements of this document are based on recognized best practices and are intended to be applicable to any organization providing health care services, regardless of its type, size, or the services it provides. • 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.

United States	*Active State Laws on Safe Patient Handling* Source: Safe Patient Handling and Mobility (SPHM) | NIOSH | CDC. • 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 • 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/ilcs/ilcs5.asp?ActID=1225&ChapterID=21 • Illinois Public Act 097-0122 – Illinois General Assembly – Full Text of Public Act 097-0122 (ilga.gov) or Public Act 0122 97TH GENERAL ASSEMBLY. https://www.ilga.gov/legislation/publicacts/97/097-0122.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/bills/text.php?number=SF3035&session_year=2023&session_number=0&version=latest • 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 Senate Bill 1758 – https://legiscan.com/NJ/bill/S1758/2022 • New York A 2180 – https://asphp.org/wp-content/uploads/2011/05/New-York-Legislative-Update.pdf • New York Section 20, Article 29 – Microsoft Word – NEW YORK-04-07-14 (asphp.org) • Ohio HB 67 signed into law on March 21, 2006, Section 4121.48. Repealed effective June 20, 2015. • Rhode Island H 7386 signed into law July 2007 - http://webserver.rilin.state.ri.us/BillText06/HouseText06/H7386.pdf • Rhode Island S 2760 – http://webserver.rilin.state.ri.us/BillText06/SenateText06/S2760A.pdf • Texas SB 1525. June 17, 2005 – https://capitol.texas.gov/tlodocs/79R/billtext/html/SB01525F.htm • Texas H 1829 – https://asphp.org/wp-content/uploads/2011/05/Texas-Legislative-Update.pdf • Washington ESHB 1672 signed into law on March 2006 - https://lawfilesext.leg.wa.gov/Biennium/2005-06/Pdf/Bill%20Reports/House/1672-S.HBR.pdf

Other Resources:	
	AASPHM: Health Care Recipient Sling and Lift Hanger Bar Compatibility Guideline https://asphp.org/wp-content/uploads/2011/05/AASPHM-Sling-Hanger-Bar-Guidelines-2016.pdf Association of Occupational Health Professionals in Healthcare (AOHP) Resource Guide • Beyond Getting Started Safe Patient Handling 2020 (4th edition) https://aohp.org/aohp/Portals/0/Documents/ToolsForYourWork/BGSpublication/20-06%20BGS%20Safe%20Patient%20Handling.pdf Association of periOperative Nurses (AORN) • Guideline Implementation: Safe Patient Handling and Movement – updated 2019 https://www.aorn.org/ (Note: need to register on this site for access to the information provided on safe patient handling). The National Association of Orthopedic Nurses (NAON) • Safe Patient Handling and Mobility Algorithms for the Adult Orthopaedic Patient - updated 2016 http://www.orthonurse.org/ The American Physical Therapy Association (APTA) • 2019 position statement on the role of a physical therapist in SPHM programs https://www.apta.org/ The American Occupational Therapy Association (AOTA). • 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 Mobility is Medicine (MiM) https://mobilityismedicine.org/ International Journal of SPHM and Falls Management • This is the only peer reviewed journal worldwide dedicated to SPHM https://sphmjournal.com/ Dept. of Veterans Affairs Safe Patient Handling and Mobility (SPHM) https://www.publichealth.va.gov/employeehealth/patient-handling/ Numerous SPHM Guidelines including: • Safe Patient Handling and Mobility (SPHM) Solution 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 • Guidelines and required ceiling lift checklists Office of Construction and Facilities Management Technical Information Library (TIL). https://www.cfm.va.gov/til/

Standards and Guidelines related to Building Design, Accessibility and SPHM	
	Patient Handling and Mobility Assessments: A White Paper (2nd ed. 2019) (PHAMA) https://www.fgiguidelines.org/resource/patient-handling-and-mobility-assessments-2nd-ed/ The Facility Guidelines Institute (FGI) publishes three 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. https://www.fgiguidelines.org/guidelines/editions/ 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 HCW safety. To date, 43 states have adopted these guidelines for use in their regulation of the licensing or construction of health care and residential care facilities. To provide architects, planners, state regulators and health care organizations guidance on about 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. Americans with Disabilities (ADA) Access to Medical Care for Individuals with Mobility Disabilities—Use of SPHM Equipment in Clinics. Department of Health and Human Services Office for Civil Rights (HHS OCR), 2010. https://www.ada.gov/resources/medical-care-mobility/ 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. ADA statutes require medical care providers in offices, clinics, and similar locations to make their services available in an accessible manner. 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 medial 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. 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 Safety Risk Assessment (SRA) is a tool to assist organizations and design professionals with incorporating design practices that reduce common risks found in health care environments. The SRA targets six areas of safety (patient handling, infections, falls, medication errors, security, and injuries of behavioral health) as required in the Facility Guidelines Institute (FGI) design and construction guidelines (Center for Health Design, 2017).

Appendix D: A Brief History of SPHM in the US

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

This belief was illustrated in an 1898 standard nursing text by Isabel Hampton who wrote "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" (Nelson, 2006).

The use of good body mechanics to protect nurses and patients from injury when lifting and mobilizing patients first appeared at the end of World War II. 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) 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 manual lift and move patients who weight was 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. 1982).

The application of ergonomics principles and use of SPHM technology to address injuries from manual patient handling began in the 1990s. In the same period, another popular approach to addressing manual patient handling injuries in the US was to reduce the physical workload of nurses through the use of lift teams. 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.

OSHA also played a role in moving SPHM forward in the 1990s when they cited Beverly Enterprises Inc., (US largest nursing home chain) under the General Duty Clause, in 1991, alleging 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 was not 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. See page 19.

As the relationship between biomechanical loading of the spine that occurs when manual lifting patients became evident, the use of powered lift equipment to move patients was recommended to minimize risk of WMSDs to 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 withing the VHAs 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 first state to pass SPHM legislation in 2005. Eight other states passed SPHM legislation and two passed resolutions to provide health care 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

What Does the Term SPHM Mean?

The phrase "safe patient handling and movement" was coined 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 publication of the 2013 American Nurses Association (ANA) *Safe Patient Handling and Mobility: Interprofessional National Standards Across the Care Continuum*, drove the initiative 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 is consistent with the focus/aligns with the current 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).

effective SPHM programs in 2006.

- In 2007, research by Dr. Thomas Waters detailed the amount of patient weight that could be lifted safely by a single caregiver under ideal conditions, answering the question of "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 health care facilities. This guide was updated in 2019 and incorporated design criteria for patients of size (bariatrics) and facilitating patient mobilization.
- "Beyond Getting Started: A Resource Guide for Implementing a Safe Patient Handling Program in the Acute Care Setting" was published in 2011 by the Association of Occupational Health Professionals, in collaboration with OSHA. The latest update of this guide was in 2020.
- In 2011, the Association of Safe Patient Handling Professionals was formed. This non-profit membership organization initiated the SPHM Professional Certification program. This program is now managed by an independent credentialing organization, the CSPHP.
- 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 to be the benchmark or gold standard for SPHM in the US.

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 health care continuum in the US.

Information about these efforts and about SPHM efforts in other countries can be found in Legislative Aspects of Safe Patient Handling and Patient Mobility Standards and Legislation found on page 36 and in *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 and 2), it wasn't 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 a hydraulic pump, but in 1982 'The Danish Hoist,' the first all-electric floor hoist operated via electric linear actuator was introduced (Mechan and Wright, 2015). Government focus on lifting and mobility equipment and services in the social sector and health care in Denmark and Sweden assisted designers and manufacturers in these countries to not only improve the functionality of floor lifts, but also develop first standing raising aids, sit-to-stand floor lifts, and ceiling/overhead lifts (Mechan and Wright, 2015). Power floor lifts, sit-to-stand devices, and ceiling lifts have been used in US health care 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 life" in 1898. Source: The National Library of Medicine

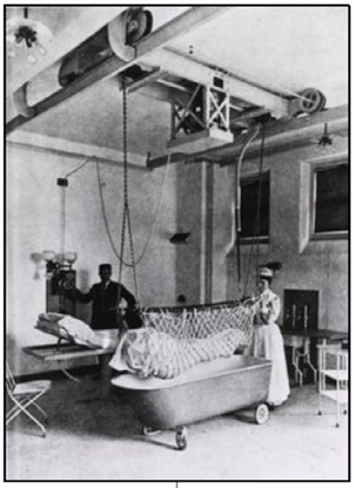


Figure 2

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 several clinical staff' (Mechan and 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 and 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 (Lloyd and Baptiste, 2006; Hwang et al., 2018; Wiggermann et al., 2021).

Figure 7

Drawsheet used to move patient in bed

Non-Powered Transfer Aids

John Thornton Posey started developing mobility 'aiding devices' in 1937 and 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, 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 la., 1999; Zhuang et al., 1999; Tang et al., 2018; Rockefeller and Proctor, 2011; Miller et al., 2017).

Figure 8

Air assist mat used to transfer a patient from one surface to another

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 by Björn Ross and his company, Romedic, from 1984 -2006.

Appendix E: SPHM Myths and Facts

SAFE PATIENT HANDLING & MOBILITY

Understanding the benefits of a comprehensive SPHM program

Nurses and other health care workers **ROUTINELY SUFFER** debilitating and often career-ending musculoskeletal disorders (MSDs)

65% reported that their risk from lifting, repositioning patients, and falls are 'significant' health concerns

58% reported experiencing pain from MSD's at work

More than any other work-related injury or illness, MSDs are responsible for lost work time, long-term medical care and permanent disability among health care workers.

THE BENEFITS OF SPHM

The Facility Guidelines Institute outlines these benefits of SPHM in "Patient Handling and Movement Assessments: A White Paper":[3]

- Improved quality of care
- Improved patient mobility
- Fewer patient falls and pressure ulcers
- Increased patient satisfaction
- Increased health care worker satisfaction
- Savings due to reductions in workers' compensation, patient falls and pressure ulcers, and employee turnover

COMMIT TO A CULTURE OF SAFETY AND DEVELOPING A SPHM PROGRAM IN YOUR FACILITY

SPHM EQUIPMENT

Manual patient handling is hazardous for both health care workers and patients. The most common patient-related tasks that lead to injury are lifting, repositioning and transferring.[2]

Lifting

Comprehensive safe patient handling and mobility (SPHM) programs drastically reduce the risk of injury for health care workers and patients while improving the quality of care. The use of technology, especially lifting devices, is critical to the success of these programs.

Repositioning

Transferring

Additional Resources

- ANA SPHM Education Video: https://www.nursingworld.org/practice-policy/work-environment/health-safety/handle-with-care/
- Association of Safe Patient Handling Professionals (ASPHP) – https://asphp.org/
- Facilities Guideline Institute - https://fgiguidelines.org/
- International Organization for Standardization – ISO 10535: 2021 Assistive products: Hoists for the transfer of persons – Requirements and test methods – https://www.iso.org/obp/ui/#iso:std:iso:10535:ed-3:v1:en
- Occupational Safety and Health Administration (OSHA) Safe Patient Handling - https://www.osha.gov/hospitals/patient-handling
- The Joint Commission – Improving Patient and Worker Safety 2012- https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/patient-safety/tjc-improvingpatientandworkersafety-monograph.pdf
- U.S. Department of Veterans Affairs Safe Patient Handling and Mobility Resources - https://www.publichealth.va.gov/employeehealth/patient-handling/

ANA AMERICAN NURSES ASSOCIATION

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3. The Facility Guidelines Institute. (2019). Patient handling and mobility assessments, 2nd Edition.
4. American Nurses Association. (2021). Safe Patient Handling and Mobility Interprofessional National Standards Across the Care Continuum, 2nd Edition.

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The Myths and Realities of Patient Handling[4]

MYTH Proper body mechanics (including the use of gait belts) prevent patient handling and nurse injuries.

REALITY Decades of research shows that "proper" body mechanics are not an effective way to reduce injuries. Do not manually lift.

MYTH Manual lifting is safer and more comfortable for patients.

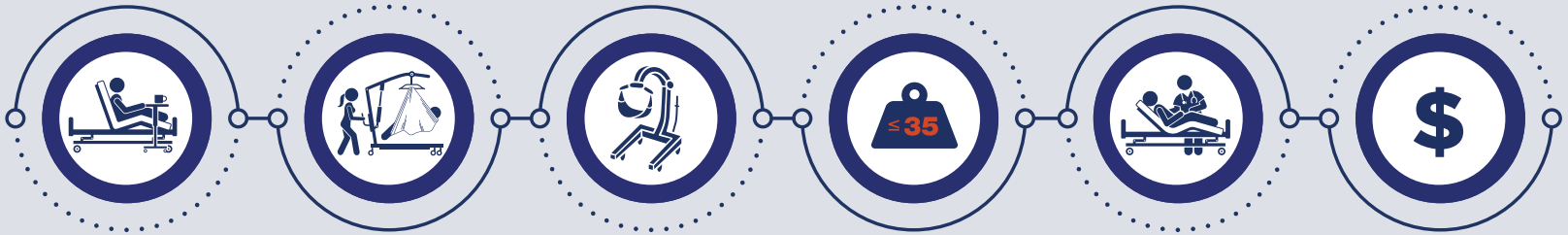
REALITY Manual lifting can result in skin tears, falls and injuries to patients.

MYTH Using SPHM technology feels impersonal.

REALITY Health care workers can effectively use SPHM technology while incorporating the professional values of respect, dignity and caring.

MYTH Health care workers who are physically fit are less likely to be injured.

REALITY Good health and strength may put health care workers at increased risk because their peers are more likely to seek their assistance when manually lifting patients.



MYTH It's much faster to move a patient manually than to take the time to get SPHM technology.

REALITY If SPHM technology is conveniently located, accessing it will not take a long time. It is often more time-consuming to assemble a team of colleagues to manually lift a patient. Institute for Occupational Safety and Health (NIOSH) recommends lifting no more than 35 pounds under the best ergonomic conditions.

MYTH Smaller, lighter patients do not warrant use of SPHM technology.

REALITY ANA recommends policies and practices that lead to the elimination of all manual lifting. National Institute for Occupational Safety and Health (NIOSH) recommends lifting no more than 35 pounds under the best ergonomic conditions.

MYTH SPHM technology is not affordable.

REALITY Savings associated with reduced health care worker and patient injuries far outweigh the costs of the equipment.

[4] *American Nurses Association. (2021). Safe Patient Handling and Mobility Interprofessional National Standards Across the Care Continuum, 2nd Edition.*

INTERPROFESSIONAL NATIONAL STANDARDS AND IMPLEMENTATION GUIDE

ANA led the development of the Safe Patient Handling and Mobility Interprofessional National Standards. The goal of this publication is to establish a uniform national foundation for SPHM in order to prevent injuries among health care workers and patients across the care continuum.

Appendix F: Examples of High-Risk Manual Patient Handling Tasks and Safer Solutions Using SPHM Technology

Source ASPHP, 2023.

More examples of SPHM Technology can be found in
Patient Handling and Mobility Assessments: A White Paper (2nd ed. 2019) (PHAMA)
https://www.fgiguidelines.org/resource/patient-handling-and-mobility-assessments-2nd-ed/

Appendix G: Selected Resources Related to Safety Culture and Change Management in Health Care

Safety Culture

The essential role of leadership in developing a safety culture. Sentinel Event Alert. The Joint Commission. Issue 57, March 1, 2017. https://www.jointcommission.org/sea_issue_57/

High Reliability in Health Care web page. The Joint Commission. https://www.jcrinc.com/what-we-offer/high-reliability/

Safety Systems for Individuals Served (SSIS) 2021. The Joint Commission.https://www.jointcommission.org/-/media/tjc/documents/standards/ps-chapters/cambhc_03a_siss_all_current.pdf

Leading a Culture of Safety: A Blueprint for Success (2017). American College of Healthcare Executives; The National Patient Safety Foundation's Lucian Leape Institute and The National Patient Safety Foundation at the Institute for Healthcare Improvement https://www.osha.gov/sites/default/files/Leading_a_Culture_of_Safety-A_Blueprint_for_Success.pdf

Safety Culture in Healthcare Settings CDC Course WB4450 – NIOSH Pub. No. 2023 – 135 (2023).The National Institute for Occupational Safety and Health (NIOSH) https://www.cdc.gov/niosh/learning/safetyculturehc/healthcare-workers.html

Culture of Safety. September 7, 2019. Agency for Healthcare Research and Quality (AHRQ). https://psnet.ahrq.gov/primer/culture-safety

High Reliability. Patient Safety Primer September 7, 2019. Agency for Healthcare Research and Quality (AHRQ). https://psnet.ahrq.gov/primer/high-reliability

TeamSTEPPS 3.0 (2023). Agency for Healthcare Research and Quality (AHRQ). https://www.ahrq.gov/teamstepps-program/index.html

High Reliability Organization Toolkit. Missouri Hospital Association. https://web.mhanet.com/media-library/high-reliability-organization-toolkit/

Organizational Safety Culture - Linking patient and worker. Occupational Safety and Health Administration (OSHA). https://www.osha.gov/healthcare/safety-culture

Creating a Culture of Safety in Nursing. American Nurses Association (ANA). https://www.nursingworld.org/resources/individual/nurse-managers/safety-in-nursing/

Culture of Safety Change Package: 2017 Update. Health Research & Educational Trust (May 2017). Chicago, IL: Health Research & Educational Trust. https://patientcarelink.org/wp-content/uploads/2018/03/2017-safety_culture_change_package.pdf

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Change Management

Psychology of Change Framework. (2018). Institute for Healthcare Improvement http://www.ihi.org/resources/Pages/IHIWhitePapers/IHI-Psychology-of-Change-Framework.aspx

EvidenceNOW Tools for Change. Content last reviewed January 2023. Agency for Healthcare Research and Quality (AHRQ) https://www.ahrq.gov/evidencenow/tools/index.html

The Leading Change Toolkit. (2024). Registered Nurses' Association of Ontario and Healthcare Excellence Canada. Provides current evidence base information and tools to help health care organizations and caregivers to successfully facilitate change when implementing patient and caregiver safety programs. https://rnao.ca/leading-change-toolkit

Facilitating Change webpage. (n.d.). Occupational Safety and Health Administration (OSHA). https://www.osha.gov/hospitals/facilitating-change

Change Management: Why It's So Important, and So Challenging, in Health Care Environments. (n.d.) Posted on September 20, 2021. https://www.hsph.harvard.edu/ecpe/change-management-why-its-so-important-and-so-challenging-in-health-care-environments/

Barrow JM, Annamaraju P, Toney-Butler TJ. **Change Management *(Healthcare-Related)*.** (n.d.) In: StatPearls. StatPearls Publishing, Treasure Island (FL); 2023. PMID: 2908381 https://www.ncbi.nlm.nih.gov/books/NBK459380/

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Swensen S, Pugh M, McMullan C, Kabcenell A. **High-Impact Leadership: Improve Care, Improve the Health of Populations, and Reduce Costs.** IHI White Paper. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2013. (Available at ihi.org)

Appendix H: AIHA and OSHA Alliance Quick Tips for SPHM

QuickTips

Developed by AIHA® in support of the OSHA Alliance

For Safe Patient Handling and Mobility *What to do today to protect worker health and prevent health hazards*	
What is the hazard?	• Care givers are at risk of developing work-related musculoskeletal disorders (WMSD) from the excessive physical demands of manually lifting/lowering, pushing/pulling, and/or supporting patients during the provision of care. • Tasks that may create a risk include: repositioning patients in bed; toileting; transferring from the bed to a chair, walker, or stretcher and back from these devices to the bed; balancing and supporting the weight of semi-ambulatory care recipients; and supporting the weight of body parts. • Care recipients (patients) may be at risk if job task requirements exceed the capabilities of the care givers. Patient harm from manual handling without the use of mechanical assists may include traumatic injury due to falls. Inability to properly handle patients without equipment may lead to chronic injuries such as bed sores, reduced mobilization, extended stay, and other hospital-acquired disability.
How do I know there is a hazard?	• Risk factors may include excessive force required to lift/push/pull patient weight, working in awkward postures, high frequency and long duration of efforts, and unexpected movement of the patient. An example of excessive force is lifting or supporting 35 or more pounds of patient weight, particularly when coupled with the presence of the other risk factors. In addition, working in areas where there is limited space for patient handling and/or equipment/aids to assist in patient handling creates the potential for harm.
Why should I care?	• The failure to use safe patient handling and mobility (SPHM) practices can result in significant harm to both care givers *and* care recipients. Consistent with the OSHA General Duty Clause and the Hippocratic Oath, employers should provide a workplace that is safe for employees *and* does not cause harm to the care recipients. Injury to both should be prevented.

What do I need to do?	• Know your patient's physical and mental ability to assist. Conduct and/or follow patient mobility assessments before performing any manual patient handling. • Be involved in the evaluation of patient handling equipment and practices. • Obtain training in safe patient handling practices. Be competent in the use of equipment. • Use the proper patient handling equipment, aids, and practices identified in the patient mobility assessment. • Make sure the equipment is readily available and in good condition before you attempt to move patients. • Be aware of and communicate changes in patient mobility. • When patient handling incidents occur, report them, record them, and get involved in identifying the root causes and suggested corrective actions.
When do I need to do it?	• Promptly report any equipment deficiencies or inadequacies, including incorrect types of equipment such as slings. • Continually evaluate conditions that may alter safe patient handling methods and report any changes to administrative staff. • Immediately report any signs or symptoms of WMSD development.
When do I need more help?	• When you have questions or concerns regarding patient handling, check with your supervisor, safe patient handling experts, and/or peer leaders.
Where can I get more help?	• Assistance and information on your safe patient handling program may be obtained from the SPHM program owners/managers. • OSHA website: www.osha.gov/dsg/hospitals/patient_handling.html • AIHA website: www.aiha.org • ASPHP website: www.asphp.org • NIOSH website: www.cdc.gov/niosh/topics/safepatient

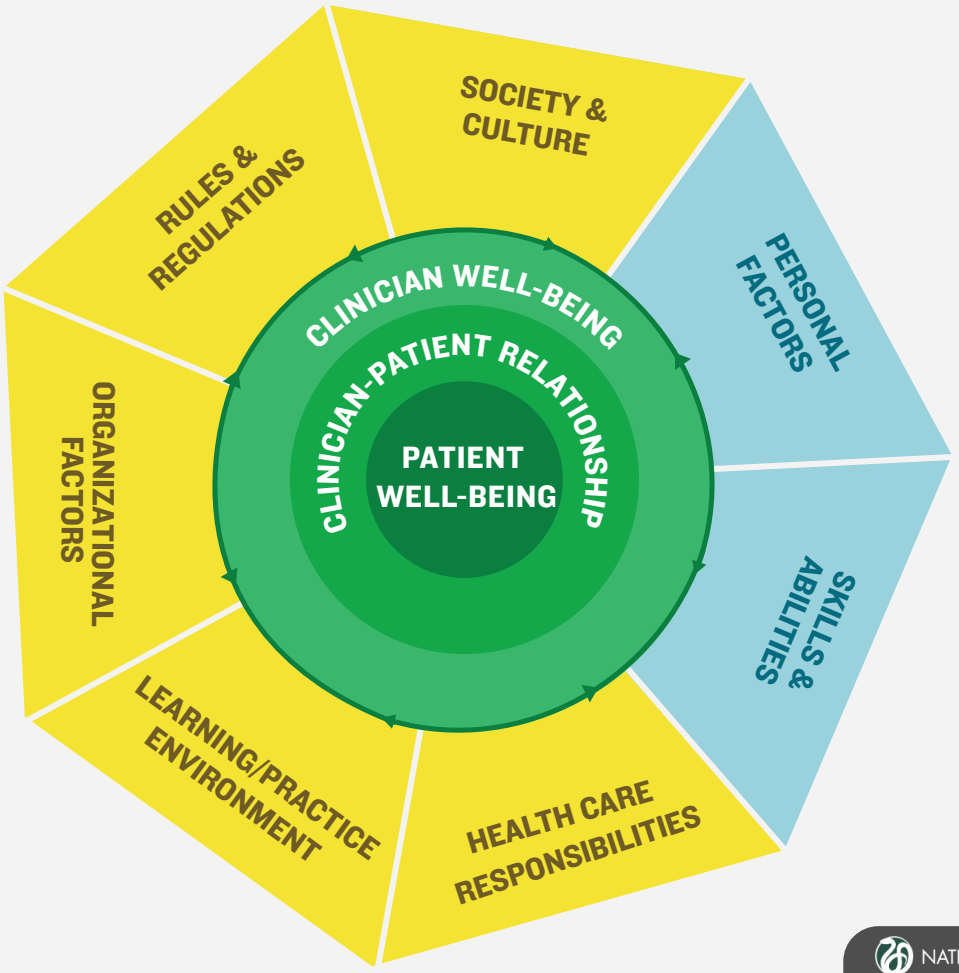
Through OSHA's Alliance Program, this Tip Sheet was developed as a product of the OSHA and American Industrial Hygiene Association Alliance for informational purposes only. It does not necessarily reflect the official views of OSHA or the U.S. Department of Labor. March 26, 2014.

English https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/OSHA-Quick-Tips-on-SPHM_Final-Mar2014.pdf

Spanish https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/Quick-Tips-on-SPHM-Spanish-OSHA-review-6-27-14_FINAL.pdf

Appendix I: Factors Affecting Clinician Well-Being and Resilience

This conceptual model depicts the factors associated with clinician well-being and resilience; applies these factors across all health care professions, specialties, settings, and career stages; and emphasizes the link between clinician well-being and outcomes for clinicians, patients, and the health system. The model should be used to understand well-being, rather than as a diagnostic or assessment tool. In electronic form, the external and individual factors of the conceptual model are hyperlinked to corresponding landing pages on the Clinician Well-Being Knowledge Hub. The Clinician Well-Being Knowledge Hub provides additional information and resources. The conceptual model will be revised as the field develops and more information becomes available.



NATIONAL ACADEMY OF MEDICINE
Learn more at *nam.edu/ClinicianWellBeing*

SOCIETY & CULTURE

- Alignment of societal expectations and clinician's role
- Culture of safety and transparency
- Discrimination and overt and unconscious bias
- Media portrayal
- Patient behaviors and expectations
- Political and economic climates
- Social determinants of health
- Stigmatization of mental illness

RULES & REGULATIONS

- Accreditation, high-stakes assessments, and publicized quality ratings
- Documentation and reporting requirements
- HR policies and compensation issues
- Initial licensure and certification
- Insurance company policies
- Litigation risk
- Maintenance of licensure and certification
- National and state policies and practices
- Reimbursement structure
- Shifting systems of care and administrative requirements

ORGANIZATIONAL FACTORS

- Bureaucracy
- Congruent organizational mission and values
- Culture, leadership, and staff engagement
- Data collection requirements
- Diversity and Inclusion
- Harassment and discrimination
- Level of support for all healthcare team members
- Power dynamics
- Professional development opportunities
- Scope of practice
- Workload, performance, compensation, and value attributed to work elements

LEARNING/PRACTICE ENVIRONMENT

- Autonomy
- Collaborative vs. competitive environment
- Curriculum
- Health IT interoperability and usability/Electronic health records
- Learning and practice setting
- Mentorship program
- Physical learning and practice conditions
- Professional relationships
- Student affairs policies
- Student-centered and patient-centered focus
- Team structures and functionality
- Workplace safety and violence

HEALTH CARE RESPONSIBILITIES

- Administrative responsibilities
- Alignment of responsibility and authority
- Clinical responsibilities
- Learning/career stage
- Patient population
- Specialty related issues
- Student/trainee responsibilities
- Teaching and research responsibilities

INDIVIDUAL FACTORS

PERSONAL FACTORS

- Access to a personal mentor
- Inclusion and connectivity
- Family dynamics
- Financial stressors/economic vitality
- Flexibility and ability to respond to change
- Level of engagement/connection to meaning and purpose in work
- Personality traits
- Personal values, ethics and morals
- Physical, mental, and spiritual well-being
- Relationships and social support
- Sense of meaning
- Work-life integration

SKILLS & ABILITIES

- Clinical Competency level/experience
- Communication skills
- Coping skills
- Delegation
- Empathy
- Management and leadership
- Mastering new technologies or proficient use of technology
- Optimizing work flow
- Organizational skills
- Resilience skills/practices
- Teamwork skills

Appendix J: Sensor Device Availability

There are many wearable and non-wearable devices that are market available. While this white paper does not endorse any products or devices, some of these devices are shown below to guide the reader:

- MobileHelp: Offers quick response time (25–50 seconds) and a range of 600–1,400 feet.
- Medical Guardian: Fast response (1–25 seconds) with a range of 1,300–1,400 feet.
- Bay Alarm Medical: Quick response (1–25 seconds) and a range of 1,000 feet (6–18 hours battery life for smartwatches).
- Medical Alert: Response time of 15–25 seconds and a range of 800 feet.
- ADT Health: Response time of 45+ seconds and a range of 300–600 feet.
- LifeFone: Response time of 1–25 seconds and a range of 1,300 feet.
- UnaliWear Kanega Watch: A smartwatch option for fall detection.

Source: Forbes, 2024. https://www.forbes.com/health/medical-alert-systems/fall-detection-devices/

Additional Sensor Resources

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