A Survey of Healthcare Workers on Safe Patient Handling and Mobility Resource Availability, Utilization, and Adherence

Kimberly Waltrip
University of Missouri-St. Louis, kdw535@umsl.edu

Follow this and additional works at: https://irl.umsl.edu/dissertation

Part of the Nursing Commons

Recommended Citation
https://irl.umsl.edu/dissertation/910

This Dissertation is brought to you for free and open access by the UMSL Graduate Works at IRL @ UMSL. It has been accepted for inclusion in Dissertations by an authorized administrator of IRL @ UMSL. For more information, please contact marvinh@umsl.edu.
A Survey of Healthcare Workers on Safe Patient Handling and Mobility

Resource Availability, Utilization, and Adherence

Kimberly D. Waltrip

MSN, Vanderbilt University – Nashville, 1998

BSN, Southeast Missouri State University – Cape Girardeau, 1995

A Dissertation Submitted to The Graduate School at the University of Missouri–St. Louis

in partial fulfillment of the requirements for the degree

Doctor of Philosophy in Nursing

December 2019

Advisory Committee

Roberta Lavin, Ph.D., FNP-BC, FAAN
Chairperson

Susan Dean-Baar, Ph.D., RN, FAAN

Anne Fish, Ph.D., RN, FAAN, FAHA

Roxanne Vandermause, Ph.D., RN

Copyright, Kimberly D. Waltrip, 2019
Abstract

The purpose of this study was to examine the current status of safe patient handling and mobility—specifically resource availability, utilization, and adherence to established safe patient handling and mobility standards—and measure any relationships among these factors. This study builds on the reliability and validity of the adapted American Nurses Association’s (2016b) Safe Patient Handling and Mobility Self-Assessment Resource. Responses came from a one-shot survey of healthcare workers in direct patient care across several private and Veterans Health Administration healthcare organizations in the Midwestern United States. The risk of injury is higher in patient handling than in many other professions; therefore, it is essential to address current practices and understanding.

A nonexperimental, descriptive, one-shot survey design was used to measure safe patient handling and mobility concepts in real-world patient care settings. Survey items assessed the current availability and use of safe patient handling and mobility resources and healthcare organizations’ adherence to safe patient handling and mobility standards. Ninety-four participants from eight healthcare organizations took part in the survey. The participants included registered nurses (n = 50), licensed practical nurses (n = 2), certified nurse assistants (n = 13), and ancillary staff (n = 10). Median scores for resource availability (82.14), utilization (83.33), and adherence (90.63) were moderately high.

There were positive correlations between resource availability and utilization (r = 0.60, p \leq .001), and availability and adherence (r = 0.61, p \leq .001), and utilization and adherence (r = 0.54, p \leq .001). This finding indicates that where there are resources there is greater utilization and adherence.
# Table of Contents

CHAPTER I INTRODUCTION

Problem .......................................................................................................................... 11
Problem Statement ......................................................................................................... 14
Purpose ............................................................................................................................ 15
Rationale ........................................................................................................................ 15
Background .................................................................................................................... 16
Significance ..................................................................................................................... 18
  Significance to Society .............................................................................................. 18
  Significance to Healthcare ......................................................................................... 19
  Significance to Nursing .............................................................................................. 21
Research Questions ....................................................................................................... 24

CHAPTER II REVIEW OF THE LITERATURE

Introduction .................................................................................................................... Error! Bookmark not defined.
Theoretical Definitions ..................................................................................................... 25
Safe Patient Handling and Mobility ................................................................................ 25
Resources for Safe Patient Handling and Mobility ........................................................ 26
The Healthcare Organization and the Context of Safe Patient Handling and Mobility .......................................................................................................................................................... 29
Conceptual Framework .................................................................................................. 33
Antecedents of Safe Patient Handling and Mobility ....................................................... 33
Context and the Healthcare Organization With a Culture of Safety ................................ 33
Literature Review ............................................................................................................ 34
The Origin and Evolution of Safe Patient Handling and Mobility .......................... 34
Categorizing Resources as Controls for Safe Patient Handling and Mobility ........ 39
Availability of Resources for SPHM ................................................................. 55
Utilization of Resources for SPHM ................................................................. 59
Adherence to Safe Patient Handling and Mobility Standards ........................... 65
Summary of the Literature Review .................................................................... 71
CHAPTER III METHOD ......................................................................................... 73
Introduction........................................................................................................... Error! Bookmark not defined.
Research Questions ............................................................................................. 73
Method ................................................................................................................... 73
Design ................................................................................................................... 73
Survey Questionnaire .......................................................................................... 74
Content Validity for the Adapted ANA Survey Questionnaire .......................... 76
State Legislation ................................................................................................. 77
Operational Definitions ....................................................................................... 80
Research Setting ................................................................................................. 82
Power Analysis .................................................................................................... 84
Sample ................................................................................................................ 84
Data Collection ................................................................................................... 84
Data Management ............................................................................................... 86
Data Analysis ....................................................................................................... 87
Strengths and Limitations of Methods ............................................................... 91
Protection of Human Subjects ............................................................................ 96
CHAPTER IV RESULTS

Introduction

Research Questions

Descriptive Statistics About Survey Participants

Research Questions and Survey Results

Research Question 1

Research Question 2

Research Question 3

Reliability of the Availability, Utilization, and Adherence Subscales

Research Question 4

Conclusion

CHAPTER V CONCLUSION

Introduction

Summary

Results

Implications

Synthesis and Summary of the Literature

Interpretation

Strengths and Weaknesses

Recommendations for Future Research

References

Appendix A

Appendix B
List of Tables

Table 1. Assistive Technology for Direct and Indirect Use in Patient Care ................. 28

Table 2. The ANA Safe Patient Handling and Mobility (SPHM) Standards and
Corresponding Legislation in Missouri ....................................................................... 78

Table 3. Safe Patient Handling and Mobility (SPHM) Constructs, Variables, and
Operational Definitions ............................................................................................... 80

Table 4. The Context of Safe Patient Handling and Mobility (SHPM) in Selected
Healthcare Organizations ......................................................................................... 83

Table 5. Adapted Survey Items with Associated Variables and the 2013 ANA Standards
for Safe Patient Handling and Mobility (SPHM) ....................................................... 88

Table 6. Data Analysis Plan for Demographic and Adapted Survey Items .................. 90

Table 7. Professional Characteristics of Survey Participants ..................................... 100

Table 8. Personal Characteristics of Survey Participants .......................................... 100

Table 9. Descriptive Statistics for the Safe Patient Handling and Mobility Availability
Subscale (n = 75) .......................................................................................................... 103

Table 10. Descriptive Statistics for the Safe Patient Handling and Mobility Utilization
Subscale (n = 80) ........................................................................................................... 105

Table 11. Descriptive Statistics for the Safe Patient Handling and Mobility Adherence
Subscale (n = 70) .......................................................................................................... 107

Table 12. Reliability of the Availability, Utilization, and Adherence Subscales (n = 70)
................................................................................................................................. 108

Table 13. Correlations Between Subscales for Safe Patient Handling and Mobility
Resource Availability, Utilization, and Adherence ................................................... 111
List of Figures

Figure 1. Antecedents and the context of safe patient handling and mobility (SPHM) within a culture of safety ................................................................. 32

Figure 2. Sample questions from the adapted survey questionnaire. ......................... 75

Figure 3. Dispersion of scores for the availability subscale ....................................... 102

Figure 4. Distribution of scores for the availability subscale .................................... 103

Figure 5. Dispersion of scores for the utilization subscale ...................................... 104

Figure 6. Distribution of scores for the utilization subscale .................................... 105

Figure 7. Dispersion of scores from the adherence subscale ................................... 106

Figure 8. Distribution of scores for the adherence subscale .................................... 107

Figure 9. Scatterplot of the availability and utilization subscales............................... 109

Figure 10. Scatterplot of the availability and adherence subscales.............................. 110

Figure 11. Scatterplot of the utilization and adherence subscale ............................... 110

Figure L1. Sahrmann’s (2002) kinesiopathologic model illustrates movement as a system produced and regulated by four interactive elements (BASE, MODULATOR, BIOMECHANICAL, SUPPORT) with various components ........................................... 210

Figure L2. Various forces exerted on the musculoskeletal system over time lead to pathologic changes that alter function, cause pain and eventual disability without treatment .................................................................................................................... 212

Figure L3. The seated, rolling walker is used for ambulatory patients who require minimal assistance while mobilizing ......................................................... 213
Figure L4. A rolling bedside commode is another option for patients who require toileting assistance when bathrooms are not readily accessible or when mobility impairments prevent safe, independent transfers to and from the toilet... 214

Figure L5. Sit-to-stand lifts and walkers allow dependent, weight-bearing patients to transfer and ambulate safely... 215

Figure L6. Transfer sheets are made of thin, slippery synthetic material to reduce friction and resistance when repositioning patients or for lateral transfers. Handles and extensions prevent added exertion and stress on healthcare workers, while promoting proper body mechanics... 216

Figure L7. Inflatable air transfer devices use forced air to significantly decrease effort and reduce friction and resistance during lateral transfers. Therefore, patients placed on air transfer devices require fewer healthcare workers... 217

Figure L8. Manual and powered mobile lifts can be used for vertical patient transfers, support during patient position changes, and patient ambulation... 217

Figure L9. Ceiling or overhead lifts are permanently fixed or installed for convenient storage and use... 218

Figure L10. Equipment vendors manufacture various slings designed for use with specific lifts, to prevent accidents or equipment failure that can occur with mismatched assistive technology... 219

Figure L11. Multiple booms and motors add functionality, direction, and positions of ceiling or overhead lifts, increasing safety during patient repositioning and transfers... 220
CHAPTER I

INTRODUCTION

Healthcare workers (HCWs) are at increased risk for musculoskeletal disorders (MSDs) and injuries during patient care activities, with consequences of disability, missed days of work, and increased healthcare costs (American Nurses Association [ANA], 2013; Bureau of Labor Statistics [BLS], 2015; Davis & Kotowski, 2015; Gomaa et al., 2015; Occupational Safety and Health Administration [OSHA], 2014; Oranye, Wallis, Roer, Archer-Heese, & Aguilar, 2016). Transferring, repositioning, and mobilizing patients are the most common causes of work-related injuries and musculoskeletal disorders in HCWs (ANA, 2013; BLS, 2015; Jäger et al., 2013; OSHA, 2014; Przybysz & Levin, 2016; Veterans Health Administration [VHA], 2016; Wurzelbacher et al., 2014). These physically demanding tasks are considered high risk and are often performed manually during patient care in suboptimal spaces, where HCWs assume awkward postures and positions (e.g., bending or leaning over hospital beds, chairs, or patients) for extended periods of time (Fragala, 2016; Lin, Wang, & Cavuoto, 2017; Szeto, Wong, Law, & Lee, 2013; Yassi & Lockhart, 2013).

Safe patient handling and mobility (SPHM) is a science focused on the prevention of HCW and patient injury and the elimination or reduction of risks associated with patient transfers, repositioning, and mobilization (ANA, 2014; Gallagher, Harrington, Kumpar, Wilson, & Zock, 2013). However, there are barriers to SPHM that preclude its effectiveness in clinical practice today. The availability and use of resources for SPHM and adherence to established standards require further study. The problem of patient handling-related injury is explained along with the study’s problem statement, purpose,
and rationale. The background and significance of SPHM is discussed. Proposed research questions conclude this chapter.

**Problem**

Historically, transferring, repositioning, and mobilizing patients were not considered high-risk tasks for HCWs (Lee, Lee, & Gershon, 2015; Olkowski & Stolfi, 2014; Powell-Cope et al., 2014). However, these particular tasks in patient care are detrimental to HCWs, as evidenced by subsequent injury or degenerative changes in the musculoskeletal system from mechanical wear and tear over time (Gomaa et al., 2015; Noble & Sweeney, 2018; Oranye et al., 2016; Sahrmann, 2002; Weiner, Alperovitch-Najenson, Ribak, & Kalichman, 2015). Patient weight, distance per patient transfer, confined or congested patient care areas, unpredictable patient behaviors, and HCWs’ awkward or unnatural positions and postures (e.g., stooping, leaning, bending, overreaching) during patient care increase the risk for injury (ANA, 2013; Freitag et al., 2013; Waters, Collins, Galinsky, & Caruso, 2006).

Repositioning patients in beds and chairs, assisting with patient hygiene and elimination needs, and vertically transferring or lifting patients are the most common high-risk tasks performed by HCWs (ANA, 2013; Fragala & Fragala, 2014; National Institute for Occupational Safety and Health [NIOSH], 2017; Waters, 2007). Transferring patients onto and from stretchers and transporting patients via bed or stretcher are examples of other high-risk tasks in patient care. These high-risk tasks vary in type and frequency due to the variety and acuity of patient populations and whether universal design considerations for SPHM have been incorporated into the environment of care (ANA, 2013; Bartnicka, 2015; Powell-Cope & Rugs, 2015).
Current patient handling practices observed in various healthcare settings are not congruent with the evidence for SPHM, despite the aforementioned risks and hazards to HCW and patient safety (ANA, 2013; Bhimani, 2016; Elnitsky, Lind, Rugs, & Powell-Cope, 2014; Lin, Xu, Wang, Cauvuto, & Xu, 2016; Noble & Sweeney, 2018; Vendittelli, Penprase, & Pittiglio, 2016). Inadequate SPHM resources (e.g., equipment or assistive technology, policies and procedures, education, training), old beliefs and habits or traditions of patient handling, and a lack of awareness create barriers to SPHM across healthcare settings. This failed translation of SPHM into real-world patient care exposes a clinical practice gap that has not been adequately addressed (Choi & Brings, 2016; Cloutier, Thomas-Olsen, & Helal, 2012; Hindson, 2016; White-Heisel, Canfield, & Young-Hughes, 2017). A paucity of legislation, no acknowledged or validated universal standards, and no mandates for SPHM, have enabled the continued use of patient handling practices that increase risk for injury (ANA, 2013; Hallmark, Mechan, & Shores, 2015; Huffman et al., 2014; Przybysz & Levin, 2016; Thomas & Thomas, 2014).

Widespread acceptance and adoption of SPHM have yet to occur in healthcare for various reasons, namely legislation. Multiple legislative barriers to SPHM at federal, state, corporate (organizational), and individual levels prevent formal recognition and enforcement of any universal standards or guidelines (Bhimani, 2016; Carayon et al., 2013; Elnitsky et al., 2014; Mayeda-Letourneau, 2014; Noble & Sweeney, 2018; Schoenfisch, Lipscomb, Pompeii, Myers, & Dement, 2013; Xie & Carayon, 2015). Currently, there are no federal standards that regulate and enforce SPHM in the United States. (NIOSH, 2017). The Nurse and Health Care Worker Protection Act of 2015 (H.R. 4266), which was referred to the Subcommittee on Workforce Protections of the House
Committee on Education and Labor in March 2016, is the most recent bill introduced to Congress (NIOSH, 2017). Current laws or regulations for SPHM have originated from legislation passed in 11 states; however, inconsistencies in content and enforcement hinder standardization and adherence (ANA, 2016; Powell-Cope & Rugs, 2015; Weinmeyer, 2016).

At the organizational level, adherence to SPHM is further challenged when healthcare organizations fail to align institutional policies and procedures with existing laws or regulations (Aslam, Davis, Feldman, & Martin, 2015; Mayeda-Letourneau, 2014; Noble & Sweeney, 2018; Przybysz & Levin, 2016). Safe patient handling and mobility is not a national mandate in the United States. (Choi & Cramer, 2016; Hallmark et al., 2015). Therefore, healthcare organizations are neither obligated nor accountable when SPHM is not reinforced or supported in clinical practice.

A lack of engagement or commitment to SPHM as a standard of care propagates a culture where adherence, resources, and competence are challenged (ANA, 2013; Elnitsky et al., 2014; Rugs et al., 2013; Sokas et al., 2013; Stevens, Rees, Lamb, & Dalsing, 2013). Legitimate, genuine efforts to maintain the collective mentality of safety or a culture of safety engage everyone in the healthcare organization. A team approach to safety facilitates improvements at all levels to address any risks or hazards anywhere at any time (TJC, 2012; Thomas & Thomas, 2014). Conversely, exceptions and deviations from SPHM practices may be allowed or ignored in healthcare organizations without an established culture of safety. The available evidence-based knowledge has not been widely implemented via universal SPHM standards or guidelines to discontinue obsolete patient-handling practices or promote SPHM as a standard of care. Standardized
programs that drive and sustain SPHM in clinical practice are another potential solution. However, no standardized SPHM program has progressed beyond existing state legislation to validate the establishment and facilitate widespread acceptance of any universal standards or guidelines in healthcare (ANA, 2013; Choi & Cramer, 2016; Hallmark et al., 2015; Pryzbysz & Levin, 2016; Vendittelli et al., 2016).

Universal standards or guidelines are helpful to clarify pertinent definitions and identify exemplars for quality and measurement across SPHM programs. Healthcare organizations must implement and sustain successful SPHM programs that enforce these standards to avoid untenable situations during patient care without necessary resources, including the appropriate education and training for HCWs (Aslam et al., 2015; J. S. Choi & Cramer, 2016; Gallagher, 2013; Kay, Glass, & Evans, 2012; Noble & Sweeney, 2018; Vendittelli et al., 2016; Weinmeyer, 2016). Further development and enforcement of legislation, widespread acceptance of universal standards in healthcare, and continued growth of successful SPHM programs are therefore necessary to protect HCWs and patients from harm.

Problem Statement

Inadequate or inappropriate resources for SPHM, the failure to use available SPHM resources, and nonadherence to established standards for SPHM increase HCWs’ risk for injury during patient care (ANA, 2013; Bhimani, 2016; Kneafsey, Clifford, & Greenfield, 2015; Noble & Sweeney, 2018; VHA, 2016). There is a need to examine the current status of these three factors and measure any relationships between them in direct patient care. No validity and reliability measures have been reported for the original ANA Safe Patient Handling and Mobility Self-Assessment Resource or an adapted version of
this survey questionnaire. Therefore, the information obtained from HCW surveys was used for the purpose of this study.

**Purpose**

The purpose of this study was to examine the current status of SPHM—specifically, resource availability, utilization, and adherence to established SPHM standards—and measure any relationships between these three factors using an adapted version of the ANA Safe Patient Handling and Mobility Self-Assessment Resource. Information was used from a one-shot survey of HCWs in direct patient care across several healthcare organizations in the Midwestern United States.

**Rationale**

Examination of the availability and utilization of resources for SPHM and healthcare organizations’ adherence to established standards provided additional information on the current status of SPHM in patient care without universal standards or guidelines. Participant survey responses described the current progress toward successful implementation and evaluation of SPHM programs in several healthcare organizations in the Midwestern United States. The information obtained was helpful in determining the adequacy of SPHM resources available for participant use during patient care. Healthcare workers’ subsequent use of available resources and adherence to SPHM standards reflect the amount of education, training, and resources provided by the healthcare organization (ANA, 2013; Noble & Sweeney, 2018). The consistent, correct use of SPHM resources and healthcare organizations’ adherence to SPHM standards will decrease the risk for HCW injury, including associated direct and indirect costs after injury, while improving
HCW retention in the workforce (OSHA, 2014; Vendittelli et al., 2016; VHA, 2016; Walden et al., 2013).

**Background**

Healthcare workers are often charged with the task of patient handling, which has typically involved manual effort for transferring, repositioning, or mobilizing patients. Patient handling is considered a high-risk task due to the associated risks and hazards for injury that are an increasingly common occurrence in healthcare (Bhimani, 2016; Davis and Kotowski, 2015; Elnitsky et al., 2014; Fragala, 2015; Gomaa et al., 2015; Jäger et al., 2013; Mayeda-Letourneau, 2014; Noble & Sweeney, 2018; Vendittelli et al., 2016; Weiner et al., 2015). Healthcare workers have a greater likelihood of musculoskeletal injury than workers in other industries (BLS, 2015; Gomaa et al., 2015; Vendittelli et al., 2016). Upper and lower extremities and the cervical and lumbar spine are the most commonly injured during patient care activities (Abedini, Choobineh, & Hasanzadeh, 2015; Davis & Kotowski, 2015; Lee et al., 2015; Yassi & Lockhart, 2013). These injuries can devastate HCWs physically, emotionally, and financially, especially when their return to work is delayed or prevented.

Evidence regarding the prevalence of musculoskeletal injuries in HCWs and subsequent interventions has accumulated over the past 30 years (Davis & Kotowski, 2015; TJC, 2012; Marras, Davis, Kirking, & Bertsche, 1999; Powell-Cope et al., 2014; Schoenfisch et al., 2013; Siddharthan, Nelson, Tiesman, & Chen, 2005; Theis & Finkelstein, 2014; Vendittelli et al., 2016; Waters, 2007; Wurzelbacher et al., 2014). Various laws and programs specifically address HCW injuries in 11 states. However, legislation enacted for improved protection has had limited success in healthcare (ANA,
The growing number of HCW injuries is a culmination of several problematic events over time. Many of today’s workforce and patient population are aging in the midst of an ongoing shortage of nurses that complicates the current roles of HCWs (BLS, 2015; Rogers, Buckheit, & Ostendorf, 2013; Rosseter, 2017; Weinmeyer, 2016). Approximately 649,100 job openings for nurses were projected by the year 2024 (BLS, 2015).

Healthcare workers are expected to perform well with additional role responsibilities, despite staffing issues and increased patient-to-HCW ratios. Another problem involves the escalating overall rate of obesity in the United States. Patient weights have continued to increase over time, along with patient comorbidities that necessitate higher levels of assistance and care (Broome et al., 2015; Choi & Brings, 2016; Davis & Kotowski, 2015; Hallmark et al., 2015; Huffman et al., 2014; Rogers et al., 2013; Walden et al., 2013). Healthcare workers are therefore assigned to more patients weighing 300 pounds or more who must be transferred, repositioned, or mobilized routinely, regardless of size or immobility (Broome et al., 2015; Hallmark et al., 2015; Walden et al., 2013).

The next challenge to HCW safety involves the high acuity of patient illness or condition required for hospital admission. Increasing numbers of outpatient surgical procedures and treatments are performed without need for inpatient admission, where patients are discharged from healthcare organizations within 23 hours or less (Hall, Schwartzman, Zhang, & Liu, 2017; Hollenbeck et al., 2014). Hospital beds are now reserved for higher acuity patients who require a level of care beyond what is provided in
an outpatient or home care setting. Bedrest is rarely ordered for these patients, who are encouraged to get out of bed and sit in a chair or ambulate as often as possible, regardless of physical mobility impairments (Adler & Malone, 2012; Broome et al., 2015; Davis & Kotowski, 2015; Drolet et al., 2013; King, 2012; Hallmark et al., 2015; Kneafsey et al., 2015; Manojlovich, Ratz, Miller, & Krein, 2017). Healthcare workers also round on patients every hour to assist with meals, hygiene, repositioning, and other comfort measures. All of these physically demanding tasks during patient care increase HCWs’ risk for injury.

**Significance**

**Significance to Society**

Healthcare workers injuries became political and legal concerns in the 1990s, when federal researchers at NIOSH investigated lumbar spine problems in HCWs from long-term care facilities (Collins & Owen, 1996). The rates of lumbar spine and other musculoskeletal injuries among HCWs were three times greater than among construction workers; more injuries in HCWs were reported than in any other industry (Guo et al., 1995; Li, Wolf, & Evanoff, 2004; Nelson, Fragala, & Menzel, 2003). The NIOSH researchers’ discovery prompted the ANA’s (2003) Handle with Care initiative, a national campaign for prevention of work-related musculoskeletal injuries that facilitated a concerted effort from the entire healthcare industry. Eleven states have passed legislation or rules and regulations mandating SPHM, or addressing HCW injury with preventive measures; ten of these states require healthcare organizations to implement and maintain comprehensive SPHM programs (ANA, 2016; Aslam et al., 2015; Choi & Cramer, 2016; Powell-Cope & Rugs, 2015).
**Significance to Healthcare**

Safety is emphasized as the primary concern over all other goals and objectives in healthcare organizations with a culture of safety, which is instrumental in preventing or reducing risks and hazards while improving the overall quality of healthcare (Committee on Quality of Health Care in America, 1999; Hallmark et al., 2015; OSHA, 2013; Przybysz & Levin, 2016; Rogers et al., 2013; Rugs et al., 2013). A culture of safety is well established in high-reliability organizations (aerospace, aviation, military, nuclear power) that operate day-to-day under hazardous conditions and therefore maintain a level of safety beyond what healthcare currently mandates (Chassin & Loeb, 2013). High-reliability organizations anticipate human error and build systems around it. However, risk management strategies in healthcare do not usually acknowledge or consider the likelihood of human error, despite a high-risk environment where human error is significant (Kay et al., 2012).

A cultural shift toward safety is now occurring as more healthcare organizations adopt a high-reliability approach to patient care. This approach is a response to healthcare reform and demands for improved performance and quality, especially now that hospital indicators are public knowledge (CMS, n.d.). Safe patient handling and mobility is one element of a culture of safety where programs are established to prevent injury to HCWs and patients, with significance to health policy, law, insurance, and healthcare organizations (Aslam et al., 2015; Choi & Cramer, 2016; Noble & Sweeney, 2018; Olkowski & Stolfi, 2014).

Healthcare organizations with successful SPHM programs incorporate the development of policies and procedures for patient handling; set standards for appropriate
education and training; provide direction on the acquisition of all necessary equipment or assistive technology to transfer, reposition, and mobilize patients safely; and establish comprehensive systems for data collection and evaluation (Aslam et al., 2015; Darragh, Shikyo, Margulis, & Campo, 2014; Dennerlein et al., 2017; Gallagher, 2013; Hallmark et al., 2015; Mayeda-Letourneau, 2014; Olkowski & Stolfi, 2014; Thomas & Thomas, 2014). Pertinent data from comprehensive systems are required to adequately assess, plan, implement, and evaluate interventions for SPHM based on the policy and equipment or assistive technology needs of the various patient care areas within healthcare organizations. Successful programs also establish SPHM committees that are authorized by healthcare organizations to make decisions regarding pertinent policies, procedures, and resources (ANA, 2013; Hallmark et al., 2015; Przybysz & Levin, 2016; Rogers et al., 2013; Rugs et al., 2013). These committees have members with SPHM expertise who are directly involved in patient care and in leadership roles, to govern SPHM programs within their respective healthcare organizations.

A well-implemented SPHM program combined with legislation produces an impressive end result. Fewer and less severe patient handling-related injuries yield significantly lower costs for healthcare organizations (Aslam et al., 2015; Fray, Hallstrom, Knibbe, Celona, & Matz, 2015; Huffman et al., 2014; Kurowski, Gore, Roberts, Kincaid, & Punnett., 2017; Mayeda-Letourneau, 2014; OSHA, 2014; Powell-Cope et al., 2014; Rugs et al., 2013; Stevens et al., 2013; Theis & Finkelstein, 2014). No-lift or zero-lift policies combined with assistive technology have replaced manual lifting in healthcare organizations with safe patient handling programs, subsequently lowering the number of patient-handling-related injuries by at least 43% (Cadmus, Brigely, &
Successful SPHM programs also conserve time and manpower with fewer missed workdays while saving money for healthcare organizations (Aslam et al., 2015; Celona, 2014; Hallmark et al., 2015; Mayeda-Letourneau, 2014; OSHA, 2014; Stevens et al., 2013; Theis & Finkelstein, 2014; Thomas & Thomas, 2014).

Although SPHM programs are expensive to implement, the initial investment of healthcare organizations can be recovered in two to five years (ANA, 2013; Aslam et al., 2015; Hallmark et al., 2015). Stanford University Medical Center is an example where $800,000 invested in a SPHM program resulted in a five-year, $2.2 million net savings; approximately half of this amount was attributed to fewer worker compensation claims and a lower number of patient pressure ulcers (Celona, Hall, & Forte, 2010; Weinmeyer, 2016). The new equipment or assistive technology, legislation, universal standards, and continued growth of successful SPHM programs show great promise for a new science that protects HCWs and patients from harm, with direct benefits for healthcare.

**Significance to Nursing**

Patient handling-related injuries do not usually occur from one-time accidents or outlier events. These injuries occur from cumulative mechanical wear and tear over weeks, months, or years of using unsafe methods for lifting, repositioning, and transferring patients (Choi & Brings, 2016; Fragala & Fragala, 2014; Jäger et al., 2013; Hallmark et al., 2015; Waters, 2007). Manual one- and two-person methods (drawsheet, hook, thigh-and-shoulder) for repositioning or transferring patients are examples associated with a high likelihood of lumbar spine injury (Fragala & Fragala, 2014; Marras et al., 1999). Nevertheless, healthcare workers continue to learn various manual
methods during undergraduate or professional education and training (ANA, 2013; Kay et al., 2014; Lowe et al., 2014).

Inservices on ergonomics or body mechanics may be offered, depending on where HCWs are employed and what resources are available. However, proper body mechanics and other methods do not prevent the degenerative musculoskeletal changes resulting from HCWs’ repeated movements, prolonged postures, and the tasks or work performed in awkward or unnatural positions (Marras, Walter, Purmessur, Mageswaran, & Wiet, 2016; Milhem et al., 2016; Noble & Sweeney, 2018; Rogers et al., 2013; Samaei, Mostafaee, Jafarpoor, Hasanali, & Hosseinabadi, 2017; TJC, 2012; Warren, 2016; Waters, 2007; Yassi & Lockhart, 2013). These particular movements and body positions stress the musculoskeletal system, causing pain and dysfunction. The subsequent effects of musculoskeletal stress are confirmed by the high numbers of HCW injuries from patient handling (BLS, 2015; Mayeda-Letourneau, 2014; Milhem et al., 2016).

Safe patient handling and mobility programs with adequate planning and implementation significantly reduce musculoskeletal disorders and injuries in HCWs, especially when education and training incorporate the use and importance of specific equipment or assistive technology with proper body mechanics (Choi & Cramer, 2016; Dennerlein et al., 2017; Hallmark et al., 2015; Lorio, Florman, Gore, Housley, & Nelson, 2016; NIOSH, 2017; Thomas & Thomas, 2014). This combination of education, training, and appropriate, available equipment or assistive technology for SPHM decreases the number of biomechanical forces exerted on the musculoskeletal system during patient care tasks and subsequently results in fewer related injuries. The positive outcomes of SPHM have been reinforced with increased HCW recruitment and retention, lower
numbers of career-ending injuries, lower associated healthcare costs, and higher levels of HCW satisfaction (Huffman et al., 2014; Lee et al., 2015; Mayeda-Letourneau, 2014; Powell-Cope et al., 2014; Thomas & Thomas, 2014).

The results of SPHM in patient care are especially relevant to nursing. Nurses are HCWs in challenging roles with increased risks for musculoskeletal problems and injuries from direct patient care (Kay et al., 2012; Stevens et al., 2013; Waters, Lu, Piacitelli, Werren, & Deddens, 2011). Without enforceable legislation, rules, or regulations at the national level, no comprehensive plans or programs exist to effectively address the widespread challenges of patient handling throughout healthcare. However, additional research regarding HCW attitudes, beliefs, experiences, and perspectives on patient handling can yield more information on current workplace culture, provide direction for development and implementation of interventions, and identify barriers or problems within the context of SPHM.

A looming barrier to SPHM involves the nursing shortage that will continue as aging nurses retire without new nurses to fill vacant positions, creating staffing issues for healthcare organizations. Therefore, nurses may have fewer resources available during patient care, such as time or manpower, precluding SPHM in clinical practice. The nursing shortage is further compounded by a growing population of today’s patients who are older, sicker, and heavier than ever. More resources for SPHM will be necessary when nurses and other HCWs are assigned to more debilitated, dependent patients. Nursing recruitment and retention are even more crucial to patient care, in addition to maintaining a healthy workforce without costly musculoskeletal injuries and staff
turnover. Now is the time to pursue SPHM wholeheartedly, to protect current and future HCWs, especially with the impending challenges for nursing and healthcare.

**Research Questions**

The following research questions direct the proposed study:

1. What is the availability of SPHM resources in patient care, based on HCWs’ survey responses?
2. What is the utilization of SPHM resources in patient care, based on HCWs’ survey responses?
3. What levels of healthcare organizations’ adherence to SPHM standards are reported in patient care, based on HCWs’ survey responses?
4. What are the relationships between SPHM resource availability, utilization, and healthcare organizations’ adherence to SPHM standards, based on HCWs’ survey responses?
CHAPTER II
REVIEW OF THE LITERATURE

This chapter summarizes the science of SPHM, explains theoretical definitions for SPHM, and presents a conceptual model applicable to SPHM. A conceptual framework relates this model to SPHM in clinical practice. The literature pertinent to SPHM is reviewed and summarized. The referenced articles, reports, and previous research describe the rationale for SPHM, the associated resources, and how this science has evolved over time. Barriers regarding availability and utilization of resources, and subsequent adherence to SPHM standards are discussed before concluding this chapter.

Theoretical Definitions

Safe Patient Handling and Mobility

Safe patient handling and mobility originated in the 1980s as safe patient handling and movement, a construct associated with moving and repositioning patients (ANA, 2013). The patient, or healthcare recipient in certain healthcare settings, is an individual who requires assistance for optimal mobility (ANA, 2013; Gallagher et al., 2013). Movement is a passive concept that describes the physical effort exerted on a patient’s behalf. The term movement was later replaced by mobility to reflect active patient involvement or participation and the potential for improved clinical outcomes (ANA, 2013; Gallagher et al., 2013). Mobility is best defined as the progressive maintenance or increase in a patient’s physical activity, with or without HCW assistance, including any equipment or assistive technology as needed (Darragh et al., 2013).

Safe, in SPHM, describes a condition where no harm or injury to a HCW or patient occurs from repositioning, transferring, or mobilizing the patient. A safe condition
or safety exists when exposure to an identified hazard or risk within the environment of care is either prevented or minimized to an acceptable level (Darragh et al., 2013; Fragala, 2012; O’Keeffe, Blewett, & Thompson, 2013; TJC, 2012). An example of safety in SPHM involves the revised NIOSH manual lifting recommendation that restricts lifting to 35 pounds or less, to protect HCWs and patients during repositioning, transferring, or mobilizing activities (Waters, 2007). This weight limit is further reduced when patient care tasks are performed by HCWs in restricted or smaller spaces, when HCWs assume awkward postures or positions during work, and when any unpredictable patient movements increase loading forces on the spine (Marras et al., 2016; Waters, 2007).

The concept of handling originated when patient repositioning, transfers, and mobilization were considered manual activities or tasks specifically powered by human strength (ANA, 2013). Handling refers to the use of HCWs’ hands and upper extremities or the physical effort required to reposition, transfer, or mobilize patients, and also includes any equipment or assistive technology used for these patient care tasks (VHA, 2008). Examples of patient handling include repositioning, lifting and lowering, pushing and pulling, carrying, turning, holding, static (stationary), and supporting body movements or positions of HCWs.

**Resources for SPHM**

**Healthcare workers.** Healthcare workers involved in direct patient care are a necessary resource for SPHM in healthcare organizations. In SPHM, the HCW selects and uses the appropriate equipment or assistive technology for each patient, while providing and requesting assistance as needed to reposition, transfer, or mobilize patients.
A SURVEY OF HEALTHCARE WORKERS

(Sokas et al., 2013). The HCWs in this particular role are typically registered nurses (RNs), licensed practical nurses (LPNs), and nurse assistants. Physicians, physical therapists (PTs), occupational therapists, and other unlicensed assistive personnel (e.g., nursing students, patient transporters), are also considered HCWs when applicable to SPHM (ANA, 2013; Mayeda-Letourneau, 2014). The HCW may also be defined as an end user or frontline staff member who uses other SPHM resources during patient care (ANA, 2013; Hallmark et al., 2015; Sokas et al., 2013).

The HCW uses the correct resources appropriately and consistently in SPHM. Such resources include the strength and effort of healthcare workers and patients, and any equipment or assistive technology used during patient care. The appropriate, consistent use of SPHM resources can eliminate or at least minimize the risks for injury when performing these high-risk tasks in patient care. In a culture of safety, the healthcare organization is responsible for providing any and all resources necessary for SPHM. Consistent, correct use of the appropriate SPHM resources ensures healthcare worker and patient safety whenever patients are repositioned, transferred, or mobilized.

**Assistive technology.** Assistive technology includes the various devices and equipment designed for direct or indirect use in SPHM (ANA, 2013; Andersen & Broberg, 2015; Arnold, Roe, & Williams, 2014; Aslam et al., 2015; Bacharach, Miller, & von DuVillard, 2016; Gold, Punnett, & Gore, 2017; Huang et al., 2014; Kairalla, Winkler, & Feng, 2016; Lin et al., 2017; Mayeda-Letourneau, 2014; OSHA, 2013; Sivaprakasam, Wang, Cooper, & Koontz, 2017; Tang et al., 2017; von der Lancken & Levenhagen, 2014; Wiggermann, 2014). Examples of assistive technology are presented in the following table of SPHM resources.
Table 1

Assistive Technology for Direct and Indirect Use in Patient Care

<table>
<thead>
<tr>
<th>Vertical transfers</th>
<th>Direct use</th>
<th>Lateral transfers</th>
<th>Mobility-assistive</th>
<th>Indirect use</th>
<th>Support resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling lifts</td>
<td>Friction-reducing devices (sheets, fabric tubes)</td>
<td>Slide boards</td>
<td>Stand-assist devices</td>
<td>Software</td>
<td></td>
</tr>
<tr>
<td>Portable lifts</td>
<td>Slings on mechanical lifts</td>
<td>Convertible chairs</td>
<td>Gait belts</td>
<td>Multimedia resources</td>
<td></td>
</tr>
<tr>
<td>Sit-to-stand lifts</td>
<td>Specialty beds and mattresses</td>
<td>Slings on mechanical lifts</td>
<td>Walkers</td>
<td>Accessories</td>
<td></td>
</tr>
<tr>
<td>Wall-mounted lifts</td>
<td>Specialty cushions, inflatable sliding aids</td>
<td>Inflatable sliding aids</td>
<td>Transfer chairs, wheelchairs</td>
<td>Data collection systems (for additional learning)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bed functions (settings for Trendelenburg position, maximum inflation on air mattresses)</td>
<td>Friction-reducing devices (sheets, fabric tubes)</td>
<td>Bed features (bed rails, overhead trapeze bars, traction equipment)</td>
<td>Motion capture technology (for additional learning)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Roller boards, mats, and trays</td>
<td></td>
<td>Stretches</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assistive technology, healthcare worker assistance, or both may be required to mobilize a patient, depending on the extent of weakness or disability. Minimum to maximum amounts of healthcare worker assistance may be described as stand-by or contact guard assist, progressing to completely dependent or total care when patients have severely impaired physical mobility (Darragh et al., 2014; TJC, 2012). Varying levels of assistance with assistive technology may still be required to transfer, reposition, or mobilize patients with significant cognitive or mobility impairments that prevent independent use (Berthelette, Leduc, Bilodeau, Durand, & Faye, 2012; Darragh et al., 2013; Kurowski, Boyer, Fulmer, Gore, & Punnett, 2012; Lowe, Douglas, Fitzpatrick, & Golub-Victor, 2014).
**Ancillary resources.** Other resources include the materials, staff, systems, and any assets necessary to improve or maintain the effectiveness of SPHM throughout the healthcare organization (ANA, 2013; Choi & Brings, 2016; VHA, 2016). More specific examples include (a) the healthcare organization’s policies and procedures; (b) any pertinent federal or state legislation; (c) support staff, leadership, and management within the healthcare organization; (d) any members of the healthcare organization involved in SPHM; (e) education and training; (e) systems for data collection, monitoring, communication, documentation, analysis, and evaluation of SPHM; and (f) any auxiliary equipment (ANA, 2013; Choi & Brings, 2016; Huang et al., 2014; OSHA, 2009; VHA, 2016).

**The Healthcare Organization and the Context of SPHM**

**Healthcare organization.** Examples of a healthcare organization include hospitals, long-term care facilities, rehabilitation centers, clinics, and home health agencies. The healthcare organization, in SPHM, sets standards and specifies requirements for HCWs and other members to maintain safety (Noble & Sweeney, 2018; OSHA, 2013; Joint Commission, 2012; VHA, 2016). Safety is maintained by an established culture of safety throughout the entire healthcare organization. A culture of safety requires every member’s commitment and effort to prevent harm and eliminate or reduce hazards and risks within the environment of care (ANA, 2013; Aslam et al., 2015; Baumann, Norman, Idriss-Wheeler, Rzik, & Fu, 2015; Fragala, 2012; Stevens et al., 2013). A healthcare organization with a culture of safety obtains all necessary, appropriate assistive technology and provides the education and training required for
SPHM across the continuum of patient care. Therefore, the emphasis on safety is clearly evident within the context of SPHM (ANA, 2013; VHA, 2016).

**Communication and collaboration.** Ongoing, effective communication and collaboration at and between all levels of the healthcare organization are necessary for promoting and maintaining safety (Bhimani, 2016; Dennerlein et al., 2017; Ecklund & Bloss, 2015; Hallmark et al., 2015; TJC, 2013; VHA, 2016). Awareness of risks and injuries, discussion of related errors and accidents, and problem-solving with appropriate interventions require communication and collaboration to improve work conditions and patient care. Transparent communication and clear expectations facilitate knowledge and understanding of risks, hazards, and every member’s role in maintaining safety throughout the healthcare organization. Communication and collaboration between the healthcare organization and HCWs ensure that all necessary resources for SPHM are available, appropriate, and functional for HCW use in all patient care areas (ANA, 2013; Anderson et al., 2014; Dennerlein et al., 2017; Vendittelli et al., 2016; VHA, 2016).

Communication and collaboration between HCWs reinforce SPHM with consistency during direct patient care, during transitions of care that occur with shift changes and patient transfers to other areas, and throughout the discharge planning process. Communication and collaboration between HCWs and patients are also required to ensure consistency in SPHM that is reinforced with accurate patient assessments of participation and mobility repeated as needed, knowledge and understanding of best practices, and mutual agreement on patient plans of care (Anderson et al., 2014; Bhimani, 2016; Dennerlein et al., 2017; Ecklund & Bloss, 2015; Vendittelli et al., 2016; VHA, 2016). The goals and expected outcomes for patients are therefore reviewed frequently
and revised as necessary, as ongoing communication and collaboration occur throughout the healthcare organization and within the context of SPHM.

**Context.** The *context*, wherever SPHM occurs, includes an adequate number of HCWs and the patient or healthcare recipient (ANA, 2013; Dennerlein et al., 2017; Ecklund & Bloss, 2015; TJC, 2012; Kay et al., 2014; VHA, 2016). The HCWs and the patient are present in this context immediately before and during any transferring, repositioning, or mobilizing activities within the environment of care. The context of SPHM also requires the appropriate, functional assistive technology for each patient and for the specified task, with safe work conditions and enough time to complete the specified task at hand (ANA, 2013; Bhimani, 2016; Ecklund & Bloss, 2015; Elnitsky et al., 2014; Joint Commission, 2012; Vendittelli et al., 2016; VHA, 2016).

A clean, uncluttered environment where HCWs can navigate easily with any necessary equipment or assistive technology, without hurrying or feeling rushed, is a contextual example of SPHM. A shortage of time or assistance presents opportunities for human error, adverse events, and harm to occur during patient care tasks or work (Bhimani, 2016; Elnitsky et al., 2014; Joint Commission, 2013; Noble & Sweeney, 2018; Vendittelli et al., 2016). Healthcare workers who feel rushed or overwhelmed can hurry through tasks and multitask to compensate, but these workarounds divide attention and distract from safety. The subsequent risks and hazards present consequences that can harm HCWs and patients (Bhimani, 2016; Darragh et al., 2013; Elnitsky et al., 2014; Griffiths, 2012; Hignett, Carayon, Buckle, & Catchpole, 2013; Noble & Sweeney, 2018). The context of SPHM is presented below in Figure 1.
Figure 1. Antecedents and the context of safe patient handling and mobility (SPHM) within a culture of safety. The context of SPHM is present within the environment of care when specific requirements for healthcare workers (HCWs), registered nurses (RNs), assistive technology, and the patient have been met. Nurses may be required to move or mobilize patients who are connected to complex medical equipment or need additional monitoring and care. The requirements included in the adapted survey are highlighted above. This context is one exemplar of a culture of safety, where communication and collaboration occur at all levels to reduce or eliminate risks and hazards throughout the entire healthcare organization. No models from the body of literature that describe or explain contextual factors of SPHM were found (H. Monaghan, personal communication, August 8, 2017). This general, overarching model was therefore created to describe SPHM as it occurs in patient care. MD = medical doctor; NP = nurse practitioner.
Conceptual Framework

Antecedents of SPHM

Antecedents in the original model above are essential to a healthcare organization with a culture of safety and the context where SPHM will occur. A common example of context is the patient’s room. The antecedents of SPHM are specific requirements of the healthcare organization, context, HCWs, RNs, assistive technology, and the patient. Safe patient handling and mobility can occur anywhere within the healthcare organization when these requirements are met (ANA, 2013; Hignett et al., 2014). The requirements mentioned in the adapted ANA survey are highlighted above in gray.

The healthcare organization is responsible for promoting safety with communication and collaboration at all levels, including the context of SPHM. Effective communication and collaboration increase awareness, knowledge, and understanding of the ongoing, collective effort to maintain safety throughout the entire healthcare organization (Baumann, Holness, Norman, Idriss-Wheeler, & Boucher, 2012; Baumann et al., 2015; Dennerlein et al., 2017; TJC, 2013; Wilson, 2014). A culture of safety is reinforced within the environment of care when the healthcare organization, HCWs, and the patient meet the requirements for SPHM (ANA, 2013; Hallmark et al., 2015; Lapane et al., 2013; Stevens et al., 2013; Theis & Finkelstein, 2014).

Context and the Healthcare Organization with a Culture of Safety

The context of SPHM involves HCWs, nurses, patient, assistive technology, and the specific requirements for each (ANA, 2013; Hignett et al., 2014; Kay et al., 2012; Przybysz & Levin, 2016; Thomas & Thomas, 2014). Healthcare workers or nurses are responsible for completing an accurate patient-specific mobility assessment, based on the
A patient’s medical condition and level of participation in physical activity or activities of daily living (ADLs). This assessment guides selection of assistive technology and determines the amount of assistance required for a specific patient care task.

Communication and collaboration between the HCWs and nurses include the patient and also facilitate selection of appropriate assistive technology for use within the context at that particular time, while clarifying expectations of the outcome: Patient repositioning, transfer, or mobilization are completed safely without harm. The HCWs, nurses, and the patient have a mutual understanding of the assistive technology’s function, safety and comfort during use, and the specific task to be performed with the patient. The consistency of SPHM throughout the healthcare organization is maintained with ongoing communication and collaboration between and within the context and the healthcare organization (ANA, 2013; Dennerlein et al., 2017; Przybsyz & Levin, 2016; VHA, 2016). The healthcare organization is responsive to the context, HCWs, and patients to maintain the vigilance required for safety. All necessary resources to sustain SPHM are provided by the healthcare organization for every patient care area.

**Literature Review**

**The Origin and Evolution of SPHM**

In 2001, the science of SPHM originated with an evidence-based, comprehensive safe patient handling and movement program in the VHA (Nelson et al., 2003; Nelson, Chen, Fragala, Lloyd, Matz, & Siddharthan, 2006; Powell-Cope et al., 2014). The program was designed to eliminate work-related musculoskeletal injuries in nurses with the implementation of best practices in healthcare and other professions, based on international case studies (Rogers et al., 2013). The following elements of a
A SURVEY OF HEALTHCARE WORKERS

A comprehensive safe patient handling and movement program were specified as requirements (Nelson et al., 2006; Rogers et al., 2013; Joint Commission, 2012):

- Ergonomic assessments of the work environment in patient care areas
- Criteria established for patient assessment
- Algorithms that direct safe patient handling and movement during patient care
- Well-developed plans for equipment (assistive technology) selection, storage, and maintenance
- Utilization of peer-safety leaders or back injury resource nurses and lift teams
- After-action or follow-up reviews
- Implementation of a no-lift policy that eliminates HCWs’ manual lifting of patients

The program elements were developed and revised upon review of current evidence and professional consensus before pilot testing in seven VHA healthcare organizations. Each element evolved over time with continued research and clinical practice. Study recommendations addressed the use of safe patient handling resources and deferred implementation of a no-lift policy until the adequate resources and systems were operational. Lift teams were suggested for patient care areas with low to moderate numbers of dependent patients. Simultaneous implementation of patient assessment criteria and algorithms was intended for the optimal utilization of safe patient handling assistive technology and subsequent patient benefits.

The VHA provided patient care areas with adequate, appropriate assistive technology and other resources required for patient handling. Gait belts with handles, stand-assist and full-body lifts, and friction-reducing devices were available for use. Peer-
safety leaders or back injury resource nurses were viewed as potential change agents who could specifically target HCW behaviors during patient-handling tasks. The VHA’s safe patient handling and movement program was initiated and sustained with careful planning that facilitated successful implementation. An evaluation of the program followed 18 months after implementation (Siddharthan et al., 2005). The VHA researchers expected the patient care areas with high injury rates would benefit most from a safe patient handling and movement program, when considering the expenditures for resources (Siddharthan et al., 2005).

Work-related injuries in HCWs were examined before and after implementation of the VHA’s safe patient handling and movement program (Nelson et al., 2006; Siddharthan et al., 2005). The results reinforced the benefits of a comprehensive program for HCWs and patients. The annual rate of HCW injuries decreased from 24% to 16.9% after the program was implemented (Mayeda-Letourneau, 2014); severity of injuries decreased, as well. Overall HCW and patient satisfaction with safe patient handling assistive technology were also reported (Nelson et al., 2006). A cost–benefit analysis of the program revealed $200,000 in annual net savings from fewer work-related injuries and subsequent workers’ compensation claims; the VHA recovered its initial investment in safe patient handling assistive technology within 5 years of the program’s inception.

Based on the pilot test results, the VHA proceeded to invest an additional $205 million annually for 4 years, and eventually established safe patient handling and movement programs in all of the 153 VHA medical centers (Powell-Cope et al., 2014). From the VHA healthcare system, the science of SPHM has evolved with continued research, the growth of new programs, and new health policy initiatives for legislation at
the federal and state levels. Several examples include the ANA’s (2003) Handle with Care campaign, revised lifting recommendations for patient care from NIOSH, OSHA’s (2009) guidelines for ergonomics in nursing homes, and education modules for nursing schools to promote SPHM as a standard of care (Hallmark et al., 2015; Rogers et al., 2013; Waters, 2007; Waters, Nelson, Hughes, & Menzel, 2009).

In 2013, the construct of safe patient handling and movement was revised to *safe patient handling and mobility*, to communicate the importance of patient autonomy and active participation during patient handling and mobilization activities (ANA, 2013; Gallagher et al., 2013). The goals of SPHM therefore include optimal levels of patient mobility, function, and independence with ADLs. Today’s SPHM programs drive early or progressive mobility initiatives across various healthcare settings, from critical or intensive care units to outpatient and home care settings, regardless of patient acuity (Azuh et al., 2016; Brissie, Zomorodi, Soares-Sardinha, & Jordan, 2017; Brown et al., 2016; Castelino et al., 2016; Drolet et al., 2013; Ecklund & Bloss, 2015; Fraser, Spiva, Forman, & Hallen, 2015; Hodgson, Matz, & Nelson, 2013; McWilliams, Atkins, Hodson, & Snelson, 2017; Santos, Ricci, Suster, Paisani, & Chiavegato, 2017; Schaller et al., 2016; Tipping et al., 2017). Design is now an important consideration for SPHM at all levels of patient care, with the integration of ergonomic principles from human factors science that promote safety and optimal utilization of resources in patient care (Devine et al., 2015; Hignett et al., 2013; TJC, 2012; Rogers et al., 2013; Warren, 2016; VHA, 2016).

The human factors perspective addresses contextual or environmental barriers encountered by HCWs when they reposition, transfer, or mobilize patients. Fitting these
patient care tasks to the HCW facilitates efficiency with safety, requires less effort, and therefore improves task performance with interventions based on the HCW’s strengths and limitations. Modifications that widen doorways and elevators, increase the available workspace in patient rooms, or include various powered functions that adjust beds and stretchers for easier patient positioning or transport are several examples of good ergonomic design incorporated into healthcare settings (Armstrong et al., 2017; Davis & Kotowski, 2015; Devine et al., 2015; OSHA, 2009; Rogers et al., 2013; Wiggermann, 2017; Zhou & Wiggermann, 2017). The evidence for safety, efficiency, and cost using a human factors approach has demonstrated value in SPHM, with well-implemented programs that manage resources effectively and reinforce standards for safety (ANA, 2013; Noble & Sweeney, 2018; Rogers et al., 2013).

The ANA’s (2013) standards for SPHM were created to establish and communicate best clinical practice in SPHM throughout healthcare, in lieu of federal legislation or regulations. Eight comprehensive, interprofessional standards were developed using current evidence and the VHA’s 2001 safe patient handling and movement initiative as a prototype for best clinical practice (ANA, 2013). Multiple professions, including human factors, nursing, physical therapy, and occupational therapy, contributed valuable content that acknowledged the diversity in healthcare organizations, settings, HCWs, and patients, with goals for generalizability and utility upon application that facilitate translation of the current evidence to clinical practice across healthcare settings. The process of generalization is necessary for translation of evidence to clinical practice, but not universal within the dynamic context of real-world patient care, where evidence is utilized based on the relevance to specific patients or
healthcare settings (Curtis, Fry, Shaban & Considine, 2016; Kristensen, Nymann & Konradsen, 2016; Polit & Beck, 2010). Despite the aforementioned usefulness and applicability, the 2013 ANA standards have not been used to fully implement SPHM programs in many healthcare organizations, which indicates a clinical practice gap that may be attributed to various organizational factors (e.g., inadequate staffing or other SPHM resources; Choi & Cramer, 2016; Powell-Cope et al., 2014; Vendittelli et al., 2016).

Widespread acceptance and adoption of the ANA standards as universal guidelines should facilitate the growth of well-implemented, sustainable SPHM programs that decrease the number of work-related injuries and subsequent costs. Variations in patient mobility, resources, and the context for SPHM can create barriers that SPHM programs effectively address with careful assessment, planning, and implementation of appropriate controls or solutions. The authors of the ANA (2013) standards for SPHM accounted for the variations across healthcare settings and populations with thorough assessments that identify the needs of healthcare organizations, HCWs, and patients. These specific needs assessments communicate deficits or unmet needs that preclude SPHM in clinical practice, drive the selection and procurement of resources, and guide evaluations of SPHM across patient care areas, to reinforce adherence and consistency throughout the healthcare organization and ensure provision of all necessary resources (ANA, 2013; Kairalla et al., 2016; Powell-Cope et al., 2014).

**Categorizing Resources as Controls for SPHM**

Safe patient handling and mobility resources may be categorized as engineering (ergonomic), administrative, or behavioral (practice) controls implemented in healthcare
settings (Mayeda-Letourneau, 2014; Przybysz & Levin, 2016; Stevens et al., 2013; VHA, 2016). Controls are the interventions or solutions that eliminate or reduce workplace risks and hazards. The hierarchy of controls is an intervention strategy used to select and implement the safest, most effective, and most feasible controls based on the risk and severity of hazard exposure (NIOSH, 2016).

Engineering controls are priority solutions that create permanent changes in the environment of care or optimize design for specific jobs or work. The various types of assistive technology are engineering controls that decrease musculoskeletal exposures to work-related hazards. Administrative controls in SPHM are the specific policies, procedures, and processes followed to prevent or reduce exposures to ergonomic hazards. The least effective solutions, behavioral or practice controls, include (a) education and training on ergonomics; (b) biomechanical protective strategies for work; (c) HCW selection of appropriate assistive technology for specific tasks and patients; and (d) local SPHM experts, such as champions, peer coaches and leaders, and super users (Hallmark et al., 2015; Kennedy & Kopp, 2015; Noble & Sweeney, 2018; Rogers et al., 2013; Szeto et al., 2013; VHA, 2016). These controls do not eliminate or design out risks or hazards, and are best used in combination with more effective controls.

**Engineering controls.** Engineering controls create permanent changes in the healthcare environment that specifically alter design or work to address risks or hazards at an identified source (Mayeda-Letourneau, 2014; Mills, 2015; NIOSH, 2016; Stevens et al., 2013; VHA, 2016). These solutions are implemented to eliminate or at least minimize risks and exposures to hazards. The human factors perspective has drawn more attention to the relationship between ergonomics and safety in healthcare, where fitting a job to the
worker improves performance after modifications for individual strengths and limitations (Carayon et al., 2013; Caspi et al., 2013; Hignett et al., 2015; IOS, 2012; Wilson, 2014). NIOSH’s (2007) Prevention through Design (PtD) initiative specifically focused on the prevention or reduction of work-related illnesses, injuries, exposures, and deaths using engineering controls as design interventions or modifications to work environments. Engineering controls are therefore preferred over the other primary prevention approaches, such as work practices or administrative policies, within the hierarchy of controls (NIOSH, 2016; Stevens et al., 2013; TJC, 2012; Wurzelbacher et al., 2014). The prevalent engineering control used in SPHM is assistive technology.

Assistive technology is used more frequently when adequate education and training are provided and when associated design barriers have been addressed in the work environment (Choi & Brings, 2016; Elnitsky et al., 2014; Olinski & Norton, 2017; Noble & Sweeney, 2018; Rogers et al., 2013). Several solutions to these barriers in SPHM involve the redesign of mobile (portable) and overhead lifts, patient lift slings, bed controls and brakes, and patient rooms to facilitate easier, safer navigation and use of assistive technology (Choi & Brings, 2016; Hallmark et al., 2015; Kurowski et al., 2012; Przybysz & Levin, 2016; TJC, 2012; VHA, 2016; Wiggermann, 2017). Air-assisted devices (see Appendix K) like the HoverMatt are easier to maneuver, require less effort, and include fewer HCWs for lateral patient transfers (pushing vs. pulling patients from bed to stretcher, stretcher to table, or other level surfaces; ANA, 2013; Fraser et al., 2015; Hallmark et al., 2015; VHA, 2016). Portable and fixed mechanical lifts (see Appendix K) perform vertical patient transfers that eliminate manual lifting when transferring dependent patients from chairs, beds, stretchers, and other locations involving height
differences or uneven surfaces (McKinney, 2015; Hallmark et al., 2015; VHA, 2016). However, portable lifts can be large, heavy, and difficult to maneuver within small spaces, therefore increasing musculoskeletal exposures to hazardous forces without the convenience and additional safety features of fixed or installed lifts (Choi & Brings, 2016; Dutta, Holliday, Gorski, Baharvandy, & Fernie, 2012; VHA, 2016).

Ceiling or overhead lifts are a fixed type of assistive technology that have become increasingly popular due to the convenience of overhead storage and location, utility for repositioning or transferring patients, and reduced musculoskeletal loading forces with less time required for use (Darragh et al., 2013; Hallmark et al., 2015; Rogers et al., 2013; Stevens et al., 2013). Overhead lifts are often used in combination with other controls in multicomponent or multifaceted SPHM programs, which are more effective in reducing work-related musculoskeletal problems than provision of assistive technology alone (Broome et al., 2015; Hodgson et al., 2013; Powell-Cope et al., 2014; Stevens et al., 2013; White-Heisel et al., 2017). The effectiveness of lifts in a healthcare organization diminishes with variations in manufacturers, types, and slings, which may be incompatible and unsafe for use with certain lifts. The resulting inconsistency can become a barrier to HCW education and training, competence, and subsequent adherence with use (Matz et al., 2016; McWilliams et al., 2017; Powell-Cope et al., 2014; VHA, 2016).

Additional engineering controls include other types of assistive technology that function without need for installation, modification of work areas, or more effort to transport. Small aids for SPHM (see Appendix K) can be used without the design constraints that interfere with installation or use of large, heavy assistive technology.
Small aids include various types of lower priced assistive technology that are frequently used during patient-handling activities. This particular equipment is nonmechanical, conveniently sized, and easily stored or transported for use. Common small aids used in patient care include (a) ladders and steps designed for bed entry and exit, (b) slide sheets, (c) friction-reducing devices, (d) antislide and transfer mats, (e) slide or transfer boards, (f) turn discs and tables, (g) gait or handling belts, and (h) various slings for patient care (Darragh et al., 2013; Freiberg et al., 2016; Mayeda-Letourneau, 2014; Villarroya, Arezes, Díaz de Freijo, & Fraga, 2017; Weiner et al., 2015). However, the available evidence on use of small aids does not clearly indicate whether they prevent, decrease, or exacerbate work-related musculoskeletal problems in patient care (Bhimani, 2016; Darragh et al., 2012; Freiberg et al., 2016; Tang et al., 2017; VHA, 2016; Villarroya et al., 2017; Weiner, Kalichman, Ribak, & Alperovitch-Najenson, 2017).

The number of low-quality studies with questionable generalizability, variations in study populations, settings, and specific types of devices, have hindered conclusion on the benefits of small aid use; despite this uncertainty, small aid use is a common recommendation when repositioning, transferring, and mobilizing patients (Brown et al., 2016; Campo, Shiyko, Margulis, & Darragh, 2013; Drolet et al., 2013; TJC, 2012; Kurowski et al., 2012; VHA, 2016; Villarroya et al., 2017). Small aids may be viewed as a more feasible option with lower cost and less maintenance when compared to the initial investment and installation required for ceiling or overhead lifts. However, the perceived benefits are overshadowed by the reduced direct and indirect costs of work-related musculoskeletal problems, plus the recovery of initial investments within two to five
years of implementing a successful, comprehensive SPHM program that uses multicomponent or several different types of interventions (Aslam et al., 2015; Lapane et al., 2017; McKinney, 2015; Noble & Sweeney, 2018; OSHA, 2014; Siddharthan et al., 2005; Waters et al., 2006; Weinmeyer, 2016).

The successful implementation of engineering controls has occurred in other healthcare organizations, in addition to the VHA medical centers (Aslam et al., 2015; Kurowski et al., 2017; Nelson et al., 2006; Siddharthan et al., 2005; Stevens et al., 2013). Although provision and installation of the adequate, appropriate assistive technology are expensive, lower workers’ compensation costs and higher productivity can easily offset the cost (Aslam et al., 2015). For example, a multicomponent SPHM program was implemented in acute care. Stevens et al. (2013) reported a 60% decrease in costs from patient-handling-related injuries, a 36% lower rate of patient-handling-related injuries, and a 71% decrease in missed work days, one year after program implementation. The authors attributed these results to an established culture of safety that increased awareness of risks and hazards and designated peer leaders for ergonomic education with the introduction of new assistive technology. According to McKinney (2015), a California VHA healthcare organization averaged $1 million in annual employee replacement costs before implementing a SPHM program. Approximately $4 million was spent on assistive technology, upgrades, and the redesign of older construction to accommodate ceiling lift installation and use. Within four years, the HCW injury rate fell 35%, employee replacement costs from work-related injuries dropped to zero, HCW retention improved, and higher levels of nurse and patient satisfaction were reported (McKinney, 2015).

Today, the VHA remains involved with construction for several new buildings
and expansion of skilled nursing facilities. The consistent incorporation of SPHM assistive technology into building design occurs throughout the current construction projects in the VHA system. Similar results in other healthcare organizations reinforce the benefits of assistive technology, and the significance of careful planning and implementation (Dennerlein et al., 2017; Huffman et al., 2014; Kennedy & Kopp, 2015; Kurowski et al., 2017; Stevens et al., 2013).

Safe patient handling and mobility programs were implemented in 136 skilled nursing facilities with direction from a contracted risk management agency, where the adequate, appropriate assistive technology was installed for every resident with impaired mobility (Kurowski et al., 2017). After provision of assistive technology, resident handling-related claims were down to less than 25% of all workers’ compensation claims, with a significantly lower number of all claims reported for three years, followed by decreasing numbers of claims over the next three years (Kurowski et al., 2017).

Positive results with assistive technology use in acute care settings have been reported, as well. A year after provision and installation of new assistive technology in four hospitals, the number of patient-handling injuries fell by between 27% and 75% at three hospitals, with a 48% to 60% reduction in associated costs at two hospitals, decreasing monthly costs by at least $2,000 or more at another hospital, and 71% fewer missed days of work with a 28% improvement in job satisfaction scores at one hospital (Dennerlein et al., 2017; Huffman et al., 2014; Kennedy & Kopp, 2015; Stevens et al., 2013).

Current assistive technology continues to progress with devices and programs that increase independence and improve function with impaired physical mobility, including
new or improved equipment for SPHM. Robotics for patient transfers, exoskeletons that mobilize affected extremities, convertible multipurpose equipment, smart devices, motion capture technology, and computer software for simulation or work have been designed to accommodate versus compensate for various mobility impairments, or for improving HCW awareness and understanding of various behaviors and movements that increase hazardous musculoskeletal exposures (ANA, 2013; Aslam et al., 2015; Kim et al., 2016; Ma, Li, Gravina, & Fortina, 2017; Nakagawa et al., 2017; Sivaprakasam et al., 2017). One review supported assistive technology use to reduce the risks associated with patient lifting but emphasized the need for cost-effective strategies to improve and develop new assistive technology (Aslam et al., 2015).

The next studies are examples of assistive technology in development and evaluation, for comparison. Lin et al. (2017) pilot-tested new assistive technology during common patient-handling activities for effectiveness in workplace activity recognition. The benefits from detecting similar patterns in activity are preventive with an increased awareness of body positions and postures and diagnostic when correction is necessary to prevent musculoskeletal injury. Weiner et al. (2017) studied the effectiveness of current assistive technology in reducing musculoskeletal loading forces using measurements of torso motion and perceived load while repositioning patients in bed. Lin et al.’s (2017) approach used smart devices in nurses’ shoes that detected differences in plantar pressure to calculate patterns in nurses’ patient-handling activities. Overall, the Smart Insole 2.0 classified 91.7% of eight patient-handling activities with accuracy and provided valuable kinetic data for prevention and safety purposes (Lin et al., 2017). Weiner et al. (2017) compared two types of assistive technology currently in use to a bedsheet to determine
which would be optimal, with the lowest amount of force exerted and the least effort; the study reinforced the benefits of friction-reducing devices for repositioning patients.

The developments in assistive technology include more than new lifting equipment; for example, they have expanded into robotics, motion capture technology, and simulation learning. Hopefully, proactive approaches to new assistive technology and further innovation will surpass the current assistive technology to finally eliminate patient lifting, for even greater improvements in safety with fewer or no related injuries. In the meantime, combinations of different controls are recommended to promote the appropriate selection and use of assistive technology, for decreased hazardous musculoskeletal exposures and injury.

**Administrative controls.** Administrative controls include the policies, procedures, and processes that prevent or reduce exposure to ergonomic risk factors. Examples include (a) more frequently scheduled breaks; (b) modifications involving activity restrictions or length of shifts; (c) training HCWs and other employees to recognize risk factors and hazards; (d) no-lift policies, where no manual lifting is permitted, with exceptions for extraordinary or life-threatening events; (e) protocols for patient care; and (f) other clinical tools, such as algorithms, that are interventions for SPHM (Caspi et al., 2013; Dennerlein et al., 2017; Lee et al., 2015; Stevens et al., 2013; Szeto et al., 2013; VHA, 2016). Recommended SPHM assessment protocols and algorithms have incorporated the available evidence for high-risk tasks in patient care. These assessment tools assist in standardizing HCW communication and decision-making, decreasing variations in clinical practice, and increasing the safe, appropriate use of assistive technology with each patient.
The development and subsequent implementation of organizational SPHM policies and procedures must reinforce existing laws or regulations to improve compliance and safety in healthcare (Choi & Cramer, 2016; Elnitsky et al., 2014; Kneafsey et al., 2015; Lee et al., 2015; Mayeda-Letourneau, 2014; Powell-Cope & Rugs, 2015; Rugs et al., 2013). The proposed universal standards from the ANA use evidence-based knowledge to discontinue obsolete patient-handling practices, and also serve as a proxy for federal legislation (ANA, 2013; Powell-Cope & Rugs, 2015). Standardized SPHM programs that evolve beyond existing state legislation can also pave the way for universal standards and guidelines, clarify definitions, and establish exemplars for quality and measurement in SPHM (ANA, 2013; Choi & Cramer, 2016; Lee et al., 2015; Powell-Cope & Rugs, 2015; Vendittelli et al., 2016).

Successfully implemented programs can significantly reduce MSDs and injuries sustained in the healthcare setting, especially when education and training incorporate the importance and use of assistive technology with content on proper body mechanics (Aslam et al., 2015; Choi & Cramer, 2016; Dennerlein et al., 2017; Kennedy & Kopp, 2015; Mayeda-Letourneau, 2014; Przybsyz & Levin, 2016; Stevens et al., 2013; Thomas & Thomas, 2014; Vendittelli et al., 2016). The developments in assistive technology, legislation, standards, and continued growth of successful SPHM programs show great promise for a new science that protects HCWs and patients from harm.

New York State’s Safe Patient Handling Act is an example of legislation passed at the state level to protect HCWs after federal bills were not enacted into law (New York State Zero Lift Task Force, 2014; Powell-Cope & Rugs, 2015). The legislation incorporated the ANA (2013) standards for SPHM, and included all hospitals, skilled
nursing facilities, outpatient healthcare settings, group homes, and prison healthcare systems. The state’s definition of safe patient handling specified the use of engineering controls, equipment for lifting or transferring patients, and assistive devices by HCWs to reposition, transfer, and lift patients. Mandates required establishment of a statewide safe patient handling workgroup that would review existing safe patient handling programs, develop education and training content, and submit a report containing sample policies, best practices, resources, and tools to help healthcare organizations meet safe patient handling requirements. New York State is currently working toward the goal of zero patient lifts throughout the state’s entire healthcare system.

Several states require healthcare organizations to have SPHM committees, preferably with half of the members in direct patient care roles to ensure adequate representation of frontline HCWs (Choi & Cramer, 2016; New York State Zero Lift Task Force, 2014; Massachusetts Department of Public Health Occupational Health Surveillance Program, 2013; Powell-Cope & Rugs, 2015; Rogers et al., 2013; Safe Patient Handling and Movement in Hospitals, 2011; Silverstein, Howard, & Adams, 2011). These committees or other specified teams are tasked with safe patient handling program design and implementation, including policies and procedures, with considerations for specific patient care areas and patient populations (ANA, 2013; Campo et al., 2013; Dennerlein et al., 2017; Gallagher, 2013; Massachusetts Department of Public Health Occupational Health Surveillance Program, 2013; Rugs et al., 2013; VHA, 2016). Best practices are therefore examined and reviewed for appropriateness in patient care areas with specific patient populations.
Safe patient handling and mobility assessments are also recommended for implementation with algorithms to direct the selection and use of assistive technology for each patient (Choi & Brings, 2016; Dennerlein et al., 2017; VHA, 2016). The ultimate goal of safety provides rationale for the work of SPHM programs, specifically the algorithms, policies, procedures, processes, education, training, and systems developed and implemented to prevent injury and reduce or eliminate hazards.

In addition to policies and procedures, SPHM programs are responsible for developing and implementing the initial and ongoing education, training, and competencies for HCWs in direct patient care, and the systems with processes for communication, reporting, resources, data collection and analysis, and ongoing evaluation of SPHM in clinical practice (ANA, 2013; Krill, Raven, & Staffileno, 2012; Rogers et al., 2013; Rugs et al., 2013; Sokas et al., 2013; Theis & Finkelstein, 2014). Well-implemented programs have also established systems and processes for the evaluation of all HCW competencies and injuries, patient injuries, and the reviews conducted by safe patient handling committees (ANA, 2013; Powell-Cope & Rugs, 2015; Przybysz & Levin, 2016; Rugs et al., 2013). Healthcare organizations also need policies and procedures in place that outline a process for HCWs’ right to refuse unsafe patient care assignments without fear of punitive or disciplinary action, as part of a Just Culture (see Appendix B) where learning and systems improvement for safety are promoted over blame or punishment for individual performance (Choi & Cramer, 2016; Kennedy & Kopp, 2015; Powell-Cope & Rugs, 2015; Rugs et al., 2013; Sokas et al., 2013).

Nonadherence with existing state legislation or healthcare organization policies may be a consequence of poorly written or absent policies and procedures and possibly
the justification for decreased funding of workers compensation claims (OSHA, 2013). Sheldon (2016) presented several views of policy applicable to SPHM. An argument for federal legislation assumes that policy at the state level is weaker and will not align with federal intent when federal control and oversight are not present. Conversely, another view posits that universal or federal policy fails to acknowledge the variations in context at the local level, and therefore is less effective across states.

Despite the absence of federal regulation or standards, Sheldon (2016) found that federal–state interactions in four states prompted the provision of state resources, such as education and consultation, for policy initiatives and even more nonregulatory consultation for healthcare organizations to assist with adherence efforts. Well-written policies and procedures that align with current legislation, will clearly communicate the significance of safe patient handling and mobility throughout the healthcare organization, and provide specific direction and guidance for the provision, allocation, maintenance, and utilization of all necessary resources to ensure safety at all times. Therefore, SPHM policy, programs, and committees have a pivotal role in the success of administrative controls in patient care.

**Behavioral controls.** Behavioral or practice controls include (a) education and training on ergonomics; (b) various biomechanical protective strategies, such as body mechanics; (c) appropriate assistive technology selection and use per patient; and (d) utilization of local experts, including unit-based peer leaders and champions, as resources for SPHM (S. D. Choi & Brings, 2016; Dennerlein et al., 2017; TJC, 2012; NIOSH, 2010; Stevens et al., 2013). Per the ANA (2013) standards, education involves knowledge acquisition, whereas training focuses on the performance of skills to achieve competence,
which should be measured and validated. Initial and ongoing sessions for education and training, with adequate time and participation, require the appropriate assistive technology for practice (Vendittelli et al., 2016). Education and training that incorporate the use of SPHM assistive technology, proper body mechanics, and other ergonomic principles are more effective than content solely focused on proper body mechanics or on assistive technology use alone (ANA, 2013; Anyan, Faraklas, Morris, & Cochran, 2013; Dennerlein et al., 2017; Huffman et al., 2014; Przybysz & Levin, 2016; VHA, 2016).

Other behavioral controls that use physical exams to rule out motor weakness in HCWs and physical conditioning programs to increase strength, endurance, and mobility have not significantly decreased HCW injuries or improved subsequent outcomes (S. D. Choi & Brings, 2016; Thomas & Thomas, 2014; VHA, 2016). Unit-based peer leaders or designated champions of SPHM have the potential to improve adherence regarding selection and use of assistive technology; however, strong evidence is lacking due to unclear or missing descriptions with variations in interventions and quality across studies (Aslam et al., 2015; Caspi et al., 2013; Stevens et al., 2013). Overall recommendations from the literature suggest a combined use of various types of controls to decrease the risk for injury from patient handling; however, content, amount, and frequency of these interventions for effectiveness are often unspecified and also difficult to determine from studies of multifaceted or multicomponent SPHM programs (Dennerlein et al., 2017; Mayeda-Letourneau, 2014; Przybysz & Levin, 2016; Sorensen et al., 2016; Stevens et al., 2013; Thomas & Thomas, 2014).

Inadequate education and training, staff turnover, habitual use of outdated and hazardous manual handling practices, and no evidence of leadership support or change in
the work culture hinder the consistent, safe, and appropriate use of assistive technology, regardless of the type and quantity provided (Bhimani, 2016; Elnitsky et al., 2014; O’Byrne, 2014; Sokas et al., 2013; Stevens et al., 2013; VHA, 2016; White-Heisel et al., 2017). Established competency and subsequent validation of skills require ongoing education and training to reinforce SPHM in patient care (ANA, 2013; Krill, Raven, & Staffileno, 2012; Noble & Sweeney, 2018; O’Byrne, 2014; Stevens et al., 2013; Vendittelli et al., 2016; VHA, 2016). These elements are vital to HCW proficiency, adherence, and comfort with assistive technology use. Education and training may be weak behavioral controls when used in isolation, but both are necessary components for the success of SPHM programs in healthcare (Lee et al., 2015).

Education and training have been used during implementation of new SPHM programs or after introducing new assistive technology to address work-related injuries from repositioning and mobilizing patients in acute care, rehabilitation, and long-term care settings (ANA, 2013; Kurowski et al., 2017; Krill, Raven, & Staffileno, 2012; Noble & Sweeney, 2018; O’Byrne, 2014; Theis & Finkelstein, 2014). One medical center invested in assistive technology and education for coaches and superusers (Noble & Sweeney, 2018). However, no plans were made for ongoing or continued education, and the number of workers’ compensation claims increased 44% within a two-year period. Similar circumstances created barriers to assistive technology use in a Midwestern hospital, based on survey responses of the HCWs (Krill, Raven, & Staffileno, 2012). SPHM education and training were two of the barriers identified, with 65% reporting both components as adequate and 78% reporting insufficient follow-up. Without additional, ongoing education and training, HCWs are unable to master the skills
necessary for safe, appropriate use of assistive technology and are therefore hesitant or incompetent (Krill, Raven, & Staffileno, 2012; Snyder, 2014; Stevens et al., 2013).

Two examples from studies in intensive care and long-term care settings also support the evidence for SPHM programs and the requisite education and training (O’Byrne, 2014; Kurowski et al., 2017). No SPHM assistive technology was used by any of the 12 HCWs with injury claims in the fiscal year specified, despite their previous education and training on selection and use in a critical care area (O’Byrne, 2014). Upon further investigation of patient care activities, several days of monitoring revealed that only 15% of the unit’s patients had the correct SPHM equipment in place.

A second study addressed the pervasive problem of resident handling-related injuries in long-term care (Kurowski et al., 2017). Healthcare worker knowledge deficits in both studies precluded accurate patient mobility assessments and correct use of the available safe patient-handling equipment per patient (O’Byrne, 2014; Kurowski et al., 2017). In the long-term care study, a risk management company was contracted for the initial and follow-up training on new assistive technology, maintenance, and policies after SPHM programs were implemented throughout a chain of skilled nursing facilities (Kurowski et al., 2017). Multiple follow-up visits with HCWs were scheduled for more hands-on training, return demonstrations with skills check-offs to verify competence, and for review of policies, procedures, and resident handling-related injuries within the first three months, then every ten weeks over the first year, and ten additional visits over the next two years. Rates of resident handling-related claims fell 32% in 3 years and 82% in six years, with the initial and ongoing education and training after program implementation by risk management consultants.
In O’Byrne’s (2014) study of HCWs in intensive care, a series of short, educational videos was recorded and uploaded to the unit’s website to address the HCWs’ knowledge deficits. Workers’ compensation claims from sprain and strain injuries were subsequently reduced by 48% over three quarters of the next fiscal year. The average cost per claim was $11,000, yielding a total savings of $33,000 plus the indirect costs for HCWs’ lost income and pain. Education and training are often used as behavioral controls in SPHM, but more factors are involved in the success of SPHM, specifically the availability and utilization of resources, and adherence with use.

**Availability of Resources for SPHM**

**Healthcare workers.** A growing number of patients with multiple comorbidities, higher acuity of illness, escalating obesity, and advancing age affect the HCW in SPHM (Blair & Bratton, 2015; Choi & Brings, 2016; Lapane, Dubé, & Jesdale, 2016; OSHA, 2013; J. A. Phillips & Miltner, 2015; von der Lancken & Levenhagen, 2014). Healthcare worker strength, range of motion, and mobility decrease over time as musculoskeletal degenerative changes occur with age and mechanical use. The onset of musculoskeletal degeneration begins around age 40 and continues as overall muscle mass decreases and intervertebral discs dehydrate and flatten (Jäger et al., 2012; Rogers et al., 2013). These musculoskeletal changes affect the HCW’s ability to reposition, transfer, and lift. The risks for HCW injury and related musculoskeletal disorders are therefore higher, especially from excessive compression and shearing forces (see Appendix K) exerted when repositioning, transferring, and mobilizing patients (OSHA, 2013; Choi & Brings, 2016; Phillips & Miltner, 2015). Most of these work-related injuries result from repeatedly transferring, repositioning, or mobilizing patients; the prolonged, awkward
body positions or postures assumed during work; or from pushing versus pulling heavy loads (ANA, 2013; Choi & Brings, 2016; Jäger et al., 2012; Hallmark et al., 2015; Hignett et al., 2013; OSHA, 2017).

The rising prevalence of obesity in the United States is evident in approximately 36.5% of adults (Choi & Brings, 2016; Ogden, Carroll, Fryar, & Flegal, 2015). Excess weight complicates patient care and creates additional health issues, including hypertension, Type 2 diabetes, and certain cancers, that often require more frequent visits with healthcare providers or hospitalization for complications (Ogden et al., 2015; Kotowski, Davis, Wiggerman, & Williamson, 2013; Réminiac et al., 2014). Dependent patients of size require more physical assistance and other resources to maintain safety and prevent complications of immobility and therefore present greater risks to HCW safety, as well (Broome et al., 2015; Choi & Brings, 2016; Hallmark et al., 2015; Hignett et al., 2013; Phillips & Miltner, 2015; Sivaprakasam et al., 2017; Walden et al., 2013). Patient handling-related injuries involving this population and others can decrease the number of available HCWs and exacerbate any overall deficits in knowledge and experience when HCWs cannot return to work after injury. Fewer HCWs and lower levels of professional knowledge and experience will eventually compromise patient care and subsequent outcomes and therefore directly affect patients and healthcare organizations (Bhimani, 2016; OSHA, 2013; Hallmark et al., 2015; Rogers et al., 2013; Stevens et al., 2013). Additional resources for SPHM, especially the appropriate assistive technology, specific policies and procedures, education, and training must be provided to maintain patient safety and a healthy workforce and promote HCW retention.
**Assistive technology.** Assistive technology (see Appendix K) involves any equipment, devices, or adaptive aids that improve or at least maintain a patient’s level of physical function and participation with ADLs. For this proposed study, physical function measures an individual’s ability to perform self-care and other common tasks or chores that require various combinations of skills, with or without assistive technology or assistance from others, and often transpire within a social context (Antmann, Johnson, Cook, & Cella, 2011; Karayannis, Sturgeon, Chih-kao, Cooley, & Mackey, 2017). Assistive technology is therefore used to promote patient independence and participation and reduce the physical assistance and care necessary to reposition, transfer, and mobilize patients (ANA, 2013; Gallagher et al., 2013; Kairella et al., 2016; Sivapraksam et al., 2017). Dependent patients require the highest levels of assistance and care, that substantiate purchase and use of assistive technology to offset safety risks and complications of immobility. However, cost is a common barrier to procurement of the adequate, appropriate assistive technology, even in acute care settings where dependent patients are admitted on a regular basis (Armstrong et al., 2017; Aslam et al., 2015; Choi & Brings, 2016; Hallmark et al., 2015).

The availability, selection, and use of assistive technology are integral factors in SPHM (ANA, 2013; Aslam et al., 2015; Hignett et al., 2013; Hignett et al., 2014; Lee et al., 2013; Stevens et al., 2013; Taylor, Sims, & Haines, 2014). An ideal system for providing assistive technology would be based on patient necessity, specifically considering patients’ motor deficits or physical impairments. This system would also provide a clear process or algorithm for the appropriate selection and use of assistive technology to establish reimbursement criteria for health policy (ANA, 2013; Hallmark et
al., 2015; Kairella et al., 2016). Unfortunately, there is no such system at this time; the provision of assistive technology varies throughout healthcare (Kairella et al., 2016). This lack of standardization reinforces the need for universal SPHM standards or guidelines that direct provision, selection, and use of assistive technology. Healthcare organizations must consider the variety and purpose of assistive technology, anticipated costs, specific use, patient populations, and healthcare settings when deliberating selection and purchase. This process is most effective when directed by specific assessments of SPHM needs throughout the healthcare organization.

Healthcare organizations with successful SPHM programs (see Appendix C) have focused efforts on planning for any and all anticipated resources (ANA, 2013; Dennerlein et al., 2017; Ecklund & Bloss, 2015; Kennedy & Kopp, 2015; Kurowski et al., 2017; VHA, 2016). The emphasis on planning ensures that all necessary assistive technology is the correct type and adequate quantity for use with specific patient populations in various healthcare settings before procurement. The healthcare organization with a culture of safety provides and maintains all resources, including assistive technology and the adequate, mandatory education and training to increase consistent, safe, and appropriate use by HCWs across patient care settings (Caspi et al., 2013; Dennerlein et al., 2017; Ecklund & Bloss, 2015; Przybysz & Levin, 2016). The failure to do so facilitates deficits from a lack of education, training, and experience, that will increase HCWs’ risk for injury.

A survey of critical care nurses and the availability and use of mechanical lifts reinforced the importance of SPHM resources from the healthcare organization (Lee et al., 2013). Nurses reporting high availability of mechanical lifts for use were half as
likely to have work-related low back pain (OR = 0.50, 95% CI [0.26, 0.96]), compared to the nurses without access to mechanical lifts. The nurses reporting moderate availability of lifts for use were 72% less likely to have work-related shoulder pain (OR = 0.28, 95% CI [0.09, 0.91]), but no clear musculoskeletal exposure–response relationships were observed by the level of availability of mechanical lifts. Cervical spine pain was three times more common in nurses reporting low levels of mechanical lift use (OR = 3.13, 95% CI 1.19–8.28). The reports of high availability and frequent use of mechanical lifts were associated with lower levels of pain in critical care nurses, which suggests the effectiveness of mechanical lifts depends on high availability without any barriers to HCW use.

**Utilization of Resources for SPHM**

Safe patient handling and mobility resource utilization depends on the availability, allocation, and appropriateness of resources, including HCWs’ demonstrated competence with consistent selection and use of the appropriate assistive technology for each patient (Elnitsky et al., 2014; Hallmark et al., 2015; Krill, Raven, & Staffileno, 2012; Stevens et al., 2013; Thomas & Thomas, 2014; Vendittelli et al., 2016). Healthcare workers must be properly educated, trained, and determined competent in the necessary skills to reposition, transfer, and mobilize patients safely. Validation of these skills requires the appropriate assistive technology for use in the HCWs’ assigned patient care areas. The allocation of adequate and appropriate assistive technology is critical to utilization, because these resources must be readily available and accessible to all HCWs during patient care.
Utilization is challenged when any SPHM resources are unavailable, inappropriate, nonfunctional, difficult to access or operate, or otherwise inadequate. In SPHM, the healthcare organization assumes much of the responsibility for resource utilization with initial selection, procurement, and allocation of assistive technology, assessments of patient acuity and levels of dependence that determine HCW assignments, and the specific HCW competencies established for SPHM (ANA, 2013; Powell-Cope et al., 2014; Stevens et al., 2013; Thomas & Thomas, 2014; VHA, 2016). Other essential resources include the SPHM policies, procedures, education, and training provided by the healthcare organization, which are also utilized for achieving and maintaining consistency in HCWs’ selection and use of appropriate assistive technology for each patient.

Optimal utilization of SPHM resources is evidenced by an adequate amount of time allotted for the specified task, with an adequate number of appropriately educated, trained HCWs who consistently select and use the correct, functional assistive technology to reposition, transfer, and mobilize every patient, and demonstrate behaviors and actions that promote safety and minimize risk for injury at all times (ANA, 2013; Blair & Bratton, 2015; Hallmark et al., 2015; OSHA, 2014; Przybysz & Levin, 2016; Vendittelli et al., 2016; VHA, 2016). Healthcare workers are ultimately responsible for the appropriate selection and use of assistive technology during patient care. Such decision-making requires HCW awareness and understanding of risks, hazards, and the rationales explaining how, when, and which assistive technology is used for each patient (ANA, 2013; Elnitsky et al., 2014; Vendittelli et al., 2016; VHA, 2016; White-Heisel et al.,
Resource utilization in SPHM is therefore complicated and can be derailed at different levels within the healthcare organization when various barriers are encountered.

The evidence-based recommendations for SPHM, including resource utilization, involve the healthcare organization and/or the HCW and are addressed in the ANA’s (2013) standards for SPHM and other literature (see Appendices A and B; Choi & Cramer, 2016; Elnitsky et al., 2014; Hallmark et al., 2015; Mayeda-Letourneau, 2014; Powell-Cope et al., 2014; Stevens et al., 2013; Vendittelli et al., 2016; VHA, 2016).

Optimal resource utilization is promoted with (a) a culture of safety established throughout the healthcare organization; (b) a successfully implemented and sustained SPHM program; (c) integration of ergonomic design considerations into the environment of patient care, including any plans for future construction and renovation projects; (d) appropriately selected, installed, and well-maintained SPHM assistive technology; (e) systems established for SPHM education and training and for determining and maintaining HCW competence; (f) SPHM-specific plans of care that facilitate patient-centered assessments and appropriate selection of assistive technology per patient; (g) return-to-work plans for injured HCWs that include adequate considerations for SPHM; and (h) established comprehensive evaluation systems for patient care and other quality and safety initiatives in the healthcare organization (ANA, 2013). Barriers to any of the above may explain various rationales for noncompliant healthcare organizations and nonadherent HCWs in the context of SPHM, in addition to the associated or subsequent failures in resource utilization.

Barriers to resource utilization can be the consequence of decision-making for SPHM that occur at any level within the healthcare organization. At the executive or
organizational level, the healthcare organization’s mission and philosophy are operationalized to drive goals and objectives, policies and procedures, the procurement, provision, and allocation of resources, and to establish the culture within the healthcare organization. Culture in the workplace is best defined by the attitudes, beliefs, behaviors, practices, and values shared by the members of the healthcare organization (ANA, 2013; Hignett et al., 2014; Parry et al., 2017; Vendittelli et al., 2017). As previously discussed, SPHM is readily identified as a priority in healthcare organizations with an established culture of safety, where safety is constantly emphasized and reinforced as the priority over all others. However, culture can create barriers for SPHM when conflicting or unclear priorities exist in the healthcare organization (ANA, 2013; Azuh et al., 2016; Carayon et al., 2014; Elnitsky et al., 2014; TJC, 2012; Noble & Sweeney, 2018; Sorensen et al., 2016; Vendittelli et al., 2016).

Several factors associated with suboptimal or failed resource utilization in SPHM include (a) inappropriate or inconsistent selection and use of assistive technology during patient lifts, repositioning, and transfers; (b) HCW perceptions of SPHM as a hindrance or unhelpful during patient care; and (c) unclear or absent SPHM policies and procedures (Elnitsky et al., 2014; Hallmark et al., 2015; Krill, Raven, & Staffileno, 2012; Noble & Sweeney, 2018; Przybsyz & Levin, 2016). These factors also suggest that safety has not been fully integrated into the decision-making, behavior, and the context or environment of care throughout the healthcare organization. When safety is not the primary concern, the consequences can be devastating to the healthcare organization, the HCW, and the patient. However, in a culture of safety, SPHM is promoted as part of the healthcare organization’s mission to maintain safety at all times. Therefore, any resources required
to eliminate or at least minimize risks and hazards to an acceptable level are provided and used appropriately.

Another approach to resource utilization uses an alternative model of SPHM. Lift teams, patient transporters, or patient transfer teams require at least two designated HCWs with medical approval or clearance and the adequate strength, mobility, education, and training to safely reposition, transfer, and mobilize patients effectively using the appropriate assistive technology (Mayeda-Letourneau, 2014; OSHA, 2013; Walden et al., 2013). Lift teams are most effective when strong support from the healthcare organization is evident—more specifically, when education, training, staffing, and assistive technology are adequate and appropriate to determine and maintain competence. Healthcare organizations may be able to sustain a high level of performance with safety and efficiency using lift teams, considering the lower training costs compared to the costs of training all HCWs in direct patient care (Lee et al., 2013; Mayeda-Letourneau, 2014). However, lift teams are not effective when used in isolation and might not be feasible for every healthcare organization, depending on the cost and availability of lift team members for each patient care area (Bacharach et al., 2013). The size of the healthcare organization and patient acuity are factors to consider before implementing lift teams.

Several studies have reported positive results from lift team use. A Florida hospital reported success with lift teams and assistive technology after rates of patient handling-related injuries fell 65%, with a 92% reduction in associated costs (OSHA, 2013). Lee et al. (2013) studied musculoskeletal problems in nurses and the effects of lift teams and mechanical lift use. The authors determined that nurses working without lift teams had odds ratios 1.2–2.6 times higher across all lumbar spine outcomes, with
significant cervical spine pain compared to nurses working with lift teams, when controlling for lift availability and other confounders. Walden et al. (2013) pilot-tested two-person lift teams in six patient care areas. The prevalence of pressure ulcers on patients admitted to the six patient care areas decreased by 43% and patient-handling-related injuries fell 38.5% in one fiscal year. The use of lift teams increased HCW satisfaction with jobs and the healthcare organization and saved $493,293 in costs for related injuries and pressure ulcers.

In the healthcare organization with a culture of safety, the examination and collective awareness of risks, hazards, and adverse events with the respective causes, can reinforce the importance of appropriate selection and use of SPHM assistive technology to all HCWs (J. S. Choi & Cramer, 2016; Elnitsky et al., 2014; Lee et al., 2015). Safety is the job of everyone in the healthcare organization that mandates proper utilization of SPHM resources during all patient care activities, with (a) an adequate number of well-educated, trained HCWs; (b) an adequate amount of time to perform patient care; (c) readily available, functional, and appropriate assistive technology per patient; and (d) HCWs’ appropriate selection and use of assistive technology for every patient, as needed (ANA, 2013; Elnitsky et al., 2014; Hallmark et al., 2015; Krill, Raven, & Staffileno, 2012; Rogers et al., 2013). The utilization of SPHM resources can serve as an indicator of safety in healthcare organizations. Adherence to SPHM involves resource utilization with consistency and duration, which is another consideration for safety in healthcare organizations.
Adherence to SPHM Standards

Discussion regarding the intersection of patient safety and HCW safety has drawn more attention to organizational culture and its influence on HCW behaviors in the workplace (TJC, 2012; National Patient Safety Foundation [NPSF], 2013). A more specific example, HCW adherence to SPHM, would be an expected outcome for the healthcare organization with a culture of safety. In this context, (a) all members of the healthcare organization acknowledge, and are aware of safety risks; (b) all resources necessary for safe patient care with consistency, are provided by the healthcare organization; (c) the importance of communication and collaboration within and between all levels of the healthcare organization is emphasized to maintain safety at all times; and (d) all members are encouraged to report all errors and adverse events regarding safety without reprimand or punishment (ANA, 2013; Marx, 2001; Nelson & Baptiste, 2004; National Quality Forum [NQF], 2013; Reason, 1997). The preceding factors in a culture of safety are applicable to SPHM and adherence because all members of the healthcare organization are accountable for safety, which must be maintained at all times. An established culture of safety would therefore facilitate adherence to SPHM at the organizational level and at the level of direct patient care for HCWs (Theis & Finkelstein, 2014).

Many healthcare organizations include SPHM as part of larger safety initiatives, but implementation of programs and interventions varies across healthcare settings, depending on the extent of adherence or compliance at the organizational level (Elnitsky et al., 2014; Snyder, 2014; Theis & Finkelstein, 2014). Adherence, in SPHM, also includes the HCW behaviors that demonstrate safety, especially in the consistent,
appropriate selection and use of assistive technology for each patient. Ongoing, effective communication and collaboration between the healthcare organization and HCWs can identify barriers to adherence at any level within the healthcare organization and facilitate changes in clinical practice that promote or reinforce SPHM (Elnitsky et al., 2014; King, 2012; Hunter et al., 2017; Kneafsey et al., 2015; Snyder, 2014; Theis & Finkelstein, 2014; VHA, 2016). Healthcare worker surveys that communicate perceived barriers to SPHM can be used to establish baselines for comparison when evaluating the effectiveness of programs or specific interventions. The information communicated by HCWs is also a part of participatory ergonomics methods that engage HCWs to plan and control much of their own work, with knowledge and power to drive the processes and outcomes for achieving goals, including adherence to SPHM (Carayon et al., 2014; Wilson, 2014).

Adherence to SPHM is also an indicator of effectiveness and a result of the healthcare organization’s ongoing commitment, support, and engagement (ANA, 2013; Elnitsky et al., 2014; King, 2012; Theis & Finkelstein, 2014; VHA, 2016). The healthcare organization drives change to transform HCW behavior and the environment of care (ANA, 2013; King, 2012; Snyder, 2014; Theis & Finkelstein, 2014). Well-implemented SPHM programs sustain this change with multiple controls for continuous evaluation and interventions that ensure safety at all times. Adherence at the organizational level is therefore reflected in the levels of HCW adherence to SPHM throughout the healthcare organization (ANA, 2013; Elnitsky et al., 2014; King, 2012; Theis & Finkelstein, 2014; VHA, 2016).
Adherence to SPHM at the patient care level requires the appropriate education, training, and assistive technology for HCWs. Johnston and Shaw’s (2013) discussion of empowerment for injured HCWs and self-management of symptoms is analogous to the healthcare organization’s role in HCW safety. Empowerment delivers a certain combination of knowledge and skills, with an increased awareness of needs and values that enables patients or HCWs in SPHM to operationalize and reach goals (Carayon et al., 2014; Johnston & Shaw, 2013; Wilson, 2014). The healthcare organization provides education and training to raise HCW awareness of risks and hazards, improve consistency with appropriate selection and use of assistive technology, and validate HCW competence, to ensure safety. An expected outcome is increased self-efficacy from the knowledge, confidence, improved planning and decision-making that facilitate patients’ self-care strategies, and HCWs’ selection and use of assistive technology, as well. Both strategies require proactive approaches and perceived control to manage symptoms, or workplace risks and hazards. The respective facilitators would be patients’ healthcare providers, and the healthcare organization for HCWs.

Several publications have emphasized the importance of including HCWs in decision-making, for example, when selecting assistive technology for patient care areas or configuring versus organizing areas for work and storage (ANA, 2013; Cortez, 2017; VHA, 2016). These examples demonstrate the value of empowerment that develops HCW ownership of SPHM (Cortez, 2017; VHA, 2016). Cortez (2017) used empowerment to give HCWs authority and the ability to act in SPHM. Assignments for adequate allocation of SPHM resources, opportunities for HCWs to contribute their knowledge and expertise, HCW readiness to take action, and positive reinforcement of
HCW attributes were used to facilitate HCW empowerment that led to a 47.8% improvement in patient-handling-related injury rates in four years. Cortez (2017) explained a tenet of participatory ergonomics with the preceding characteristics of empowerment.

Empowerment transforms HCWs from their previously passive roles to problem-solving stakeholders in SPHM. Empowerment was also a factor in PTs’ assistive technology use. Survey results of PTs in an acute care setting revealed that 91.1% reported use of assistive technology, 93.8% were confident using assistive technology, 87% agreed with supporting evidence for assistive technology use, and 92.2% reported assistive technology use was feasible where they worked. The survey responses also indicated that an established SPHM program increased the likelihood of assistive technology training and use, and positive perceptions of assistive technology, all of which promote adherence.

Elnitsky et al. (2014) followed the progress of existing VHA programs using surveys of the SPHM program coordinators, who had associated nonadherence with preventable adverse events. The responses included recommendations to improve patient safety that also promoted adherence with (a) nursing assessments that identify changes in patients’ conditions and include the appropriate assistive technology for use; (b) implementation of policies, procedures, and algorithms to facilitate adherence; (c) redesign of patient care areas to improve HCWs’ access to assistive technology per patient use; (d) specific needs assessments that determine and evaluate the appropriate assistive technology for every patient care area, and the education, training, and assessments required for HCW competence with use; (e) emphasis on HCWs’ increased
awareness and understanding of preventable adverse events; and (f) staffing with HCW-to-patient ratios that consider patient acuity and fall risk, and improved HCW communication to promote patient participation. These recommendations are reflected in the ANA (2013) standards and have been discussed in other literature, as well (ANA, 2013; King, 2012; Theis & Finkelstein, 2014).

Hunter et al.’s (2017) quality improvement project and Caspi et al.’s (2013) pilot of a multicomponent intervention support several of the preceding recommendations with the use of behavioral controls for improving adherence to an early mobility protocol and safe patient-handling behaviors respectively, while King’s (2012) development of an early mobility protocol integrated evidence and change theory with administrative and behavioral controls. These strategies to prevent the adverse events or injuries associated with organizational and HCW nonadherence to SPHM in clinical practice. Adherence was promoted using education and training with presentations, clear guidelines, handouts, and algorithms to correct nurses’ knowledge deficits and reduce their fear of mobilizing critically ill patients (Hunter et al., 2017).

King’s (2012) evidence-based protocol also supported the use of education, clear guidelines, and algorithms to address knowledge deficits and inconsistencies in patient mobility activities that hinder adherence. Nurses reported increased knowledge and less fear after the training sessions in Hunter et al.’s (2017) study, although fear and patient mobility rates did not change significantly after eight weeks ($p = .06; p = .07$). Adherence to the early mobility protocol improved to 78%, an indication of successful education and training that also highlights the necessity of resources. Nurses had previously reported inadequate numbers of HCWs and assistive technology, that are barriers to adherence
Hunter et al. did not address. Caspi et al. (2013) reported an increase in HCWs’ safe patient-handling behaviors during patient care ($p < .001$), improved safety practices ($p < .001$), less heavy lifting (> 100 lbs.; $p = .009$), and increased support from leadership ($p = .01$). These results indicate organizational and HCW adherence to SPHM as evidenced by implementation of unit champions, education, and training to increase HCW awareness, collaboration, and use of assistive technology.

The examples above support previous reports of various human factors where (a) knowledge and training deficits; (b) inappropriate selection and use of assistive technology; (c) inaccurate or missing SPHM assessments; and (d) nonadherence to SPHM guidelines, policies, and protocols can lead to preventable adverse events in patient care (Elnitsky et al., 2014; King, 2012; Theis & Finkelstein, 2014). As stated previously, additional research on SPHM is necessary to address existing knowledge and clinical practice gaps with well-designed, quality studies. The consequences are evident in clinical practice where a number of healthcare organizations operate without SPHM policies, programs, assistive technology, or the appropriate education and training. Healthcare workers have been or will continue to be injured as a result (Anyan et al., 2013; Choi & Cramer, 2016; Massachusetts Department of Public Health Occupational Health Surveillance Program, 2013; Snyder, 2014).

Substantial heterogeneity across populations and settings, in study design, interventions, specific protocols, outcomes, and variations in reporting, preclude generalizability, replication, and additional research, such as meta-analyses (Castelino et al., 2016; Kay et al., 2014; Powell-Cope et al., 2014; Santos et al., 2017). Difficulties with randomized controlled trials in patient care involve a dynamic healthcare setting that
includes human factors and behavioral or practice controls, such as patient mobilization, that complicate assessments and outcomes measurement (Castelino et al., 2016; Choi & Cramer, 2016; Powell-Cope et al., 2014; Villarroya et al., 2017). The benefits of SPHM certainly outweigh the consequences of unsafe work practices and conditions. However, change is necessary to establish universal standards or guidelines, and the collective effort of healthcare organizations and HCWs to reposition, transfer, and mobilize every patient with minimal or no risk for injury.

Summary of the Literature Review

High rates of work-related musculoskeletal injuries in HCWs have instigated research and initiatives that promote evidence-based interventions to eliminate or minimize exposures to musculoskeletal hazards. The seminal work by VHA researchers in 2001 introduced a prototype that facilitated system-wide changes that followed in 2008, with planning and implementation of additional SPHM programs in all of the 153 medical centers. These programs used multiple controls as solutions for various human factors and design flaws that create unsafe work conditions, specifically when repositioning, transferring, or mobilizing patients.

Endorsements from NIOSH, OSHA, and the ANA have supported the VHA’s evidence-based patient-handling practices, but have not driven policy responses at the federal level to protect HCWs. The challenges in occupational safety also include HCW perceptions of musculoskeletal injuries as the outcomes of poor body mechanics, knowledge deficits, inadequate resources, and barriers to assistive technology use. Despite growing state legislation, healthcare organizations operate without SPHM programs, policies, education, and training to provide oversight of patient handling
practices. The assistive technology provided is often unused, as evidenced by the current rate of MSDs and injuries in healthcare. Additional insight into the context of SPHM will provide more information on the effectiveness of current legislation, policies and procedures, and resources used by HCWs.
CHAPTER III

METHOD

Chapter III includes the research questions, methods, settings, sample, and procedures for data collection and analysis. Strengths and limitations of the proposed study are discussed. Considerations for the protection of human subjects are addressed. An ANA survey adapted for the purpose of this study is presented in Appendix F. The original ANA (2016) survey is also included for comparison (see Appendix D).

Research Questions

The proposed research questions are as follows:

1. What is the availability of SPHM resources, based on HCWs’ survey responses?
2. What is the utilization of SPHM resources, based on HCWs’ survey responses?
3. What levels of healthcare organizations’ adherence to SPHM standards are reported, based on HCWs’ survey responses?
4. What are the relationships among SPHM resource availability, utilization, and healthcare organizations’ adherence to SPHM standards, based on HCWs’ survey responses?

Method

Design

A nonexperimental, descriptive, one-shot survey design measured SPHM variables in real-world patient care settings. Survey items assessed the current availability and utilization of SPHM resources and healthcare organizations’ adherence to SPHM standards (see Appendix F). An electronic survey questionnaire was distributed to a convenience sample of HCWs in direct patient care roles. Approval from the ANA,
University of Missouri—St. Louis, two private healthcare organizations, and three VHA healthcare organizations was obtained before the study.

**Survey Questionnaire**

For this study, 21 items of an ANA survey (see Appendix F) were adapted, based on the survey’s relevance to HCWs in direct patient care. These items were selected from the ANA (2016b) Safe Patient Handling and Mobility Self-Assessment Resource (see Appendix D), a 45-item self-administered electronic survey questionnaire that assesses implementation of the eight ANA standards in healthcare organizations. The adapted version of this survey was administered to HCWs in a state with enacted legislation. Information collected from survey participants provided a status update since Missouri’s 2011 legislation on SPHM in healthcare organizations with an adult inpatient population. The adapted survey (Appendix F) included questions with dichotomous (yes/no) or ordinal ratings to measure participants’ responses. Seven survey items are applicable to the availability of resources, six survey items pertain to utilization of resources, and eight survey items address adherence of the healthcare organization. Each survey item aligns with one ANA SPHM standard and one of the three primary variables from the research questions.

The adapted survey includes three subscales to measure primary SPHM variables associated with successful SPHM programs and a culture of safety. Each subscale addresses one of the three primary variables in the proposed research questions, specifically SPHM resource availability, utilization, and the healthcare organization’s adherence to seven of the eight ANA SPHM standards. Standard 8, Establishing a Comprehensive Evaluation System, was omitted due to lack of alignment with the
research questions. This standard involves SPHM data collection and analysis, quality improvement, risk management, and compliance or regulatory processes. Therefore, the corresponding survey items would not be familiar or pertinent to HCWs in direct patient care roles.

Participants were instructed to select the most applicable or descriptive response. Survey questionnaire responses include dichotomous (yes/no) and ordinal ratings that communicate the presence or extent of resource availability, utilization, and healthcare organizations’ adherence to SPHM standards. Examples of questions from the adapted survey questionnaire are presented below in Figure 2.

<table>
<thead>
<tr>
<th>Is there a hospital system for tracking the frequency, severity, and costs of employee injuries from repositioning, transferring, or mobilizing patients?</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Yes</td>
</tr>
<tr>
<td>o No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Please select the response that best describes a culture of safety in your hospital.</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Not everyone in the hospital knows what a culture of safety is.</td>
</tr>
<tr>
<td>o It is not clear how a culture of safety makes patient care safer throughout the hospital.</td>
</tr>
<tr>
<td>o A culture of safety is a hospital goal, and everyone knows why it is needed for patient care.</td>
</tr>
<tr>
<td>o The hospital has a culture of safety and is working to prevent accidents and make patient care safer.</td>
</tr>
<tr>
<td>o A culture of safety is everyone’s job, and we are all responsible and held accountable for safety at all times.</td>
</tr>
</tbody>
</table>

*Figure 2.* Sample questions from the adapted survey questionnaire.
Content Validity for the Adapted ANA Survey Questionnaire

Three nurses from one of the selected healthcare organizations served as experts for pretesting, reviewing, and selecting relevant items for the adapted survey. The direct patient care perspective comes from within the context of SPHM—when and where a patient is repositioned, transferred, or mobilized with assistance—and is therefore invaluable. Relevant survey items were selected and revised based on feedback and suggestions from the three experts, in addition to this researcher’s review of SPHM literature and nursing experience (Panacek, 2008). Deleted survey items were those identified as redundant, nonpertinent, or unfamiliar by the nurses and researcher (see Appendix E). The nurses’ recommendations were used for subsequent revisions to clarify language and remove items that were unknown or nonpertinent to HCWs in direct patient care, therefore facilitating survey completion.

The eight demographic items (see Appendix G) inquire about the participants’ (a) profession, (b) number of years employed at the healthcare organization, (c) number of years worked in direct patient care roles, (d) age, (e) race or ethnicity, (f) gender, and (g) level of education. These HCW characteristics provide additional details regarding the number of HCWs per patient care area, various HCW roles, and potential barriers to SPHM, such as HCW age or length of time in current role. For example, increasing longevity of HCWs in their professions can introduce and establish habits and traditions that are difficult to break, such as manual lifting, failure to use available SPHM resources, and nonadherence to SPHM standards. These habits and traditions can be passed down to younger or newer HCWs, who adopt them as well. The participants’ demographic information also describes current HCW employment in critical, acute,
rehabilitative, and extended or skilled care settings of five Midwestern healthcare organizations.

**State Legislation**

Pertinent state legislation, Safe Patient Handling and Movement in Hospitals (2011), was enacted in Missouri before the ANA (2013) SPHM standards were published. Missouri is one of 13 states with safe patient handling legislation. Examining the status of 2011 state legislation also describes the progress of SPHM in Missouri. Missouri’s legislation contains the following clinical practice requirements for safe patient handling in a hospital (Safe Patient Handling and Movement in Hospitals, 2011).

A. A committee with members from multiple disciplines will be charged with implementing and monitoring the healthcare organization’s safe patient handling program. Healthcare workers or frontline staff involved in patient handling will comprise 50% or more of committee membership.

B. The program will include

1. A safe patient handling policy and procedure that will eliminate manual lifting, transferring, and repositioning all or most of a patient’s weight, with exceptions for emergent, life-threatening, or other circumstances

2. A hazard assessment that considers various patient-handling tasks, patient care areas, patient populations, and the physical environment for patient handling

3. A safe patient handling process which assesses patient-specific needs

4. Education for patients and families that orients them to the safe patient handling program
5. Annual program evaluation with measurable outcomes, such as employee and patient injuries, missed work days, and related workers’ compensation claims.

6. Evidence of action or program revision, based on the annual evaluation.

C. All healthcare workers and staff who perform patient care handling tasks are educated and trained. Every healthcare worker and staff member will demonstrate competence on safe patient handling policies and procedures, equipment, and any devices before use, every year, and whenever program changes are made.

Table 2 presents the 2011 legislation and the ANA SPHM standards to examine similarities, alignment, and gaps in Missouri’s legislation.

Table 2

*The 2013 ANA Safe Patient Handling and Mobility (SPHM) Standards and Corresponding Legislation in Missouri*

<table>
<thead>
<tr>
<th>2013 ANA SPHM Standard</th>
<th>2011 Missouri SPHM Legislation for Hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Establish a culture of safety</td>
<td>Standard not addressed</td>
</tr>
<tr>
<td>2. Implement and sustain a SPHM program</td>
<td>A committee with members from multiple disciplines will be charged with implementing and monitoring the healthcare organization’s safe patient handling program. Healthcare workers or frontline staff involved in patient handling will comprise 50% or more of committee membership. The program will include</td>
</tr>
<tr>
<td></td>
<td>A safe patient handling policy and procedure that will eliminate manual lifting, transferring, and repositioning all or most of a patient’s weight, with exceptions for emergent, life-threatening, or other circumstances</td>
</tr>
<tr>
<td></td>
<td>A hazard assessment that considers various patient-handling tasks, patient care areas, patient populations, and the physical environment for patient handling</td>
</tr>
<tr>
<td></td>
<td>A safe patient handling process which assesses patient-specific needs</td>
</tr>
<tr>
<td></td>
<td>Education for patients and families that orients them to the safe patient handling program</td>
</tr>
</tbody>
</table>
Upon comparison, the Missouri legislation aligns with the corresponding ANA standards for SPHM. However, the 2011 legislation preceded publication of the ANA (2013) standards and did not address several of the standards, such as an established culture of safety, ergonomic principles, appropriate assistive technology, or plans for injured employees’ return to work. Therefore, the state legislation does not thoroughly address SPHM to adequately protect HCWs and patients. Assessment of these three variables and any relationships between them provides additional information on the current status of SPHM in Missouri since 2011. The 21-item adapted ANA survey questionnaire specifically measured the current status of SPHM regarding resource availability, utilization, and healthcare organizations’ adherence to SPHM standards in a state with enacted legislation.
Operational Definitions

The 2013 ANA standards for SPHM were used to develop operational definitions of availability, utilization, and adherence. Table 3 presents the associated constructs and operational definitions for each variable.

Table 3

Safe Patient Handling and Mobility Constructs, Variables, and Operational Definitions

<table>
<thead>
<tr>
<th>Associated Construct</th>
<th>Variable</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of SPHM resources</td>
<td>Availability</td>
<td>SPHM resources that are present, accessible, and immediately ready for healthcare worker use, measured by items on the adapted ANA survey questionnaire</td>
</tr>
<tr>
<td>Utilization of SPHM resources</td>
<td>Utilization</td>
<td>Practical, effective, and correct use of SPHM resources to safely reposition, transfer, and mobilize patients, measured by items on the adapted ANA survey questionnaire</td>
</tr>
<tr>
<td>Adherence of the healthcare organization to SPHM standards</td>
<td>Adherence</td>
<td>The healthcare organization’s sustained commitment to SPHM in a culture of safety, measured by items on the adapted ANA survey questionnaire</td>
</tr>
</tbody>
</table>

Note. ANA = American Nurses Association.

The availability of SPHM resources affects subsequent utilization, as well as adherence (Broome et al., 2015; Noble & Sweeney, 2018; Kairalla et al., 2016; Lee & Lee, 2017; Lee et al., 2015; Makic, 2015). Available resources are those that are present, easily accessible, and immediately ready for use, to ultimately save HCWs’ time and effort. Examples include assistive technology located in or near patient rooms, specific policies and procedures for SPHM, an adequate number of HCWs assigned to a patient
care area, and education or training sessions scheduled frequently at various times to accommodate more HCWs (ANA, 2013; Broome et al., 2015; Lee et al., 2015; Noble & Sweeney, 2018; Rogers et al., 2013).

Utilization demonstrates practical, effective use of SPHM resources that improves with the increasing availability of resources, HCW knowledge and skills, or continued practice (Arnold et al., 2014; Bhimani, 2016; Elnitsky et al., 2014; Noble & Sweeney, 2018; Sivaprakasam et al., 2017; VHA, 2016; Weiner et al., 2015). Safe patient handling and mobility resources are (a) well-maintained for safety and function during use; (b) selected appropriately for each patient, based on the patient’s specific needs or deficits; and (c) used correctly as intended to safely reposition, transfer, or mobilize patients.

Education and training are interventions that establish and reinforce availability, utilization, and adherence at all levels of the healthcare organization. The consistent availability and utilization of SPHM resources are required for adherence to occur (ANA, 2013; Bhimani, 2016; Elnitsky et al., 2014).

Adherence is defined by consistency, specifically the sustained commitment to SPHM, at any level of the healthcare organization (Arnold et al., 2014; Devine et al., 2015; Lowe et al., 2013; Powell-Cope et al., 2014; Przybysz & Levin, 2016). Adherence is required in a culture of safety where SPHM is part of the healthcare organization’s mission to ensure safety at all times, specifically when repositioning, transferring, or mobilizing patients (ANA, 2013). Adherence involves the healthcare organization’s consistent support and reinforcement of SPHM as a standard of care. Healthcare worker adherence is also involved, as part of the healthcare organization’s collective effort to maintain safety at all times.
Adherence at the HCW level is an indicator of the healthcare organization’s adherence. The healthcare organization is responsible for establishing and sustaining a culture of safety—specifically, ensuring the availability of all necessary SPHM resources that facilitate HCW adherence (see Appendix A). Healthcare worker adherence is demonstrated by the consistent utilization of available SPHM resources for SPHM without subsequent injury to patients or HCWs (Burdorf, Koppelaar, & Evanoff, 2013; Lapane et al., 2016; Lee et al., 2013; Przybysz & Levin, 2016).

**Research Setting**

Healthcare worker participants were employees of five private healthcare organizations and three VHA healthcare organizations in the Midwestern U.S. The selected healthcare organizations were hospitals or medical centers with adult inpatient populations requiring acute care or rehabilitation following illness or surgery. Several of the healthcare organizations provide critical care services. Extended or skilled nursing care was available at one healthcare organization. Additional details on these healthcare organizations are presented in Table 4.
Table 4

The Context of Safe Patient Handling and Mobility in Selected Healthcare Organizations

<table>
<thead>
<tr>
<th>Location</th>
<th>Type of Healthcare Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Private</td>
</tr>
<tr>
<td></td>
<td>Cape Girardeau 308</td>
</tr>
<tr>
<td>Location</td>
<td>Poplar Bluff 58</td>
</tr>
<tr>
<td>Location</td>
<td>St. Louis 509</td>
</tr>
<tr>
<td>Number of beds</td>
<td>-</td>
</tr>
<tr>
<td>Beds designated by patient acuitya</td>
<td>-</td>
</tr>
<tr>
<td>Critical care (ICU)</td>
<td>61</td>
</tr>
<tr>
<td>Acute care (medical–surgical)</td>
<td>150</td>
</tr>
<tr>
<td>Rehabilitative care</td>
<td>30</td>
</tr>
<tr>
<td>Extended care (skilled)</td>
<td>0</td>
</tr>
<tr>
<td>Bed occupancy rates (%)</td>
<td>—</td>
</tr>
<tr>
<td>Staffing ratio: Maximum number of patients per RN, LPN, CNA or PCTa</td>
<td>-</td>
</tr>
<tr>
<td>Critical care (ICU)</td>
<td>2:1</td>
</tr>
<tr>
<td>Acute care (medical–surgical)</td>
<td>8:1</td>
</tr>
<tr>
<td>Rehabilitative care</td>
<td>10:1</td>
</tr>
<tr>
<td>Extended care (skilled)</td>
<td>—</td>
</tr>
<tr>
<td>Other healthcare workers (e.g., patient transport, lift teams)</td>
<td>—</td>
</tr>
<tr>
<td>SPHM resources present</td>
<td>Yes</td>
</tr>
<tr>
<td>Program Policy and procedure</td>
<td>Yes</td>
</tr>
<tr>
<td>Assistive technology</td>
<td>Yes</td>
</tr>
<tr>
<td>Fixed or installed (e.g., lifts)</td>
<td>Yes</td>
</tr>
<tr>
<td>Mobile or portable (e.g., small aids)</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Power Analysis

A power analysis was not necessary for the purpose of this study. The research questions are descriptive and a convenience sample was used. Therefore, no inferential statistics were calculated.

Sample

A nonprobability sampling method was used to survey HCWs who routinely reposition, transfer, and mobilize the adult inpatient population in healthcare organizations. A convenience sample of HCWs in direct patient care roles was obtained from five Midwestern healthcare organizations. All types of HCWs in critical, acute, rehabilitative, and extended care areas for adults were recruited. HCWs recruited from these four areas were RNs, LPNs or LVNs, certified nurse assistants, patient transporters, lift teams, or any other employees who reposition, transfer, and mobilize adult patients.

Data Collection

The final version of the 21-item adapted survey questionnaire was created in Qualtrics (see Appendix F) to (a) facilitate recruitment, (b) provide a link via participants’ e-mail or on a website, (c) automatically save survey responses, and (d) include back buttons and page breaks between survey questionnaire items that decrease the content per screen view, and therefore facilitate survey completion. The selected healthcare organizations were contacted before data collection to confirm approval, processes for electronic survey delivery, and dates for survey activation and closure. A recruitment flyer for the survey (see Appendix H) was not distributed as intended, due to policy restrictions in several healthcare organizations. The healthcare organizations forwarded an introductory e-mail (see Appendix I) about the survey to HCWs who had
direct patient care roles in critical, acute, rehabilitative, and extended care areas. The introductory e-mail included instructions to complete and submit the survey one time only. Appropriate staff members in information technology, education, or administrative roles at healthcare organizations selected options to (a) forward an electronic invitation with the survey link to participants’ employee e-mail addresses or (b) install desktop shortcuts to the survey on password-protected computers located where participants work. Both options avoided disclosure of participants’ e-mail addresses and other personal or identifying information.

The desktop shortcut or an electronic link opened the survey in Qualtrics, a web-based data processing system used by the University of Missouri–St. Louis. Qualtrics is an online platform used to develop and distribute electronic surveys, anonymize and store participant responses, perform data analysis, and generate reports on the data collected (Qualtrics, 2016). The functionality and utility of this platform allows participants to (a) review, revise, and save survey responses; (b) stop or resume the survey at any time; and (c) view progress toward survey completion. The survey was completed online via web browser on a computer, smart phone, or other mobile device. Options for survey delivery and access were selected based on healthcare organizations’ preferences and the technology available for participants’ use. Autogenerated survey reminders were forwarded with healthcare organizations’ permission to HCWs’ employee e-mail addresses each week, then 24 hours before the end of the survey, and on Day 21, the last day for survey completion.
Data Management

The data collection and measurement of variables informed data analysis and study validity (Sangra & Codina, 2015). An ongoing review of Qualtrics survey data for errors, accurate coding, missing values, outliers, and survey completion began after submission of the first survey, then continued through Day 21. Original variables were recorded when possible, before using any categorical or calculated variables. All variables were coded and labeled correctly by a statistician and this researcher before data analysis.

Missing data can significantly decrease sample size, the degrees of freedom for statistical tests, and therefore a study’s power (Duffy, 2006; Oliver & Mahon, 2005). Therefore, significant findings may also be missed. Biased estimates of parameters, lost information, higher standard errors, and less generalizability are also associated with missing data (Dong & Peng, 2013). Careful design and data collection can minimize the rate of missing data. The missing data mechanism, rate, patterns, and distribution were examined before selecting and implementing a method to treat. Any missing survey data were classified using three mechanisms: (a) missing completely at random (MCAR), where missing data do not depend on observed or unobserved values; (b) missing at random (MAR), where missing data depend on observed values; and (c) not missing at random (NMAR), where missing data depend on unobserved values (Dong & Peng, 2013; Sangra & Codina, 2015). Listwise deletion for MCAR data was adequate, considering the low number of cases with missing data and frequent blank responses. Any outliers resulting from human or instrument error were corrected or deleted. Survey items were then coded for analysis in SPSS Statistics (Version 25).
Data Analysis

Survey data stored in Qualtrics was exported for analysis in SPSS. Exploratory data analysis using descriptive statistics detected missing values, outliers, and normality. The level of significance was set at $p < .05$. An appropriate procedure for missing data was selected based on the proportion and patterns of missing data and specific assumptions (MAR, NMAR, or MCAR; Dong & Peng, 2013; Fox-Wasylyshyn & El-Masri, 2005). Multiple imputation was initially considered, based on preliminary results. Multiple imputation may be necessary for any nominal or categorical MAR data, when a significant amount of missing data can be replaced with simulated data in SPSS. The uncertainty about which values to impute would be represented, and each imputation in SPSS would generate data sets for use (Dong & Peng, 2013; Duffy, 2006; Fox-Wasylyshyn & El-Masri, 2005). However, the conditions of this study did not warrant multiple imputation. Instead, missing values were replaced with the corresponding mean values per survey item. Statistical uncertainty may also result from outliers, which can be detected using a box or probability plot, histogram, or interquartile rank. The outliers not caused by human or instrument error can occur from the inherent variability of variables, skewed data, or data from another population (Duffy, 2006; Whitley & Ball, 2002). The deletion of outliers is controversial and unnecessary if robust univariate or multivariate statistical methods are used (Fisher & Marshall, 2009; Sangra & Codina, 2015).

Table 5 presents the description of survey items with the associated ANA standards and variables to be measured.
### Table 5

**Adapted Survey Items with Associated Variables and the 2013 ANA Standards for Safe Patient Handling and Mobility (SPHM)**

<table>
<thead>
<tr>
<th>Survey item and variable</th>
<th>Level of measurement</th>
<th>No. of adapted survey items per variable and ANA standard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Availability</td>
</tr>
<tr>
<td><strong>Standard 1: Establish a culture of safety</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Adherence</td>
<td>Ordinal</td>
<td>✓</td>
</tr>
<tr>
<td>2. Adherence</td>
<td>Ordinal</td>
<td>✓</td>
</tr>
<tr>
<td>3. Availability</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td>4. Utilization</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Standard 2: Implement and Sustain an SPHM program</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Utilization</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td>6. Utilization</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td><strong>Standard 3: Incorporate ergonomic principles to provide a safe environment of care</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Adherence</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td>8. Availability</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Standard 4: Select, install, and maintain SPHM technology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Utilization</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td>10. Utilization</td>
<td>Ordinal</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td><strong>Standard 5: Establish a system for education, training, and maintaining competence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Availability</td>
<td>Ordinal</td>
<td>✓</td>
</tr>
<tr>
<td>12. Utilization</td>
<td>Ordinal</td>
<td>✓</td>
</tr>
<tr>
<td>13. Adherence</td>
<td>Ordinal</td>
<td>✓</td>
</tr>
<tr>
<td>14. Availability</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td><strong>Standard 6: Integrate patient-centered SPHM assessment, plan of care, and use of SPHM</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Availability</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td>16. Availability</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td>17. Adherence</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td>18. Adherence</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td>19. Adherence</td>
<td>Ordinal</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

**Standard 7: Include SPHM in reasonable accommodation and post-injury return to work**
The 21-item adapted ANA survey questionnaire used nominal- and ordinal-level responses. Therefore, an alignment procedure was used to record each item, scoring from 0 to 100. So, the lowest and highest possible scores for all items are 0 and 100, respectively, which are considered as interval data. This means that the nominal-level item that had response choices 1 = yes and 0 = no was recorded into values of 100 = yes and 0 = no. The ordinal item that had five response choices (1–5) was recoded into values of 100, 75, 50, 25, and 0, respectively.

Cronbach’s alpha was used to estimate internal consistency reliability, which assessed the consistency of participants’ responses to items within each subscale and whether different items within an instrument yielded similar conclusions about a particular variable or the homogeneity of items. Internal consistency was therefore necessary for the adapted ANA survey questionnaire. Survey items measuring the same variable that were highly related had high alpha coefficients. A cut-off set at .70 or higher therefore supported a set of items considered to be an acceptable scale. The general plan for data analysis is presented in Table 6.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20. Availability</td>
<td>Ordinal</td>
<td>✓</td>
</tr>
<tr>
<td>21. Adherence</td>
<td>Nominal</td>
<td>✓</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total no. of adapted survey items per variable</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>
Table 6

Data Analysis Plan for Demographic and Adapted Survey Items

<table>
<thead>
<tr>
<th>Research Questions (RQs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RQ1</strong></td>
</tr>
<tr>
<td>What is the <strong>availability</strong> of safe patient handling and mobility resources during patient care, based on survey participants’ responses?</td>
</tr>
<tr>
<td><strong>RQ2</strong></td>
</tr>
<tr>
<td>What is the <strong>utilization</strong> of safe patient handling and mobility resources during patient care, based on survey participants’ responses?</td>
</tr>
<tr>
<td><strong>RQ3</strong></td>
</tr>
<tr>
<td>What levels of healthcare organizations’ <strong>adherence</strong> to safe patient handling and mobility standards are reported, based on survey participants’ responses?</td>
</tr>
<tr>
<td><strong>RQ4</strong></td>
</tr>
<tr>
<td>What relationships are present among safe patient handling and mobility resource <strong>availability</strong>, <strong>utilization</strong>, and healthcare organizations’ <strong>adherence</strong> to safe patient handling and mobility standards?</td>
</tr>
</tbody>
</table>

*Note.* Survey data will be examined using various statistical analyses according to levels of measurement.

**Demographic Items**

Nominal data
- **Mode**
  - Frequency distribution (# of cases per category by %)

Ordinal data
- **Median**, **mode**
  - Frequency distribution: maximum/Q3, minimum/Q1; range (maximum – minimum), IQR (Q3 – Q1), percentiles/quartiles

Continuous data
- **Mean**, **median**, **mode**
  - Frequency distribution: maximum/Q3, minimum/Q1; range, IQR or SD, percentiles/quartiles
  - *If skewed, decide whether to transform (z-scores) vs. use nonparametric tests*

Outliers and missing data
- Nominal: Cross-tabs, bar graphs
- Ordinal: Box plots
- Continuous: Histograms

**RQ1**
- **Mean**, **Median**, **mode**

**RQ2**
- Frequency distribution: maximum/Q3, minimum/Q1; range, IQR, percentiles/quartiles

Outliers and missing data
- Nominal: Cross-tabs, bar graphs
- Ordinal: Box plots

Cronbach’s alpha for estimating Internal Consistency **Reliability**

**Pearson Correlation Coefficients for Examining Binary Relationships Between Variables**

**RQ4**
- **Availability + Utilization**
- **Availability + Adherence**
- **Utilization + Adherence**
Strengths and Limitations of Methods

An electronic survey and the nonprobability sampling method using a convenience sample are inexpensive ways to improve accessibility and proximity for participant recruitment and data collection. Survey questionnaires have demonstrated utility for data collection in clinical practice, public health, and epidemiologic studies (Bee & Murdoch-Eaton, 2016; Belisario et al., 2015). The survey questionnaire can be used to describe or summarize, focus on sensitive topics, and cover expansive geographic areas of target populations, while requiring less time and manpower for data collection (Belisario et al., 2015). Survey responses are generated from the interaction between a participant, the survey itself, and mode of survey delivery. Therefore, data collection can be expedited and more scalable using an electronic survey questionnaire instead of a paper version (Belisario et al., 2015). Applications on smart devices, such as phones or tablets, are also available for survey delivery and completion in Qualtrics. The survey was delivered in an electronic format, using Qualtrics to facilitate survey delivery, access, and completion. This online platform also includes an option for returning to a previous survey item before advancing to the next item, which is recommended to reduce response burden (Hays et al., 2010).

The electronic survey adapted for this proposed study was developed by the ANA and Atlas Lift Tech to describe the current implementation of SPHM programs. Atlas Lift Tech is a company with SPHM consultants that is by healthcare organizations to establish a culture of safety, reduce HCW injuries and associated costs, and improve patient safety. This partnership identified strengths and weaknesses in SPHM programs for healthcare organizations. Survey items were developed to assess SPHM in healthcare organizations.
regarding (a) inventory and availability of SPHM assistive technology, (b) continuity of SPHM programs, (c) the designation and functions of an interprofessional SPHM task force, (d) appropriate algorithms, policies, and procedures, (e) patient-specific plans for SPHM, and (f) HCW education, training, and competencies.

The survey includes characteristics of successful SPHM programs (see Appendix C) in a culture of safety and is based on the ANA SPHM standards (see Appendix A). These eight standards are the product of expertise and evidence that drove interprofessional collaboration. The interprofessional collaboration achieved consensus upon evaluation of the current evidence and determined best SPHM practices. Other information from a previous ANA survey of HCWs who purchased copies of the ANA SPHM standards, and several focus groups conducted at a 2015 national SPHM conference, was also considered during survey development (Einck & Francis, 2016; Waltrip, 2015). The contributions from experts, HCWs, and other professionals demonstrate (a) academic thinking, (b) collaboration, and (c) routine acceptance and use of evidence, which are suggested attributes of a nursing research culture within the context of clinical practice (Berthelsen & Hølge-Hazelton, 2017). These contributions and current evidence provided a strong foundation for the original survey.

The current study used a 21-item adapted ANA survey in a state with enacted legislation to provide a status update on SPHM with an adult inpatient population. Survey content measured three primary variables in SPHM that are associated with successful SPHM programs and a culture of safety. The survey was pretested and reviewed by three nurses in direct patient care roles from one of the selected healthcare organizations. The nurses’ recommendations were used for subsequent revisions to clarify language, remove
items that were unknown or nonpertinent to HCWs in direct patient care, and facilitate survey completion. The direct patient care perspective came from within the context of SPHM in which a patient is repositioned, transferred, or mobilized with assistance, and is therefore invaluable. Survey data were collected from frontline HCWs in a real-world patient care setting. A convenience sample included HCWs in direct patient care roles from several patient care areas of hospitals or medical centers, where dependent or immobile adults were regularly admitted. However, the survey participants’ responses provided nominal- and ordinal-level data, which are not as robust as continuous data regarding measurement and analysis.

Nominal and ordinal data from survey responses require nonparametric tests that are less sensitive to outliers, but are also less effective than parametric tests (Jakobsson, 2004). Therefore, the survey data were converted from nominal- and ordinal-level to continuous data. Pearson correlation testing was used to assess for significant relationships between availability, utilization, and adherence. The use of nonresponse options and forced selection of one response per item throughout is also recommended for consistency or completeness before survey submission (Eysenbach, 2004). The adapted survey used one nominal or ordinal response per item; nonresponse options were not present because the original ANA survey did not include them. The original and adapted survey questionnaires have not been thoroughly examined for validity and reliability; therefore, this study serves as an initial step toward both. Other limitations involve the nonrandomized sampling method and absence of a well-defined sampling frame.
Sampling and design limitations in the study must be considered. A one-shot survey design entails data collection at a single point in time. This cross-sectional approach did not consider the passage of time, changes in staffing or workload, pertinent policies and procedures, or the healthcare organization in general. No additional information was available for assessment and comparison of participants who did not take the survey with the participants who completed and submitted surveys. Therefore, any differences between participants who responded and participants who did not respond were not detected. The convenience sample also obscured existing differences in HCWs’ knowledge, experience, and views of SPH, because all HCWs were not represented (Eysenbach, 2004). A convenience sample lacks the randomization that prevents over- and underrepresentation of populations. In this study, participant rationales for submitting versus not submitting surveys were not communicated or known. For example, voluntary participation may have been motivated by interest in the survey topic or negative perceptions of the healthcare organization. Other design factors and variation in the mode of survey delivery could have affect the quality of survey responses.

The user interface, survey questionnaire, and interventions are design factors that could have created measurement error or bias when participants were unable or chose not to complete and submit surveys. The amount of time required for survey completion may have decreased response rates. Qualtrics was used to facilitate survey completion in the proposed study. The online platform is available for use on computers and smart devices and offers multiple features, such as back buttons, automatic advance options between survey items, and survey progress indicators that improve the user interface. Online survey completion or internal consistency of items requires reinforcement, using alerts
that prompt participants to answer all questions or providing visible reminders that highlight unanswered questions before survey submission (Eysenbach, 2004). An online program and the electronic device for participant use should be easy to navigate, efficient, and user-friendly in order to achieve the desired result. Acceptability to survey participants and the time required for survey completion are influenced by various contextual factors during survey completion and submission. Survey questionnaires that are not systematic, too lengthy, or contain double-barreled items or confusing language are other design factors to address when participants choose not to complete or submit surveys.

The setting, participants taking a survey at work versus off work, and participant characteristics could have influenced survey results. Time, fatigue, stress, and perceptions of research as unhelpful or irrelevant, are additional factors that may have hindered survey participation, as well. Typical personal biases and contextual factors, such as (a) job satisfaction; (b) ulterior motives or issues of trust, grievances, or favoritism; (c) work distractions; (d) inadequate time, incentive, or direction for survey completion; (e) fatigue; (f) lack of participant engagement; and (g) systems failures can preclude survey participation and data accuracy. Participants’ work conditions and role responsibilities can also affect the goals and motivation to complete the survey questionnaire, especially when job demands or the competing priorities of patient care are significant.

Another consideration involves the user interface, where Qualtrics survey links can introduce bias and subsequently affect results (Qualtrics, 2016). The electronic survey link utilized options in Qualtrics that remove participants’ internet protocol addresses and anonymize data. These options also allow participants to complete the
same survey more than once, subsequently decreasing data accuracy (Eysenbach, 2004). Another Qualtrics link includes an opt-out function that may challenge survey completion, if convenience is valued over participant effort. Mitigating options to consider are those that describe survey attempts and completion using the rates of participation, completion, and completeness, to provide additional details about survey data (Eysenbach, 2004). The participation or recruitment rate can be calculated using the number of participants who answer any item on the first page of the survey, divided by the number of participants who click on the electronic link to open the survey. The completion rate is a measure for attrition that uses the number of participants who submit the survey, divided by the number of participants who click on the electronic link to open the survey. However, a completion rate does not measure the extent of completion, or account for the unanswered items on survey questionnaires. The completeness rate will address the number of unanswered items on submitted survey questionnaires. Participants were informed in an introductory e-mail about the importance of data accuracy and survey completion, with instructions in bold font to complete the survey only one time and prevent duplicate responses that affect survey results (see Appendix I).

**Protection of Human Subjects**

There was minimal risk to participants, and no personal identifying information was collected for the purpose of this survey. Participants received survey questions regarding their professional roles and demographic information. A general statement about participant confidentiality or anonymity with internet use and online data transmissions was included in the HCWs’ e-mail invitations (Eysenbach, 2004; Qualtrics, 2016). The University of Missouri–St. Louis provides student access and support for
Qualtrics, a web-based service designed for surveys or evaluations. Qualtrics satisfies university requirements for data collection involving institutional review board or privacy standards. For this study, Qualtrics was used for survey development and distribution, data collection, storage, and analyses.

Surveys in Qualtrics will be password-protected, or incorporate unique identification links that preclude unauthorized use. Qualtrics anonymizes data to ensure confidentiality and contains no specific knowledge of any data collected. Qualtrics does not provide data to outside parties and only processes data to the extent necessary for provision of services (Qualtrics, 2016). Firewall systems are in place, regularly scheduled vulnerability scans are performed, and encrypted backups of Qualtrics servers occur every night. System security practices and operations are also assessed and monitored continuously by Qualtrics staff. Stored, encrypted data from participants’ survey responses were password-protected on my personal laptop computer and backed up on an external hard drive with secure access. All data will be deleted in Qualtrics and from my personal laptop computer 2 years after submitting the final version of the dissertation to the University of Missouri–St. Louis.
CHAPTER IV

RESULTS

Chapter IV includes the research questions, descriptive statistics about survey participants, and other results from data analysis. Professional and personal baseline data and then inferential results are presented.

Research Questions

The research questions are as follows:

1. What is the perceived availability of SPHM resources, based on HCWs’ survey responses?

2. What is the perceived utilization of SPHM resources, based on HCWs’ survey responses?

3. What are the perceived levels of healthcare organizations’ adherence to SPHM standards, based on HCWs’ survey responses?

4. What are the relationships between SPHM resource perceived availability, utilization, and healthcare organizations’ adherence to SPHM standards, based on HCWs’ survey responses?

Descriptive Statistics About Survey Participants

Survey items 22–30 address survey participants’ professional roles, employment, age, race or ethnicity, gender, and education. Descriptive data are presented in Tables 7 and 8.
Research Questions and Survey Results

The results from the data analysis are presented by research question. Descriptive statistics for the three survey subscales are presented. Tables, box and whisker plots, distributions, scatter plots, and correlation matrices are used.
Table 7

Professional Characteristics of Survey Participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>%</th>
<th>M</th>
<th>Mdn</th>
<th>Mode</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare organizations and participants (n = 94)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital A</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital B</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital C</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital D</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital E</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital F</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital G</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital H</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Years employed at health care organization (n = 74)                     |           | 7.51 | 3.0   | 0    | 10.26| 0–41
| Patient care area (n = 94)                                             |           |      |       |      |      |        |       |
| Critical or intensive care                                             | 21        | 22.3 |       |      |      |        |       |
| Acute care or medical–surgical                                         | 55        | 58.5 |       |      |      |        |       |
| Inpatient rehabilitation                                               | 9         | 9.6  |       |      |      |        |       |
| Extended or skilled care                                               | 9         | 9.6  |       |      |      |        |       |
| Profession (n = 75)                                                     |           |      |       |      |      |        |       |
| RN                                                                      | 50        | 66.7 |       |      |      |        |       |
| LPN/LVN                                                                 | 2         | 2.7  |       |      |      |        |       |
| CAN                                                                     | 13        | 17.3 |       |      |      |        |       |
| Ancillary Staff                                                         | 10        | 13.3 |       |      |      |        |       |
| Years of experience in direct patient care (n = 74)                     |           | 12.85| 10.00 | 5    | 9.95 | 0–42

Note. RN = registered nurse; LPN = licensed practical nurse; LVN = licensed vocational nurse; CNA = certified nursing assistant.

*a*The item response Prefer not to answer was selected by a survey participant but not included for analysis.

*b*Valid percentages were given for each category.

Table 8

Personal Characteristics of Survey Participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>%</th>
<th>M</th>
<th>Mdn</th>
<th>Mode</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Table 1: Demographic Characteristics of Respondents

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age, years</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 71)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>41.61</td>
<td>38</td>
</tr>
<tr>
<td>Median</td>
<td>37, 38</td>
<td>13.39</td>
</tr>
<tr>
<td>Minimum/Maximum</td>
<td>20–70</td>
<td></td>
</tr>
<tr>
<td><strong>Race or ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 71)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American or Black</td>
<td>6</td>
<td>8.5%</td>
</tr>
<tr>
<td>Asian</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>Caucasian or White</td>
<td>60</td>
<td>84.5%</td>
</tr>
<tr>
<td>Middle Eastern or North African</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>4.2%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 72)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>11</td>
<td>15.3%</td>
</tr>
<tr>
<td>Female</td>
<td>61</td>
<td>84.7%</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 73)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school or equivalent</td>
<td>11</td>
<td>15.1%</td>
</tr>
<tr>
<td>AND</td>
<td>22</td>
<td>30.1%</td>
</tr>
<tr>
<td>BSN</td>
<td>26</td>
<td>35.6%</td>
</tr>
<tr>
<td>MSN</td>
<td>7</td>
<td>9.6%</td>
</tr>
<tr>
<td>PhD or DNP</td>
<td>7</td>
<td>9.6%</td>
</tr>
</tbody>
</table>

*Note.* ADN = associate’s degree in nursing; BSN = bachelor of science in nursing; MSN = master of science in nursing; PhD = doctor of philosophy in nursing; DNP = doctor of nursing practice.

*a* The item response *Prefer not to answer* was selected by a survey participant but not included for analysis.

*b* Valid percentages were given for each category.
Research Question 1

What is the perceived availability of SPHM resources, based on HCWs’ survey responses?

Survey responses were analyzed from 75 of 94 (80%) participants who completed the availability subscale in the Adapted Safe Patient Handling and Mobility Self-Assessment Resource. Figure 3 presents the range (0–100), median (82.14), and quartiles. Participant scores ranged from 14.29 to 100. The median indicates that 50% of subscale scores are above 82.14. The interquartile range (IQR), measured between the 25th and the 50th percentiles, is 39.29 and indicates the range in which 50% of the scores lie. The 25th, 50th, and 75th percentiles are 57.14, 82.14, and 96.43, respectively.

Figure 3. Dispersion of scores for the availability subscale.

The availability subscale mean and median were 73.19 and 82.14, respectively. A 95% confidence interval (CI) for the mean fell between 67.32 and 79.07. Figure 4 presents negatively skewed data with a majority of participant scores above 60, especially within the 80–100 range. Subscale item response values of 75 and 100 (mode) are therefore prevalent in the left-skewed distribution.
Figure 4. Distribution of scores for the availability subscale.

The availability subscale mean was 73.19, (95% CI [67.32, 79.07]). These values fall below the median (82.14) and mode (100) and account for the negatively skewed data in Figure 4. Subscale scores range from 14.29 to 100, SD = 25.53. The standard deviation further explains the clustered scores between 80 and 100 in Figure 4. Survey item responses were assigned values of 0, 25, 50, 75, and 100 to quantify the availability of SPHM resources. The prevalence of scores in the upper quartile suggests most survey participants selected subscale item responses with values of 75 and 100. Table 9 presents the availability subscale results.

Table 9

Descriptive Statistics for the Safe Patient Handling and Mobility Availability Subscale (n = 75)

<table>
<thead>
<tr>
<th>Subscale</th>
<th>$M$</th>
<th>$Mdn$</th>
<th>Mode</th>
<th>$SD$</th>
<th>Range</th>
<th>95% CI</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>73.19</td>
<td>82.14</td>
<td>100</td>
<td>25.53</td>
<td>14.29−100</td>
<td>67.32, 79.07</td>
<td>57.14, 82.14, 96.43</td>
</tr>
</tbody>
</table>
Research Question 2

What is the perceived utilization of SPHM resources, based on HCWs’ survey responses?

Survey responses were analyzed from 80 of 94 (85%) participants who completed the utilization subscale in the Adapted Safe Patient Handling and Mobility Self-Assessment Resource. Figure 5 presents the range (0–100), median (83.33), and quartiles. Participant scores ranged from 29.17 to 100. The median indicates that 50% of subscale scores are above 83.33. The IQR, measured between the 25th and the 50th percentile, is 25.00 and indicates the range in which 50% of the scores lie. The 25th, 50th, and 75th percentiles are 66.67, 83.33, and 96.17, respectively.

Figure 5. Dispersion of scores for the utilization subscale.

The utilization subscale mean and median were 77.40 and 83.33, respectively. A 95% CI for the mean fell between 77.31 and 81.49. Figure 6 presents negatively skewed data with a majority of participant scores above 60, especially within the 80–100 range. Subscale item response values of 75 and 100 (mode) are therefore prevalent in the left-skewed distribution.
The utilization subscale mean was 77.40 (95% CI [77.31, 81.49]). These values below the median (83.33) and mode (100) account for the negatively skewed data in Figure 6. Subscale scores range from 29.17 to 100 ($SD = 18.83$). The SD further explains the clustered scores between 80 and 100 in Figure 5. Survey item responses were assigned values of 0, 25, 50, 75, and 100 to quantify the utilization of SPHM resources. The prevalence of scores in the upper quartile suggests most survey participants selected subscale item responses with values of 75 and 100. Table 10 includes the utilization subscale data described.

Table 10

*Descriptive Statistics for the Safe Patient Handling and Mobility Utilization Subscale (n = 80)*

<table>
<thead>
<tr>
<th>Subscale</th>
<th>$M$</th>
<th>$Mdn$</th>
<th>Mode</th>
<th>SD</th>
<th>Range</th>
<th>95% CI</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilization</td>
<td>77.40</td>
<td>83.33</td>
<td>100</td>
<td>18.83</td>
<td>29.17–100</td>
<td>73.31, 81.49</td>
<td>66.67, 83.33, 91.67</td>
</tr>
</tbody>
</table>
Research Question 3

What are the perceived levels of healthcare organizations’ adherence to SPHM standards, based on HCWs’ survey responses?

Survey responses were analyzed from 70 of 94 (75%) participants who completed the adherence subscale in the Adapted Safe Patient Handling and Mobility Self-Assessment Resource. Figure 7 presents the range (0–100), median (90.63), and quartiles. Participant scores ranged from 59.38 to 100. The median indicates that 50% of subscale scores are above 90.63. The IQR measured between the 25th and the 50th percentile is 15.63 and indicates the range in which 50% of the scores lie. The 25th, 50th, and 75th percentiles are 81.25, 90.63, and 96.88, respectively.

Figure 7. Dispersion of scores from the adherence subscale.

The adherence subscale mean and median were 87.78 and 90.63, respectively. A 95% CI for the mean fell between 85.00 and 90.54. Figure 8 presents negatively skewed data with a majority of participant scores in the 70–100 range and a few scores in the middle 50s to upper 60s.
Figure 8. Distribution of scores for the adherence subscale.

The adherence subscale mean was 87.78 (95% CI [85.00, 90.54]). These values below the median (90.63) and mode (96.88), account for the negatively skewed data in Figure 8. Subscale scores range from 59.38 to 100 (SD = 11.60). The SD further explains the clustered scores between 80 and 100. Survey item responses were assigned values of 0, 25, 50, 75, and 100, to quantify the healthcare organization’s level of adherence to SPHM standards. The prevalence of scores in the upper quartile suggests most survey participants selected subscale item responses with values of 75 and 100. Table 11 includes the adherence subscale data described.

Table 11

Descriptive Statistics for the Safe Patient Handling and Mobility Adherence Subscale (n = 70)

<table>
<thead>
<tr>
<th>Subscale</th>
<th>M</th>
<th>Mdn</th>
<th>Mode</th>
<th>SD</th>
<th>Range</th>
<th>95% CI</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25th</td>
</tr>
<tr>
<td>Adherence</td>
<td>87.78</td>
<td>90.63</td>
<td>96.88</td>
<td>11.60</td>
<td>59.38</td>
<td>85.0,</td>
<td>81.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>90.54</td>
<td>90.63</td>
</tr>
</tbody>
</table>
Reliability of the Availability, Utilization, and Adherence Subscales

The preceding subscales were examined together to determine how consistently availability, utilization, and adherence constructs were measured in SPHM. Cronbach’s alpha was used to measure internal consistency and estimate measurement error. Reliability was acceptable ($\alpha = .75$). The availability subscale accounted for approximately 58.5% of the variance within the Adapted Safe Patient Handling and Mobility Self-Assessment Resource. Reliability did not improve upon deletion of any subscale ($\alpha \leq .68$). The remaining item-total statistics are included in Table 12.

Table 12

*Reliability of the Availability, Utilization, and Adherence Subscales (n = 70)*

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Item-total statistics for subscales</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scale $M$ if item deleted</td>
<td>Scale variance if item deleted</td>
<td>Corrected item-total correlation</td>
<td>Squared multiple correlation</td>
<td>Cronbach’s $\alpha$ if item deleted</td>
<td></td>
</tr>
<tr>
<td>Availability</td>
<td>167.89</td>
<td>585.25</td>
<td>0.65</td>
<td>0.44</td>
<td>.68</td>
<td></td>
</tr>
<tr>
<td>Utilization</td>
<td>163.28</td>
<td>1,076.11</td>
<td>0.60</td>
<td>0.37</td>
<td>.65</td>
<td></td>
</tr>
<tr>
<td>Adherence</td>
<td>155.63</td>
<td>1,270.25</td>
<td>0.66</td>
<td>0.43</td>
<td>.67</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Listwise deletion based on participant completion of all subscales.

Research Question 4

What are the relationships between SPHM resource perceived availability, utilization, and healthcare organizations’ adherence to SPHM standards, based on HCWs’ survey responses?

Scatterplots of the availability, utilization, and adherence subscale data depict the relationships between these three constructs. The linearity, direction, and strength of these relationships are evidenced by the following patterns in survey data. Figure 9
includes a scatterplot of the availability and utilization subscale data. A positive, linear relationship between constructs is noted. Data points are clustered in the upper right corner, with a range of availability scores between 50 and 100 and utilization scores between 70 and 100. The remaining availability scores between 20 and 50 and utilization scores between 30 to 60 are widely scattered, indicating a moderately weak relationship between these two constructs. In Figure 10, a scatterplot of the availability and adherence subscale data shows a positive, linear relationship between constructs. Clusters of data points are present in the upper middle and upper right corner, with a range of availability scores between 50 and 100 and adherence scores between 75 and 100. The remaining availability scores between 20 and 50, and adherence scores between 60 and 75, reveal scattered data that indicate a moderately weak relationship between these two constructs.

The last scatterplot in Figure 11 includes the utilization and adherence subscale data. A positive, linear relationship between constructs is noted. The majority of data points are located in the middle to upper right corner, with a range of utilization scores between 70 and 100 and adherence scores between 75 and 100. The remaining utilization scores between 30 and 50 and adherence scores between 60 and 75 reveal scattered data that indicate a moderately weak relationship between these two constructs.

Figure 9. Scatterplot of the availability and utilization subscales.
Figure 10. Scatterplot of the availability and adherence subscales.

Figure 11. Scatterplot of the utilization and adherence subscales.
Table 13

Correlations Between Subscales for Safe Patient Handling and Mobility Resource

Availability, Utilization, and Adherence

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Availability</th>
<th>Utilization</th>
<th>Adherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>1</td>
<td>0.60</td>
<td>0.61</td>
</tr>
<tr>
<td>Pearson correlation</td>
<td>&lt; .001</td>
<td>1</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Significance (2-tailed)</td>
<td>75</td>
<td>74</td>
<td>70</td>
</tr>
<tr>
<td>N</td>
<td>75</td>
<td>74</td>
<td>70</td>
</tr>
<tr>
<td>Utilization</td>
<td>0.60</td>
<td>1</td>
<td>0.54</td>
</tr>
<tr>
<td>Pearson correlation</td>
<td>&lt; .001</td>
<td>80</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Significance (2-tailed)</td>
<td>74</td>
<td>80</td>
<td>70</td>
</tr>
<tr>
<td>N</td>
<td>74</td>
<td>80</td>
<td>70</td>
</tr>
<tr>
<td>Adherence</td>
<td>0.61</td>
<td>0.54</td>
<td>1</td>
</tr>
<tr>
<td>Pearson correlation</td>
<td>&lt; .001</td>
<td>&lt; .001</td>
<td>70</td>
</tr>
<tr>
<td>Significance (2-tailed)</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>N</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
</tbody>
</table>

Note. Significant correlations in bold. $p < .001$ (2-tailed).

Conclusion

Median scores for resource availability (82.14), utilization (83.33), and adherence (90.63) were moderately high. There were moderately weak positive correlations between resource availability and utilization ($r = .60$, $p \leq 0.001$), availability and adherence ($r = .61$, $p \leq 0.001$), and utilization and adherence ($r = .54$, $p \leq 0.001$).
CHAPTER V

CONCLUSION

Introduction

A summary of the study and subsequent conclusions are presented in Chapter V. A brief report of the results and implications are discussed. Consistencies and inconsistencies between the results and those from other studies describe the study’s alignment with existing research. The preceding chapters guide interpretation of the results. Recommendations for future research follow. The need for additional research, including specific types, is explained at the end of this chapter.

Summary

The purpose of this study was to examine the current status of SPHM, specifically resource availability, utilization, and adherence to established SPHM standards, and measure any relationships among these factors. This study has built reliability and validity of the adapted ANA Safe Patient Handling and Mobility Self-Assessment Resource. Responses from a one-shot survey of HCWs in direct patient care were obtained from several private and VHA healthcare organizations in the Midwestern United States. Patient handling and the risk of injury are pervasive in healthcare, compared to other professions; therefore, current practices must be addressed to improve HCW knowledge, awareness, and understanding of safety in clinical practice. A nonexperimental, descriptive, one-shot survey design was used to measure SPHM concepts in real-world patient care settings. Survey items assessed the current availability and utilization of SPHM resources and healthcare organizations’ adherence to SPHM standards.
Results

Ninety-four participants participated in the survey from eight healthcare organizations. The participants included RNs $(n = 50)$, LPNs $(n = 2)$, certified nursing assistants $(n = 13)$, and ancillary staff $(n = 10)$. Median scores for resource availability (82.14), utilization (83.33), and adherence (90.63) were moderately high. There were positive correlations between resource availability and utilization $(r = .60, p \leq .001)$, availability and adherence $(r = .61, p \leq .001)$, and utilization and adherence $(r = .54, p \leq .001)$. This finding indicates that where there are resources there is greater utilization and adherence.

Implications

This study has value for education and clinical nurses. Schools of nursing are gradually introducing SPHM content into undergraduate plans of study, since NIOSH and the CDC developed specific training content for use (Waters et al., 2009). Conceptual foundations introduced in this project build on prior work in multiple healthcare settings. At the graduate level, SPHM belongs in curricula for patient safety and quality, risk management, and healthy policy as well. Escalating healthcare costs and an aging workforce more than justify the need to protect patients and the healthcare workforce, who are typically between the ages of 45 and 55.

Nurses in clinical practice today may have missed education and training for SPHM during undergraduate coursework and possibly during nursing orientation and other required sessions. These nurses need ongoing education and training to maintain competence, reinforce accountability, and consistently deliver safe, effective care at all times. Knowledge, awareness, engagement, and accountability are requisite to a culture
of safety, and therefore SPHM. Beliefs, norms, and values are shaped by culture. In a culture of safety, for example, hand hygiene upon entering and leaving patient rooms is now habitual to prevent the spread of infection. Patient handling must be become a top priority at all levels of the healthcare organization to ensure a healthy workforce and to maintain safety throughout repositioning, transferring, or mobilizing activities.

SPHM involves more than education, training, competence, and equipment. The patient population now lives with multiple comorbidities and chronic diseases that were previously fatal, or at least shortened life expectancy. The relationship between mobility and wellness is evidenced by early mobility programs implemented to shorten hospital stays; the buildings, homes, and other areas adapted to facilitate participation and physical activity; and technology that increases individual autonomy and independence during ADLs. Despite failed attempts to pass federal legislation, healthcare organizations, federal organizations such as OSHA, NIOSH, and the CDC, and state lawmakers are now coming together to improve HCW and patient safety with other interventions and initiatives. SPHM is valuable to the healthcare profession, patients, and society at large, especially when healthcare resources are costly and often scarce. These solutions for safety and improved mobility are preventive and restorative as well.
Synthesis and Summary of the Literature

The healthcare organization assumes primary responsibility for eliminating barriers to SPHM by providing all necessary resources, establishing standards for all members, and reinforcing by example. Establishing accountability that requires HCWs to engage as partners in the ongoing commitment to safety also reinforces the necessary communication, collaboration, and active participation. The example set for all HCWs and staff then promotes patient communication, education, and participation to decrease safety risks and avoid additional barriers.

The healthcare organization’s existing goals and objectives must align with SPHM to engage HCWs and reinforce the importance of safety at all times, especially as the end users of SPHM assistive technology. Commitment and participation are evidenced by demonstrated accountability, communication, and collaboration that provide all necessary resources at all times to ensure safety while transferring, repositioning, and mobilizing patients.

Effectively implemented SPHM programs are one solution to HCW- and patient-safety-related issues from injuries during patient transfers, repositioning, and mobilization activities. Barriers involving the healthcare organization, HCW, and patient that preclude SPHM practices have been described along with potential solutions, such as an established culture of safety; comprehensive evaluation systems for ongoing data collection, analyses, and monitoring; systems for communication that include a clear hierarchy for reporting; and facilitating a just culture, where accountability, open communication, and risks, hazards, and errors are reported without fear of retribution.
Ergonomics and assistive technology are implemented together to prevent harm or injury to HCWs and patients during repositioning, transfers, or mobilization activities. However, providing assistive technology does not facilitate correct, consistent use during patient-handling activities. Effective education and training are required to reinforce awareness and understanding of SPHM and to validate HCW competence with safe and consistent use, therefore decreasing injury and related risk.

The context of SPHM is largely determined by the healthcare organization, which influences HCW attitudes and behaviors via resources provided, such as education and training on SPHM, SPHM assistive technology, and patient education. Therefore, the healthcare organization indirectly affects safety for HCWs and patients during transferring, repositioning, and mobilizing activities. Concepts and a model derived from current literature represent various levels of membership within the healthcare organization and the roles in the context of SPHM. This context reflects the healthcare organization’s influence on safety, resources, and staff behaviors and practices. Awareness and understanding of hazards and risks to safety, with adequate education and training, have increased safe and consistent use of SPHM assistive technology that decreases the risk for HCW and patient harm or injury.

**Interpretation**

Descriptive and correlational work has an important place in nursing knowledge development. In the current study, I have described the responses to actual nurses’ work on the front line with SPHM.

Low scores in resources for patient handling and mobilization mean that availability, utilization, or adherence of the health care organization are absent or at a
point where care could be dangerously low, which is synonymous with highly unsafe. There is little or no snowball effect produced by the resource being there. Such little emphasis means that efforts to use evidence-based practice or quality improvement methodologies are frequently lacking.

Moderate scores indicate that healthcare organizations have purchased a limited number of resources for HCWs and patients. These healthcare organizations have begun to implement SPHM education, training, policies, procedures, communication and reporting guidelines, and requirements mandated by state legislation. However, financial restrictions preclude further development of SPHM programs and adequately protect HCWs and patients.

Moderately high scores, as indicated in the current study, demonstrate the effort of healthcare organizations and HCWs to maintain safety throughout patient care. Financial limitations, ineffective reinforcement of a culture of safety, or inconsistency between patient care areas may explain why these particular scores are not high. When adequate resources are not present, subsequent utilization and organizational adherence cannot improve. Conversely, inadequate adherence at the organizational level can preclude necessary expenditures for resources, as well.

High scores demonstrate the healthcare organizations’ commitment to maintain a culture of safety at all times. These healthcare organizations ensure that all necessary resources for SPHM are present, functional, and appropriate for each patient care setting. HCWs in these healthcare organizations therefore adopt the culture of the healthcare organization and utilize the correct resources consistently to maintain safety at all times.
Strengths and Weaknesses

The instrument used was developed by expert panel at the ANA in conjunction with an established vendor of safe patient devices. The prospective study was done in a state, Missouri, with safe patient handling legislation, so it serves as an evaluation of this legislation. The state legislation was compared to the ANA standards before the study commenced.

The measures were self-reported and presented an adapted version that was used for the first time in real-world patient care, so further testing is required. The number of responses was low but acceptable given the type of data required. A disproportionate number of surveys from a large healthcare organization affected how other healthcare organizations were represented. Without permission to advertise the survey before activation, soliciting a larger sample was not possible.

**Recommendations for Future Research**

- Testing and refinement of the adaptive ANA safe patient handing and mobility resource instrument
- Additional studies with very clear definition and measurement of SPHM resources
- Additional research on ANA SPHM resources and ergonomic design
References


Armstrong, D. P., Ferron, R., Taylor, C., McLeod, B., Fletcher, S., MacPhee, R. S., & Fischer, S. L. (2017). Implementing powered stretcher and load systems was a
cost effective intervention to reduce the incidence rates of stretcher related injuries in a paramedic service. *Applied Ergonomics, 62*, 34–42.

http://doi.org/10.1016/j.apergo.2017.02.009


http://doi.org/10.1002/ajim.22500


http://doi.org/10.1016/j.amjmed.2016.03.032


http://doi.org/10.1097/01.NURSE.0000475501.70596.2b


http://doi.org/10.1016/j.ssci.2014.08.010


http://doi.org/10.1016/j.apergo.2011.05.008


http://doi.org/10.1002/rnj.185

https://doi.org/10.1002/rnj.187

http://doi.org/10.1097/01.NUMA.0000461060.03542.06

http://doi.org/10.1093/pubmed/fdi031


http://doi.org/10.1016/j.iccn.2017.03.007


http://doi.org/10.1001/jamainternmed.2016.1870


http://doi.org/10.1136/oemed-2012-101210


https://doi.org/10.1177/216507990605400803


http://doi.org/10.1097/01.NUMA.0000524820.33911.87


https://doi.org/10.2345/0899-8205-48.4.300


http://doi.org/10.1111/jocn.13586


http://doi.org/10.1080/10803548.2016.1198092

http://doi.org/10.5014/ajot.2013.005389

http://doi.org/10.3233/WOR-2012-1430


http://doi.org/10.1097/NCQ.0000000000000115

http://doi.org/10.1097/NCQ.0000000000000205


Hignett, S., Fray, M., Battevi, N., Occhipinti, E., Menoni, O., Tamminen-Peter, L., . . . Jager, M. (2014). International consensus on manual handling of people in the


Hunter, O. O., George, E. L., Ren, D., Morgan, D., Rosenzweig, M., & Klinefelter Tuite, P. (2017). Overcoming nursing barriers to intensive care unit early mobilisation:
A quality improvement project. *Intensive and Critical Care Nursing*, 40, 44–50.
http://doi.org/10.1016/j.iccn.2016.10.005


http://doi.org/10.1111/j.1471-6712.2004.00305.x

http://doi.org/10.1179/1743288X12Y.0000000061

http://doi.org/10.1179/1743288X13Y.0000000087


http://www.jcrinc.com/assets/1/7/ECNews-June-2013.pdf


Mills, G. (2015). Living better in the built environment. Make sure the environment of care is both safe and comfortable for patients, visitors, and staff. *Joint*
Commission Perspectives, 35(9), 9–11. Retrieved from

application and removal of lifting slings: The effects of patient weight, bed height
http://doi.org/10.1080/00140139.2016.1211750

The motion analysis of transferring from bed to wheelchair conducted in the
nursing field with focusing on the body pressure distribution. In V. G. Duffy
(Ed.), Applications in health, safety, ergonomics, and risk management:
Ergonomics and design: 8th International Conference, DHM 2017, Part I, LNCS
10286 (pp. 141–159). http://doi.org/10.1007/978-3-319-58463-8_13

National Institute for Occupational Safety and Health. (2013). Safe patient handling and
mobility (SPHM). Retrieved from https://www.cdc.gov/niosh/topics/safepatient/

National Institute for Occupational Safety and Health. (2017). Workplace safety and
health topics: Safe patient handling and mobility (SPHM). Retrieved from
https://www.cdc.gov/niosh/topics/safepatient/

http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPerio
dicals/OJIN/TableofContents/Volume92004/No3Sept04/EvidenceBasedPractices.
html?css=print

http://doi.org/10.1177/2165079917697216

http://doi.org/10.1097/PRS.0000000000000794


A SURVEY OF HEALTHCARE WORKERS


http://doi.org/10.1002/nur.21754


http://doi.org/10.3928/19404921-20140731-01


http://doi.org/10.1111/jan.12425

Terpeluk, P., Rogen, B., & Gilliam, T. (2016). Medical and pharmacy costs for new hire nurses following a physical strength evaluation screening in a large health system.

*Workplace Health & Safety, 64*, 420–425.

http://doi.org/10.1177/2165079915621317


http://doi.org/10.1017/CBO9781107415324.004


http://doi.org/10.1002/rnj.108


http://doi.org/10.1016/j.ijnurstu.2014.03.007


safety and health engineering controls in reducing workers’ compensation claims and costs. *American Journal of Industrial Medicine, 57*, 1398–1412. doi:10.1002/ajim.22372


http://doi.org/10.1097/01.NAJ.0000512286.71113.23
Appendix A

ANA 2013 Safe Patient Handling and Mobility (SPHM) Interprofessional National Standards

The Role of the Healthcare Organization

1. Establish a Culture of Safety

1.1.1. Establish a statement of commitment, in writing, to a culture of safety that will guide the organization’s priorities, resource allocation, policies and procedures, and define accountability throughout the organization.

1.1.2. Establish a nonpunitive environment, supporting a system that encourages HCWs to report hazards, errors, near misses, and accidents to better understand antecedents of SPHM errors for prevention purposes while emphasizing HCW accountability regarding individuals’ actions (not for systems or environmental issues that are uncontrollable).

1.1.3. Provide a system for right of refusal stated in organizational policy that specifies the right to refuse, accept, or object to any patient care assignments where patient transfer, repositioning, or mobility issues increase HCW risk for injury.

1.1.4. Provide safe levels of staffing using an evidence-based system to determine HCW assignments that support SPHM, including time allocated for SPHM education and training.

1.1.5. Establish a system for communication and collaboration between all patient care areas of the organization to inform and engage HCWs and patients about SPHM.

2. Implement and Sustain a SPHM Program
2.1.1. Designate a group or groups of stakeholders to develop, implement, evaluate, remediate, and maintain a SPHM program, establishing a committee of organization leaders, HCWs, and ancillary/support staff who will collaborate in completing the work required for the SPHM program

2.1.2. Perform a comprehensive assessment of SPHM initially and periodically, including a SPHM technology needs assessment

2.1.3. Develop a written SPHM program, with goals, objectives, and a plan for ongoing evaluation, compliance, and quality improvement, addressing (a) ANA’s eight standards of SPHM (b) any pertinent local, state, or federal regulations and laws (c) SPHM program’s short- and long-term goals and objectives (written, including the plan and timeline for meeting goals and evaluation requirements and the names and titles of the individuals responsible for developing and implementing the plan (d) compliance monitoring with an established hierarchy of reporting that is clear and in writing

2.1.4. Customize and integrate the SPHM program across the continuum of care, addressing SPHM with each transition of care

2.1.5. Provide funding to implement and sustain the program, utilizing cost–benefit, business case, or return-on-investment analyses

2.1.6. Identify the essential physical functions of and high-risk tasks of jobs in written job descriptions based on evidence-based processes or literature review describing or defining activities that increase HCWs’ risk for injury
2.1.7. Reduce the physical requirements of high-risk tasks involving transfer, repositioning, and mobilization of patients using engineering, safe work practices, and administrative controls

3. Incorporate Ergonomic Design Principles to Provide a Safe Environment of Care

3.1.1. Plan for a safe environment of care during new construction and renovation projects, reviewing design for ergonomic, safety, and health risk factors (e.g., facility design, process flow, evaluation of new or different SPHM assistive technology appropriate for the specific patient population and work area, accessibility issues)

3.1.2. Include diverse perspectives, related to ergonomic design principles, requesting input from HCWs and other ancillary/support staff at all stages of construction and renovation projects

4. Select, Install, and Maintain SPHM Technology

4.1.1. Perform an organizational SPHM technology needs assessment in all contexts of care within the organization, utilizing an interprofessional group of stakeholders

4.1.2. Develop a plan for the selection of SPHM technology that includes quality and safety standards, and the compatibility and operational use of SPHM technology throughout the organization

4.1.3. Provide opportunities for trial and to provide feedback about SPHM technology to the HCWs utilizing it
4.1.4. Develop a SPHM technology procurement plan and introduction schedule, then communicate to HCWs

4.1.5. Provide and strategically place SPHM technology for accessibility, considering the context of SPHM, to minimize risk of injury for HCWs and patients

4.1.6. Install fixed SPHM technology (e.g., ceiling or wall-mounted lifts) according to manufacturer’s specifications

4.1.7. Establish a system to clean, disinfect, maintain, repair, and upgrade SPHM technology on a regular basis using manufacturer’s specifications and assign responsibility for monitoring and action to a specific position

5. Establish a System for Education, Training, and Maintaining Competence

5.1.1. Establish an education and training system appropriate for adult learners and provide to HCWs and ancillary/support staff upon hire, annually, and whenever new competencies or SPHM are introduced

5.1.2. Include healthcare workers (HCWs) from across the continuum of care, using content specific to the HCW and ancillary or support staff roles, and the designated work areas

5.1.3. Provide time for employees to participate in learning sessions, scheduling sessions during work hours and during shifts worked

5.1.4. Provide appropriate SPHM technology for education and training, using the same SPHM technology throughout the organization preferably in simulation or point-of-care formats

5.1.5. Require and document HCW competence prior to actual patient SPHM tasks and monitor for effectiveness and compliance
5.1.6. Provide adequate time and resources for HCWs to educate patients and family members about SPHM

6. Integrate Patient-Centered SPHM Assessment, Plan of Care, and Use of SPHM Technology

6.1.1. Provide a written procedure on the SPHM assessment and plan of care outlining how to evaluate patient SPHM status, establish goals, select the appropriate technology for specific tasks, and address HCW role and responsibilities regarding patient assessment and scoring, evaluation, plan of care, and documentation

6.1.2. Require initial and ongoing assessment of the patient or a process to determine SPHM needs based on physical, cognitive, clinical, and rehabilitative needs upon admission and on an ongoing basis. Outcomes of the assessment, evaluation, or scoring systems will be integrated into the patient plan of care

6.1.3. Include SPHM in the plan of care, specifying required SPHM technology, methods, and expected patient outcomes while promoting independence as appropriate

6.1.4. Address SPHM at transitions of care, including pertinent information and resources during bedside shift report, upon transfer to other patient care areas, and in discharge planning

6.1.5. Provide a system to resolve patient refusals of SPHM technology use that addresses HCW and patient safety

6.1.6. Monitor frequency, severity, and cost of patient injuries associated with patient handling and mobility

6.1.7. Support safe delegation and assignment of SPHM tasks and activities consistent with the state practice act or other legislation governing licensure
7. Include SPHM in Reasonable Accommodation and Post-Injury Return to Work

7.1.1. Facilitate the employment of disabled HCWs, matching physical capabilities to the physical demands required for the job

7.1.2. Monitor HCW injuries (frequency, severity, and cost including workers’ compensation) associated with patient handling and mobility and use for the purpose of prevention

7.1.3. Facilitate early return to work following injury, ensuring that jobs are medically suitable and physical restrictions are honored during the period of restricted activity, to prevent harm and expedite recovery

8. Establish a Comprehensive Evaluation System

8.1.1. Establish a comprehensive evaluation and quality improvement system while planning the SPHM program (i.e., formative and summative evaluations, process and outcome measures, communication of results, plans for remediation and for emphasis of positive outcomes), based on the program’s goals and objectives

8.1.2. Identify a variety of data sources and measures for quality improvement reflective of ANA’s SPHM standards, assess effectiveness of the SPHM program and related processes, and identify selected program outcomes

8.1.3. Utilize standardized definitions and evidence-based methods for data collection and analysis, changing evaluation methods as needed

8.1.4. Disseminate findings, establishing a formal process that informs key stakeholders using various routes of communication (e.g., online summaries, printed materials, staff meetings, leadership meetings, and organizational meetings)
8.1.5. Develop a plan for quality improvement and remediation of deficiencies within a reasonable amount of time, assigning review of data and development of recommendations to a diverse group of stakeholders.

8.1.6. Comply with the organization’s policies, appropriate professional codes of ethics, federal privacy laws and regulations, state workers’ compensation laws, and other language specified in applicable codes and regulations.

Note. From “Interprofessional Standards for Safe Patient Handling and Mobility” (pp. 23–38), in Safe Patient Handling and Mobility: Interprofessional National Standards Across the Care Continuum by the American Nurses Association, 2013, Silver Spring, MD: Author. Copyright 2013 by the American Nurses Association. Reprinted [or adapted] with permission.
Figure B1. The just culture model is based on the assumption that human error often results from interactions between individuals and systems (e.g., environment of care, equipment, devices, electronic systems, other individuals or processes utilized), not reckless behavior. Systems with suboptimal design do not match or fit the abilities or characteristics of the individual. Therefore, the opportunity for human error and at-risk behaviors will increase. In a nonpunitive environment, individuals are held accountable for their behavior and performance, not for system failures or design flaws. From The Just Culture Algorithm (p. xxx), by D. Marx, 2008, Plano, TX: Outcome Engenuity. Copyright 2005 by Outcome Engenuity. Reprinted [or adapted] with permission.
Appendix C

Characteristics of Successful Safe Patient Handling and Mobility (SPHM) Programs

1. Established commitment of the organizational leadership, management, and healthcare workers to reducing or eliminating risky or reckless techniques for transferring, repositioning, and mobilizing patients: The healthcare organization provides ongoing, mandatory education, training, and verification of competency regarding injury prevention, and the appropriate selection and consistent use of assistive technology per patient.

2. Healthcare workers’ adherence to the healthcare organization’s policies and procedures are demonstrated by their safe, consistent techniques and use of appropriate assistive technology per patient.

3. Healthcare workers’ demonstrated understanding and awareness of occupational low back pain, other work-related MSDs, and importance of early reporting and the procedures for work-related injuries.

4. Established communication process for healthcare workers to report any complaints and offer their suggestions specifically related to SPHM.

5. Systems in place for identification and analysis of occupational risks and hazards that define high-risk tasks and patient care areas, such as duration, frequency and amount of exposure to exertional forces, repetitive movements, sustained postures, and other ergonomic stresses that increase healthcare workers’ risks for pain and injury.
6. Systems are utilized to provide information for analyses of healthcare worker injury and illness reports, track data over time to detect trends or patterns in reported injuries, and therefore allow further opportunities to prevent recurrence.

7. Processes implemented for hazard prevention and control that eliminate occupational hazards or at least decrease risk to an acceptable level, appropriate selection and procurement of assistive technology, adequate staffing with adequate healthcare worker-to-patient ratios, SPHM needs assessments that focus on the patient population to be admitted, the patient care area involved, the appropriate assistive technology per patient population and patient care area, and the policies and procedures that restrict patient admissions.

8. Established occupational health program for medical management that emphasizes MSD prevention, accurate documentation of work-related injuries and illnesses, early identification and treatment of injured healthcare workers, activity restrictions specific to healthcare worker roles during the recovery process, vigilant monitoring of injured healthcare workers, and accurate return-to-work assessments based on the requirements specified for regular activity.

9. System(s) established for required education and training of all healthcare workers, orientees, and leadership, that provide content for ongoing education on occupational hazards, reinforce healthcare worker understanding and awareness of injury, include the related risks, causes, associated symptoms, and processes for reporting healthcare worker injuries and potential problems, and emphasize healthcare workers’ health and wellness with physical fitness, health protection, and health promotion.
10. Implemented policies and procedures that specifically address healthcare workers’ balance, ergonomics, the assistance required to lift over 35 pounds from other healthcare workers and assistive technology, limits the number of lifts per day, reduces repetitive movements and sustained postures during everyday activities, and eliminates manual lifting > 35 lbs., especially when bending or twisting at waist level.

*Note.* From “Interprofessional Standards for Safe Patient Handling and Mobility” (pp. xx–xx), in *Safe Patient Handling and Mobility: Interprofessional National Standards Across the Care Continuum*, by the American Nurses Association, 2013, Silver Spring, MD: Author. Copyright 2013 by the American Nurses Association. Reprinted [or adapted] with permission.
Appendix D

2016 ANA Safe Patient Handling and Mobility Self-Assessment Resource

### STANDARD 1: ESTABLISH A CULTURE OF SAFETY

1. Establish a statement of commitment to a culture of safety.

Organizational policy will include a written commitment to a culture of safety that will be used to guide the facility’s priorities, resource allocation, policies, and procedures. The written statement regarding SPHM will describe layers of accountability across sectors and settings.

*Please rate the degree to which the facility and healthcare workers promote and train a culture of safety, (5 = greatest degree)*

- [ ] Our facility does not promote and train a culture of safety.
- [ ] Our facility inconsistently promotes and trains a culture of safety.
- [ ] Our facility is working towards promoting and training a culture of safety.
- [ ] Our facility works fairly consistently to promote and train a culture of safety.
- [ ] Our facility consistently and constantly promotes and trains a healthy culture of safety.

2. Establish a non-punitive environment.

Organizational policy will support a system to encourage healthcare workers to report hazards, errors, incidents, and accidents, so that the precursors to SPHM errors can be better understood and organizational issues can be changed to prevent future incidents and injuries. Healthcare workers know that they are accountable for their actions, but will not be held accountable for problems within the system or environment that are beyond their control.

*Please rate the degree to which healthcare workers are able to report hazards or errors without fear of retribution.*

- [ ] Healthcare workers are discouraged from reporting any hazards or errors.
- [ ] Healthcare workers are uncomfortable reporting any hazards or errors.
- [ ] There is seldom discussion pertaining to reporting of hazards or errors.
- [ ] Healthcare workers are encouraged to report any hazards or errors.
- [ ] Healthcare workers are expected to report all hazards or errors.

3. Provide a system for right of refusal.

Organizational policy will provide the healthcare worker the right to accept, reject, or object to any healthcare recipient transfer, repositioning, or mobility assignment that puts the healthcare recipient or the healthcare worker at risk for injury. The refusal shall be made in writing, without fear of retribution. The policy will describe steps for resolving the hazard.

*Does the organization have a policy and procedure for healthcare workers to report an unsafe assignment and refuse the unsafe assignment prior to assuming responsibility?*

- [ ] Yes
- [ ] No

4. Provide safe levels of staffing.

An evidence-based system will be used to determine safe and appropriate caseloads. Adequate staffing levels will support safe patient handling and mobility and include allocated time for training and education.

*Does the facility possess a system for safe staffing?*

- [ ] Yes
- [ ] No
5. Establish a system for communication and collaboration.

Collaboration among all sectors and settings is critical. The facility will utilize a variety of communication systems to inform and engage healthcare workers and healthcare recipients about SPHM.

How evident is collaboration among sectors and settings?

☐ There is no process for communication to inform or engage healthcare workers or healthcare recipients about safe patient handling.

☐ There is very little communication to inform and engage healthcare workers and healthcare recipients about safe patient handling.

☐ Processes for communication to inform and engage healthcare workers and healthcare recipients about safe patient handling are in development.

☐ There is a singular active level of communication to inform and engage healthcare workers and healthcare recipients about safe patient handling.

☐ There are numerous active levels of communication to inform and engage healthcare workers and healthcare recipients about safe patient handling.

STANDARD 2: IMPLEMENT AND SUSTAIN A SPHM PROGRAM

1. Designate a group or groups of stakeholders to develop, implement, evaluate, remediate, and maintain a SPHM program.

An organizational committee will identify or develop systems that support SPHM programs. The committee will receive and review data about SPHM and make recommendations for improvement. The work of the committee will reflect collaboration among organizational leadership, the healthcare worker, and ancillary/support workers.

Did the facility create a task force charter consistent with that of other organizational teams?

☐ Yes  ☐ No

How thorough is the facility’s baseline data, such as cost of musculoskeletal discomfort (MSD), severity of MSD, incidence of MSD, number of light/modified/restricted duty days due to handling injuries, number of lost work days due to handling injuries, and prevalence of MSD in healthcare workers?

☐ There is no access to baseline data.

☐ There is limited access to baseline data.

☐ There is general, restricted data available pertaining to patient handling injuries.

☐ There is widespread, detailed data available pertaining to patient handling injuries.

☐ There is widespread, detailed data available pertaining to patient handling injuries, including prevalence of musculoskeletal discomfort in healthcare workers.

2. Perform a comprehensive assessment of SPHM.

The facility will initially and periodically perform a comprehensive assessment of patient handling, mobility, and technology, including a SPHM technology needs assessment (see Standard 4.1.3).

Was there an initial, comprehensive, and written needs/ergonomic assessment to define the scope and direction of the SPHM program?

☐ Yes  ☐ No

Does the facility routinely track SPHM training of healthcare workers?

☐ Yes  ☐ No

Has the facility assessed its physical environment to ensure all building codes, room layouts, and technology meet requirements and are up-to-date?

☐ Yes  ☐ No

3. Develop a written SPHM program, with goals, objectives, and a plan for ongoing evaluation, compliance, and quality improvement.

The written SPHM program will address each of the Safe Patient Handling and Mobility Interprofessional National Standards, and will reflect compliance with federal, state, and local laws and regulations. The written program will include short and long-term goals, as well as a realistic plan with timeline to meet goals and evaluation requirements. The written SPHM program will identify, by title, individuals who have responsibility, authority, and accountability for developing and implementing the plan. The written SPHM program will also establish a clear reporting hierarchy to monitor compliance.
A SURVEY OF HEALTHCARE WORKERS

To what degree do specific and measurable goals for the reduction or elimination of healthcare worker and healthcare recipient injury exist alongside data sources to track the progress toward those goals?

- There is no interdisciplinary collaboration on measurable injury data points.
- There is insufficient data for establishing measurable goals.
- There is infrequent, incomplete data for tracking progress towards established goals.
- There is ongoing interdisciplinary collaboration on measurable injury data points.
- There is ongoing interdisciplinary collaboration on measurable injury data points, and a plan to address deficiencies.

To what extent has the facility identified, by title, individuals responsible and accountable for the safe patient handling plan?

- The facility has not identified, by title, any individuals responsible or accountable for the safe patient handling plan.
- The facility is seeking to identify, by title, the individuals responsible and accountable for the safe patient handling plan.
- The facility has begun to identify, by title, the individuals responsible and accountable for the safe patient handling plan.
- The facility has identified, by title, the Safe Patient Handling Coordinator/Director, the Executive Champion, and Task Force/Committee members.
- The facility has identified, by title, the Safe Patient Handling Coordinator/Director, the Executive Champion, and Task Force/Committee members. A clear reporting hierarchy to monitor compliance is in place.

Does the facility identify specific federal, state, and local laws and regulations, including pending legislation?

- Yes
- No

4. Customize and integrate the SPHM program across the continuum of care.

The SPHM program will be customized for, and integrated into, care settings throughout the facility and continuum of care, ensuring that SPHM is addressed through transitions of care.

Is each setting-specific SPHM plan appropriately integrated into the organizational SPHM program?

- Yes
- No

5. Provide funding to implement and sustain the program.

The employer will identify and allocate funding to implement and sustain the program based on business case and return on investment analytics or cost/benefit analysis.

Does the budget specify funding for the SPHM program?

- Yes
- No

6. Identify the essential physical functions and high-risk tasks of jobs.

The facility will identify the essential physical functions of a job in a written job description. An evidence-based process or review of scientific literature will be used to identify activities that place the healthcare worker at high risk for injury.

Is scientific literature/evidence used to identify jobs that place the worker at risk?

- Yes
- No
### STANDARD 3: INCORPORATE ERGONOMIC DESIGN PRINCIPLES TO PROVIDE A SAFE ENVIRONMENT OF CARE

1. **Plan for a safe environment of care during new construction and/or renovation.**

   Construction and/or remodeling will incorporate the review of ergonomic and other safety and health risk factors into the design of the project. This includes the design of facilities, process flow, evaluation of different technology, and accessibility issues.

   *Does the organization require inclusion of ergonomic design principles in all construction and remodeling projects of healthcare recipient care areas?*

   - [ ] Yes
   - [ ] No

2. **Include diverse perspectives related to ergonomic design principles.**

   Input will be gathered from healthcare workers and ancillary/support staff at all stages and in all activities of new construction, rebuilding, and remodeling.

   *Did the facility develop a survey tool that captures SPHM and general patient care needs?*

   - [ ] Yes
   - [ ] No

[Save And Close] [Next]
1. Perform an organizational SPHM technology needs assessment.

An interprofessional group of stakeholders and/or subject matter experts will perform the facility’s SPHM technology needs assessment within all environments of care.

Did the facility perform a general and unit-specific literature review to identify universal technology needs?
☐ Yes  ☐ No

2. Develop a plan for the selection of SPHM technology.

A plan will be identified to ensure that SPHM technology meets quality and safety standards and devices/accessories are compatible/interoperable within the facility.

Is there a procedure to guide the procurement of SPHM technology?
☐ Yes  ☐ No

3. Provide opportunities for trial and feedback about SPHM technology

The facility considering the purchase or rental of SPHM technology will provide healthcare workers with opportunities to try out the technology and provide feedback.

Are healthcare workers able to provide feedback on SPHM technology being considered for procurement?
☐ Yes  ☐ No

4. Develop a SPHM technology procurement plan and introduction schedule.

The SPHM technology procurement plan and introduction schedule will be developed and communicated to the healthcare worker.

Does the company have a process in place to introduce new technology?
☐ Yes  ☐ No

5. Provide and strategically place SPHM technology for accessibility.

The organization will develop a process for providing SPHM technology and accessories that ensures ease in accessibility. The quantity and type of SPHM technology will be sufficient to minimize risk for the healthcare recipient population served and the environment of care.

How accessible is the SPHM technology strategically placed?
☐ SPHM technology is not accessible or available.
☐ SPHM technology is located in the facility, but not easily accessible or available.
☐ SPHM technology is located on the unit.
☐ Most SPHM technology is located within a line-of-sight area with an available power source.
☐ All SPHM technology is located within a line-of-sight area with an available power source.

6. Install fixed SPHM technology according to manufacturer’s specifications.

Fixed SPHM technology, such as ceiling or wall-mounted lifts and bariatric toilets, will be installed according to the manufacturer’s specifications.

Are there systems in place to ensure that ceiling lifts and other fixed SPHM technology are installed safely and according to manufacturer’s specifications?
☐ Yes  ☐ No
STANDARD 5: ESTABLISH A SYSTEM FOR EDUCATION, TRAINING, AND MAINTAINING COMPETENCE

1. Establish an education and training system.

SPHM education and training will be provided to the healthcare worker and ancillary/support staff as appropriate: at orientation, annually, and with the introduction of new competencies or SPHM technology solutions. Select a methodology that meets the needs of the adult learner.

How comprehensive is the facility’s education and training of healthcare workers about SPHM?

☐ Currently, no safe patient handling education or training is in place.
☐ The facility provides annual body mechanics/back injury prevention training only.
☐ The facility provides annual SPHM education and technology training.
☐ The facility provides annual SPHM education and bedside/skills competency training.
☐ Currently, facility training consists of annual education, skills training, bedside competency, and Return-to-Work retraining.

2. Provide time for employees to participate in learning sessions.

Employee participation will be facilitated by providing time and scheduling support services. Education and training should be provided during regular work hours, including shift work.

How would you rate the accessibility of the facility’s education and training opportunities? Considerations should include whether training is provided during shifts and to what degree healthcare workers are permitted to attend.

☐ Little to no SPHM training available to healthcare workers.
☐ Some SPHM training available to a limited number of healthcare workers on a limited shift schedule.
☐ Frequent SPHM training available to designated healthcare workers on a limited shift schedule.
☐ Widespread, frequent, and easily accessible SPHM training available to designated healthcare workers.
☐ Widespread, frequent, and easily accessible SPHM training available to all healthcare workers on all shifts.


The healthcare worker will demonstrate competence with SPHM prior to providing actual care. The effectiveness of the education and training will be monitored.

How effective is the facility’s system at documenting the competence of healthcare workers on the understanding and use of technologies and methods for transfer, repositioning, ambulation, and other patient care tasks?

☐ There is no policy or process in place for training or documenting healthcare worker competence.
☐ It’s assumed all healthcare workers are competent in safe patient handling.
☐ Attending safe patient handling training assumes competence.
☐ Peers support one another in establishing safe patient handling competency.
☐ A written policy is in place for training and documenting healthcare worker competence.

4. Provide time and resources for education of healthcare recipients.

The organization will allocate time and learning resources for healthcare workers to educate healthcare recipients and their families about SPHM, as appropriate.

Is time allocated for healthcare workers to educate healthcare recipients and their families about SPHM (as appropriate)?

☐ Yes ☐ No
STANDARD 6: INTEGRATE PATIENT-CENTERED SPHM ASSESSMENT, PLAN OF CARE, AND USE OF SPHM

1. Provide a written procedure on the SPHM assessment and plan of care.

The written procedure outlines how to evaluate a healthcare recipient’s SPHM status, establish goals, select SPHM technology for specific care tasks, and address roles and responsibilities of the healthcare worker related to assessment, scoring, evaluation, plan of care, and documentation.

Does the facility have a written procedure describing how to individually assess, evaluate, or score a healthcare recipient related to SPHM, establish a healthcare recipient’s SPHM goals, and select appropriate SPHM technology (this should include a standardized tool for assessing mobility, cognition, and ability to participate in activities)?

☐ Yes  ☐ No

2. Require initial and ongoing assessment or process to determine SPHM needs.

The healthcare recipient will be evaluated for physical, cognitive, clinical, and rehabilitative needs that impact mobility needs, both initially and on an ongoing basis. The outcome of the assessment, evaluation, or scoring system will be incorporated within the individual plan of care.

Are healthcare recipients evaluated on a regular schedule for physical, cognitive, clinical, and rehabilitative needs that impact mobility and use of SPHM technology?

☐ Yes  ☐ No

3. Address SPHM at transitions of care.

The shift report, transfer, or discharge plan will include information and resources for SPHM, as appropriate.

Do the shift report and discharge plans relay information on SPHM, as appropriate?

☐ Yes  ☐ No

4. Provide a system to resolve healthcare recipient’s refusal.

A system will be developed to address the safety of the healthcare worker and the healthcare recipient if the healthcare recipient refuses the use of SPHM technology.

Is there a procedure to address the safety of both the healthcare worker and the healthcare recipient if the healthcare recipient refuses the use of SPHM technology?

☐ Yes  ☐ No

5. Monitor healthcare recipient injuries associated with patient handling and mobility.

The facility will determine the frequency, severity, and cost of healthcare recipient injuries associated with patient handling and mobility.

Is there a system to monitor healthcare recipient injuries and clinical outcomes associated with patient handling and mobility?

☐ Yes  ☐ No

6. Support safe delegation of SPHM tasks and activities.

The facility will support the delegation or assignment in a manner consistent with its state’s individual practice act or other legislation governing licensure.

To what degree do policies and practices support safe delegation of SPHM tasks and activities?

☐ There are no policies and procedures to support safe delegation of safe patient handling tasks and activities.
☐ Safe delegation of safe patient handling tasks and activities is assumed as a part of professional training.
☐ Policies and procedures are in progress that will support safe delegation of safe patient handling tasks and activities.
☐ General policies and procedures are assumed to support safe delegation of safe patient handling tasks and activities.
☐ Policies and procedures support safe delegation of safe patient handling tasks and activities.
1. Facilitate the employment of disabled workers.

The facility will have a system to match the physical capability of an injured healthcare worker to the physical demands of a job. The use of SPHM technology is one strategy to facilitate the employment of disabled or injured workers.

To what degree is SPHM technology available as an accommodation for a healthcare worker with an injury, as appropriate?

- [ ] There is no Return-to-Work policy that addresses safe patient handling.
- [ ] Return-to-Work policy is in progress.
- [ ] Return-to-Work includes access to appropriate technology.
- [ ] Return-to-Work includes access to appropriate technology and training.
- [ ] Return-to-Work program includes access to appropriate technology, training, and support, matching the physical capabilities of the injured healthcare worker to the physical demands of the job.


Monitoring will include determining the frequency, severity, and cost of healthcare worker injuries associated with lifting, transfers, repositioning, and mobility. Data about healthcare worker injuries will be used to prevent future injuries. The frequency, severity, and cost of patient handling and mobility injuries included in the workers' compensation program will be carefully monitored.

Is there a system to monitor the frequency, severity, and costs of healthcare worker injuries associated with patient handling and mobility?

- [ ] Yes
- [ ] No

Did the facility collect baseline data on injuries such as frequency, severity, and cost?

- [ ] Yes
- [ ] No

3. Facilitate early return to work following injury.

The employer will establish, implement, and sustain a process to help injured healthcare workers return to work as quickly as possible, to jobs that are medically suited to their needs. The process will be managed to ensure that restrictions are honored, preventing harm, and expediting recovery during the restricted work activity period.

Is there a system to facilitate early return to work following injury, while honoring medical restrictions?

- [ ] Yes
- [ ] No
### STANDARD 8: ESTABLISH A COMPREHENSIVE EVALUATION SYSTEM

1. **Establish a comprehensive evaluation system.**

   The facility will establish a comprehensive evaluation and quality improvement system during the planning phase, based on the goals and objectives of the SPHM program. Formative and summative evaluations will be performed, including process and outcome measures. Evaluations will be conducted on a regular basis. The program evaluation methods will change depending on the maturity of the SPHM program. A mechanism will be used to provide organizational leadership and key stakeholders with the results of these analyses. Positive outcomes will be emphasized and remediation plans will be developed for substandard outcomes.

   **Are regular evaluations performed, based on the goals of the SPHM program?**

   - [ ] Yes
   - [x] No

2. **Identify a variety of data sources and measures.**

   The organization will identify appropriate quality improvement indicators that reflect the content of SPHM Interprofessional National Standards, assess the effectiveness of the SPHM program and the processes implemented during program development, and identify selected program outcomes.

   **Do the data sources provide information on all eight standards?**

   - [ ] Yes
   - [x] No

3. **Utilize evidence-based methods for data collection and analysis.**

   The facility will use standardized definitions and evidence-based methods for data collection and analysis. Evaluation methods may change depending on the maturity of the SPHM program.

   **Does the facility use standardized definitions and consistent, evidence-based methods for data collection?**

   - [x] Yes
   - [ ] No

4. **Develop a plan for quality improvement and remediation of deficiencies.**

   A diverse group of stakeholders (Standard 2.1.1) will review the data and develop recommendations. The facility will develop and implement a plan or activities to remediate deficiencies within a reasonable time.

   **Did the SPHM committee or SPHM program manager recommend a plan to organizational leadership for quality improvement and remediation of deficiencies?**

   - [x] Yes
   - [ ] No

5. **Comply with the facility’s policies, professional codes of ethics, privacy laws and regulations, and other regulatory language.**

   The SPHM program will comply with organizational policies, appropriate professional codes of ethics, the Health Insurance Portability Privacy and Accountability Act, the Americans with Disabilities Act, state workers’ compensation laws, and other applicable codes and regulations.

   **Are organizational policies and practices consistent with a code of ethics, the law, privacy requirements, and other policies?**

   - [x] Yes
   - [ ] No
Appendix E

2017 Initial Draft for an Adapted, Scored Version of the ANA Safe Patient Handling and Mobility Self-Assessment Resource

AR = Availability of resources

UR = Utilization of resources

OA = Healthcare organizations’ adherence to safe patient handling and mobility

---

**STANDARD 1: ESTABLISH A CULTURE OF SAFETY**

1. Please select the response that best describes a culture of safety in your hospital.

   **OA; Ordinal**

   o 1 Not everyone in the hospital knows what a culture of safety is.
   o 2 It is not clear how a culture of safety makes patient care safer throughout the hospital.
   o 3 A culture of safety is a hospital goal, and everyone knows why it is needed for patient care.
   o 4 The hospital has a culture of safety, and is working to prevent accidents and make patient care safer.
   o 5 A culture of safety is everyone’s job, where we are all responsible and held accountable for safety at all times.

2. Please select the response that best describes how hazards and errors, specifically the mistakes and accidents at work, are reported.

   **OA; Ordinal**

   o 1 Employees are discouraged from reporting any hazards or errors.
   o 2 Employees are uncomfortable reporting any hazards or errors.
   o 3 Employees rarely mention or discuss reporting any hazards or errors.
   o 4 Employees are encouraged to report any hazards or errors.
   o 5 Employees are expected to report all hazards or errors.
3. Is there a hospital policy and procedure for reporting and refusing an unsafe patient assignment before assuming responsibility for it at work?

AR; Nominal
- 2 Yes
- 1 No

4. Does the hospital use a system for safe staffing, so the right number of healthcare workers are assigned for each shift?

UR; Nominal
- 2 Yes
- 1 No

5. Please select the best response that describes communication and collaboration between employees and patients throughout the hospital.

- There is no way to inform or involve employees or patients about safe patient handling and mobility.
- There is very little communication that informs and involves employees and patients about safe patient handling and mobility.
- The hospital is currently working on a better way to inform and involve employees and healthcare patients about safe patient handling and mobility.
- The hospital does have a way to inform and involve employees and healthcare patients about safe patient handling and mobility.
- The hospital has numerous or several ways to inform and involve employees and patients about safe patient handling and mobility.

STANDARD 2: IMPLEMENT AND SUSTAIN A SAFE PATIENT HANDLING AND MOBILITY (SPHM) PROGRAM

6. Did the hospital create a safe patient handling and mobility task force charter similar to what other teams or groups in the hospital use?
7. How much information does the hospital collect on employee injuries from patient transfers or moving patients?

(For example, the cost, severity, and incidence of musculoskeletal disorders [MSDs] or injuries, the number of light/modified/restricted duty days or lost work days due to patient-handling injuries, or the prevalence of MSDs in employees)

- There is no access to baseline data that includes this type of information.
- There is limited access to baseline data that includes this type of information.
- There is general data available on employee patient handling injuries.
- There is widespread, detailed data available on employee patient handling injuries.
- There is widespread, detailed data available on patient handling injuries that includes the prevalence of musculoskeletal disorders in employees.

8. Was a thorough, written assessment of what the hospital needed for safe patient handling and mobility and ergonomics, used as a guide to direct the safe patient handling and mobility program?

- Yes
- No

9. Does the hospital keep track of employee education and training for safe patient handling and mobility?

UR: Nominal

- 2 Yes
- 1 No
10. Has the hospital’s physical work environment been assessed to ensure all building codes, room layouts, and equipment or assistive technology meet required standards and are currently up-to-date?
   - Yes
   - No

11. Do hospital goals for reducing or stopping employee and patient injuries match the information collected on employee and patient injuries?
   - There are no set or measurable goals for these injuries.
   - There is no available information about the hospital’s progress toward goals for these injuries.
   - The information from these injuries is either unavailable or incomplete.
   - There are people working together to measure the information from these injuries.
   - There are people working together to measure and analyze the information from these injuries, with plans to address any problems found.

12. Is there a plan where the individuals responsible and accountable for safe patient handling and mobility are identified by title, in your hospital?
   - My hospital has not identified, by title, anyone responsible or accountable for a safe patient handling and mobility plan.
   - My hospital plans to eventually identify, by title, the individuals responsible and accountable for safe patient handling and mobility.
   - My hospital is currently working to identify, by title, the individuals responsible and accountable for a safe patient handling and mobility plan.
   - My hospital has identified, by title, the Safe Patient Handling Coordinator/Director, the Executive Champion, and Task Force/Committee members for safe patient handling and mobility.
   - My hospital has identified, by title, the Safe Patient Handling Coordinator/Director, the Executive Champion, and Task Force/Committee members. We have a clear system for reporting (hierarchy in place) to monitor compliance throughout the entire hospital.
13. Does the hospital identify specific federal, state, and local laws and regulations, including any upcoming legislation?
   - Yes
   - No

14. Does the hospital’s safe patient handling and mobility program thoroughly address a plan for safe patient handling and mobility in each unit or patient care area?
   
   UR; Nominal
   - 2 Yes
   - 1 No

15. Does the hospital have a specific budget, or money set aside for the safe patient handling and mobility program?
   
   - Yes
   - No

16. Is evidence or scientific literature/research used to identify jobs that place employees at risk?
   
   - Yes
   - No

STANDARD 3: INCORPORATE ERGONOMIC DESIGN PRINCIPLES TO PROVIDE A SAFE ENVIRONMENT OF CARE

17. Does the hospital include ergonomic design, fitting the work area to the employee in patient care, for all new construction and remodeling projects?

   OA; Nominal
   - 2 Yes
   - 1 No
18. At any point in time, were you or other employees asked about specific resources and general needs for safe patient handling and mobility in patient care?

AR; Nominal
- 2 Yes
- 1 No

STANDARD 4: SELECT, INSTALL, AND MAINTAIN SPHM TECHNOLOGY

19. Did the hospital review the available safe patient handling and mobility research/evidence from general and specific patient care areas to identify universal equipment or technology needs for safe patient handling and mobility?

- Yes
- No

20. Is there a hospital policy, procedure, and/or process for buying SPHM equipment or assistive technology?

- Yes
- No

21. Do employees test safe patient handling and mobility equipment, and give their opinions before the hospital buys it?

UR; Nominal
- 2 Yes
- 1 No

22. Does the hospital have a process to introduce new equipment used for safe patient handling and mobility?

- Yes
23. How accessible is the safe patient handling and mobility (SPHM) equipment, based on its location where you work?

UR; Ordinal

- 1 SPHM equipment is not accessible where I work.
- 2 SPHM equipment is present in the hospital, but not easily accessible where I work.
- 3 SPHM equipment is accessible where I work.
- 4 Most SPHM equipment or assistive technology is located where I can see it at work.
- 5 All SPHM equipment or assistive technology is located where I can see it at work, near an available outlet or power source.

24. Does the hospital have systems in place to ensure that ceiling lifts and other fixed or mounted equipment are installed safely, following the manufacturers’ specifications?

- Yes
- No

25. Please select the best response that describes cleaning, disinfection, preventive maintenance, repair, and upgrades of SPHM equipment or assistive technology in your hospital.

- There is nothing specific about cleaning, disinfecting, or maintaining SPHM equipment or technology.
- The hospital is working on specific systems for cleaning, disinfecting, and maintaining SPHM equipment or technology.
- There are specific systems for cleaning, disinfecting, and maintaining SPHM equipment or assistive technology, but employees are not aware of what the hospital has in place.
- Employees have a general awareness of the systems in place for cleaning, disinfecting, maintaining, repairing, and upgrading SPHM equipment or technology.
- Hospital wide systems for cleaning, disinfecting, maintaining, repairing, and upgrading SPHM equipment or technology are routine and common in practice.
STANDARD 5: ESTABLISH A SYSTEM FOR EDUCATION, TRAINING, AND MAINTAINING COMPETENCE

26. Which response best describes the employee education and training on safe patient handling and mobility in your hospital?

AR; Ordinal
- 1 I do not know of any safe patient handling and mobility education and training at this hospital.
- 2 The hospital provides annual training on body mechanics for back injury prevention.
- 3 The hospital provides annual education and training on the use of safe patient handling and mobility equipment.
- 4 The hospital provides annual education and training with skills check-offs to verify safety while using safe patient handling and mobility equipment.
- 5 The hospital’s annual education and training includes skills check-offs, bedside competencies, and return-to-work retraining after employee injury.

27. How convenient are the safe patient handling and mobility education and training, based on employee schedules?

UR, Ordinal
- 1 Little to no training is available to employees.
- 2 Some training is available to a number of employees on a limited shift schedule.
- 3 Frequent training is available to a number of employees on a limited shift schedule.
- 4 Hospital-wide, frequent, and easily accessible training is available to a number of employees.
- 5 Hospital-wide, frequent, and easily accessible training available to all employees on all shifts.

28. How does the hospital document and evaluate how employees use safe patient handling and mobility equipment, reposition, transfer, and mobilize patients, and other patient care tasks?

OA; Ordinal
I do not know of a hospital policy or process for employee training and documenting skills on any of the above.

It is assumed that employees already have skills in safe patient handling and mobility.

Skills in safe patient handling and mobility are verified when employee attendance is documented.

On the job, employees support each other while establishing skills in safe patient handling and mobility.

The hospital has a policy and procedure for education, training, and documenting employee skills in safe patient handling and mobility.

29. Do employees have time to educate patients and families about safe patient handling and mobility, as needed?

AR; Nominal

- 2 Yes
- 1 No

STANDARD 6: INTEGRATE PATIENT-CENTERED SPHM ASSESSMENT, PLAN OF CARE, AND USE OF SAFE PATIENT HANDLING AND MOBILITY

30. Does the hospital have a written safe patient handling and mobility policy and procedure that explains how to assess, evaluate, and set goals for a patient?

AR; Nominal

- 2 Yes
- 1 No

31. Does the hospital have a standardized flowsheet, chart, or algorithm for selecting safe patient handling and mobility equipment based on a patient’s mobility, mental status, and ability to participate in activities?

AR; Nominal

- 2 Yes
32. Are patients scheduled for regular evaluations of physical, cognitive, clinical, and rehabilitative issues affecting their mobility and use of safe patient handling and mobility equipment or assistive technology?
- Yes
- No

33. Is information on safe patient handling and mobility communicated during shift report and throughout discharge planning for patients?
OA; Nominal
- 2 Yes
- 1 No

34. Is there a hospital policy and procedure that addresses employee and patient safety if a patient refuses safe patient handling and mobility equipment or assistive technology for repositioning, transfer, or ambulation?
- Yes
- No

35. Is there a hospital system that monitors patient injuries and clinical outcomes associated with patient handling and mobility?
OA; Nominal
- 2 Yes
- 1 No
36. Do hospital policies and procedures support safe delegation of safe patient handling and mobility (SPHM) related tasks and activities?

OA; Ordinal
- 1 There are no hospital policies and procedures that support safe delegation of SPHM tasks and related activities.
- 2 It is assumed that safe delegation of SPHM tasks and activities is included during education and training.
- 3 The hospital is working on policies and procedures to support safe delegation of SPHM tasks and related activities.
- 4 It is assumed that general hospital policies and procedures support safe delegation of SPHM tasks and related activities.
- 5 There are hospital policies and procedures that support safe delegation of SPHM tasks and related activities.

STANDARD 7: INCLUDE SAFE PATIENT HANDLING AND MOBILITY (SPHM) IN REASONABLE ACCOMMODATION AND POST-INJURY RETURN-TO-WORK

37. How available is the specific safe patient handling and mobility equipment for an injured employee returning to work?

AR; Ordinal
- 1 I do not know of a hospital return-to-work policy that addresses safe patient handling and mobility for employees.
- 2 The hospital is working on a return-to-work policy.
- 3 The hospital’s return-to-work policy includes employee access to appropriate safe patient handling and mobility equipment.
- 4 The hospital’s return-to-work policy includes employee training and access to appropriate safe patient handling and mobility equipment.
The hospital’s return-to-work program includes employee access to appropriate safe patient handling and mobility equipment, training, support, and matching employees’ physical capabilities to the demands of their jobs.

38. Does the hospital use a system for monitoring the frequency, severity, and costs of employee injuries from repositioning, transferring, or mobilizing patients?
   o Yes
   o No

39. Does the hospital collect baseline data on injuries such as frequency, severity, and cost?
   o 2 Yes
   o 1 No

40. Is there a hospital system for an early return-to-work after employee injury that supports physician orders for any medical and/or physical restrictions?

OA; Nominal
   o 2 Yes
   o 1 No
Appendix F

2017 Final, Scored Version of the Adapted ANA Safe Patient Handling and Mobility Self-Assessment Resource

<table>
<thead>
<tr>
<th>STANDARD 1: ESTABLISH A CULTURE OF SAFETY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Please select the response that best describes a culture of safety in your hospital.</td>
</tr>
<tr>
<td>- (0) Not everyone in the hospital knows what a culture of safety is.</td>
</tr>
<tr>
<td>- (25) It is not clear how a culture of safety makes patient care safer throughout the hospital.</td>
</tr>
<tr>
<td>- (50) A culture of safety is a hospital goal, and everyone knows why it is needed for patient care.</td>
</tr>
<tr>
<td>- (75) The hospital has a culture of safety, and is working to prevent accidents and make patient care safer.</td>
</tr>
<tr>
<td>- (100) A culture of safety is everyone’s job, where we are all responsible and held accountable for safety at all times.</td>
</tr>
</tbody>
</table>

| 2. Please select the response that best describes how hazards and errors, the mistakes and accidents at work, are reported. |
|   - (0) Employees are discouraged from reporting hazards and errors. |
|   - (25) Employees are uncomfortable reporting hazards and errors. |
|   - (50) Employees rarely mention or discuss reporting hazards and errors. |
|   - (75) Employees are encouraged to report hazards and errors. |
|   - (100) Employees are expected to report hazards and errors. |

| 3. Is there a hospital policy and procedure for reporting and refusing an unsafe patient assignment before assuming responsibility for it at work? |
|   - (100) Yes |
|   - (0) No |

| 4. Does the hospital use a system for safe staffing, to assign the right number of healthcare workers for each shift? |
STANDARD 2: IMPLEMENT AND SUSTAIN A SAFE PATIENT HANDLING AND MOBILITY (SPHM) PROGRAM

5. Does the hospital keep track of employee education and training for safe patient handling and mobility?
   - 100 Yes
   - 0 No

6. Does the hospital’s safe patient handling and mobility program thoroughly address a plan for safe patient handling and mobility for each unit or patient care area?
   - 100 Yes
   - 0 No

STANDARD 3: INCORPORATE ERGONOMIC DESIGN PRINCIPLES TO PROVIDE A SAFE ENVIRONMENT OF CARE

7. Does the hospital include ergonomic design, fitting the work area to the employee in patient care, for all new construction and remodeling projects?
   - 100 Yes
   - 0 No

8. At any point in time, were you or other employees asked about specific resources for safe patient handling and mobility and general patient care needs?
   - 100 Yes
   - 0 No

STANDARD 4: SELECT, INSTALL, AND MAINTAIN SPHM TECHNOLOGY
9. Do employees test safe patient handling and mobility equipment, and give their opinions before the hospital buys it?
   - 100 Yes
   - 0 No

10. How accessible (easy to get what you need) is the safe patient handling and mobility (SPHM) equipment where you work, based on its location?
   - 0 SPHM equipment is not accessible where I work.
   - 25 SPHM equipment is present in the hospital, but not accessible where I work.
   - 50 SPHM equipment is accessible where I work.
   - 75 Most SPHM equipment is located where I can see it at work.
   - 100 SPHM equipment is located where I can see it at work, near an available outlet or power source for recharging.

STANDARD 5: ESTABLISH A SYSTEM FOR EDUCATION, TRAINING, AND MAINTAINING COMPETENCE

11. Which response best describes the employee education and training on safe patient handling and mobility in your hospital?
   - 0 I do not know of any safe patient handling and mobility education and training at this hospital.
   - 25 The hospital provides annual training on body mechanics for back injury prevention.
   - 50 The hospital provides annual education and training on the use of safe patient handling and mobility equipment.
   - 75 The hospital provides annual education and training with skills check-offs to verify safety while using safe patient handling and mobility equipment.
   - 100 The hospital’s annual education and training includes skills check-offs, bedside competencies, and return-to-work retraining after employee injury.
12. **How convenient are safe patient handling and mobility education and training, based on employee schedules?**
   - 0 Little to no education and training are available to employees.
   - 25 Some education and training is available to a number of employees on certain shifts.
   - 50 Frequent training is available to a number of employees on certain shifts.
   - 75 Hospital-wide, frequent, and easily accessible training is available to a number of employees.
   - 100 Hospital-wide, frequent, and easily accessible training available to all employees on all shifts.

13. **How does the hospital document and evaluate how employees use safe patient handling and mobility equipment, reposition, transfer, and mobilize patients, and other patient care tasks?**
   - 0 I do not know of a hospital policy or process for employee training and checking skills on any of the above.
   - 25 The hospital assumes that employees already have skills in safe patient handling and mobility.
   - 50 Employee attendance at training sessions means that employees have skills in safe patient handling and mobility.
   - 75 On the job, employees support each other while establishing skills in safe patient handling and mobility.
   - 100 The hospital has a policy and procedure to follow for education, training, and checking employee skills in safe patient handling and mobility.

14. **Do employees have time to educate patients and families about safe patient handling and mobility, as needed?**
   - 100 Yes
   - 0 No

**STANDARD 6: INTEGRATE PATIENT-CENTERED SPHM ASSESSMENT, PLAN OF CARE, AND USE OF SAFE PATIENT HANDLING AND MOBILITY**
15. Does the hospital have a written safe patient handling and mobility policy and procedure that explains how to assess, evaluate, and set goals for a patient?
   - 100 Yes
   - 0 No

16. Does the hospital have a standardized flowsheet, chart, or algorithm for selecting safe patient handling and mobility equipment based on a patient’s mobility, mental status, and ability to participate in activities?
   - 100 Yes
   - 0 No

17. Is information on safe patient handling and mobility communicated during shift report and throughout discharge planning for patients?
   - 100 Yes
   - 0 No

18. Is there a hospital system that monitors patient injuries and clinical outcomes associated with patient handling and mobility?
   - 100 Yes
   - 0 No

19. Do hospital policies and procedures support safe delegation of safe patient handling and mobility (SPHM) related tasks and activities?
   - 0 There are no hospital policies and procedures that support safe delegation of SPHM tasks and related activities.
   - 25 It is assumed that safe delegation of SPHM tasks and activities is included during education and training.
The hospital is working on policies and procedures to support safe delegation of SPHM tasks and related activities.

It is assumed that general hospital policies and procedures support safe delegation of SPHM tasks and related activities.

The hospital has policies and procedures that support safe delegation of SPHM tasks and related activities.

STANDARD 7: INCLUDE SAFE PATIENT HANDLING AND MOBILITY (SPHM) IN REASONABLE ACCOMMODATION AND POST-INJURY RETURN-TO-WORK

20. How available is the specific safe patient handling and mobility equipment for an injured employee who returns to work?

- 0 I do not know of a hospital return-to-work policy that addresses safe patient handling and mobility for employees.
- 25 The hospital is currently working on a return-to-work policy for employees.
- 50 The hospital’s return-to-work policy includes employee access to appropriate safe patient handling and mobility equipment.
- 75 The hospital’s return-to-work policy includes employee training and access to the available, appropriate safe patient handling and mobility equipment.
- 100 The hospital’s return-to-work program includes employee access to the available, appropriate safe patient handling and mobility equipment, training, support, and matching employees’ physical capabilities to the demands of their jobs.

21. Is there a hospital system for an early return-to-work after employee injury that recognizes and supports physician orders for any medical and/or physical restrictions?

- 100 Yes
- 0 No
Appendix G
Demographic, Coded Items for Survey Participants

22. What is your profession or current job?
   - 6 RN
   - 5 LPN or LVN
   - 4 CNA or nurse assistant
   - 3 Ancillary staff (patient transport, lift team)
   - 2 Other
   - 1 Prefer not to answer

23. Please select your hospital or medical center
   - 1 St. Francis Medical Center
   - 2 Southeast Hospital-Dexter
   - 3 VAMC-JB (Jefferson Barracks in St. Louis)
   - 4 VAMC-JC (John Cochran in St. Louis)
   - 5 VAMC-JP (John J. Pershing in Poplar Bluff)

24. How many years have you worked at this hospital or medical center?
   - (Dropdown box for 0 years and up)
   - 1 Prefer not to answer

25. Where are you working currently?
   - 5 Critical care (ICUs)
   - 4 Acute care (medical–surgical patient care areas)
   - 3 Rehabilitation (inpatient)
   - 2 Extended or skilled care
   - 1 Prefer not to answer
26. **How many years have you worked in direct or hands-on patient care?**
   - (Dropdown box for 0 years and up)
   - 1 Prefer not to answer

27. **What is your age?**
   - (Dropdown box for 18 years and up)
   - 1 Prefer not to answer

28. **What is your race or ethnicity?**
   - 2 African American or Black
   - 3 Asian
   - 4 Caucasian or White
   - 5 Hispanic, Latino, or Spanish
   - 6 Middle Eastern or North African
   - 7 Other
   - 1 Prefer not to answer

29. **What is your gender or sex?**
   - 3 Female
   - 2 Male
   - 4 Other
   - 1 Prefer not to answer

30. **What is the highest degree or level of school you have finished?**
   - 2 Less than a high school diploma
o 3 High school diploma or equivalent (GED)

o 4 Associate’s degree

o 5 Bachelor’s degree

o 6 Master’s degree

o 7 Doctorate

o 1 Prefer not to answer

Note. The numeral 8 was used to code survey items without responses with exceptions for items 24 and 26. Survey items 24 and 26 received a “51” when responses were missing.

*Based on U.S. Census Bureau information.
Appendix H

Flyer Advertisement for Survey

Survey on Safe Patient Handling and Mobility

Healthcare Workers Needed

If you reposition, transfer or mobilize patients where you work, your input is needed for an online survey. Your current knowledge and experience will update the progress of safe patient handling and mobility in hospitals.

Check employee e-mail for details and TAKE THE SURVEY

Contact Kim Waltrip with any questions kdwaltrip@yahoo.com   314-651-1413
Appendix I

Introductory Letter E-mailed to Participants

Subject: HEALTHCARE WORKERS NEEDED

Hello to all of you in patient care,

I am a nurse and a Ph.D student at the University of Missouri—St. Louis. I'm studying healthcare workers who reposition, transfer, or mobilize patients on a regular basis. You are my experts who take care of weak or immobile patients. I want to learn more about where you work, what’s available to help you move your patients, and how you use it.

Safe patient handling and mobility (SPHM) refers to using your hands and/or equipment to reposition, transfer, or mobilize a patient safely, while encouraging the patient and any other healthcare workers to participate as much as possible (ANA & ASPHP, 2014). I'm asking you and other healthcare workers to fill out a survey for me. The survey focuses on inpatient areas with adults in critical care (ICU), acute care (any medical-surgical area), inpatient rehabilitation, and extended care. Your view from direct patient care updates the status of SPHM after Missouri’s (2011) legislation and the ANA’s (2013) Interprofessional Standards for Safe Patient Handling and Mobility.

The best way I can represent you and the work you do, is if everyone with this survey will answer the questions and turn it in. Survey results depend on a large number of people to respond. The most accurate, complete information is collected when many surveys are returned. An electronic link to the survey is included below my e-mail. Please click on this link and give yourself 5 - 10 minutes to complete the survey.

You will have 21 multiple-choice questions about your job, where you work, and 9 questions about yourself. Choose the one best answer for each question. Your name and other personal details will NOT be included with the answers you send to me. All survey information is saved without your personal information in Qualtrics, a secure, encrypted website. Please take the survey one time, only. Submitting your answers more than once gives me less accurate and reliable information from the survey. I will report the results to your hospital and you, after all surveys have been reviewed and analyzed.

An electronic survey poses little risk to you. Online confidentiality and security risks are present whenever you use the internet, your e-mail, or download anything electronically. Qualtrics is used for this survey to reduce those risks. Your participation is voluntary, and you may stop taking the survey anytime. Another link is available for you to opt out or discontinue the survey, if you decide to do so for any reason.

Again, I appreciate your time and attention to safety when moving or mobilizing patients, especially with the heavy assignments, and busy shifts. If you have any questions or concerns about the upcoming survey, please call or e-mail me anytime. Your phone number or e-mail address will not be saved, and any contact information will be deleted after I have answered your questions or concerns.

Most importantly, thanks for all you do in patient care,

Kimberly D. Waltrip, APRN-BC
Cell: 314-651-1413
E-mail: kdwaltrip@yahoo.com

Follow this link to the Survey:
${l://SurveyLink?d=Take the Survey}
Or copy and paste the URL below into your internet browser:
${l://SurveyURL}
Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}
SUBJECT: A note from Kim

Thank you very much for taking my survey,

Your knowledge and experience will give me great information about your job and where you work. The survey results will provide an update after Missouri's 2011 safe patient handling legislation and the ANA's 2013 standards for safe patient handling and mobility. The hospital's progress with safe patient handling and mobility will be recognized, as well.

You'll receive the results after all surveys have been reviewed. I'll let you know when I finish my report for your hospital. I look forward to hearing from your coworkers, too!

Much appreciated,

Kim Waltrip
Nurse practitioner and Ph.D student
University of Missouri - St. Louis
Appendix K

Timetable and Phases of the Proposed Study

<table>
<thead>
<tr>
<th>Days/Weeks at completion</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated</td>
<td>Actual</td>
</tr>
<tr>
<td>Week #1</td>
<td>Week #1</td>
</tr>
<tr>
<td>Week #2</td>
<td>Week #2</td>
</tr>
<tr>
<td>Week #3</td>
<td>Week #3</td>
</tr>
<tr>
<td>Week #5</td>
<td>Week #</td>
</tr>
<tr>
<td>Weeks #6 – 8</td>
<td>Week #</td>
</tr>
<tr>
<td>• Survey Day #6</td>
<td>Week #</td>
</tr>
<tr>
<td>• Survey Day #13</td>
<td>Week #</td>
</tr>
<tr>
<td>• Survey Day #21</td>
<td>Week #</td>
</tr>
<tr>
<td>Week #9</td>
<td>Week #</td>
</tr>
<tr>
<td>Week #9</td>
<td>Week #</td>
</tr>
<tr>
<td>Week #10</td>
<td>Week #</td>
</tr>
<tr>
<td>Week #13</td>
<td>Week #</td>
</tr>
</tbody>
</table>
Appendix L

Images Explaining Musculoskeletal Forces, Safe Patient Handling and Mobility, and Assistive Technology

*Figure L1.* Sahrmann’s (2002) kinesiopathologic model illustrates movement as a system produced and regulated by four interactive elements (BASE, MODULATOR, BIOMECHANICAL, SUPPORT) with various components. Anatomic systems serve three of the four elements. The functions and interactions of all components affect movement and are also affected by movement, which are represented using bidirectional arrows. Repeated Specific Joint Movements and Sustained Postures alter components’
function or their interactions, creating suboptimal function (Movement Impairments).

Over time, uncorrected movement impairments lead to Movement Impairment Syndromes (pain) and component damage. Ongoing damage is detected upon changes in physical assessment, related test results (Abnormalities: Evident by Neurologic or Radiologic Testing), and mobility (Functional Limitations). These particular changes may cause a movement impairment syndrome, or worsen versus result from a pre-existing one. Bidirectional arrows reflect this association. From *Diagnosis and Treatment of Movement Impairment Syndromes* (p. 14), by S. Sahrmann, 2002, St. Louis, MO: Mosby. Copyright 2002 by Mosby. Reprinted [or adapted] with permission.
Figure L3. The seated rolling walker is used for ambulatory patients who require minimal assistance while mobilizing. Two hinged, padded surfaces are raised during ambulation, but can be lowered for seating when necessary. From “SARA Stedy Standing & Transfer Aid” by Adaptive Living, 2018, https://www.store.adaptivelivingstore.com/sara-stedy-standing--transfer-aid-p1379.aspx. Copyright 2018 by Adaptive Living. Reprinted [or adapted] with permission.
Figure L4. A rolling bedside commode is another option for patients who require toileting assistance when bathrooms are not readily accessible or when mobility impairments prevent safe, independent transfers to and from the toilet. From “LiftSeat Powered Toilet Lift” by OnCare Medical, 2018, https://www.oncaremedical.com/product/liftseat-powered-toilet-lift/. Copyright 2018 by Universal Hospital Services. Reprinted [or adapted] with permission.
Figure L6. Transfer sheets are made of thin, slippery synthetic material to reduce friction and resistance when repositioning patients or for lateral transfers. Handles and extensions prevent added exertion and stress on healthcare workers, while promoting proper body mechanics. From “Lateral Transfer and Repositioning” by Arjo, 2018, https://www.arjo.com/en-us/products/patient-handling/lateral-transfer-and-repositioning/. Copyright 2018 by Arjo, Inc. Reprinted [or adapted] with permission.

Figure L8. Manual and powered mobile lifts can be used for vertical patient transfers, support during patient position changes, and patient ambulation. Lift selection is based on a patient’s mobility impairments and the level of assistance that patient requires to move. From “Mobile Patient Lifts” by Wy’East Medical, 2018, http://wyeastmedical.com/products/lifts/. Copyright 2018 by Wy’East Medical, Inc. Reprinted [or adapted] with permission.
Figure L9. Ceiling or overhead lifts are permanently fixed or installed for convenient storage and use. From “Safe Patient Handling” by ArjoHuntleigh, 2018, http://www.arjohuntleigh.fi/knowledge/safe-patient-handling/ceiling-lifts/. Copyright 2018 by ArjoHuntleigh. Reprinted [or adapted] with permission.
Figure L11. Multiple booms and motors add functionality, direction, and positions of ceiling or overhead lifts, increasing safety during patient repositioning and transfers.