Use of the Bedside Mobility Assessment Tool to Improve Emergency Department Safety

Submitted by

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Abstract

Falls are a common occurrence in the emergency department and can lead to unintended patient harm and work-related injury. Fall rates at the site remained a concern, so an evidence-based approach was sought. The purpose of this quantitative, quasi-experimental quality improvement project was to determine if or to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department in Southern California over four weeks. Nola Pender's middle-range theory, the health promotion model, and Roger's diffusion of innovation change theory framed the scientific underpinnings for the project. Data were extracted from the electronic medical record and analyzed using a chi-square test from the total sample population of N = 10,469; n = 5,456 in the comparative group and n = 5,013 in the implementation group. The fall rate in the comparison group was 0.05% (n =3), and .02% (n=1) in the implementation group, X^2 (1, N = 10, 469) = .840, p = .359. The p-value of .359 showed no statistically significant difference in fall rates. There was clinical significance as the fall rate was reduced by 0.3% over the project timeline. Based on the results of this project, completing the BMAT could reduce fall rates in the emergency department. Recommendations include sustaining the project at the current site and disseminating results.

Keywords: Hillrom bedside mobility assessment tool (BMAT), emergency department (ED), falls, safe patient handling and mobility (SPHM), manual lift technique, Rogers' diffusion of innovation, Pender's health promotion model.

Dedication

This project is dedicated to my wonderful husband, who has provided his unwavering support, and who has encouraged me throughout this incredible journey. Chris has endured my strange hours, lack of availability, and has willingly listened to hours of my talking through thoughts about safety in healthcare these past two years. For all you do and for who you are, I am forever grateful for you in my life and for being my life partner. I share this accomplishment as something we achieved together. To my daughter, who shared her insights on how to be a college student in this day and time. Thank you for taking my calls on how to manage technology and search for sources on google scholar; I am forever grateful and proud of you. Continue to reach for the stars. I am grateful to God for my family, for my ability to learn and challenge myself, and for all life's blessings.

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Chapter 1: Introduction to the Project

Manual lift and transfer of patients in any setting where health care is delivered is a high-risk activity for both the healthcare worker and patient. The issue starts at the bedside when the clinician responds to a patient's need for help. There is a loss of focus for personal safety when a patient is struggling to sit upright or stand. Instinctively, clinicians respond to the need for help and bend, reach, or overextend their bodies to render aid. This action, which is done to offer help, places both the patient and healthcare worker at risk of injury. In the absence of a documented mobility assessment, the clinician is left to guess the patient's ability to participate in movement and transfer activities. To prevent patient handling injuries, intervention efforts that begin with a patient assessment of mobility function, that is documented in the electronic medical record (EMR), were proven to be effective in improving the safety of both patients and healthcare workers (Boynton et al., 2020; Dennerlein et al., 2017; Jones & Eagerton, 2020; Lee & Lee, 2017; Teeple et al., 2017).

Studies indicated that a fall that occurs while a patient is in the emergency department (ED) or hospital can add as many as six days to a hospital stay (Stoeckle et al., 2019; Turner et al., 2020). The World Health Organization (World Health Organization, 2019) indicated that globally as many as four out of ten patients are harmed while seeking ambulatory services, and 80% of the harm that occurs is preventable. It is not surprising to find that falls top the list of what is categorized as a preventable injury; as many as 1,000,000 inpatient falls occur annually in United States hospitals (Fehlberg et al., 2018; Turner et al., 2020). Falls are a priority for healthcare organizations; however, with all that is known about falls in hospitals, research specific to the

environment of the ED is limited (Milbrath & Snyder, 2021). The World Health Organization (WHO, 2019) emphasizes that prevention strategies should include education, training, creating safer environments, and establishing effective organizational policies to reduce risk.

The significance of this quantitative, quasi-experimental direct practice improvement project was to show how the Hillrom bedside mobility assessment tool (BMAT) could be utilized as a part of a fall prevention program in the unique environment of the ED to improve patient safety during handling, lift, and transfer tasks (Boynton et al., 2020). The current practice of using the manual lift technique poses a significant risk to both the patient and clinician. The usage of the tool and the assessment follows a series of steps. Primarily, during a mobility assessment, a clinician tests a patient's strength, balance, and gait, using the following fall assessment tools: Timed Up-and-Go (Tug). This test checks the patient's gait. If it takes patients 12 seconds or more to stand up and walk from the chair to a point 10 feet away, it may mean they are at higher risk for a fall (Centers for Disease Control and Prevention, & The National Institute for Occupational Safety and Health, n.d.). Determination of the risk for falling does not guide the clinician in what interventions might reduce the risk of a fall. The BMAT is the only mobility assessment tool that does not place the patient at risk and guides the clinician in determining what safe patient handling technology is best to support patient care (Boynton et al., 2020). The project intervention used an evidence-based approach to examine how a mobility assessment tool could be used to help clinicians enhance patients' safe care and reduce fall rates through the use of existing safe patient handling and mobility technologies.

Emergency departments are unique environments with complex patient dynamics and varying skill sets and experience among the workforces. The risk of a patient falling during a lift, transfer, and mobility help in the ED is compounded by extrinsic factors, such as lighting, a crowded environment, and the overall layout of the space (Stoeckle et al., 2019). Unfortunately, tailoring a fall prevention program specific to the ED is challenged by a gap in the literature since most research on the topic of fall prevention is focused on inpatient settings (Cook et al., 2020; Pop et al., 2020; Scott et al., 2018). However, evidence showed that falls occur more commonly in units where patients are ambulatory (Cook et al., 2020; Scott et al., 2018; Turner et al., 2020). The importance of understanding who falls in the ED and why is an important consideration for implementing a successful fall prevention program for this unique population.

Press Ganey recently introduced guidelines for data collection and submission on patient falls as an ambulatory indicator (Agency for Healthcare Research and Quality, 2020; Press Ganey, 2021). The project site of a busy suburban ED voluntarily participated in the data submission with the National Database for Nursing Quality Indicators (NDNQI) and has been an outlier for a high fall rate for seven out of the past eight quarters. The challenge for healthcare organizations to apply validated evidence-based strategies to the unique environment of the ED is prevalent. A recent study conducted by Scott et al. (2018) found that fall risk assessment tools were inadequate to support the unique environment of the ED. Implementation of a strategy to reduce falls must be designed for the ED environment and population. Interventions should be patient-centered to account for the setting and maximize patient involvement to tailor interventions specific to patient needs. Standardized clinical practice tools to identify

patient mobility status and link available resources to support safe patient care need to be implemented to improve patient safety. This could be accomplished by implementing an evidence-based, nurse-driven tool for mobility assessment that achieves the goal of identifying the safest course of care for the patient.

This chapter presents an outline for the project. It includes a discussion about the background of falls in the ED, including the problem, purpose, and clinical question that drove the implementation of the BMAT. Included in the chapter are discussions about how the project advanced scientific knowledge and its significance for the literature and practice. The quantitative method and quasi-experimental design used to implement the project are introduced. The chapter ends with a discussion on the key terms, assumptions, limitations, and delimitations that underlined the project.

Background of the Project

In healthcare, the most common adverse event reported in acute care settings is the preventable adverse event of patient falls (LeLaurin & Shorr, 2019). Annually, somewhere between 700,000 and one million people in the United States experience a fall in a hospital (Agency for Healthcare Research and Quality [AHRQ], 2021). The site for this quality improvement project was a busy ED of a suburban hospital in Southern California, which was identified as having a high fall rate as compared to other units of similar size and patient volume. The total number of falls over the past 12 rolling months was 39. Converting this number to a rate is based on the monthly volume of patients seen, and in a hospital, fall rates are reported as the number of events per 1,000 patient days (Press Ganey, 2021). Falls that occur in the ambulatory setting of the ED are calculated using the number of fall events, divided by the total number of patient visits, and

multiplied by 1,000 patient visits to achieve a rate (Press Ganey, 2021). Benchmark data specific to falls that occur in medical centers is voluntarily submitted to NDNQI, which is reported as the sum of all falls in the licensed space of a hospital (Spano-Szekely et al., 2019). Organizations use NDNQI fall rate data to benchmark quality improvement activities and establish organizational goals. The more recent addition of falls that occur in the ED further emphasized the importance of this unique environment needing a focused approach that addresses the unique population of patients seen in the ED (Cook et al., 2020). Table 1 reflects the NDNQI data submissions for the calendar year of 2020. In all four quarters, the project unit exceeded the national benchmark (which is reflected as the first line; 50th percentile).

Table 1

Injury Falls Per 1,000 Patient Visits at Baseline

Quarter	2020 Q1	2020 Q2	2020 Q3	2020 Q4
50th Percentile (Median) *Benchmark*	0.41	0.52	0.48	0.52
Unit	0.63	0.58	0.71	0.70
Mean	0.44	0.58	0.55	0.61
Standard Deviation	0.27	0.38	0.35	0.44

The AHRQ (2021) indicated that one-third of falls that occur in healthcare settings result in an injury. A study conducted by McErlean and Hughes (2017) examined falls in the ED and indicated the rate of falls range from 0.031 falls per 1,000 visits to 2.89 per 1,000 visits. The ED of the project site was compared to units of comparable size using the NDNQI estimates and was found to have exceeded the benchmark for seven of the past eight quarters. Examining quarter 3 and quarter 4 of 2020, the NDNQI all hospital means equaled 0.12 and .014 respectively. The project site, for this same

period, had fall rates of 0.38 and 0.21, which exceeded the benchmark by a considerable amount. Falls that occur in the unique environment of the ED are supported by the literature as being preventable (Scott et al., 2018; Stoeckle et al., 2019). The manual lift technique was the most common intervention at the project site, regardless of patient functional status and age. The need to approach this problem with a comprehensive strategy that is specific to the unique population of patients and that includes a mobility assessment that links tailored interventions to meet the individual patient needs was supported by the literature (Pop et al., 2020; Spano-Szekely et al., 2019; Stoeckle et al., 2019). The Hillrom bedside mobility assessment tool is indicated for use in patients of any age and specifies what assistance is needed based on the individual patient's functional mobility status.

Fall prevention initiatives and strategies were noted in the literature as being ineffective when based on fall risk assessment alone (Fowler & Reising, 2021; Spano-Szekely et al., 2019). A study examining fall prevention implementation strategies across the U.S. to generate formal recommendations indicated that implementation strategies must include the application of an intervention (Turner et al., 2020). The involvement of the patient (and family when present) is important to the success of a fall prevention program (Fowler & Reising, 2021). Safe patient handling and mobility (SPHM) are at the top of hospitals' prevention strategies for limiting falls that occur during a lift, transfer, and mobility mishaps (Dennerlein et al., 2017; LeLaurin & Shorr, 2019). Teeple et al. (2017) cautioned that the implementation of an SPHM program must be tailored to account for the environment of the unit and be based on the individual needs of the patient. Improving safety for patients visiting the ED with a focus on fall prevention

requires a mobility assessment (Baptiste-McKinney & Halvorson, 2018; Boynton et al., 2020; Wåhlin et al., 2020). Adding to the importance of incorporating SPHM as a strategy to improve safety is California State Senate legislation requiring healthcare organizations to implement safe patient-handling policies and programs (Lee et al., 2021).

Fall risk tools and strategies help staff quantitatively assess patients for the risk of falling and apply standard interventions to improve patient care. Identifying the most effective strategy for implementing a fall prevention program requires a close examination of patient demographics and characteristics of the population of patients who fall in the ED. McErlean and Hughes (2017) found that falls that occur in the ED are distinctly different from inpatient fall risk categories. McErlean and Hughes (2017) identified the characteristics of patients who fall in the ED; the majority are younger than the commonly referenced high-risk age of 65, which was most frequently noted in the literature for inpatient falls. This project also found that patients who fall in the ED are more likely to have ingested substances such as alcohol or illicit drugs (McErlean & Hughes, 2017).

The unique characteristics of the project site were captured in a rolling 12 months of data that showed the age range of those who fell in the ED was as young as 20 and as old as 100. The time of day that falls most frequently occurred at the project site was in the late afternoon between 3:00 pm and 6:00 pm. A rethinking of methods to solve the problem of falls in the ED was needed. Before the project, the current practice included only the use of the Hester Davis fall risk assessment on patients over the age of 65. The fall risk assessment was specific to examining falls in a hospital, while the Hillrom

BMAT is a general tool for assessing the functional mobility level of a patient (Boynton et al., 2020).

Implementing evidence-based interventions and strategies to prevent falls and fall-related injuries in the ED is a significant patient safety concern that begins with a nurse-driven tool for assessing patient mobility status. Using an evidence-based, validated assessment tool that directs the caregiver to select interventions appropriate for individuals based on the functional mobility status score was the proposed solution to this significant problem in this project. According to the literature, the interventions linked to the score should include the appropriate safe patient handling technologies for safely moving and transferring individuals (Boynton et al., 2020). Studies indicated that the intervention of SPHM technologies can prevent as many as one-third of falls if patients are involved in the process (Jones & Eagerton, 2020; Lee et al., 2021; LeLaurin & Shorr, 2019). The Hillrom BMAT promotes consistency in evaluating mobility and helps the clinician select the least restrictive lift that promotes maximum patient participation (Boynton et al., 2020). This strategy also aligns with the American Nurses Association (2015) recommendations for limiting manual lift practices to improve workplace safety, which was the common practice for a patient move and transfer tasks at the project site. The BMAT assessment empowers caregivers with the knowledge of a patient's mobility level and targets the right piece of equipment in less than two minutes (Boynton et al., 2020).

The Hillrom BMAT was designed to assess a patient's functional status safely and does not rely on the assessment of gait to decide the patient's level of function (Boynton et al., 2020). Previously, there was no process for assessing mobility at the project site.

Soubra et al. (2019) cautioned selecting a mobility assessment should meet the needs of the population being served. The Hillrom BMAT provides clinicians with a baseline of the patient mobility functionality (Boynton et al., 2020). When a patient fails to progress in the phases of functional ability, the score provides the clinician with a patient-specific intervention that includes the patients and can reduce falls.

Problem Statement

It was not known if or to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department. According to UCLA Health (2021), BMAT was developed during a multi-hospital SPHM implementation to answer the questions: "What type of equipment do I use with my patient?" and "What is my patient's level of mobility?"

The Institute of Medicine (IOM) introduced *To Err is Human* as an initiative to draw attention to the impact of medical errors on the U.S. healthcare system and ensure that safety is built into the process of care (Donaldson et al., 2000). Among the patient safety issues highlighted in the IOM report is the preventable injury of patient falls. Falls resulting in injury cost health care approximately $30 billion annually (Scott et al., 2018). For patients receiving care in a hospital, the rate of injury specific to falls is a known number, which Stoeckle et al. (2019) said accounted for as high as 40% of documented hospital risk reported injuries. Because fall rates specific to care received in the ED was a new reportable metric with NDNQI, less was known about this complex problem, making

benchmarking for proven strategies to reduce fall rates more challenging (Cook et al., 2020; Pop et al., 2020; Spano-Szekely et al., 2019; Stoeckle et al., 2019).

Over the past three years, the number of falls in a 60-bed suburban ED had a significantly high rate of falls. In 2018 and 2019, there were 29 falls documented each year. In 2020, a total of 39 falls were reported, with over 25% of these falls being noted as falls with injury. Applying the NDNQI formula to calculate the rate of falls showed the ED had exceeded the national benchmark for seven out of the past eight quarters. In the second half of 2020, the national benchmark was a 0.14 rate of falls per 1,000 visits, while the project site fall rate was 0.38 in quarter three and 0.21 in quarter four. Examination of the population that fell when visiting the ED reflected an age range between 18 to 100 years. This information demonstrated that all adult patients were at risk of falling when visiting the ED of the project site. The outcome variable of a decrease in fall rate was the desired outcome of this quality improvement project.

An evidence-based, validated strategy for limiting the risk of falls that are common to the environment of the emergency room discussed in the literature was the use of a standardized mobility assessment tool (Boynton et al., 2020; Dennerlein et al., 2017; Jones & Eagerton, 2020). Early, reliable risk stratification of patients acutely unwell is important for preparing for the rapid escalation of care that is prevalent in the ED. The Hillrom BMAT is the only validated mobility assessment tool developed specifically for nursing (Boynton et al., 2020). The average time to complete the assessment is two minutes (Boynton et al., 2020). An advantage to using the BMAT over the many other mobility assessment tools is that it provides clinicians with the information needed to choose the right equipment for mobility and movement tasks that

support the safest care for patients identified as needing mobility help. This direct practice improvement project introduced the use of BMAT to improve workplace safety, limiting manual lift techniques. The BMAT is used to protect patients from unnecessary risk and harm from falls, and improve access to safe patient handling and mobility technology.

Purpose of the Project

The purpose of this quantitative, quasi-experimental quality improvement project was to determine if or to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department in Southern California over four weeks. Adult patients are defined as persons over the age of 18. Falls that occurred at the project site involved patients between 20 and 100. The quality improvement project examined if emergency room nurses' familiarity with the use of a standardized BMAT (independent variable) would impact fall rates when compared to the current practice of using manual lift technique during patient mobility and transfer tasks of adult patients that visit the ED.

Implementation of BMAT education was introduced using the ten-minute BMAT education video available from Hillrom (Safe Patient Handling Solutions, 2018). An overview of the project was presented using email communications, flyers, and huddle messaging at the five daily huddles throughout the four-week implementation period. Documentation of the mobility assessment in the electronic medical record (EMR) was used to improve communication among the care team, while also providing the ability to

leverage the EMR tools that link assessment scores with safe patient handling technologies. Because the ED had extensive patient handling equipment in place, the project sought to determine if the new knowledge provided by the BMAT would improve the use of interventions specific to the identified needs of a patient when performing handling tasks.

The results of this project were determined by comparing the fall rates from the four weeks before and four weeks after the project was implemented. The population of patients that fall in the ED is not limited to advanced age, a specific gender, or easily identified based on a medical condition (Stoeckle et al., 2019). Fast-paced, high acuity, and crowded environments contribute to implementing a mobility assessment as an important component of a fall prevention program (Stoeckle et al., 2019). Injuries sustained from a fall can increase a patient's need for hospitalization and add up to 6 days to a hospital stay (Eagles et al., 2018; LeLaurin & Shorr, 2019). Fall prevention benefits patient outcomes by not adding to the patient’s problems, which allows for full focus on the issue that brought the patient to the ED.

Clinical Question

There was a lack of literature specific to falls and fall safety that focused on the unique environment of the ED. A recent study conducted by Stoeckle et al. (2019) examined falls and injuries that affected adult patients visiting the ED. Stoeckle et al. (2019) presented the case for implementing multifactorial fall prevention strategies to achieve improved outcomes in the ED. Understanding that falls result from intrinsic and extrinsic risk factors, the unique environment and population of patients who seek care in the ED require careful consideration when considering fall prevention strategies. Falls

that occur in a busy suburban ED in Southern California affected adult patients and the volume and significance of injury made this project a priority. The primary objective of this quantitative direct practice improvement project was to answer the following clinical question:

> To what degree does the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices impact fall rates when compared to the current practice among adult patients in a busy suburban emergency department in Southern California?

The independent variable was the implementation of the BMAT to determine the relationship that this intervention had on the dependent variable of fall rates among adult patients.

Advancing Scientific Knowledge

Change in healthcare is inevitable. As new evidence from research is generated, organizations assess new knowledge to explore what process and practice changes are needed to improve patient outcomes. As a result, the implementation of change projects has become increasingly common to remain current with accreditation standards, regulatory requirements, and more recently, minimize pay-for-performance threats (Turner et al., 2020). Patient safety initiatives are at the top of every healthcare organization's list. The project site made the initial investment of the purchase of extensive SPHM equipment. Despite the availability of equipment, annual education on how to use the equipment, and the adoption of the Hester Davis fall risk assessment tool as a strategy to improve safety for the geriatric patient population, falls continued to

occur at an unacceptable rate. Additionally, employees of the ED had the highest workplace injury rate specific to patient handling tasks of the entire medical center for the past two years. Patients seeking care at the project site could be positively impacted by the implementation of BMAT with better quality and safer care. The right approach to providing safe patient handling and mobility engages patients in teaching health promotion through active involvement that results in an objective assessment that is a standardized tool for assessment employed by all members of a care team (Spano-Szekely et al., 2019). The gap, then, that this project addressed was identifying the right intervention that would reduce the rate of falls in the ED.

A functional mobility assessment of patients was not previously performed by the ED staff at the project site. Existing patient handling equipment was not routinely used. Current fall risk assessment and other strategies for preventing falls have had little effect on improving patient safety. A gap in practice and ED-specific literature on fall prevention denoted that the fall prevention strategies being applied were not appropriate for the unique environment and patient population (Scott et al., 2018). The use of a mobility assessment upon or shortly after admission could work to overcome the misconception that patients of a younger age are more capable and can mobilize safely. Assessment information gained from the functional mobility assessment would provide a sustainable model for improving patient safety and could lead to the future adoption of the intervention throughout the medical center as a standardized mobility assessment tool.

Nurses play a key role in creating environments that are safe for patient care. Equally, they have accountability for their safety when delivering care. The theoretical foundation for the quality improvement project was the middle-range theory, Nola J.

Pender's (1982) health promotion model (HPM). The HPM is noted for its applicability for linking an individual's beliefs and perceptions to a behavior that can influence health-related choices (Pender, 1982). Pender's (1982) framework was coupled with Rogers' (2003) diffusion of innovation theory. Rogers' (2003) change theory was noted for its effectiveness in enhancing the adoption of evidence-based practice change (Mohammadi et al., 2018). An opportunity was identified to improve nursing awareness and knowledge regarding the benefits of implementing evidence-based strategies at the project site.

The usability of the BMAT coupled with the promotion of health through improved safety could be positively correlated with evidence-based practice adoption. The Hillrom BMAT is a nurse-driven tool that guides a clinician in selecting equipment safest for the individual patient's needs (Boynton et al., 2020). Pender (1982) introduced the concept that the environment can be manipulated by the clinician to create cues and facilitators for health-enhancing behaviors. It was evident, from the fall rates at the project site, that the availability of SPHM equipment does not guarantee its use. Applying the theoretical framework of Pender (1982) to the use of BMAT (Boynton et al., 2020) may have reduced variation in clinical practice, improved patient outcomes, and offered a sustainable solution for future implications across entities in the medical center. Similarly, Roger's diffusion of innovation is used to advance clinical practice change and the adoption of evidence-based practice in the clinical setting.

Significance of the Project

Patient safety was introduced as a major focus for U.S. hospitals following the IOM report *To Err is Human* (Donaldson et al., 2000). Later, the Centers for Medicare and Medicaid Services (CMS) implemented financial no-pay policies for hospital-

acquired conditions, which included falls, to drive practice improvements (Fehlberg et al., 2018). Falls are a safety concern for EDs; however, there was limited literature that addressed this unique environment (Cook et al., 2020). According to the CMS National Health Expenditure Data (2019), the average daily cost of hospital services in the State of California is $3,271. The 39 falls that occurred at the project site in 2020 had the potential to add six days to each patient's hospital stay (Turner et al., 2020). Had these cases resulted in hospitalization and met the projected six days of hospital stay, the no-pay penalties would have equated to lost revenue of $800,000. As such, based on the number of falls in one year alone, implementing an evidence-based practice strategy to reduce the risk of falls was a patient safety initiative that had the potential to save the organization's reputation and revenue.

This direct practice improvement project contributed to the improvement of assessing patient mobility status and function. The American Nurses Association (2015) recommended the incorporation of the Hillrom BMAT as a standard of nursing practice to improve patient and nurse safety. Soubra et al. (2019) conducted a systematic review of 31 assessment tests that evaluate mobility and emphasized the objective of mobility assessment tools that could be used to assist in guiding therapeutic interventions. Despite this being the objective of conducting a mobility assessment, the tools reviewed by Soubra et al. (2019) did not provide a recommendation for intervention, nor did any one of the tools reviewed link the outcome of the assessment to interventions, other than the Hillrom BMAT created by Boynton et al. (2014, 2020). The priority for healthcare organizations to implement solutions that address the problem of falls is evident. Cook et

al. (2020) reflected on the extensive fall prevention literature related to inpatient falls and limited ED-related studies to help with fall prevention.

Carbuto et al. (2020) compiled a report of findings issued by the Occupational Safety and Health Administration (OHSA), which highlighted 11 facilities recently cited for ergonomic hazards related to patient handling. The Carbuto et al. (2020) study reiterated the importance of educational needs to reset the belief that ergonomics and body mechanics training are effective in limiting patient handling injuries and falls. A recent quality improvement project implemented in an ED in the Southeast region of the U.S. implemented a fall prevention program to test what fall prevention strategies might translate successfully to the ED (Cook et al., 2020). The findings from Cook et al. (2020) confirmed that the three elements needed for successful fall prevention program implementation in the ED are (1) accurate identification of the population at risk, (2) risk factor screening, and (3) an individualized, comprehensive plan of care. The Hillrom BMAT meets all three of these criteria. Currently, the Hillrom BMAT is used at UCLA Medical Center, Duke Health, The Veterans Hospital System, and Banner Health and has led to a sustainable reduction of falls and reduced incidence of musculoskeletal injuries among the workforce (Boynton et al., 2020; Duke MOVES, 2017; UCLA Health, 2021).

Key implications for ED safety improvement strategies specific to falls are based on the understanding that nurses are at the front line to assess patient mobility status and devise a care plan that meets the individual patient needs (Fowler & Reising, 2021). Use of the Hillrom BMAT would take the guesswork out of selecting interventions that are not based on causation or standard protocol. Documentation of a patient’s mobility status in the EMR could contribute to improved communication among all members of the care

team so that they use the same language for a patient's functional status (Stoeckle et al., 2019). This project had the elements to contribute to the existing body of knowledge regarding BMAT implementation in the ED. The quality improvement project of introducing the BMAT for use in the ED was significant and fit with other projects in the field. The results could positively affect patient outcomes by reducing the incidence of falls and improving safety for the healthcare worker.

Rationale for Methodology

New knowledge is generated in nursing using various research methodologies and designs. Research methodology refers to the specific approach a primary investigator will use to collect data and then analyze and interpret results to address the research problem (Rutberg & Bouikidis, 2018). A quantitative methodology was used to fulfill the goal of the direct practice improvement project, which was to test if implementing the BMAT in the ED improved patient safety by reducing preventable falls that occur during patient lifts and transfer of care. The quantitative methodology allowed for the use of numerical data to reflect the impact of an intervention, such as the implementation of the BMAT, on improved patient outcomes, such as reduced falls. The quantitative method was the optimal design for implementing an evidence-based clinical practice change that generated objective numerical data that were used to present a statistical analysis of information generated from the examination of the project of variables (Cato et al., 2019).

Alternatively, a qualitative study approach can be used to examine a clinical question to understand all sides of a problem by exploring perspectives or attributes, and qualities of subjects (Chicca, 2020). Examination of nurse perceptions might have provided additional insights into the staff's thinking and decision-making process;

however, the time required to conduct such a project was not conducive to the practice improvement timeline. Using a quantitative, quasi-experimental design supported the goal of showing a cause-and-effect relationship between the implementation of BMAT and fall rates and provided an understanding of whether the education and training on conducting a mobility assessment using the BMAT improved safety and increased the use of safe patient handling equipment.

Nature of the Project Design

The project design was organized to assess the cause-and-effect relationship between the use of the BMAT and the incidence of patient falls using a quantitative method. The project design was quasi-experimental, which was used to show if the BMAT when used as instructed, improved patient outcomes through appropriate determination and selection of SPHM equipment. Miller et al. (2020) emphasized that the quasi-experimental design is a method used to predict the effect of an intervention without applying randomization of participants.

Further, the term quasi indicates a resemblance, which depicts the nature of its meaning (Miller et al., 2020). The experimental design is used to test an idea or program to see if it makes a difference. A quasi-experimental design is the same as an experimental design, but the key difference is the lack of randomly assigned subjects to a control or test group (Rutberg & Bouikidis, 2018). Implementing the quality improvement project allowed for examination of the effect BMAT would have on the environment of the ED; therefore, the quasi-experimental design was practical and feasible for establishing cause and effect inferences about this intervention.

A convenience sample of all adult patients who visited the ED at the project site was included in the project to determine if the independent variable of the implementation of BMAT had a relationship to the fall rate. Information gathered to represent the sample did not contain any protected health information. Only the rate of falls, date, time, and age of the patient was used to establish the relationship between variables. Information was obtained from existing department quality data collected for monitoring outcomes. Because the information was already de-identified and reflected only numerical data, the information was used to perform statistical analysis. Data utilized for this project were safeguarded for security and privacy for the duration of the quality improvement project period of four weeks and up to the final manuscript approval. Following the final manuscript approval, the data will be destroyed in adherence to the organization's policy for data destruction.

Definition of Terms

This quantitative, quasi-experimental quality improvement project used the following operational terms. The terms are defined to reflect how they were used in this project. Providing the definitions supports consistency in understanding the project’s underlying concepts.

Clinical Significance

Clinical significance (also known as clinical relevance) reflects the finding's influence on clinical practice and shows how the results provided reflect significance (Melnyk & Fineout-Overholt, 2019).

Construct Validity

The BMAT was validated through construct validity. Construct validity is

achieved by the tool's ability to discriminate differences between patient groups (Boynton et al., 2020). Coates (2019) described the term construct validity as something that shows agreement between a theoretical concept and a specific measuring device or tool.

Evidence-Based Practice

Zaccagnini and Pechacek (2019) indicated the "defining feature of evidence-based practice is linking of current research findings with patients' conditions, values, and circumstances" (p. 52). A description of evidence-based practice was provided by Zaccagnini and Pechacek (2019) as a scientifically proven method for delivering quality care to a specific population.

Hillrom Bedside Mobility Assessment Tool

The BMAT is a tool that is valid and reliable and highly effective when combined with a comprehensive protocol and fall-prevention products and technologies. The Hillrom BMAT reduces variation in care related to the risk of patient handling and falls (Boynton et al., 2020). The BMAT also recommends equipment for safe patient transfer and mobility.

Inferential Statistics

Inferential statistics, also known as null hypothesis testing, are intended to be used to show if a particular sample is representative of the population (Daniel, 2017).

Intervention

An intervention, as defined when conducting practice improvement in healthcare, was noted by the U.S. Department of Health and Human Services (2017) as processes or procedures by which information is collected and manipulations of the person or the person's environment are examined.

Fall

The AHRQ (2021) indicated that the most important consideration for measuring fall rates is a uniform agreement on the definition of a fall. The AHRQ (2021) defined a patient fall as the unplanned descent of a patient to the floor with or without injury.

Fall Rate

This is the figure obtained from adding up the total number of patient encounters for a specified period, divided by the number of falls for the same period, and then multiplied by 1,000 to get the fall rate per 1,000 patient visits (Press Ganey, 2021). The method of calculation in the ED is based on patient visits, rather than patient days, which is the multiplier for inpatient hospital fall rate calculation.

Just Culture

The American Nurses Association (2015) stated a Just Culture is founded on the desire for organizations to create an open, fair, and just culture that works to hold individuals accountable for behavior through the thorough investigation of the behavior that led to the error. A Just Culture is defined as a learning culture aimed at designing safe systems to identify opportunities to improve understanding of both system risk and behavior risk (ANA, 2015).

Manual Lift Technique

Manual lift is defined by the Centers for Disease Control and Prevention, & The National Institute for Occupational Safety and Health (n.d.) as the moving of items or a person by lifting, lowering, carrying, pushing, or pulling where the transport or support of the load is done by hand or by bodily force. The revised NIOSH lift equation definitively states that the maximum recommended weight limit for lift and transfer of a patient is 35

pounds (American Nurses Association, 2015; Centers for Disease Control and Prevention, & The National Institute for Occupational Safety and Health, n.d.).

Patient-Centered Care

The IOM indicated patient-centered care is care that is provided by a clinician responsively and respectfully that achieves meeting a patient's individual needs and preferences (Donaldson et al., 2000).

Statistical Significance

Lib Guides (2021) referred to statistical significance as the probability that the difference between the outcomes of the comparative or control group and the implementation or experimental group are great enough that it is unlikely due to chance. The goal of the quasi-experimental design is to evaluate the impact of an intervention on quantitative outcomes of interest. Statistical significance was reflected based on data compared from two patient populations at two different points in time. The patient population visiting the ED who provided the baseline for fall rate was similar, but not the same, as the population of patients who were evaluated following the project's implementation. This project identifies the two groups which are comparative and implementation that is presented for comparison.

Assumptions, Limitations, Delimitations

Zaccagnini and Pechacek (2019) described the importance of addressing assumptions, limitations, and delimitations to dispel preconceived biases or assumptions that the reader may have related to a topic. Assumptions are stated as what is acceptable for the project. The first assumption was that the fall data that had been collected from the reports provided at the project site were accurate and reflected the representation of

the population and significance of the problem. McErlean and Hughes (2017) cautioned encouraging clinicians to understand the importance of incident reporting. In the absence of injury, a fall may not be reported, particularly in environments where near-miss reporting is low (McErlean & Hughes, 2017). A second assumption was that the staff knew the ambulatory safe patient handling and mobility policy. With the introduction of new knowledge, staff was able to apply what was being taught and learned to adhere to existing policy and procedure that they had received previously instruction on at hire and annually. Lastly, it was assumed the staff would find value in being introduced to the evidence-based, validated tool of the Hillrom BMAT and work to adopt the clinical practice change into their daily workflow when caring for patients.

Theofanidis and Fountouki (2019) emphasized the importance for a primary investigator to challenge a project's assumptions and openly expose shortcomings that might be considered limiting to the overall validity and value of the work. Theofanidis and Fountouki (2019) described a limitation as an imposed restriction that is outside of the control of the primary investigator. A recognized limitation of this quality improvement project was the consistency of staffing for the duration of this quality improvement project. The project site struggled with frequent shortages in staffing due to work-related injuries, leaves of absence, and sick calls. Because of the pandemic, staff absences or restrictions and limitations of duty due to modified work status was an ongoing problem and was a recognized limitation to achieve significant and consistent participation. An additional limitation was the short timeframe of the quality improvement project. The short duration of the project required staff participation for the duration of the project which was compounded by the knowledge that staffing absences

were an issue in the ED. Lastly, this study was conducted at one suburban ED and may not be transferable or generalized to other EDs in Southern California.

The ED of a busy suburban hospital was plagued with a high rate of falls that resulted in harm to patients. Due to the short timeframe of this study, the following delimitations were understood and accepted due to the importance of this quality improvement project. Delimitations refer to the boundaries of the research study based on the researcher's decision of what to include and what to exclude (Theofanidis & Fountouki, 2019) The quasi-experimental design used did not protect against confounding effects from other interventions that may have begun contemporaneously and affected the outcome (Miller et al., 2020). Additionally, voluntary participation of the direct patient care staff of the ED was an acknowledged delimitation of this study. The survey of a single ED staff who elected to participate in the quality improvement project to promote clinical practice change limited the demographic sample to one staff cohort. Every effort was made to solicit participation. The convenience sample of staff was utilized as all staff had knowledge of the EMR, organizational policy, and equipment for safe patient handling. The impact of a unit-wide fall prevention campaign was not measured in this project.

Summary and Organization of the Remainder of the Project

The goal of this quantitative, quasi-experimental quality improvement project was to determine if or to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department in Southern California over

four weeks. To enhance fall prevention efforts by healthcare organizations, several U.S. improvement agencies, such as the Institute for Healthcare Improvement (IHI), The Joint Commission (TJC), and the AHRQ, developed guidelines to aid in fall prevention strategy implementation. Unfortunately, all these programs were exclusively aimed at the inpatient environment. Scott et al. (2018) found, through an extensive literature review, that no single fall risk assessment tool is effectively used across different populations and settings. Additionally, Scott et al. (2018) emphasized that fall risk assessment and prevention strategies that are designed and used in the inpatient setting do not adequately address the unique intrinsic and extrinsic factors of the ED.

Preventing falls in the ED is of high importance owing to the implications of a higher likelihood of the need for admission, health care costs, and the pain and suffering that come as a result. Current accreditation requirements require healthcare organizations to conduct patient assessments for fall risk upon admission and further mandate that fall prevention interventions be put in place (Joint Commission, 2020). Accreditation requirements aside, of equal importance, is the impact of the CMS no-pay policy for hospital-acquired falls that can result in significant costs to organizations that fail to address this problem (Fehlberg et al., 2018). Studies estimated that between 25% to 50% of in-hospital falls result in significant injuries and can add as many as six days to a hospital stay (AHRQ, 2021; Turner et al., 2020). A 60-bed ED in a suburban city in Southern California was the setting for this fall prevention program. Implementing a fall risk assessment tool had done little to change the rate of falls occurring in this ED. Given this fact, there was a need for a fall prevention quality improvement strategy that

identified patient mobility status early so that interventions could be utilized that improved the safe care of both the patient and the healthcare worker.

Mobility assessment and the use of SPHM technologies have achieved success in improving safety when supported by leadership at all levels of the organization and interventions applied are specific to a patient population (Lee & Lee, 2017). The use of a standardized patient mobility assessment is a crucial part of implementing a sustainable, safe patient handling and mobility program (Soubra et al., 2019). The Hillrom BMAT is an evidence-based, validated tool that was designed to improve patient safety by linking patient care interventions to assessment results (Boynton et al., 2020). Stoeckle et al. (2019) emphasized the unique environment of the ED as having complex patient populations with varying needs that lend to the challenge of addressing fall prevention interventions that are sustainable for improving outcomes. The project site was troubled with many falls among adult patients for the past two years. Implementation of a fall prevention program that would improve the safety of both patients and healthcare workers was needed.

Nurses play a critical role as front-line caregivers to promote safe patient handling and mobility interventions to achieve quality outcomes for patients needing mobility help. A mobility assessment helps identify changes in an individual's mobility status, helps detect early signs of decline, and helps guide therapeutic interventions (Soubra et al., 2019). A quantitative method with a quasi-experimental design was used to implement this project. Comparison of comparative and post-intervention patient falls after implementation of the Hillrom BMAT to improve patient safety was evaluated during the project timeframe.

The following chapter will explore the evidence supporting the necessity of implementing a fall prevention program in the ED and highlight the importance of beginning with an assessment of mobility. A literature review is presented that covers the current scholarly evidence and introduces the theoretical framework of Pender's (1982) health promotion model in improving the adoption of a clinical practice change for improving safety in the ED. Rogers' (2003) change model will also be discussed. Chapter 3 will describe the methodology, design, and procedures for this project. In Chapter 4, details on how the data were analyzed will be provided with a graphic summary of the results. Lastly, Chapter 5 will present an interpretation and discussion of the results as they relate to the existing body of evidence related to the use of the Hillrom BMAT to reduce preventable falls in the ED.

Chapter 2: Literature Review

The literature review is provided to connect how this project relates to other studies of significance. The purpose of this quantitative, quasi-experimental quality improvement project was to determine if or to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department in Southern California over four weeks. This chapter will introduce three themes and sub-themes that are significant to the introduction of the clinical practice change of completing a mobility assessment for improving safety and reducing fall rates in the emergency setting. Additionally, this chapter will introduce the theoretical framework and change theory that is used to enhance nursing professional practice and promote health among the population of patients who seek care at the project site. This project can influence nursing practice in all areas of the hospital by creating a standardized approach to safe patient handling to prevent falls.

A recent systematic review of 31 assessment tests for evaluating mobility in healthcare presented that mobility assessments are done to guide the clinician in therapeutic interventions to better care for the patient (Soubra et al., 2019). Of the 31 tools assessed, only one was validated for its ability to measure what it was supposed to measure. The Hillrom BMAT was validated for inter-rater reliability and was the only tool that connected the outcome of an assessment score with patient-centered interventions for safe patient handling.

Following the publication of the American Nurses Association *Inter-Professional Standards on Safe Patient Handling and Mobility* (SPHM), healthcare organizations began the work of exploring best practices for the implementation of a program aimed at limiting the injuries that result from traditional manual lift techniques (American Nurses Association, 2015). Proposed national legislation focused on SPHM program implementation in healthcare failed to pass, largely due to the perceived cost of equipment (Lee et al., 2021). Despite the support of organizations like the CDC, TJC, Occupational Safety & Health Administration (OSHA), the American Physical Therapy Association (APTA), the Association of Rehabilitation Nurses (ARN), Veterans Administration (VA), the Association of Perioperative Registered Nurses (AORN), and the National Institute for Occupational Safety and Health (NIOSH), the solution of safety in patient handling, transfer and mobility tasks using SPHM technology has failed to transform practice. The decision to enact an evidence-based strategy to improve safety for both patients and the clinicians providing care would benefit every stakeholder in the ED.

Numerous fall prevention interventions have been introduced to help healthcare organizations solve this complex problem. Current practices at the project site were not effective in preventing falls. The patient outcome of falling while in the hospital or an acute care setting is a nurse-specific quality indicator that requires an evidence-based strategy that is nurse-driven (Spano-Szekely et al., 2019).

An extensive review of the literature was conducted using the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Pub-Med, Clinical Key, Medline Plus, Gale Academic OneFile, Access Medicine, Pro-Quest, and Google Scholar.

Keywords used in the searches included falls, fall interventions, fall prevention, fall reduction strategies, and emergency department falls, which produced a total of 14 scholarly articles that applied to the unique environment of the ED to support the quality improvement project and were published in the last five years. Additionally, the same search engines were used with the keyword's mobility, mobility assessment, and safe patient handling and mobility. Articles accessed were limited to only those published in the last five years. The literature search provided many scholarly articles that were reviewed and sorted for themes that were identified as necessary to answer the clinical question. A synthesis of the literature shows the importance of implementing a fall prevention program specific to the unique environment of the ED that incorporates the use of SPHM science.

Falls in the ED was an identified problem at a busy suburban medical center in Southern California. Despite implementing a fall risk assessment tool directed at determining fall risk of patients over 65, patients were still injured when visiting the ED at an alarming rate. Fall risk assessment tools are effective in predicting falls. The BMAT is an effective tool for all ages and was introduced at the project site to be used with all adult patients for determining functional mobility. Injury and harm during patient handling activities are a reality for the caregiver as well. Healthcare workers record some of the highest injury rates across the nation, costing the industry $13.1 billion and lost workdays that exceed $2 million as indicated by the Bureau of Labor Statistics (2019). SPHM is an evidence-based approach to reducing the risk of injury to caregivers and patients (Gibson et al., 2017; McMillan et al., 2018).

The following review of literature will present a historical overview of the problem of falls and a proposed solution of the use of a mobility assessment that directs interventions to specific safe patient handling strategies for enhanced safety and quality of care. Three primary themes identified include (1) environment, with a unique population of patients, communication and safety climate sub-themes; (2) evidence-based SPHM, with sub-themes of the importance of assessment, equipment use, and policy and legislation; and lastly, (3) leadership, with the sub-themes of education and training, program standardization and just culture.

Theoretical Foundations

The prevention of falls in the ED will require a clinical practice change that includes applying an evidence-based practice mobility assessment tool. Theoretical frameworks are used to guide the process of translating research into practice. This theoretical framework helped nurses in the understanding of the phenomenon and was used to explain what influences implementation outcomes. Nola Pender's (1982) middle-range nursing theory, the health promotion model (HPM) was selected as the theoretical foundation to guide the implementation of this study.

Pender's HPM evolved from her background in human development and experimental psychology (Alligood, 2018). Pender's (2011) HPM applies the use of a holistic nursing perspective and learning theory. When health promotion and prevention fail, Pender (2011) noted that the priority of care shifts to a focus on the treatment of illness or injury. When a nurse decides to apply ergonomics to patient handling tasks without first assessing the patient's ability and willingness to participate, the decision is most often based on prior experience and related behavior. Experience of applied

ergonomics achieving the task without a negative consequence is the prior related behavior. Pender's (2011) HPM was selected as the theoretical framework to guide the quality improvement project of improving safety and health for both the recipient of care (patient) and the giver (healthcare worker/nursing) more consistently, based on the application of evidence-based, nurse-driven strategies. Pender's (2011) model promotes the nursing profession in supporting independent professional practice, which is founded on promoting interventions and education that are health-promoting behaviors.

The HPM was used to assist nurses in understanding the major determinants of health behaviors among patients who fall in the ED. While rounding, and during huddles, past fall events were discussed with the staff to emphasize the importance of behavioral counseling to promote shared goals for healthy behaviors while in the ED. Explaining to the direct patient care team how thoughts, behavior, and the environment interact engaged the care teams in altering how they think about the process of assessing patients for fall risk and what strategies they can employ to change behaviors. Through the process of conducting the assessment, the clinician guides the patient through altering how they think about safety. Achieving a commitment to a plan of action and intention to carry out the health behavior of accepting assistance during a move and transfer to achieve safety is the shared goal of health-promoting behavior (Pender, 2011).

Introducing evidence-based practice as a strategy for improving patient safety and quality of care is not achieved by simply informing staff of the evidence. Utilizing a theoretical framework to achieve clinical practice change helps facilitate adoption. Everett Rogers' (2003) diffusion of innovation (DOI) theory was selected to facilitate the adoption of the Hillrom BMAT to improve patient safety by reducing falls in the ED.

Roger's DOI theory was shown to advance clinical practice change and adopt the evidence-based practice in the clinical setting by nurse educators (Mohammadi et al., 2018). Using the five phases for facilitating change, Rogers' theory was shown to facilitate the adoption of evidence-based practice among nurses. The change occurs as the nurse sees the clinical practice change as a new idea or behavior that is to be embraced as an innovation (Mohammadi et al., 2018). The five phases that occur when using Rogers' (2003) model are awareness, interest, evaluation, trial, and adoption.

Mohammadi et al. (2018) showed how Rogers' DOI could be used to move clinicians through the phases of gaining knowledge to adopt clinical practice change when they are allowed to see the practice change as an innovation that is the best available option for moving forward. A key component to the five phases is the trialability phase when staff learn the ease of use and perceive the advantage of change as compatible with their practice (Rogers, 2003). As staff began to adopt the clinical practice change of completing the BMAT, others observed the change of early adopters and begin the process of change themselves.

The use of the five stages to implement a clinical practice change using Rogers (2003) DOI were introduced sequentially. In the first and second innovation attributes, the clinical practice change was introduced to show the relative advantage of a bedside mobility assessment that takes only two minutes and is compatible with existing policy for SPHM and an evidence-based strategy that can solve the problem of falls. Simplicity, observability, and trialability were progressively reinforced as more staff adopted the clinical practice change and began to use the terminology of the BMAT score during patient hand-off. These phases influenced the project in that, as staff worked through the

five stages, the clinical practice change of early adopters was observed by others and they began the process of change themselves. Therefore, the compatibility of change to personal practice was a significant aspect of consideration.

Rogers' (2003) DOI worked with the HPM to improve staff awareness of the benefits of using research effectively in professional practice to achieve quality patient outcomes. Pender's (1982) HPM framework was used to explain factors that influence health-promoting behaviors. Understanding why the staff was resistant to change helped identify the behavior-specific cognitions and affect, which could be leveraged to introduce behavioral change and outcomes (Noble & Sweeney, 2018). Noble and Sweeney (2018) described individual characteristics and experiences as the first factor to consider in overcoming barriers to using assistive devices. Prior related behavior and personal factors are precursors to behavior-specific cognitions and affect, which are the individual's reasons for choosing one intervention over another. These can be based on perceived benefits, perceived barriers, perceived self-efficacy, institutional influences, or situational influences (Noble & Sweeney, 2018). Overcoming resistance to change and effectively modifying behavior was supported in this project by applying Pender's HPM theoretical framework and Rogers' DOI.

Review of the Literature

This section provides a broad and balanced overview of the existing empirical evidence relative to the implementation of the BMAT in guiding clinicians in the selection of the equipment to safely handle and mobilize patients in the ED. A synthesis of existing empirical, peer-reviewed articles that supported the historical and progressive views of the topic, such as the early, reliable risk stratification of acutely unwell patients

seeking ED care, is the focus of this section. The literature synthesis provides discussions on the different publications' contributions on the topic, linking the studies to the themes, trends, methodologies, and findings.

The implementation of evidence-based practice in healthcare to advance clinical practice is best supported using theoretical models and frameworks. Introducing quality improvement should incorporate care consideration of the environment, the need or problem, and the solutions that will fit with the existing structure (AHRQ, 2021). The problem of falls and unsafe practices in the ED related to patient mobility and transfer tasks was the focus of this quality improvement project. A question of influence or impact of the implementation of a nurse-driven mobility assessment and the use of SPHM equipment in the environment of the ED was unknown (Brabrand et al., 2018). The primary themes of a unique environment of the ED, the importance of evidence-based SPHM technology, and the importance of leadership at all levels of the organization are examined to determine their influence on the solution to this problem. Sub-themes are further identified among these primary themes to emphasize the empirical evidence. The sub-themes for the environment include a unique population of patients, communication, and safety climate. Evidence-based safe patient handling and management include the importance of assessment, the equipment uses, and policy and legislation. Finally, leadership includes education and training, program standardization, and just culture.

Although fall prevention has been an area of focus for healthcare spanning decades, falls continue to occur at an alarming rate. Patient falls were highlighted by LeLaurin and Shorr (2019) as the most common adverse event reported in hospitals. A

gap in the literature examining falls specific to the environment of the ED existed at the time of this project (Kientz & Hester, 2020). The incidence of falls in the hospital is between 700,000 to 1 million in U.S. hospitals, and as many as 50% of patients were estimated to be at risk for a fall while seeking health care (Avanecean et al., 2017; LeLaurin & Shorr, 2019; Turner et al., 2020). An activity that poses a significant risk to both the patients and healthcare workers is patient handling and mobility assistance (Cook et al., 2020; Gibson et al., 2017; Noble & Sweeney, 2018). The assessment of individuals seeking care in the ED for fall risk and mobility capability is paramount for prevention (McErlean & Hughes, 2017; Scott et al., 2018).

Environment

Three quantitative retrospective studies emphasize how the environment of the ED was shown to have distinct differences from the inpatient setting that challenge the effectiveness of interventions designed specifically for acute care patient populations (McErlean & Hughes, 2017; Pop et al., 2020; Spano-Szekely et al., 2019). These studies emphasize the challenge of providing safe care to every patient at every moment because of a personal sense of urgency to provide care and services quickly. A meta-analysis conducted by Lake et al. (2019) emphasized nurses' working environment as being critical to the quality of nursing care and patient outcomes. Emergency care environments are challenging because of overcrowding, urgent patient needs, and the increasing complexity of care (Scott et al., 2018). Challenges in communication, teamwork and poor safety culture are associated with a high rate of errors resulting in injury and adverse events (Spano-Szekely et al., 2019). The environment was a vital theme identified due to its importance for implementing the clinical practice change in the ED. Conroy et al.

(2017) conducted a retrospective review on the multidimensional concept of safety and the influence of the environment on physical and psychosocial safety. This study emphasized the need to consider the healthcare environment and processes to solve complex problems. These and other empirical studies are reviewed in detail to show the importance of the environment when considering an evidence-based clinical practice change for improving fall rates in acute care.

In a quantitative, retrospective study examining who falls in the ED and why, the uniqueness of the ED environment as compared to inpatient settings was explored (McErlean & Hughes, 2017). Differences in the patient populations lend to the ineffective transference of inpatient fall prevention strategies to the ED (McErlean & Hughes, 2017). McErlean and Hughes (2017) examined incident reports using descriptive statistics for all collected variables to compare differences in gender, time of day, age, and activity. Similarly, a descriptive and mixed study conducted by Gomes et al. (2019) examined the uncertainty of situations that occur in the ED and how this can influence staff thinking when pressed for time. This cross-sectional study focused on the challenge uncertainty lends to the pressure of a fast pace environment and unknown patient characteristics (Gomes et al., 2019). The population of patients visiting the ED spans all ages, and those who are at risk of falling are younger than the population identified in most inpatient studies (McErlean & Hughes, 2017). This factor can create a perception that younger people are more capable. McErlean and Hughes (2017) also revealed that 48.9% of patients who fell during the study period did so when moving from a sitting to a standing position. McErlean and Hughes (2017) emphasized how this less-described focus on the

population of patients who fall in the ED lends to ineffective strategy implementation when patient fall prevention strategies are applied in the ED.

Associations between the nurses' working environment and four sets of outcomes were the focus of a meta-analysis conducted by Lake et al. (2019). This study aimed to evaluate quantitatively the association of the work environment with quality outcomes and nurse job outcomes. A total of 40 studies were used by Lake et al. (2019) to definitively define the nurse work environment, and the organizational traits that influence professional nursing practice. Lake et al. (2019) used the Practice Environment Scale of the Nursing Work Index using odds ratios of 95% confidence intervals to describe what reflects better work environments. Significant associations were found to connect the work environment with all outcome classes (Lake et al., 2019). Statistical significance (0.93) showed that negative patient outcomes result in environments where nurses lack influence in decisions related to safety (Lake et al., 2019).

Teeple et al. (2017) performed a meta-analysis on the outcomes of safe patient handling and mobilization programs in the U.S. The search yielded a total of 2,889 studies on the topic of patient handling. The authors reduced the number of articles to exclude duplicates and non-healthcare worker studies among other criteria. Twenty-seven articles met the criteria of SPHM in healthcare, and findings were gathered from a total of 44 facilities (Teeple et al., 2017). Teeple et al. (2017) found that SPHM programs are highly effective in reducing healthcare worker injuries. One important distinction made by Teeple et al. (2017) was the importance of the variability of the patient care setting. Teeple et al. (2017) referred to the environment of the ED as creating unique challenges; however, the literature produced was found to focus on hospital-based units. Of

significance was the finding that no specific components were consistently identified that resulted in greater effectiveness. Longer follow-up duration was noted to be the most common association for reducing work injury rates with safe patient handling mobilization program implementation. The study introduced the work done by the Joint Commission (2020) that linked the risk of injury to both the patient and the healthcare worker. Teeple et al. (2017) demonstrated the work that has been done about safety specific to SPHM within the last five years.

Unique Population of Patients. Patients who present to the setting of the ED for care are an important consideration when proposing quality improvement clinical practice change. New York is where an individualized fall prevention quantitative quality improvement program that used the Hillrom BMAT created by Boynton et al. (2020) was shown to reduce falls in an acute care setting (Spano-Szekely et al., 2019). Outcomes were measured using fall rates, and the project achieved a fall rate of 1.14 down from a baseline of 3.21. Additionally, Spano-Szekely et al. (2019) had a 72% expense reduction based on decreased sitter usage by leveraging the patient-centered shared decision-making aspects of the Hillrom BMAT. Similar to the project site, the hospital in this study was described as not effective. The authors asserted the incorporation of a standardized mobility assessment tool is necessary for achieving consistent communication of risk factors among the entire care team (Spano-Szekely et al., 2019). Findings from this study reflected specific interventions that are better suited to the attributes of the population of patients who seek acute care services (Spano-Szekely et al., 2019). This study provided significant evidence supporting the incorporation of the Hillrom BMAT as an effective fall prevention strategy in the unique environment of the

emergency room (Spano-Szekely et al., 2019). Following full implementation of the fall prevention program, the site of this study achieved a 54% reduction in falls. The results of this study were sustained with the ongoing focus and attention on communication and a culture of learning and safety.

Pop et al. (2020) conducted a quantitative quality improvement project at Rush University in Chicago to examine fall bundle components that include a comprehensive assessment and individualized interventions and their impact on fall rate in the ED. The authors posed the challenge that falls prevention strategies that are designed for the inpatient setting can be transferred to the ED (Pop et al., 2020). Pop et al. (2020) uncovered that falls in the ED are more likely to result in injury or death than those that occur in the hospital setting. Pop et al. (2020) found that combining fall prevention measures into a multi-component bundled approach could reduce fall risk by as much as 30%. An emphasis was made on the ED's unique population risk factors, such as intoxication or illicit drug use, that make gait assessment tools a danger to the patient (Pop et al., 2020). This study emphasized the importance of communication in using the EMR to assimilate information about patient mobility status so that all members of the care team are aware of patient abilities and limitations. Additionally, the authors concluded that no one strategy alone can improve fall safety (Pop et al., 2020). This study reinforced the need to approach fall prevention using multifactorial methods.

Conroy et al. (2017) conducted a retrospective review to examine the role of effective nurse-patient relationships in enhancing patient safety. This study aimed to describe how an effective nurse-patient relationship contributes to patient safety, reduced safety risks, and better working relationships among team members. The Fundamentals

of Care Framework was used as a model to examine the contributing factors for what contributes to improved safety (Conroy et al., 2017). A key finding of this study is the emphasized importance that effective nurse-patient relationships have in achieving patient safety (Conroy et al., 2017).

Communication. Communication is an important factor highlighted throughout the literature specific to implementing evidence-based practice when initiating a clinical practice change. The importance of communication in the ED is challenged by its complex environment. A quantitative, quality improvement project sought to examine the unique environment of the ED to determine what combination of interventions best supported the patient populations of a Midwest hospital with a high rate of falls with injury (Stoeckle et al., 2019). Three multifactorial interventions were implemented that included re-education of the importance of a fall risk assessment. Results reflect variability in staff performance in completing the fall risk assessment that ranges between 47-90 percent. The study identified the importance of visual communication tools as an effective intervention for preventing falls in the ED (Stoeckle et al., 2019). The most notable communication tools, in addition to documentation of the baseline assessment in the EMR, were yellow stop signs for high-risk patients outside the patients' room. Visual cues were noted to serve two important purposes. The first was the value communication provided to the patient and family for adhering to risk-reducing guidelines. The second was how this communication strategy provided all care team members with a visual cue as a reminder and heightened awareness to the patients identified as at-risk (Stoeckle et al., 2019). This study was relevant to the project problem of fall prevention quality

improvement for the ED and emphasized the need to approach the problem with multiple fall prevention interventions.

A quantitative quality improvement study by Scott et al. (2018) examined the effectiveness of a new fall risk assessment tool titled the Memorial ED Fall Risk Assessment Tool created by Scott et al. (2018) specifically developed for the unique environment of the ED. The importance of fall risk being a nurse-sensitive quality indicator was the focus of this study, along with the reference that there was a limited amount of research that has been conducted specifically to the environment of the ED (Scott et al., 2018). An important finding noted by Scott et al. (2018) was the importance of using a standardized flowsheet to communicate assessment findings to all care team members. The flowsheet was pictured as one of the study tables, which showed a resemblance to the existing flow sheet in the study site EMR. Like the BMAT, the proposed tool utilized a scoring system to reflect the patient's ability to follow commands. BMAT is unique in facilitating decision-making for the selection of patient handling equipment (Boynton et al., 2020). Scott et al. (2018) examined other prevention measures, including the use of the flowsheet, bed placement in the low position, call light in reach, and bed alarm. Results of this quality improvement project reflect that the tool demonstrated inter-rater reliability of $\kappa=0.701$. The study by Scott et al. (2018) reiterated the significance of leveraging a flow sheet in the EMR to capture patient assessment data at a given point in time. Consistency in collecting information and standardizing where the information is documented was reiterated as influential in the success of this study and provided additional reinforcement to the value of leveraging the EMR for communicating patient assessment details.

A recent quantitative research study conducted by Cook et al. (2020) reiterated the limited literature on the topic of fall prevention specific to the environment of the ED. This study was a single-unit quality improvement project. Cook et al. (2020) explored a multifactorial approach used at a medical center in the Southeast region of the U.S. They wanted to identify key interventions that could be applied to improving fall safety in the emergency room. The study found that the age of patients who should be assessed for risk should include all adults over 20 (Cook et al., 2020). This distinction was significant to the direct practice improvement project. Patients visiting the ED of all ages can have conditions that might place them at increased risk for instability or impaired mobility. Drugs and alcohol contribute to the risk of impaired mobility and were emphasized by Cook et al. (2020) as the need to assess every adult to minimize risk. An emphasis on the importance of communication among all members of the care team to create a culture of safety was found to have the most significant influence on sustained improvement in fall reduction (Cook et al., 2020). Various fall risk assessment tools were evaluated for efficacy; however, no one tool was found to have a significant impact on fall reduction in the ED among the tools studied (Cook et al., 2020). Examining various tools for use in the ED did have an impact on the culture of the department becoming more safety-focused. Cook and colleagues noted that as fall rates were communicated to the staff regularly, the decline in events fueled the culture of safety and resulted in a 27% decrease in falls as staff began to recognize that falls are preventable injuries that are influenced by the presence or absence of teamwork (Cook et al., 2020). This study provides additional insight into various fall risk assessment tools designed specifically for the inpatient setting that are not transferable for effective use in the unique environment of the ED.

Communication between the caregiver and the patient is an essential factor for establishing understanding. A quantitative, quality improvement study examined the effectiveness of the John Hopkins Fall Assessment Tool at an Army Medical Center located in the Southwest region of the U.S. (Bargmann & Brundrett, 2020). This study introduced the value of communication that establishes a plan of action to enhance a safe care environment (Bargmann & Brundrett, 2020). Bargmann and Brundrett (2020) explored the concept of creating an environment of safety and how this shared goal among the care team could influence the conservation of resources. Results emphasize the importance of improved compliance with fall intervention strategies upwards of 89% when incentives are offered to the staff (Bargmann & Brundrett, 2020). When errors occur, and patients or caregivers suffer an injury, the stability of the work environment is impacted with a shift in resources to mitigate the harm and loss of resources when healthcare workers are pulled from the team to seek care for themselves. This study provided additional insight into the importance of communication among team members and patients to establish safety agreements (Bargmann & Brundrett, 2020). Bargmann and Brundrett (2020) found that increased education of patients and nursing staff through regular communication and information sharing was a key factor in reducing fall rates in hospitals. This study's value was the notion of improved safety being achieved in a collaborative environment, which facilitates nurses' provision of safe, quality care for patients.

Safety Climate. Critical care work environments were the focus of an extensive study conducted by Ulrich et al. (2019). The study found that the climate of the critical care work setting has a tremendous influence on a safe climate and is linked to patient

and nurse-specific quality outcomes (Ulrich et al., 2019). This mixed-method study conducted by Ulrich et al. (2019) consisted of a convenience sample of 8,080 nurse members of the American Association of Critical-Care Nurses (AACN) who responded to a survey created by the AACN based on standards for establishing and sustaining healthy work environments. Data were collected from a convenience sample that included all RNs in the AACN database with the intent of exploring perceptions of the work environment on decision-making capability. Questions focused on individual perceptions and what factors nurses perceive to most affect patient safety. Additionally, the survey explored input on what nurses perceived to limit their ability to perform when working in critical care environments. Key findings of the study showed nurses felt inadequate staffing was a significant challenge among 60% of nurses surveyed when situations are of heightened urgency that requires them to work with what they have. Among the most common issues reported by the nurses surveyed was the impact of the safety climate and pressure of urgency on a nurse's ability to select care interventions that are perceived to take more time (Ulrich et al., 2019).

Effects of the work environment on patient and nurse outcomes were presented in a systematic review presented by Copanitsanou et al. (2017). According to Copanitsanou et al. (2017), in work environments where nurses work as a team and feel supported, fewer patient complications are seen, which results in improved outcomes for nurses. Critical care work environments are stressful and often suffer from increased turnover, absenteeism, lack of teamwork, and clarity on unit goals (Copanitsanou et al., 2017). These variables were noted by Copanitsanou et al. (2017) as contributing factors to a poor safety climate. The systematic review examined articles dating back to 1999.

Copanitsanou et al. (2017) highlighted how very little changed over almost two decades related to the effects of the work environment on culture and safety. The importance that this study provided to this project is work climates where nurses can exert control over work decisions and where greater participation in decision-making exists to support professional nursing practice have the potential to improve patient outcomes. Key points summarized from the literature review indicated that nurses who perceive their work environments as supportive and have a nurse manager who recognizes performance and achievements are an environment where they can thrive (Copanitsanou et al., 2017). Positive reinforcement is known to encourage behavior change and significantly influences the adoption of new habits.

A descriptive, cross-sectional, and mixed approach study conducted by Gomes et al. (2019) was the method used to study the perception of nurses about safety when working in an emergency care environment. A lack of structured processes was found to contribute to nurses feeling restless and adopting workaround and shortcuts. Gomes et al. (2019) used Sandplay therapy to assess nursing perceptions and found that the key to achieving a safety climate is when well-structured routines and protocols are used for high volume, high-risk procedures, and tasks.

In summary, a total of 14 studies were reviewed to show the importance of the environment of the ED. Empirical evidence of the importance of the environment was further differentiated thorough discussion of the unique patient population cared for in the ED, the significance of communication, and the influence of a safety climate on nurses' work and patient outcomes. The ED is challenged with overcrowding, urgent cases, and the increasing complexity of care needs (McErlean & Hughes, 2017). Implementation of

a safety program in the ED does not allow for the cessation of services to allow inspiring change, education, training, and validating new processes and workflows. The literature supported the notion that falls may be difficult to predict and prevent in the ED due to the acute nature of patient visits and unique circumstances involving drugs and alcohol (Gomes et al., 2019; McErlean & Hughes, 2017; Stoeckle et al., 2019). In environments where staff work as a team, utilizing various modalities of communication, and where working relationships are built on mutual trust and appreciation result in a safety culture, which supports quality outcomes (Bargmann & Brundrett, 2020; Conroy et al., 2017; Lake et al., 2019).

There were a limited number of studies examining patient safety and fall prevention in the unique environment of the ED. NDNQI indicators focus on hospital falls, which include all falls that occur within the licensed space of the hospital. Studies focused on the ED are needed to explore best practices for fall prevention in this environment (McErlean & Hughes, 2017). The importance of the patient population and the unique environment of the ED requires additional study to build upon the current literature and to show how to best serve this unique environment and patient population.

Evidence-Based Safe Patient Handling and Mobility

SPHM was noted in the literature to decrease overall work injury costs, improve healthcare quality, and improve patient and healthcare worker safety (Dennerlein et al., 2017; Olinski & Norton, 2017). Dennerlein et al. (2017) conducted a quantitative research study that compared patient and healthcare worker outcomes between two hospitals. Both medical centers were comparative in size and had similar rates of injury-related to SPHM events. Where one hospital implemented practices to improve SPHM

and the other did not, the intervention hospital showed significant improvement in worker safety ($p < 0.0001$) as compared to the hospital that did not modify practice. Healthcare workers perform patient handling during the process of transfer, repositioning, and ambulation in providing care daily. The American Nurses Association (2015) indicated that nurses and aids can cumulatively lift 3,600 pounds for one day's work through the processes of moving patients. New knowledge generated by the Institute for Safety, Compensation, and Recovery Research (Gibson et al., 2017) has provided a greater understanding of the unsafe aspects of ergonomic lift techniques and how lifting a patient is frequently associated with injury and falls. The rate and severity of the injury are multiplied by the failure to assess the patient's ability to assist in the move or transfer before the move (Avanecean et al., 2017; Fowler & Reising, 2021). These studies are reviewed further when examining the literature related to the implementation of a SPHM program.

An important consideration on the topic of patient handling is how much weight can be safely lifted without assistive equipment. The CDC's National Institute for Occupational Safety and Health (NIOSH) produced the Revised NIOSH Lifting Equation (RNLE), which applies to healthcare settings and should be applied to clinical decision-making when considering lifting (American Nurses Association, 2015; Centers for Disease Control and Prevention, & The National Institute for Occupational Safety and Health, n.d.). A panel of NIOSH researchers developed the RNLE to distinguish weight limits for limiting risk and preventing musculoskeletal injury caused by manual lifting of objects (Teeple et al., 2017). Additionally, the minimum horizontal distance of ten inches part of the RNLE cannot be supported when moving a patient (Centers for Disease

Control and Prevention, & The National Institute for Occupational Safety and Health, n.d.). The distance between the lifter's spine and the patient should be no greater than 14.5 inches (Centers for Disease Control and Prevention, & The National Institute for Occupational Safety and Health, n.d.). Therefore, RNLE definitively states that the maximum recommended weight limit for lift and transfer of a patient is 35 pounds (American Nurses Association, 2015; Centers for Disease Control and Prevention, & The National Institute for Occupational Safety and Health, n.d.). A case for SPHM is made based on the RNLE equation for safe lift and transfer of no greater than 35 pounds.

Recent studies examined the link between safety climate and the impact on safety for both patient and healthcare worker outcomes. The beforementioned systematic review conducted by Copanitsanou et al. (2017) noted that patient handling was identified as one of the most common themes specific to patient care activities that increase the risk of patient falls. The case for implementing a safe patient handling program in healthcare settings was supported throughout the literature and was presented as a standard of care by the American Nurses Association (2015) Inter-professional National Standards to change clinical practice away from the manual lift technique.

Importance of Assessment. A common thread that unites all areas of nursing practice is the nursing process (Toney-Butler & Thayer, 2020). Assessment of the patient is the first step and involves the nurse's critical thinking and data collection to begin the formulation of a nursing diagnosis (Toney-Butler & Thayer, 2020). Evidence-based safe patient handling requires the clinical nursing skill of assessing the patient. Baptiste-McKinney and Halvorson (2018) presented a descriptive study to provide information on how various types of friction-reducing devices can be used effectively with SPHM

programs. Baptiste-McKinney and Halvorson (2018) noted that there is a strong influence specific to patients' pain tolerance for reposition and transfer tasks. In addition to the objective information of the patients' abilities to help with movement, the subjective information of pain tolerance adds to the nursing diagnosis. The authors highlighted lateral transfers, vehicle-to-wheelchair, and wheelchair-to-exam-table transfers as the activities most associated with injury and fall in the ED, which was significant to the project setting (Baptiste-McKinney & Halvorson, 2018). The outcome of this study presents the importance of an individualized plan of care based on assessment findings that should be utilized when implementing SPHM programs.

Soubra et al. (2019) completed a systematic review of 31 tools and tests to evaluate mobility in healthcare. Many of the assessment instruments are used to evaluate a patient's mobility and balance. Two of the more popular tests are the Timed Up and Go (TUG) or EGRESS tests both of which are noted for their differing results that are dependent on the reviewers' subjective method for measurement and recording outcomes (Soubra et al., 2019). Both mobility assessment tools were in use at the project site, which was not standardized or outlined for use in policy. A key finding from this review was the consideration of the choice of a measurement tool being reliant on the objectivity of the evaluation (Soubra et al., 2019). The selection of a mobility assessment tool as a strategy for preventing falls is supported throughout the literature (Cook et al., 2020; Pop et al., 2020; Turner et al., 2020). The Hillrom BMAT created by Boynton et al. (2020) was the only mobility assessment tool that linked the assessment measurement to the utilization of existing SPHM equipment.

Conducting a patient assessment is a unique process in most emergency rooms. Several studies reflect the importance of the assessment of mobility being a part of the nurse's initial assessment. A recent exploratory qualitative study using focus groups was conducted to explore the experience and understanding of triage as a nursing process in emergency settings by Wolf et al. (2018). The results showed a shift in nurse priorities when working in the ED to move patients to beds as quickly as possible. This study presented the challenge that volume has on the comprehensive assessment of patients who seek care in the ED. Wolf et al. (2018) shared that a staggering 130.4 million patients visit EDs every year in the United States. Nurses reported the prevalence of a 'quick look' as a triage approach for keeping pace with the high volume of patients.

In a similar study that utilized the strategy of quantitative review, Avanecean et al. (2017) sought to examine the effectiveness of patient-centered interventions on falls in acute care settings. Avanecean et al. (2017) used a standardized critical appraisal instrument from the Joanna Briggs Institute using two independent reviewers to assess validity before determining that a patient-centered assessment is a key strategy for identifying patients at risk for falls with a 95% confidence interval. The absence of a functional mobility assessment is noted by Avanecean et al. (2017) as being paramount for prevention. Similar to the study conducted by Wolf et al. (2018), prioritization based on acuity or severity of condition has led to adhering to the nursing process to being risk-stratified and task-focused to move quickly. In the unique environment of the ED, facilitators, and barriers to an accurate acuity assessment were numerous and highly dependent on the flow and volume of patients being treated in the ED (Wolf et al., 2018).

These two studies emphasize the importance of individualized care, using a systematic approach to achieve quality outcomes.

Staff willingness to speak up about safety risks was the focus of a quantitative research study conducted by Wåhlin et al. (2020). This study explored patient injuries specific to movement activities using event reporting data from a total of 65,749 patient incidents taken from an incident reporting system used by a healthcare system in Sweden (Wåhlin et al., 2020). This retrospective study focused on injuries that resulted from patient handling and ultimately resulted in a patient fall, with over 15 percent of patient injuries requiring treatment. Incidents were analyzed to correlate patient injury data with healthcare worker (HCW) injuries to link types of patient injuries with the types of injuries suffered by HCWs. Findings from this study emphasized the need for risk assessment for patients and HCWs to prevent harm and promote a healthy work environment where staff felt like a part of the decision-making process (Wåhlin et al., 2020). Although no specific risk assessment tool was presented, the importance of completing the patient assessment was a significant finding in support of an effective SPHM program. The authors noted a limitation of this study was the lack of additional data sources and points that might have enriched the analysis regarding the sequences of the incidents that were retrieved from the system (Wåhlin et al., 2020). This study did add value to the performance improvement project in the connection is provided to the foundational nursing process of completing the assessment before moving a patient.

A quantitative, multi-center cohort study by Brabrand et al. (2018) was conducted to examine the importance of assessing for impaired mobility on presentation to acute care settings. A total of 9,684 Danish and Irish patient records were reviewed from

multiple medical centers to examine the presence of a mobility assessment with the outcome variable, including an association with mortality rates (Brabrand et al., 2018). The authors noted that early, reliable risk stratification of patients presenting in an acute care setting would provide for the rapid provision and escalation of care (Brabrand et al., 2018). Brabrand et al. (2018) indicated that a mobility assessment should be done in one to two minutes. The Hillrom BMAT created by Boynton et al. (2020) has been validated to take only two minutes. The findings of this study provided evidence that impaired mobility on presentation is a strong predictor of mortality, which was independent of age (Brabrand et al., 2018).

A recent quantitative, cross-sectional, descriptive study conducted by Turner et al. (2020) that examined fall prevention implementation strategies in use at 60 U.S. hospitals provided several findings significant to the study. Turner et al. (2020) indicated that this study was the first to examine what specific implementation strategies were being used in the U.S. and identify what factors might be attributed to program success. A significant finding of this study noted the importance of assessing patients to identify fall risk and the importance of documenting the findings in the EMR to provide communication to the entire care team (Turner et al., 2020). The authors explored the importance of leveraging the EMR for daily documentation of patient fall risk and mobility assessments. Findings demonstrated that although the use of the EMR for charting existed, very few organizations had leveraged the EMR to its full capability, including the lack of use of targeted fall prevention strategies (Turner et al., 2020). Many EMR tools can link mobility assessments to fall prevention tools and resources, including the ability to alert the central supply of the rate of use of disposable or reusable supplies to trigger auto-

replenishment. This study provided insight into untapped resources and tools that might exist at the project site for consideration. Another essential reference made by Turner et al. (2020) was the importance of leadership in fall prevention program success. The importance of leadership support and involvement in implementing a clinical practice change of this magnitude was highlighted throughout the literature and further validated the importance of securing support at all levels before program implementation.

A study conducted at Banner Health (Boynton et al., 2014) was the foundation for the clinical practice change, quality improvement project. The research design of this study was termed a validation study to determine the inter-rater reliability of an assessment tool. Boynton et al. (2014) achieved validation of the BMAT using an expert panel to assess content validity. Inter-rater reliability was determined as four observers simultaneously completed the assessment on the same group of patients. Accurate assessment of mobility status enables clinicians to monitor for improvement and deterioration, and apply interventions to safely move, lift, transfer and mobilize patients when deficits are present (Boynton et al., 2014). The Banner mobility assessment tool was designed to align with the American Nurses Association SPHM standards to improve patient and healthcare worker safety.

Boynton et al. (2020), published BMAT 2.0 to incorporate new knowledge and expand upon the BMAT tool for use in patients at any age. Clarification was added to indicate a pass or failure to indicate a patient's progression from levels of 1 to 4 (Boynton et al., 2020). The BMAT was created to identify patient mobility deficits and guide the clinician in selecting SPHM technology to safely handle patients. Boynton et al. (2020) reassessed current tools in use to further validate the effectiveness of the now-termed

Hillrom BMAT to present the significance of a standardized nursing process for conducting a mobility assessment that is linked to SPHM technology to improve patient and healthcare worker safety.

Equipment Uses. Equipment used for patient handling, transfer, and mobility help is an important factor for the success of an SPHM program. A quantitative, quality improvement study examined the implementation of the Transfer and Lift with Care SPHM program among multiple hospitals in northeast Florida showed how extensive equipment purchases do not guarantee the staff will use it (Olinski & Norton, 2017). This study sought to examine why equipment that was made available was not being used. Olinski and Norton (2017) examined adopting a no-lift policy with layered accountability for non-compliance. Through the course of multiple interventions to improve the utilization of equipment, the study added measures for the management of equipment and supplies to ensure reusable supplies were readily available and available in quantities that would support consistent use (Olinski & Norton, 2017). Significant success in transforming the environment for ease of use was noted as a reason for program success that was sustained for eight years. Results reflected an overall reduction of 82% in OSHA-recordable patient handling injuries in the first year. The value this study added to the project was reinforcing a non-punitive process for investigating non-compliance to promote a culture where SPHM could be built on the beliefs of health promotion and create a just culture.

Eagles et al. (2018) conducted a systematic review that examined the impact of ED mobility assessment tools on older patients. The study focused on EDs in the region of Ottawa, Canada. Eagles et al. (2018) identified that the high-risk population of patients

traditionally of focus in the inpatient setting of over 65 years of age, and accounted for 12% to 24% of the population visiting the ED. A significant finding that was shared by Eagles et al. (2018) was that the use or lack of use of a mobility assessment before ED discharge for older patients did not correlate with adverse outcomes or return visits to the ED (Eagles et al., 2018). Eagles et al. (2018) emphasized, from a healthcare spending perspective, additional research specific to the most appropriate mobility assessment for unique populations visiting the ED is needed to evaluate their association with adverse outcomes. This study reinforced self-reported mobility should not be used to record the documented mobility assessment. Eagles et al. (2018) also noted the lack of reliability of self-report and that most patients were found to under-report personal limitations. This study reinforced that the use of an evaluation tool that can be done expeditiously supports the use and provides for objective information that can be used to select patient handling equipment to meet individual patient needs.

A qualitative descriptive study conducted by Monaghan (2020b) examined the challenge of change among healthcare workers in making the shift away from manual lift technique to consistent use of SPHM equipment. Monaghan (2020b) explored the lack of compliance that persists when organizations attempt to implement SPHM programs and staff persistent on over-rely on the use of body mechanics to move patients. Change theories were utilized to examine staff resistance to change and categorized into three levels of resistance: cognitive, behavioral, and emotional (Monaghan, 2020b). Traditional approaches to introducing evidence-based practice change through a directive or coercive model to stimulate fear among the workforce do little to produce sustained change and often lead to resentment. An important finding from the study was that staff should be

focused on being trained only on the equipment they will be using (Monaghan, 2020b). Providing an overview of all equipment available in the organization can lead to confusion about what piece of equipment is best suited for the task.

Two similar quantitative studies were conducted in the U.S. to examine perceived barriers to the use of assistive devices. The number one reason that staff indicated as a barrier to equipment use was the availability of other staff to help (Kucera et al., 2019; Noble & Sweeney, 2018). In both studies, staff shared that the need for help during patient handling and transfer is the most significant barrier to the use of SPHM equipment (Kucera et al., 2019; Noble & Sweeney, 2018). Kucera et al. (2019) used a prospective observational cohort study in one university teaching hospital, whereas Noble and Sweeney (2018) used a quantitative design using both descriptive and correlational methods. In a similar quantitative, descriptive correlational study by de Moura et al. (2019) conducted in a Portuguese hospital that sampled 260 nurses, nurses reflected that pain and injury are expected as part of the job due to the frequency and demands of moving and positioning patients. Despite the overwhelming evidence of the risk of injury, and knowing the risk, nurses continue to revert to manual lift out of familiarity (de Moura et al., 2019; Kucera et al., 2019; Noble & Sweeney, 2018). These studies further validate that the presence of equipment does not guarantee its use.

A controlled before-after quantitative study conducted by Risør et al. (2017) in Denmark sought to examine the influence of a five-element standardized SPHM training program on decreasing musculoskeletal problems and pain and staff's willingness to adopt equipment use strategies. Although the study did show an improvement in staff attitudes toward equipment use, the injury rate and lost days from work continued at the

same rate 12 months after program implementation (Risør et al., 2017). The authors found that a challenge of introducing a clinical practice change to promote patient handling equipment use is the problem of teaching staff to unlearn what has been taught and used for decades. Numerous studies highlighted the significant hurdle for implementing an SPHM program is the belief that the manual lift technique is an acceptable practice (American Nurses Association, 2015). Risør et al.'s (2017) study were significant to the problem of adopting the mobility assessment tool that links SPHM equipment to fall reduction interventions and placed additional emphasis on using Rogers' DOI to change the behaviors of both patients and caregivers.

Policy and Legislation. A mixed-method study conducted by Przybysz and Levin, (2017) examined the impact of Illinois legislation and its influence in achieving results when medical centers are required to implement safe patient handling strategies. The study sought to explore solutions to the problem of inadequate and fragmented equipment utilization, a lack of incident reporting, and the need for policy that would seek to serve best the intent of promoting practice change (Przybysz & Levin, 2017). Legislative requirements and standards were the precursors for the study. The foundational doctrine was thoroughly examined to meet the policy intent. SPHM policy was formatted from exemplar organizations and included language on the right to refuse, which was noted as a provision and requirement by the state legislation (Przybysz & Levin, 2017). This study emphasizes the importance of policy is specific to the provisions set forth by the state in states where SPHM legislation is in effect is an important factor. California, which is the state of the project site, has legislation that requires a detailed review to ensure the language of the law is incorporated into the organization's policy.

A cross-sectional, quantitative research study conducted by Lee et al. (2015) assessed the early phases of implementation of safe patient handling practices following the passing of state-wide legislation in the State of California. California was noted as an early adopter of implementing legislation intended to reduce the incidence of musculoskeletal injury among healthcare workers. The initial study conducted by Lee et al. (2015) explored nurses' perceptions from a random sample of 396 registered nurses licensed in California to determine the epidemiological assessment of organizational safe patient handling practices and revealed significant gaps in nurse awareness and understanding of the recommended changes from ergonomic lift techniques to the need to use SPHM technology. More recently, Lee et al. (2021) conducted a repeat cross-sectional survey study to the initial study. The authors noted that a total of 11 states in the U.S. have since passed legislation to protect healthcare workers from patient handling injuries (Lee et al., 2021). This study showed improvement over the initial survey. Lee et al. (2021) examined all states with SPHM legislation. They concluded that states with legislation were more likely to have formalized policies and programs and more technologies to support lift and transfer tasks. The most significant finding was that the most successful programs were identified as those with established ‘right to refuse’ policies to support staff autonomy in refusing an assignment thought to be unsafe (Lee et al., 2021). This study was significant to the practice improvement project as its focus was on the State of California; it provided insight into how other medical centers in the state made progress using the legislation to raise awareness. Lee et al. (2021) found significant increases in nurses’ awareness of the importance of SPHM. The unfortunate area of

practice that had failed to show improvement from the previous study was the presence of equipment that was not used consistently by the staff.

The CMS no-pay policy was noted by Fehlberg et al. (2018) to have increased utilization of fall prevention strategies in U.S. hospitals. Fehlberg et al. (2018) conducted a secondary observational analysis using EMR data from the Southern United States to examine the influence that no-pay policy has on influencing nurses' intentions to apply fall prevention strategies to their clinical workflow. Additionally, this study sought to provide insight into what motivates nurses to act (Fehlberg et al., 2018). The authors examined if policy change, communication aids, fall risk assessment, or audible bed alarms influenced nursing interventions aimed at fall safety (Fehlberg et al., 2018). The results revealed that the pressure to implement fall prevention strategies had the greatest impact on limiting the mobility of patients, which were the cause of other negative outcomes (Fehlberg et al., 2018). To promote an environment of safety, the results showed that harm could result from overly restrictive practices. Overly restrictive policies were shown when patients are held in the ED for extended periods awaiting consultation or bed placement (Fehlberg et al., 2018). The need to be cautious of the unintended consequences of forcible behavior change requires a close examination of outcome variables to ensure that the goal of fall prevention does not result in other harm to the patient.

Kayser et al. (2020) conducted a quantitative, cross-sectional study examining factors associated with safe patient handling practices in the acute care settings of 642 participating U.S. hospitals. The study provides additional insight into the importance of legislation and showed a connection that the likelihood to use lift equipment was greater

in states that had SPHM legislation (Kayser et al., 2020). An important antecedent to the SPHM program effectiveness is the nursing assessment and the use of the EMR for clinical documentation and order review (Kayser et al., 2020). Results of this study showed a low rate of lift use during hospital stays of only 3.7 percent. Mobility was not found to be a deciding factor. Rather, the most common influencer for lift use was noted to be due to patient size and was only found to be used 11 percent of the time (Kayser et al., 2020). This study further emphasizes the importance of a thorough evaluation of patient characteristics. Overall, U.S. acute care facilities were found to have invested in purchasing equipment for patient handling; however, the use of lifts to safely transfer and mobilize patients was still very low (Kayser et al., 2020).

The wealth of literature on SPHM primarily focuses on the prevalence of injury and harm that affects the caregiver. An evidence review conducted by Gibson et al. (2017), on behalf of the Safety Compensation and Recovery Research Institute, examined the influence of healthcare worker musculoskeletal health and safety interventions and work environment on patient outcomes. Gibson et al. (2017) confirmed the prevalence of injuries to patients during movement and positioning to include skin tears and falls. A total of 19 studies were selected to show the relevance and importance of SPHM being an important element to a fall prevention program in any setting. Additionally, Gibson et al. (2017) concluded that fall-related events were not uncommon and could range from less serious injuries of sprains and strains to more serious fractures, concussions, bleeding, and death. This study is the only one of its kind that presents evidence that links patient safety with healthcare worker safety.

In summary, a total of 24 empirical studies supported the importance of implementing an evidence-based SPHM program as part of a fall prevention strategy. Limited information or studies existed that examined the relationship between healthcare injuries and patient injuries specific to SPHM. This presents a significant gap in the literature. Inpatient transfer and positioning activities, healthcare workers who utilize SPHM equipment as intended and designed could potentially eliminate or drastically reduce the risk for injury when the high-risk task of patient transfer is performed (Dennerlein et al., 2017; Monaghan, 2020b). The use of a standardized mobility assessment tool to prevent falls is prevalent in the literature as a key component for providing patient-centered interventions (Cook et al., 2020; Pop et al., 2020; Turner et al., 2020). The mitigation of harm that can result from the choice to use SPH equipment that is readily available improves patient and healthcare worker safety and improves the probability of achieving quality patient outcomes.

Leadership

Nurse leaders are best positioned to empower nurses to seek information and develop skills to generate new knowledge for improving patient care delivery. Leadership is key for setting the tone and creating a climate of safe for followers. Leading by example and empowering staff to be a part of the solution that results in improved patient outcomes and sustained safety performance was reflected in the literature as being highly reliant on the style of the leader (Asamani et al., 2016; Tafvelin et al., 2019). Three sub-themes emerged under the primary theme of leadership: education and training, the importance of program standardization, and the role of a safety culture in the workplace.

Safety leadership and management practices positively influence the safety attitudes and behaviors of followers. The engagement of staff can be seen through the caring nurse practice of knowing, appreciating, and engaging (Akbar & Locsin, 2017; Asamani et al., 2016). Evidence was presented in the literature that a positive work culture environment improves the nurse-patient relationship, which is experienced through engaged nurses, favorable patient perceptions of care, and reduced incidents of injury or harm (Akbar & Locsin, 2017; Ulrich et al., 2019). One of the most significant barriers to improving patient safety is a work culture that is driven by fear of being blamed (Monaghan, 2020b). Staff led by a leader who manages for safety are more apt to report errors, near misses, and system flaws aimed at improving patient care that ultimately results in improved quality of care (Akbar & Locsin, 2017; Asamani et al., 2016).

A quantitative, correlational, cross-sectional study of 1,500 nurses and 80 nurse leaders was conducted by Paradiso and Sweeney (2019) in New York. The study sought to examine whether there was a relationship between trust, just culture, and error reporting among nurse leaders and followers. Participation in the study was voluntary, which yielded a total of 185 participants from the total sum. The nurses who responded to the survey had been employed for 10 years or more in direct patient care roles. The study tool divided questions into six domains that explored nurse leaders' perceptions and direct patient care. Results showed statistically significant differences in trust and just culture beliefs between the two groups (Paradiso & Sweeney, 2019). This study found that the strongest indicator for creating a just culture is to create open communication related to safety events (Paradiso & Sweeney, 2019). When errors occur, staff’s fear of being

blamed or punished was shown to result in low reporting. Lack of reporting is a barrier to continuous quality improvement and safety. A second important factor for creating a just culture is respecting suggestions (Paradiso & Sweeney, 2019). Staff not feeling their suggestions or ideas are heard with openness, their voice does not matter, and that they do not influence the work environment can lead to dissatisfaction. A meaningful reference that came from this study was the description of a just culture. Paradiso and Sweeney (2019), indicate a just culture is a culture of balanced accountability. Focus on adverse events should be on the system, and what in the system is lending itself to interfere with safety and quality. Fixing what is wrong is a part of the equation. The most important reminder from this study was consistent, open, and honest communication should be fostered between nursing staff and nursing managers.

A descriptive, quantitative research study conducted in Ghana by Asamani et al. (2016) presented the topic of leadership as being a critical component in the success of nurses' professional development and job satisfaction. This study employed a cross-sectional survey design to collect data from 273 nurses across five hospitals. The results were shared using descriptive and regression analysis, which showed varying styles of nurse managers' leadership approaches. Style and approach varied depending on the situation, which is tied to a nurse's willingness or want to stay in the current job (Asamani et al., 2016). A significant finding from this study was the further validation that nurses satisfied in their professional role are more likely to provide quality and safe care, which translates to improved outcomes for both the healthcare worker and the patient (Asamani et al., 2016). Limitations of this study included that the education and training of nurses to qualify their leadership style was limited; therefore, the behavioral

assessment of nurse leaders was limited to the survey answers and results are not transferable. The value that this study adds is based on the evidence of improved outcomes of patients when nurses are happy in their job.

Hattke and Hattke (2019) conducted a study at the University of the Armed Forces Hamburg, Germany. The authors sought to examine the effectiveness of leaders who promote ethical values authentically and their influence on inspiring followers. This quantitative study tested the moderated-median model based on survey data from 741 offers from various branches of military service. The findings of this study validated existing literature that speaks to the most influential leadership styles for nurses leading change in healthcare in which authenticity moderates the relationship between leader ethical influence and follower ethical behaviors (Hattke & Hattke, 2019). Hattke and Hattke (2019) confirmed that even among members of the various military forces, the top-down method did little to influence behavior change that is intended to transform practice. The importance of distinguishing ethical leadership in producing ethical behavior was presented by Hattke and Hattke (2019), thereby spotlighting the extensive literature related to transformation leadership being influential in inspiring followers. Of important note, transformational leadership was emphasized by Hattke and Hattke (2019) as not being a qualifier for ethical behavior or practice. In essence, a leader’s ability to inspire followers does not guarantee that followers' actions will be ethical. Ethical leadership inspires ethical behavior and is best supported when the leadership style is authentic (Hattke & Hattke, 2019). This study demonstrated the importance of emphasizing ethical behavior and practice. Consistency of leaders in promoting the assessment and use of SPHM equipment required the leaders to reinforce the practice

change. Authentic and ethical leaders are positioned to promote the relationship between the leader and followers and inspire ethical behavior.

Education and Training. A quantitative study examining ergonomics science to achieve a compelling adaptation of clinicians' intent to use the safety equipment provided important information on the intent to use SPHM equipment following education and training (Saremi et al., 2019). Saremi et al. (2019) conducted a cross-sectional study to examine how working conditions influence a clinician's decision to apply known safety-enhancing principles and knowledge to clinical practice. This study focused on the historical education of ergonomic training for patient handling. The benefits of providing training on ergonomics were examined across a five-hospital university healthcare system to determine if ergonomic interventions specific to SPHM could reduce the rate of injuries (Saremi et al., 2019). A population of 150 professionals, including nurses, nurse supervisors, and nurse practitioners, made up the study population. A standardized questionnaire was used and provided insight into a reverse relationship between the knowledge of ergonomics and occupational injuries. The study findings demonstrated that training and ergonomic interventions could be useful in SPHM education (Saremi et al., 2019). Ergonomics is an essential factor in safety for both the patient and the healthcare worker.

A quantitative, empirical research study conducted by Garzillo et al. (2020) examined factors associated with lift equipment use and non-use. This study examined nurses' intent to use patient lift equipment while working at a university hospital in the U.S. Following the education and training on how to use SPHM technology, staff was questioned about the intent to use lift equipment. The staff projected the intent to use

equipment was largely due to the availability of help with equipment use (Garzillo et al., 2020). An important recommendation made by the authors was the need for future training programs to be done where the work is performed rather than done in a lab (Garzillo et al., 2020). The authors indicated this might overcome perceived barriers to use. Summaries of the interviews of the study participants were overwhelmingly positive, with a consistent request for more training of this nature. The associated risks of not performing the skills were found to modify attitudes held by employees performing patient movement tasks regularly. The literature supported that staff value education and training (Garzillo et al., 2020). An important consideration for the implementation of clinical practice change projects is ensuring that education, training, and skill development meet the recipients' needs in all ways possible.

Two descriptive studies that examined the implementation of an SPHM program using education, training, and skill validation were presented by Monaghan. Monaghan (2019) used the principles of adult learning to identify opportunities to enhance the implementation of SPHM programs. Barriers to effective implementation revealed that timing is an important factor. Identifying the right time to educate staff properly is noted by Monaghan (2019) as an indicator for successful practice change. An important consideration when introducing clinical practice change to a population of nurses is the where and when to teach (Monaghan, 2019). Monaghan (2020a) built upon the foundations presented in her earlier work and examined the models of competence for verifying competence to balance the needs of time and a need to verify staff competence. The value of incorporating a theoretical framework when introducing clinical practice change is also emphasized. Education requires careful consideration of what equipment

the staff will be using and for what situations and conditions the kit will be needed. Monaghan (2019) noted that SPHM education begins with assessing the patient for the correct selection of equipment needed for the task.

Program Standardization. Program standardization allows teams to follow processes and achieve organization. A quantitative, descriptive study conducted in Boston across two hospitals surveying 1,832 direct patient care workers was conducted by Dennerlein et al. (2017). This study revealed the importance of hospital-wide implementation to achieve standardization in practice when seeking to implement SPHM programs. This was a foundational study, referenced in several other articles examining the effective implementation of SPHM programs in healthcare. Dennerlein et al. (2017) emphasized the importance of applying a systems approach to implementing an SPHM program. In this study, two hospitals were evaluated concurrently, with one implementing a comprehensive SPHM program while the other did not. The unique element of this study was the researchers' intent to integrate SPHM equipment use into the patient care plan (Dennerlein et al., 2017). A reduction in SPHM injuries was seen at the intervention hospital where the non-intervention hospital showed no change in outcomes. An unexpected finding of this study was the influence of leadership on this program's success. The authors emphasized a limitation of this study was that all types of musculoskeletal disorders were not evaluated; therefore, the study did not observe a reduction in other types of injuries (Dennerlein et al., 2017). This research suggested that hospitals should consider prescribing SPHM equipment practices into the plan of care for patients needing mobility assistance, emphasizing standardization across all entities.

In New York, Graham (2020) conducted a quantitative change project that presented a gap in teaching SPHM at nursing schools. The continued teaching of ergonomics to move and transfer patients has the effect of continuing the teaching of high-risk methods and is no longer reflective of best practice. A lack of standardization among nursing schools continues to contribute to the challenges of organizations attempting to change practice (Graham, 2020). Results of this study show that over half of nursing schools surveyed continue to teach body mechanics for patient move tasks (Graham, 2020). An example provided by Graham (2020) was the pivot transfer technique in which the caregiver supports the patient in the turn and transfers to a new position. Studies showed that this technique contributes to the risk and cause of patient harm during transfer with bruising and skin tears (Graham, 2020). Graham (2020) uncovered the changes in state boards of nursing exams have begun to reflect information from the ANA Handle with Care campaign, which further complicated the teaching of outdated and unsafe handling skills. The need to erase the mindset that ergonomic lifting is an appropriate option for SPHM needs to change in nursing schools. The value this article added to the project was the important considerations for new employee onboarding education and training to reset the mindset of employees entering the workplace using SPHM equipment.

A mixed-methods pilot study conducted by Eberth et al. (2019) determined the effectiveness of a hybrid pedagogy to develop SPHM knowledge among 16 occupational therapy students over five weeks. The study was done using five modules of education and training using a pre- and post-test design. The research question asked if a hybrid pedagogy could effectively teach the knowledge, self-efficacy, and skills needed to

develop safety judgment regarding SPHM among occupational therapy students (Eberth et al., 2019). Using a standardized approach to education, training, and skill development was the approach, with defined methods to meet educational objectives (Eberth et al., 2019). The value this study provided was the importance of a multi-tiered approach to education, indicating that education provided over time builds upon the knowledge gained from each successive module. It was concluded the didactic education with skill validation of manually performing what was learned was determined to add value to the understanding and ultimately led to clinical practice change. The authors recommended exploring a shorter duration, fast-paced learning program in future research. Standardized education seeks to achieve consistency in practice.

The development and implementation of an SPHM program require a systematic approach as evidenced by the extensive literature and various evidence-based approaches to SPHM program implementation resources. A study by Latvala and Masterman (2017) was conducted to understand the development and implementation of a unit-specific pilot program at a 261-bed hospital in New York. This quantitative, descriptive research study described pre-implementation and post-implementation analysis of the 69 staff members and their personal beliefs and behavior changes specific to clinical practice change training. The findings of this study were significant in that the program was attributed to lower costs related to workplace injuries and lower absenteeism among the study participants. In addition, the unanticipated benefit of increased reporting of near misses was observed, along with staff engagement in providing suggestions for improvement in SPHM processes and reporting of injury and harm (Latvala & Masterman, 2017). The multiple areas of learning that take place daily in healthcare compete with the time and

attention to implement a program of this magnitude. A recommendation for future research was to explore how much time it takes to fully implement an SPHM program that will result in sustainable change.

The Veterans Health System is a source for numerous quality improvement studies around SPHM. Reframing SPHM equipment as mobilization tools that can be used to help safely mobilize patients to improve health outcomes is a successful strategy discussed by this system. Wyatt et al. (2020) summarizes a qualitative quality improvement project that reflects the value of an interdisciplinary approach to improving safe patient handling program implementation. Leadership reframed the improvement program to enhance the progress seen in the use of SPHM equipment to include the mobilization of patients to their highest level of mobility (Wyatt et al., 2020). Leadership sought to create awareness and interest using a campaign approach to define the opportunity. A key takeaway from this study was the important elements of combining initiatives and emphasizing the use of a standardized assessment tool (Wyatt et al., 2020). Standardization of the consistent use of one mobility assessment tool facilitates all members of the care team with clear communication and a clearer focus on the goals for the patient.

Just Culture. Paradiso and Sweeney (2019) indicated that a just culture is a work culture that has a non-punitive response to errors. Leadership training specific on how to lead for safety in healthcare is limited. There is universal agreement in healthcare that protecting patients from injury and harm is the responsibility of all healthcare team members. Compromises in patient safety can result from a knowledge deficit, noncompliance with known safety practices, staffing shortages, or other systems issues

that may result from a lack of reinforcement in staff reporting due to poor safety culture (Lee & Lee, 2017; Monaghan, 2019). Strategies to prevent injury when assisting patients with movement, transfer, or mobility that are grounded in evidence-based practice minimize the risk of musculoskeletal injury to the healthcare worker and minimize the risk of injury to the patient (Monaghan, 2020a). Historically, staff trained in body mechanics skills and lift techniques that aimed to achieve assistance with manual assistance.

A mixed-methods study using qualitative analysis conducted by Engle et al. (2019) reinforced the challenge of culture change and presented areas of enhancement in medical centers that seek to deliver evidence-based and patient-centered care. The authors highlighted the contradictory aspects of achieving a culture that focuses on providing the most current evidence-based practice while seeking to achieve a patient-centered care model (Engle et al., 2019). Twelve VA hospitals made up the populations of focus for determining what factors might inhibit or enhance the practice question. Systematic analysis of the data shows that medical centers with a high-performing leadership structure that promoted a bottom-up decision-making structure with strong involvement among the workforce in decision-making and engagement were most successful in achieving evidence-based practice and patient-centered care (Engle et al., 2019). Leadership support at all levels of the organization was identified as a significant contributing factor to the most successful sites. Active, innovative, and improvement-oriented culture is a challenge to achieve without institutional support and autonomy at the clinical care leader level (Engle et al., 2019). This study reinforced the importance of attaining support at all levels of the organization to implement clinical practice changes.

To explore key predictors of safety leadership, Tafvelin et al. (2019) examined leadership training as a strategy to improve workplace safety. This quantitative research study sought to explain the relationship between leaders and followers, the differences in perceptions exacting to exhibited behaviors of leaders and how followers rate these leader behaviors, and their influence on safety (Tafvelin et al., 2019). Healthcare has turned to the airlines and adopted the pre-flight checklist for perioperative services and patient verification. With the absence of a specific healthcare leadership training framework, the literature focused heavily on organizational culture for transforming safety outcomes. Changing a unit work culture in healthcare is a tremendous undertaking, and throughout the literature, leadership was highlighted as the most influential factor for transforming safe work culture. Tafvelin et al. (2019) used a before and after training intervention that focused on teaching leaders' safety. This study was conducted outside of healthcare in the high risk and rate of injury industry of the forestry service in Sweden. A total of 101 leaders underwent a training program over 20 days, and 240 followers were invited to participate in the survey of which 158 responded. Results provided a significant finding in the discrepancy between leaders' and followers' perceptions of safety leadership where disagreements regarding safety leadership were important for followers' self-efficacy in proactively intervening with observed unsafe work practices (Tafvelin et al., 2019). This was relevant to the PICOT in that leaders' and followers' cohesiveness is significant for achieving alignment on what is safe. Limitations of this study were that it was the only study of its kind, and it was not specific to healthcare. The recommendation for future studies noted by the authors was to conduct similar studies in other high-risk, high-injury industries and workplaces to provide additional support for this work. Lack of research in

leadership training for healthcare-specific to safety leadership was an identified gap of this literature review.

The attitudes of ED nurses toward patient safety were the focus of a quantitative, descriptive study conducted by Durgun and Kaya (2018). The study sought to examine staff's willingness to speak up regarding issues of safety. This study included 321 nurses working in tertiary hospitals in Istanbul, Turkey. An informational Patient Safety Attitude Scale was used to collect information, and data were summarized using the numerical rating scale. Results of this study showed that nurses generally had a positive attitude towards patient safety. An unexpected finding from this study was the reluctance to report incidents in which a patient suffered from harm due to the fear of malpractice (Durgun & Kaya, 2018). A nurse's fear of being punished and fear of losing their job was at the forefront of being associated with the failure to report (Durgun & Kaya, 2018). Limitations of this study included the sampling of nurses was from only one hospital emergency department; therefore, results could not be generalized to all emergency nurses.

In summary, a commitment from staff at all levels is needed for a safety program to reach its full potential. A total of 25 empirical studies were used to support the importance of leadership in influencing the implementation of evidence-based clinical practice change. Leadership was emphasized throughout the literature as being essential in ensuring a successful launch of an SPHM program. Leaders are influential in providing ongoing support for sustainability, which is the goal of shifting away from manual lift techniques to evidence-based practice strategies known to improve safe patient handling (Asamani et al., 2016; Lee et al., 2021). To be an effective leader for safety, followers

need to be aligned in thinking and understand the intent of leaders who are seeking to lead for safety (Tafvelin et al., 2019). Unfortunately, in healthcare, very little research had been conducted specifically on what leadership strategies are known to influence safety and support effective safety leadership strategies (Yodang & Nuridah, 2020). This poses a significant gap in the literature.

Leading for safety was a unique skill explored extensively in other industries and is overdue for consideration in healthcare. Organizations are forced to look outside of healthcare to explore industries that have built effective strategies to develop safety leadership and apply these skills to the healthcare setting (Yodang & Nuridah, 2020). Leadership involvement was supported throughout the literature as important when implementing new strategies and programs that seek to improve quality, safety and achieve better outcomes (Asamani et al., 2016; Dennerlein et al., 2017; Lee et al., 2015).

Summary

Body mechanics and ergonomic training for patient-assisted movement and handling have been used for years (Saremi et al., 2019). This has embedded a mindset among healthcare workers that the manual lift technique is an effective strategy for assisting patients to stand, walk, and move (Monaghan, 2020b). The education and skills to perform safe patient handling are unique and require the unlearning of behaviors used by staff for years (Carbuto et al., 2020). In states where legislation has been passed to support practice change to the use of SPHM technology, progress is varied (Lee et al., 2021). Clinical practice change requires careful consideration of what is taught as well as how education is delivered and should include both education and training that improves the knowledge and skill of healthcare workers (Monaghan, 2019).

The literature supported, dating back almost two decades, that manual lift techniques are related to the high incidence of musculoskeletal disorders and injury resulting in lost workdays for healthcare workers (Kayser et al., 2020; Wåhlin et al., 2020). Progress has occurred with the promotion of accreditation standards and the passing of legislation to improve safety in fall risk, fall prevention, and safe patient handling (Kayser et al., 2020; Lee et al., 2021; Olinski & Norton, 2017). However, only 11 states took steps to hold healthcare organizations accountable through legislation to shift this paradigm to implementing evidence-based practice to improve SPHM to improve safety for both patients and healthcare workers (Lee et al., 2021).

The unique environment of the ED requires a prevention strategy that accounts for the unique patient population and that consists of risk factor screening and individualized, comprehensive care planning (Cook et al., 2020; Pop et al., 2020; Turner et al., 2020). Assessment tools that do not link assessment findings with a patient-centered intervention create a lack of consistency among clinical care staff (Boynton et al., 2020). In the absence of a documented assessment, interventions aimed at improving safety during transfer and lift tasks are left to chance (Brabrand et al., 2018; Turner et al., 2020). Triage in the ED that focuses on the environment of this hospital setting with a goal of bedding patients rather than on the individual needs of the patient poses a significant risk to achieving safety and quality outcomes (Wolf et al., 2018).

Administrative support at all levels of the organization was a well-documented component to improving safety and quality outcomes in healthcare (Asamani et al., 2016; Cook et al., 2020; Pop et al., 2020; Turner et al., 2020; Ulrich et al., 2019). From financing the purchase of equipment to the support of nursing personnel in being visible

and present when care is being provided, leaders have an important and influential role in the success of the implementation of evidence-based practice (Latvala & Masterman, 2017). Leaders who inspire followers and eliminate the fear of being punished for reporting safety concerns were shown to create a culture where staff feels more comfortable about speaking up (Durgun & Kaya, 2018; Hattke & Hattke, 2019; Yodang & Nuridah, 2020).

A limited number of studies focusing on the unique environment of the ED poses a challenge for healthcare organizations seeking to implement evidence-based strategies specific to the population of patients seeking care in the ED (Cook et al., 2020). Work-related musculoskeletal and patient injuries resulting from patient handling tasks are preventable (Dennerlein et al., 2017; Gibson et al., 2017; Kucera et al., 2019). Likewise, patient safety is improved using an evidence-based mobility assessment tool (Boynton et al., 2020). Fall prevention strategies specific to the ED's unique environment are more effective in addressing the challenge of patients who fall in this setting (Cook et al., 2020; Pop et al., 2020). The adoption of evidence-based strategies aimed at minimizing the use of manual lift techniques helps organizations achieve success in reducing avoidable injuries. The literature supported the importance of implementing SPHM programs for achieving improved safety (Dennerlein et al., 2017; Jones & Eagerton, 2020).

The literature presented provided a rationale for the theoretical framework of Pender's HPM to be used to link health behavior influences that lead to the choices made by clinicians to practice health-promoting behaviors (Pender, 2011). Pender's (1982) HPM helped explain how individual characteristics and experiences can directly or indirectly influence health-promoting behaviors. Rogers' (2003) diffusion of innovation

theory worked to enhance the adoption of evidence-based practice clinical practice change, particularly in the ED, where cessation of care and services is not possible. Overcoming obstacles to using SPHM technology and equipment use begins with the help of a validated mobility assessment tool (Boynton et al., 2020).

The quantitative methodology was chosen for this project due to the short timeframe and the reduction of falls was rooted in the goal of the project. The test of whether the implementation of the BMAT improved the use of safe patient handling equipment to improve safety was reflected in the reduction of falls that occurred in the ED. Numerical data were collected and represented to show if the intervention improved patient safety. A quantitative, quasi-experimental quality improvement method is optimal for nurse-generated quality improvement studies (Cato et al., 2019). Chapter 3 will provide details of how the quality improvement project of implementing the BMAT to enhance the use of SPHM equipment to improve patient safety in a busy suburban ED in Southern California was conducted so that replication by others will be possible.

Chapter 3: Methodology

Fall prevention strategies and interventions that are focused on the individual patient were supported in the literature review. When a patient falls in the ED, the probability of requiring admission to the hospital increases by 25% to 50% according to a recent descriptive study conducted by Turner et al. (2020). The problem of falls in the acute care setting has continued to grow in the U.S. despite expert fall prevention strategies being introduced and implemented at a record pace (Turner et al., 2020). The project site for this quality improvement project used the leadership strategy of implementing policy, purchased extensive amounts of patient handling equipment, and educated staff on fall safety practices and processes upon hire and annually for several years. Despite these interventions, falls in the ED were above the national benchmark for ED fall rates. Chapter 3 will present a methodology for the implementation of this evidence-based fall prevention quality improvement project. The goal of this quality improvement project was to educate the clinical staff of a busy suburban ED in Southern California to raise awareness of the significance of the preventable problem of falls. An evidence-based intervention that is best suited for the environment of the ED is presented.

The purpose of this quantitative, quasi-experimental quality improvement project was to determine if or to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department in Southern California over four weeks. An assessment using the Hillrom BMAT takes two minutes to complete and was noted by Boynton et al. (2020) as empowering the caregiver to assess,

coordinate, and target (ACT). Assess for mobility level in safe mode, coordinate strategies for strengthening, and target the right piece of equipment to safely care for the patient (Boynton et al., 2020). The four-step functional task list is used to identify the level of mobility the patient can achieve without physical help. Information from the Hillrom BMAT score guides the nurse in selecting the most appropriate equipment and tools needed to lift, transfer, and mobilize the patient safely. The mobility assessment will be described in detail later in this chapter.

Chapter 3 will provide details about data collection procedures and data analysis, including information about validity, reliability, and measures taken to mitigate bias. This quality improvement project was conducted to answer the clinical question of to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in a busy emergency department in Southern California. This project was necessary because the project site staff did not conduct mobility assessments on patients when they entered the ED. There was a high incidence of falls, and the existing patient handling technologies were grossly underutilized.

Statement of the Problem

It was not known if, or to what degree, the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department. Acute care settings where patients present for urgent and emergent care consist of patient encounters

of all demographics and types. An important factor when implementing a fall prevention program is the population of patients.

Patients who fall in the ED are uniquely different from the population of patients known to fall in the inpatient setting. Special considerations of intrinsic and extrinsic factors specific to the environment and population served in the ED must be considered when selecting a fall prevention strategy (Stoeckle et al., 2019). Intrinsic factors include demographic information, pain present on admission, the presence of narcotics or alcohol, and the presence of two or more comorbidities (Stoeckle et al., 2019). Extrinsic factors include the time of day, which can affect lighting, medical devices available, and the overall state of the environment of trauma care and staffing (Stoeckle et al., 2019).

Clinical Question

This quantitative, quasi-experimental direct practice improvement project answered the clinical question: To what degree does the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices impact fall rates when compared to the current practice among adult patients in a busy suburban emergency department in Southern California? The independent variable was the implementation of the BMAT in a busy ED of a suburban medical center. The dependent variable was the fall rates that occurred among the patients who visited the ED for four weeks following the implementation of the education initiative. Falls were described using the patient characteristics of age, gender of the patient, and time of day in which the fall occurred to further define the dependent variable. The fall rate was tallied and captured in the department monthly quality data and reported on the department safety scorecard.

The fall rate was collected for four weeks before and four weeks after the implementation of the BMAT in the ED. The fall rate is expressed using numbers; therefore, a quantitative methodology was appropriate for this project. The quasi-experimental design was selected for its use in establishing a case and effect distinction among the variables. Miller et al. (2020) reinforce that the quasi-experimental design is most appropriate for examining the relationship between variables.

Project Methodology

Rutberg and Bouikidis (2018) indicated that a project methodology is determined by a clinical question. A quantitative method was selected as the most appropriate method to answer the clinical question and identify the influence of variables on the outcome of patient falls, quantified by the fall rate. The quantitative method is numeric; therefore, statistical tests could be conducted to make statements about the data using deductive reasoning to support answering the question (Rutberg & Bouikidis, 2018). Implementation of the Hillrom BMAT created by Boynton et al. (2020) to improve patient safety and reduce the number of falls that occurred among adult patients that visit the ED was studied to show a meaningful impact on patient care and to establish a cause-and-effect relationship of a clinical practice change to the fall rates.

The rationale for selecting a quantitative methodology over a qualitative methodology was due to the short timeframe of the project. It was rooted in the goal and clinical question to be answered. Qualitative studies seek to describe the qualities or characteristics of something. Queirós et al. (2017) indicated qualitative research is done to develop an understanding of a given problem and is not concerned with a numerical

illustration of what is learned. Cato et al. (2019) indicated that a quantitative, quasi-experimental quality improvement method is the optimal design for patient care provider-generated quality improvement studies. While qualitative designs would provide additional insight into the staff's thinking and decision-making processes; however, the time required to conduct such a project was not conducive to the practice improvement project timeline. Therefore, examination of cause and how different causes interact, and influence outcomes, was best described using the quantitative method.

The quantitative method was used to collect data and describe the change in fall rates before and after the implementation of the BMAT intervention. Quantitative methodology was the most appropriate methodology to obtain and evaluate pertinent information for answering the clinical question. In a quantitative study, data is measurable and quantifiable when a valid and reliable instrument, such as the BMAT is used. When making comparisons, correlations and the extent of impact were measured and displayed using descriptive statistics.

Project Design

A quasi-experimental design was the selected project strategy for this quality improvement project. Vetter (2017) indicated the quasi-experimental design is the most appropriate for studying an intervention and manipulation of an independent variable without randomization. Vetter (2017) referred to the quasi-experimental design as the most appropriate for practice-based studies intended as quality improvement or process improvement projects. Rutberg and Bouikidis (2018) specified that interventions with outcome measures that are tallied pre- and post-implementation will compare information

that can be described using numeric data to determine if the intervention made a difference in the form of an outcome.

There are various design options available for investigators to consider when seeking to implement quality improvement projects. In seeking to quantitatively describe the relationship between variables, the choices are experimental or non-experimental designs (Siedlecki, 2020). Experimental designs are also referred to as true experiments and use randomized sampling of subjects to improve internal validity (Siedlecki, 2020). This design is also termed research, which was not the objective of this project; therefore, a true experimental design was not appropriate for this project.

The quasi-experimental design is the best design for the implementation of quality improvement clinical practice change projects that collect quantitative data to answer a clinical question. Comparative baseline data on fall rates were collected to show the significance of the problem before the introduction of the Hillrom BMAT created by Boynton et al. (2020). After four weeks of the intervention being employed as part of the clinical practice of the direct patient care staff, post-implementation fall data were examined using the same de-identified characteristics to show the influence the independent variable had on the incidence of falls that occurred in the ED.

The incorporation of a mobility assessment in the workflow of a uniform cohort of the clinical staff of the ED was intended to improve the quality and safety of patient care using a process improvement intervention. Outcomes with quantifiable differences are considered relative to the intervention. An uncontrolled before and after study measures performance before and after the introduction of an intervention (Vetter, 2017). The staff was consistent in the before and after periods, and all worked at the same

practice site over the four weeks. A quasi-experimental design enables the primary investigator to establish a cause and effect where descriptive and inferential statistical comparisons could be conducted to compare results (Vetter, 2017).

All direct patient care staff were introduced to the education of an evidence-based fall prevention strategy that focused on the functional mobility assessment of adult patients termed the bedside mobility assessment tool. The Hillrom BMAT, created by Boynton et al. (2020), is a systematic method of determining a patient's mobility function status. The education of the Hillrom BMAT is achieved by viewing a ten-minute educational video provided with permission by Safe Patient Handling Solutions (2018). View of the training video was an independent function of direct patient care staff, introduced via email, flyers posted throughout the unit, and reinforced through leadership rounding and regular huddle messages over four weeks.

The nature of the project design was selected due to the setting, the problem to be solved, and the clinical question. The project timeline was set as four weeks, which was a short timeframe. A quasi-experimental project design allowed for the manipulation of the independent variable within that short timeframe. Measurement of the dependent variable comparative and implementation was done to measure if there was a difference in fall rates. The ability to conduct this study without randomly assigning or selecting participants assisted in supporting the short timeframe of the project. Fall data were gathered and included the date and time of day of the fall injury as well as the patients' ages and genders. Comparing the comparative and implementation fall data using statistical analysis determined if performing a mobility assessment using the BMAT to choose the proper assistive devices to lift patients improved falls in the ED.

Population and Sample Selection

The population of the city where the project was located was estimated at 1.42 million with a median age of 35.4, a poverty rate of 12.8%, median household income of $85,507, a medium property value of $658,400, and an employed population of 733,667 (Data USA, 2021). Data available on this site were representative of 2019 data collection and statistics (Data USA, 2021). Patients representing the focus of the project were those presenting by emergency transport, direct admission, transfer from another facility for a higher level of care, and by walk-in to the ED.

The clinical site for this quantitative, quality improvement project consists of a 60-bed emergency room. The average visit volume for the previous six months was approximately 4,900 encounters per month. As a result of the recent surge in patient illness due to COVID-19, the average monthly volume for the 90 days before the project increased significantly. The four-week baseline period had a visit volume of 6,021 adult patient visits meeting the criteria for inclusion. The staffing mix to support this patient volume included a total of 100 full-time equivalents (FTE) registered nurses, with at most 10 part-time staff, 22 ED technicians, and 2 licensed vocational nurses. Examination of the fall data for the past rolling 12 months indicated most falls occurred in the ED between 3:00 pm and 6:00 pm. The incidence of falls during this period equated to over half of all falls reported for the same rolling 12 months, which equaled 18 falls in the same period.

This quality improvement project utilized a convenience sampling of all adult patients who visit the ED of the project site during the project timeframe of four weeks. As noted by Cook et al. (2020), evidence supported that falls that occur in the ED are

most prevalent among adults over the age of 20. Convenience sampling is a form of non-probability sampling that is conducted to include a target population that meets a certain criterion or is present at a certain period. Inclusion criteria were adult patients who visit the ED during the four-week project timeframe and who were alert and oriented to person, place, and time. The need to follow a command and participate in the mobility assessment was crucial to the BMAT's effectiveness and validity. Exclusion criteria for the project were patients under the age of 18, and those who were brought in unconscious and not oriented to person, place, and time.

Adults over the age of 18 years were selected for the population due to important distinctions related to the unique population of patients who visit the ED. Falls by age data were reviewed for the past rolling 12 months to ensure the population of focus was specific to the problem and project site. Of the falls that occurred at the project site, all but one fall were noted to occur among adults between the ages of 18 and 100. One study in the limited literature on falls that occur in the ED provided a mean age of 50 as representative of the population of patients who fall in the ED (McErlean & Hughes, 2017). Additional studies referred to the at-risk populations for falls in the ED as adults (Cook et al., 2020; Pop et al., 2020; Scott et al., 2018). LeLaurin and Shorr (2019) noted that patients 65 and over are high-risk during hospitalization, which differs significantly from the population of patients at-risk in the ED. Therefore, adult patients over the age of 18 were included in the measurement to determine the outcome of the intervention of a mobility assessment in the reduction of falls that occurred at the project site.

Due to the large patient volume seen by the project site ED, a sample size estimate was used. G Power 3.1.9.7 was utilized to conduct a sample size based on 80%

power, a medium effect size (w = .30), and alpha set to .05 for a chi-square test, a total sample of N = 88 is required (n = 44 in the comparative group and n = 44 in the implementation group). Although a sample size estimate was completed, all adults over the age of 18 who were alert, oriented, and able to follow commands were included which totaled 10,469, n = 5456 in the comparative and n = 5,013 in the implementation group. All data were presented in numerical format only. Data were de-identified to protect the privacy of patients and adhere to the approval requirements of conducting a quality improvement project. Data received from the department analyst were encrypted and stored on a secure desktop computer in adherence with organizational policy.

Because the project is termed quality improvement, and the project site deems this as within the scope and normal work of the staff, consent is not required. All clinical staff assessing patient mobility function capability applied prior learning of safe patient handling technology to the care of the patient. The nature of the project taking place in an acute care setting, standard confidentiality protection of all medical records, according to the Health Insurance Portability and Accountability Act (HIPAA), was followed.

Instrumentation and Sources of Data

Using an assessment tool during patient care helps clinical staff to determine the ability of the patient to perform progressive tasks. Important information is gained about the patient's strength, coordination, balance, tolerance, and ability to follow directions. The Hillrom BMAT was incorporated into the routine patient assessment at the project site. To begin, the direct patient care staff establishes if the patient can follow commands and meets the inclusion criteria for completing the mobility assessment. After the clinician determined that the patient could follow commands, the patient was asked to sit

on the edge of the bed. A patient who was unable to maneuver to a seated position is considered a level 1, or most dependent on assistance. If the patient can position themselves in a seated position and shake the hand of the clinician, they progress to a level 2. Failure to do any of the progressive tasks ends the assessment and the functional level is correlated with what is known about safe patient handling and mobility equipment technology. In under 10 minutes, the nurse can learn the stages and scoring of the Hillrom BMAT and use the tool to assess a patient in two minutes. The scoring stages are: 1 total lift and position support, 2 unable to bear weight, total lift, 3 need for non-powered raising level, and 4 equate to the determination of a patient having modified independence (Boynton et al., 2020).

Assessing a patient's functional mobility status is crucial for determining their ability to help with the move and transfer tasks. A key benefit of using the BMAT is that the score is used to direct the clinician in what equipment is best to assist the patient in moving and transferring. Safe patient handling technologies are available in abundance at the project site; however, not unlike the numerous studies presented in the review of literature, having equipment has done little to promote its use (Kucera et al., 2019; Noble & Sweeney, 2018; Olinski & Norton, 2017). The BMAT also helps in the identification of a patient’s risk for falling. The tool is fitted and designed to cater to the physical support needs of patients. A standardized approach for assessing and documenting a mobility assessment of all adult patients that visit the ED could decrease care variation to improve outcomes for all patients. Documentation of the BMAT score in the EMR at admission and once per shift provides important assessment information that helps establish progress or deterioration in function.

The project site utilized an EMR for all aspects of direct patient care. Upon arrival, patient demographic data were entered into the EMR by the triage nurse who established their age and initial assessment data. Admission to the ED required an assignment to a vacant bed and care team. The clinical care team, as part of their normal workflow, further assessed the patient adhering to required elements of data gathering to address the immediate care needs of the patient. A standardized approach for documenting the mobility assessment was available in an existing flowsheet that is incorporated into the clinical practice change workflow. The one-page EMR job aid was included in the project's initial education and weekly rounding updates.

All adult patient visit information was easily pulled into existing reports that could be sorted by date, time, patient acuity, age, and other pertinent information. Total patient visit data were needed to determine the rate of falls that occurred among patients being seen over a period. The data pulled were not done using a census approach. Patient visit data occurred and were counted on the day of arrival. Census capturing is more time-consuming and could artificially inflate numbers when a patient arrives on one day and is carried over to the next (Press Ganey, 2021). The arrival approach was more appropriate for the total patient visit volume rather than ED length of stay information. The patient visit volume report was generated nightly by the department data analyst to show the total number of patients seen within the facility by date. This report allowed for sorting patients by age. Based on the agreement and permissions to use department-specific data, a report of all adult patients seen who meet the inclusion criteria of over the age of 18 and were alert and oriented was provided for both the comparative and implementation project periods. Patient visit volume reports were provided for the use of

establishing a baseline and implementation analysis. All personally identifiable information was removed.

Data collected for this project included the comparative group fall rates and implementation group fall rates. Additional descriptive data included the patient's age, gender, and time of day that the fall occurred. Data were collected on patient encounters by day, which was then correlated with the age of each patient by the department quality analyst. Permission was provided by the organization's quality director for the use of the department fall data to evaluate if the clinical practice changes of assessing patients using the Hillrom BMAT had a positive effect on the rate of falls that occur among adult patients being cared for in the ED. All data were received in a numerical form already de-identified of any personally identifiable information. The outcome data were also collected by the department data analyst and included time of day falls occurred and the gender and age of patients who fell in the comparative and implementation periods. At no time was the EMR accessed by the primary investigator for any data related to the project.

Validity

Boynton et al. (2014) achieved instrument validation of the Banner mobility assessment tool through an expert panel to establish content validity. Use of a contrasted-groups approach with expert agreement provided construct validity ($X^2 = 22.68$, $p < 0.001$) of the Banner MAT (Boynton et al., 2014). The study determined that the tool could discriminate differences between groups with construct validity through expert agreement of 81% (Boynton et al., 2014). Banner MAT was determined to be reliable with 93% agreement among the experts ($\kappa = 0.91$) (Boynton et al., 2014). The study

conducted at Banner Health provided evidence to support the BMAT as a valid instrument for use in assessing a patient's mobility status. BMAT is the only mobility assessment tool that links the assessment score with the intervention of using safe patient handling equipment for safe mobility and transfer of the patient. The Hillrom BMAT tool was validated for construct validation among contrasted groups ($p = 0.001$) and constructs validity for expert agreement (81%) and inter-rater reliability (93%). The BMAT is valid because it is an evidence-based tool and was not primarily made for this quality improvement project.

EMRs are the systematized collection of patient and population electronically-stored health information in a digital format (Palmer et al., 2019). These records can be shared across different health care settings (Palmer et al., 2019). All of these will be necessary and actualized during patient handling, especially when collecting data via a questionnaire. The EMR is a valid source of information to provide the patient encounter and outcome data (Palmer et al., 2019). A recent study examining the integration, accuracy, and precision of the EMR for documenting mobility assessment data supports that the EMR is a reliable and valid source for data when assessing patient outcomes (Kawar et al., 2021).

Reliability

Inter-rater reliability of the BMAT was established among a population of 20 patients over one day with a total of four nurses conducting assessments (Boynton et al., 2014). Study participants were observed for validation that the assessment did not deviate from the four-step functional task list to identify the level of mobility the patient could achieve (Boynton et al., 2014). Results were compared among the four nurses in the

study, and their results had a 93% agreement level ($\kappa = 0.91$), which is significant agreement. The research study conducted by Boynton et al. (2014) suggested that MAT has inter-rater reliability among nurses.

Use of EMR data to define the outcome variable determined to be reliable. The reliability of EMR data for research and quality improvement is touted by Lee (2017) as instrumental in the advancement of knowledge for improving health and quality for patients. Data were extracted from two source reports by the department analyst to compare the accuracy of the information used. Specifically, numerical patient encounter data, sorted by age, date, time, and gender were used. The data used was in numerical form only and did not violate the privacy of any individual.

Data Collection Procedures

Permission to conduct the quality improvement project was provided by Grand Canyon University's Institutional Review Board (Appendix A). Additionally, the project site Institutional Review Board and Director of Human Research Subjects Protection Office Academic Center for Research provided approval for the quality improvement project's implementation. This clinical practice change is termed quality improvement and does not pose a risk to study participants and subjects.

Emergency room nurses and technicians assigned to work at the project site were introduced to the independent variable of the clinical practice change education of the Hillrom BMAT. The Hillrom BMAT was introduced to patient care staff using an online educational video at the start of the four-week implementation period. Additionally, flyers with a QR code and global address were placed throughout the unit and near all nursing stations. Huddle messaging at the change of shift was presented by department

leaders and educators. Rounding occurred by all department leaders to reinforce the use of new knowledge to improve the assessment skills of using the Hillrom BMAT. The abbreviated timeframe of the project required a rapid identification of participants and an introduction of the intervention. Educational tools were utilized from the BMAT Implementation Workbook, which included a ten-minute video on how to perform the BMAT assessment. All materials were provided with permission from Hillrom (Appendix C). Leadership engagement had been established before the start of the project with a letter of support from the Chief Administrative Officer, the clinical department director, and site managers for all shifts.

Project implementation strategies were taken from the evidence-based practice change outlined in the *BMAT Implementation Workbook* (Safe Patient Handling Solutions, 2018). Permission was granted by both the original author of the Banner mobility assessment tool and Hillrom BMAT (Appendix C) to use all materials associated with the implementation of the tool (Appendix B). The following steps were taken to collect data for this quality improvement project:

Step 1. The primary investigator obtained IRB approval from the project site and Grand Canyon University before introducing the independent variable of a clinical practice change.

Step 2. Meetings with unit leaders, the clinical educator, the Chief of the ED, and the patient safety champion occurred to notify them of the project start and devise a plan for huddle messaging and placing flyers throughout the department.

Step 3. Baseline data were collected by the department quality analyst and included the total number of adult patient encounters and included the number of falls

sorted by date, age, gender, and time of day for four weeks before the introduction of the BMAT.

Step 4. A notice was provided to the labor union to inform them of the implementation of a quality improvement project and timeframe.

Step 5. Staff was introduced to the quality improvement project of implementation of the evidence-based assessment tool using the department email distribution list, huddle messages, and the placement of flyers on department information boards. The email included the significance of the problem that compared the rate of falls at the project site, as compared to other units of similar size. Staff was directed to complete a 10-minute training video by accessing the quick link, or by scanning the quick response code for viewing the training using a smartphone. Training materials created by Safe Patient Handling Solutions (2018) were used with permission from Hillrom as outlined in Appendix C. Reinforcement of training was done using weekly emails and huddle messages. The clinical educator included the BMAT education video as part of onboarding education for all newly hired ED staff during the implementation period.

Step 6. Rounding in the unit to discuss accessing the education materials and share resource materials for quick reference occurred on all shifts, attending all change of shift huddles, and encouraging staff to view the weekly huddle emails for updates on the status of the project results.

Step 7. Regular attendance at the change of shift huddles by the primary investigator occurred throughout the implementation timeframe to answer questions and introduce the intervention to staff that may have missed the initial launch huddles.

Step 8. A meeting with unit leadership was conducted at a minimum of weekly throughout the intervention period, and immediately following the one fall that occurred during the intervention period to debrief the event.

Step 9. Post-implementation data was requested from the data analyst to provide for the adult visit encounters of patients who met the criteria of alert and oriented that occurred during the four weeks of implementation, and the descriptive data of the age, gender, date, and time of fall for the known fall that occurred to an 87-year-old female during the day shift.

Step 10. Data was analyzed to establish statistical significance using SPSS software by conducting a chi-square test.

Patient's fall data were compiled by a department data analyst and de-identified to include the date of falls, time of day, and gender and age of the person who fell. A convenience sample of all adult patients over the age of 18 who presented for care in the ED and were alert and oriented was included as the project population for the four-week comparative and four-week implementation period. Consent of the patients was not required, because the intervention of conducting a mobility assessment is within the normal scope of the direct patient care team and the monitoring of clinical practice change is viewed as quality improvement and not human research subject to such protections.

Fall data were collected and summarized monthly by the Clinical Director of the ED with the help of the data analysis and reporting team. An agreement to share this data with the primary investigator was established before the project. Permission to use ED fall data was granted by the facility quality director. The data provided included the fall

rate before and after the implementation of the project as well as the date and time of falls and the age and gender of patients who fell.

The summary of the ED fall data was shared via secure email. No printing, replication, or sharing of this information, other than numerical data that reflected the number of falls, the time of day of the occurrence, and the falls by age, will be displayed to represent the outcome variable. Upon completion of this quality improvement project, all data files will be retained in encrypted files for the period prescribed to support the validity of this study. After which time, the data will be destroyed following organization policy for confidential and protected information destruction.

Data Analysis Procedures

This quantitative, quasi-experimental quality improvement project sought to quantify to what degree the translation of Boynton et al.'s research on the use of the Hillrom BMAT used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients that visit the ED in Southern California over four weeks. The independent variable was the implementation of the Hillrom BMAT. The patient fall rate was the outcome variable (dependent variable). Both variables were defined with numeric, nominal level data to reflect the number and rate of falls during the comparative and implementation periods of the intervention implementation. Age, gender, and time of day of the falls were further defined to show differences among the reported events. Analysis of the two data sets (comparative and implementation encounters), including descriptive statistics was conducted to summarize sample characteristics and key measures. Chapter 4 describes the data analysis in more detail.

Fall data are sensitive information and were provided by the project site and evaluated in numerical form only. Any reference to the privacy of the individuals was meticulously safeguarded and eliminated from the analysis and reporting for this project. Data were described numerically as they related to the number of falls that occurred in the ED and were compared and displayed using descriptive analysis of the outcomes and with the use of charts and tables.

Charts and graphs were used to help visualize and organize the data results. While the demographic information was best analyzed on a graphical approach, fall rates were best addressed and analyzed via tables. The Statistical Package of the Social Sciences (SPSS) software provided the ability to compare two independent samples to conclude the differences between the two data sets, specifically comparative and implementation fall rates. Using the SPSS software, a chi-square test was used to examine differences in the data sets. Chi-square was selected because of its usefulness in testing the relationship between variables (Jones et al., 2021). In determining significance, the goal was to determine the effectiveness of the intervention on patient outcomes. Statistical significance was reflected in a p-value to achieve significance in a $p < 0.05$.

Potential Bias and Mitigation

Zaccagnini and Pechacek (2019) indicated bias is a point of view of personal prejudice. Interpretation and evaluation of quantitative evidence require an objective measurement of data to take special care to avoid undue influence or action that may distort or slant findings (Zaccagnini & Pechacek, 2019). Tests were done to examine threats to the internal validity of the project to ensure the results reflected were accurate

and procedures were done correctly. Sampling bias was avoided with the coding of data to de-identify participants.

Bias was minimized as all adult patients between the ages of 18 to 100 were included in the patient population for measuring the outcome variable. Bias related to recruitment was eliminated to ensure all patients had an equal probability of being included. Careful attention to honest and full representation of the data was applied to avoid data misrepresentation and ensure fully reported. Data interpretation was supported with the correct statistical analysis of all data points and correctly analyzed and presented by using SPSS.

Ethical Considerations

Before the application submission to the organization Institutional Review Board (IRB), the primary investigator completed a 20-hour evidence-based quality improvement project implementation training, self-learning module associated with the project site. Additionally, participation in the CITI Program titled *Responsible Conduct of Research for Social and Behavioral Science Doctoral Learners* was completed (CITI Program, 2017). IRB approval was granted at the project site and Grand Canyon University to conduct the quality improvement project as outlined.

Hall et al. (2020) emphasized the careful consideration needed when introducing a quality improvement to clinical settings to determine the intention of the project to remain consistent in the approach. This quantitative, quasi-experimental quality improvement project was implemented to improve current workflow processes and enhance the quality and safety of patient care at the project site. The primary investigator worked to uphold the ethical principles of autonomy, beneficence, non-

maleficence, and justice throughout the process of conducting and summarizing this project and its results. The principles were chosen for their centrality in ensuring the safety, justice, and well-being of patients, which are the main elements of concern in fall prevention. Care was taken to ensure the safety of both patients and direct patient care staff, with the intent of helping patients and staff avoid injuries. The educational sessions on the BMAT emphasized the importance of the principles of patient-centered care in being respectful and responsive to individual preferences, needs, and values.

Patients were not directly involved or participated in this quality improvement project. As a result of the clinical practice change, patients underwent an assessment by the direct patient care staff, which consisted of usual and customary care. The mobility assessment was conducted to assess and document cognitive ability and the patient's progressive functional ability. This change in clinical practice was undertaken as part of the normal roles and responsibilities of the clinical staff and did not pose an additional risk to patients. Therefore, consent was not required.

Protecting patient privacy is paramount in implementing quality improvement projects that will be supported with data. The importance of protecting patient privacy is required to ensure that no harm will occur to any subjects. The Belmont Report (U.S. Department of Health and Human Services, n.d.) emphasize respect for persons, beneficence, and justice as ethical responsibilities when studies are conducted in healthcare. Careful consideration to the threat of privacy violation and potential compromise of the confidentiality of health information was during all aspects of data collection. The information collected was organized and analyzed by the primary

investigator to be presented in a narrative description of the findings. Data were reflected in the number and rate of events only. Special care was given to de-identify any data received and presented. The project was ethically within the bounds of academic quality improvement, while the population and sample of interest took part in the project with strict adherence to the demands of ethical work which is understood as a responsibility that health care providers must adhere to.

All data received from the project site will be stored electronically on a password-protected desktop computer that provides security measures for data encryption. Adherence to organization policy that speaks to secure electronic storage of patient data will be adhered to. Data will be retained for the period required to receive final manuscript approval. During which time, all data will be contained in a manner that is compliant with the organization's security policy. After which time the information is no longer needed, the project site information technology department will permanently remove confidential project data through regularly scheduled data elimination procedures.

Limitations

The results of this project were limited to the participation of the clinical staff who were on duty and applied the clinical practice change of using the Hillrom BMAT. Because the project was being conducted during the peak vacation months and coincided with a fourth surge in COVID cases in Southern California, the number of staff may have been limited, and or turnover of staff may have contributed to staffing challenges that could alter their receptivity to the education on the practice change.

A second limitation for this quality improvement project was related to the project methodology and design. Queirós et al. (2017) indicated that the quantitative method is limited in the rigidity of the structure and does not capture emotions, behavior, or a change in the thinking of the respondents. The intent to change clinical practice or sustain the adoption of the BMAT to improve safety was also a known limitation. As this quality improvement project was conducted at a single facility in Southern California; external validity relating to the generalizability of the results was a limitation.

The intent to apply evidence-based practice to clinical practice was unknown among the staff at the project site. Recent staff assessment climate surveys for the project site indicated that staff did not perceive the environment as safe for both patients and the clinical care teams. Leadership involvement in the deployment of the intervention and the use of various communication tools and strategies for keeping the staff informed throughout the project implementation and observation period were critical to the success of introducing the evidence-based practice to change clinical practice and improve safety. The main delimiters of the study were embedded in the boundaries set to ensure that data were only analyzed according to the chosen scope, such as adult patients over the age of 18. There was also a generalization that patients and other participants would give truthful information.

Summary

Chapter 3 presented the intent and rationale for selecting the methodology of quantitative and project design of quasi-experimental to conduct a quality improvement project introducing the BMAT to the staff of a busy suburban ED in Southern California.

The problem this quantitative, quasi-experimental quality improvement project sought to quantify was to determine if or to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department in Southern California over four weeks. The quantitative method, which is numeric, was selected for this project; therefore, statistical tests were conducted to make statements about the data using deductive reasoning. The methodology was chosen as the intent of the project was to implement a practice-based change to improve patient quality (Vetter, 2017).

An outcome variable of falls was selected due to the prevalence of falls that occurred in this unit despite the implementation of administrative interventions of policy implementation and education focused on fall safety and SPHM dating back several years. Benchmark data from NDNQI was used to present the significance of the problem and showed the project site as being out outlier for 7 out of the past 8 quarters. Falls are a nurse-specific quality outcome; however, the limited data on fall safety and prevention specific to the ED has hindered the effective implementation of fall prevention (Stoeckle et al., 2019). This quality improvement project utilized a convenience sample of all adult patients over the age of 18 who visited the ED at the project site during the study timeframe of four weeks. The BMAT intervention was introduced to all direct patient care staff working in the ED. Every effort was made by the primary investigator to ensure maximum participation to promote the clinical practice change. Bias was minimized as all adult patients were included in the patient population for measuring the outcome

variable. Bias related to recruitment will be eliminated and ensure equal probability to be included.

The BMAT is the only validated, nursing-specific assessment instrument for determining a patient's mobility status at the bedside (Boynton et al., 2020). Descriptive data were collected to include age, gender, and time of day when falls were reported to have occurred. The fall rate was computed using the NDNQI definition for computing fall rate, which was devisable by the total number of adult encounters for the specified period. A non-biased evaluation of the results was conducted, presented, and organized using data summary tables and graphs. Comparative and intervention patient fall rates were evaluated to determine if the Hillrom BMAT had an impact on reducing the fall rate. A non-parametric chi-square test was performed to conduct a comparison of observed results with expected results. Results are presented in chapter 4.

Care was given to ensure the safety of both patients and direct patient care staff, with the intent being to help patients and staff avoid fall-related injuries. Because the project was conducted during the peak vacation months and coincided with the reopening of the country as social distancing orders are lifted, the number of full-time, regular staff may have been limited. The following chapter will summarize the collected data, providing analysis and results of the project. The interpretation of the results is to be presented in Chapter 5.

Chapter 4: Data Analysis and Results

Patient safety is a top priority in healthcare. Patient falls that occur while a patient is seeking care in the ED can result in serious and even potentially life-threatening consequences for patients (Stoeckle et al., 2019). Falls are often the result of unsafe care and are termed a failure in achieving quality care (AHRQ, 2021). Safety in healthcare should not be left to chance. The absence of a standardized mobility assessment creates a barrier to communication among the care team specific to the patient's activity level and poses a barrier to estimating the patient's ability to participate in a move or transfer. This chapter summarizes the collected data, analysis, and results following the implementation of the Hillrom BMAT. It also presents the influence this intervention had on reducing the rate of falls that occurred in the unique environment of a busy suburban ED in Southern California.

The literature presented the importance of implementing a fall prevention strategy that is appropriate for the environment and patient population in the ED (McErlean & Hughes, 2017; Pop et al., 2020; Spano-Szekely et al., 2019). Although the use of a fall risk assessment had occurred at the project site, this strategy had not positively influenced the fall rate occurring in the ED. The staff have extensive options for SPHM technologies available and have received education, training, and skill validation for use. Despite this, 12 out of 42 injuries over the past 12 months are attributed to patient handling. Most common are injuries that involved manual lift and transfer activities. This accounts for .29 per 100 FTE SPHM injuries annually at the project site. The purpose of this quantitative, quasi-experimental quality improvement project was to determine if or to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside

mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department in Southern California over four weeks. The independent variable was the use of the Hillrom BMAT by all direct patient care staff with adult patients who were identified as alert; oriented to person, place, and time; and able to follow commands. The fall rate was the dependent variable (outcome variable). Data on falls that occurred in the ED for four weeks preceding the intervention were solicited from the department quality reports to provide the baseline for determining if the implementation of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department in Southern California over four weeks.

The direct practice improvement project aimed to answer the clinical question: To what degree does the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices impact fall rates when compared to the current practice among adult patients in a busy emergency department in Southern California? This quality improvement project used the quantitative methodology to determine the relationship between the fall rates and the clinical practice change of completing a mobility assessment. The quantitative methodology supported showing the differences among the variables in numeric form. The quasi-experimental design further supported the quality improvement project by allowing for the comparison of fall rates collected before and after the implementation of the project.

Chapter 4 presents the project findings and analysis from implementing the Hillrom BMAT to reduce the fall rate in the ED. The chapter includes a detailed explanation of descriptive data, data collection, and data analysis. Project results are described in narrative form, using tables and figures.

Descriptive Data

Participants were adult patients who were alert, oriented, and able to follow commands. The sample size included all adult patients during a four-week period who met the inclusion criteria. The outcome data include the total number of patients who fell during the four-week comparative and four-week implementation periods. Demographic data on all patients seen were not collected. Descriptive data on the patients who sustained a fall were collected that included age, gender, and time of day.

The total sample for the project was N = 10,469 (n = 5,456 in the comparative group and n = 5,013 in the implementation group). Only the patients who sustained a fall during the project's comparative and implementation are defined in number to associate the date, time, age, and gender of the person(s) who fell. In the comparative period, there were a total of three falls (n = 3) with two patients being male (n = 2) and one patient being female (n = 1). Among the population who fell all were 87 years of age. In the implementation period, there was one fall (n = 1). The patient was female and aged 84. To show age from a chronological viewpoint, Table 2 describes falls in two categories: less than 65 and 65 or older. The gender and age of the patients who fell during the comparative and implementation periods are reflected in Table 2.

Table 2

Demographics for Patients who Fell

	Comparative		Implementation	
Variable	*n*	%	*n*	%
Gender				
Male	2	66.7	0	0.0
Female	1	33.3	1	100.0
Age				
Less than 65	0	0.0	0	0.0
65 or older	3	100.0	1	100.0

Data Analysis Procedures

After receiving approval from Grand Canyon University Institutional Review Board, the process of collecting baseline data from the project site quality department and department data analyst occurred. Baseline NDNQI data were presented earlier and are pictured in Table 1. This information presents the significance of the problem at the project site as compared to other medical center emergency units of similar size. It is important to mention that NDNQI does not provide a comparison when insufficient data are submitted to provide for an adequate comparison. If the number of units or hospitals is less than five, comparison data are suppressed to maintain confidentiality (Press Ganey, 2021).

Data were collected on fall rates for a four-week comparative and a four-week implementation period. The project site department data analyst provided information on fall rates and the demographics of patients who fell in numeric form only. Total patient volumes were tallied during the four-week comparative period and implementation period to reflect all adult patients that met the inclusion criteria. Data analysis was

conducted to determine to what degree the implementation of the Hillrom BMAT (Boynton et al., 2020) improved safety by reducing the fall rate in a busy suburban ED in Southern California. The comparative period began July 27, 2021, and continued through August 23, 2021. The project was implemented on August 24, 2021, and data collection ended at 11:59 pm on September 21, 2021.

All demographic and outcome data for the project were entered using numeric values into a Microsoft Excel file by the department data analyst. After data were compiled, they were exported to IBM SPSS version 28 for statistical analysis. To prepare the data for analysis, frequency counts and range scores were computed to check for outliers. Descriptive statistics were conducted on the demographic data of patients that recorded a fall during the comparative and implementation data collection periods. The planned statistical test to address the clinical question was a chi-square test. Data were evaluated to ensure assumptions of the chi-square test were met. A chi-square test was conducted to address the clinical question because the chi-square test examines the differences between groups on a categorical dependent variable (Schober & Vetter, 2019), and the fall rate is a categorical variable (Yes or No- Fall). The level of significance for analysis to address the clinical question was set to $p < .05$. Summary statistics were presented for the fall rates per 1,000 patient visits for the comparative and intervention groups.

The reliability and validity of the data were dependent on the EMR software system at the facility. EMR data are considered valid and reliable data sources for data collection (Akhu-Zaheya et al., 2018). According to a study by McGinnis et al. (2009) that examined electronic and written records, the EMR-based data validity was shown to

be moderate to excellent, with Pearson *r* correlations ranging from .875 to .99 for EMR and documentation records (McGinnis et al., 2009). The EMR is also considered a reliable source of data as Goulet et al. (2007) found strong agreement (Kappa between .86 and .99) and high sensitivity and specificity (≥ .95) for quality measures based on electronically abstracted structured data compared with manual review.

The validity and reliability of the data presented for this project were largely dependent on timely and accurate reporting of falls. Annual staff safety training has included education on the NDNQI definition of a fall for several years, in which staff completion is a condition of employment each year. The NDNQI acknowledges that accurate reporting relies on the judgment of the nursing staff to distinguish between what constitutes a fall, as compared to an intentional descent of the patient to the floor (Press Ganey, 2021).

Results

This quantitative, quality improvement project addressed to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices impacted fall rates when compared to the current practice among adult patients in an emergency department in Southern California over four weeks. A chi-square test was conducted to compare the fall rate in the four weeks before implementation (comparative) and implementation, and the results are presented in Table 3. The fall rate was computed as the percentage of patients that fell out of the total adult patient volume, which is reflected in Figure 1. The percentage of falls in the comparative group was

0.05% (n = 3), which decreased to .02% (n = 1) at implementation, X^2 (1, N = 10, 469) = .840, p = .359.

Table 1

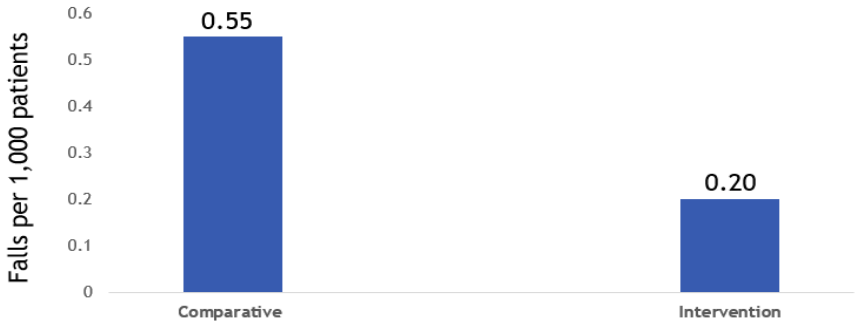
Chi-Square Test Results for Fall Rates at Comparative and Implementation

	Comparative (n = 5,456)		Implementation (n = 5,013)			
Variable	n	%	n	%	$X^2(1)$	p
Fall Rate	3	.05	1	.02	.840	.359

The p-value is greater than .05, which indicates that the decrease in the fall rate was not statistically significant. The results do support clinical improvement, however, as reflected in the decrease in the fall rate after the implementation of the Hillrom BMAT as compared to the current practice of using a manual lift technique. There was a .03% reduction in the fall rate from .05% to .02%. Summary statistics were computed to evaluate the fall rate per 1,000 patient visits in the comparative and implementation periods. Figure 1 displays the results. The fall rate was .55 per 1,000 patient visits during the comparative data collection period, and the fall rate decreased to .20 per 1,000 patients during the implementation data collection period.

Figure 1

Fall Rate per 1,000 Patients during Comparative and Implementation Periods



Summary

The purpose of this quantitative, quasi-experimental quality improvement project was to determine if or to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department in Southern California over four weeks. The Hillrom BMAT was introduced to patient care staff using an online educational video with permission from Hillrom at the start of the four-week implementation period. Additionally, flyers with a QR code and global address were placed throughout the unit and near all nursing stations. Huddle messaging at the change of shift was presented by department leaders and educators. Rounding occurred by all department leaders to reinforce the use of new knowledge to improve the assessment skills of using the Hillrom BMAT. Leadership at all levels of the organization was engaged in the process of introducing and reinforcing the use of the Hillrom BMAT to assess the functional mobility status of adult patients.

For this project, a total of 10,469 patients were included (n = 5,456 in the comparative group and n = 5,013 in the implementation group). A chi-square test was conducted to compare the fall rate at pre- and post-intervention and found that the percentage of falls during the comparative period was 0.05% (n = 3), which decreased to .02% (n = 1) during implementation, X^2 (1, N = 10, 469) = .840, p = .359. Statistical significance was not supported as the p-value was greater than the level of significance set to .05. The results do show clinical improvement after the implementation of the

Hillrom BMAT rate as shown by a reduction in falls from the comparative period to implementation; although, the improvement was small (.03%).

The quantitative, quasi-experimental design was appropriate for this quality improvement project and achieved the goal of answering the clinical question of, to what degree does the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in a busy emergency department in Southern California. The short timeframe of this project created a challenge in determining clinical and statistical significance. The collection of more data over an extended period could provide for a greater understanding of how the BMAT impacts fall and safety culture. Chapter 5 will present results and conclusions to summarize the project findings and implications of the data and data analysis relative to the clinical question. Unexpected results from the intervention will be presented in addition to project implications and directions for future study.

Chapter 5: Summary, Conclusions, and Recommendations

There were a limited number of studies that address the widespread problem of falls that occur in the ED. Numerous U.S.-based quality organizations, such as the American Nurses Association, Institute of Healthcare Improvement, The Joint Commission, and the Agency for Healthcare Research and Quality, have developed guidelines focused on inpatient fall prevention; however, these strategies do not consider the intrinsic and extrinsic factors that make the ED unique. This is a challenge for healthcare organizations that seek to solve this complex problem with evidence-based solutions. Prevention of falls in any direct patient care setting requires careful consideration of the environment, patient population served by the clinical care team, education that achieves clinical practice change, and leadership support at all levels (Cook et al., 2020). Adoption and use of the Hillrom BMAT created by Boynton et al. (2020) were shown to improve the accuracy of assessing mobility status among all members of the healthcare team and help clinicians in the selection of the best safe patient handling equipment for a move and transfer. This final chapter is written to provide a comprehensive summary of the entire project of the implementation of a standardized mobility assessment tool to reduce the fall rate in a busy ED in Southern California.

The clinical question this quantitative, quasi-experimental quality improvement project answered was to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in a busy emergency department in Southern

California. The introduction of the independent variable of use of the BMAT occurred at a morning huddle and via email on Tuesday, August 24, and was reinforced at subsequent huddles throughout the week using the ten-minute video on conducting the BMAT. Ease of learning was an objective of the project because the ED is unable to pause patient care for education and training. Subsequent rounding by the unit educator, clinical supervisors, and management team emphasized the education of BMAT as a safety initiative for improving quality outcomes by reducing the rate of falls. It was recognized by the staff that BMAT is vital to answering the question of what SPHM equipment is best for use with my patient.

Through the introduction of this evidence-based intervention strategy to reduce the fall rates that occur in the ED, this quality improvement project contributed to the body of knowledge related to advancing nursing knowledge and skills about evidence and the importance of assessing mobility using the nurse-driven, validated Hillrom BMAT. This project enhanced clinician performance in improved decision-making by achieving a greater understanding of a patient's abilities and limitations. Staff reconnected with the fundamentals of nursing practice by applying known knowledge of the nursing process to guide in the choice of what mobility equipment is best to safely move the patient based on the assessment findings. Finally, this project enhanced clinical leaders' knowledge in the use of the current best evidence-based practice to solve clinical problems and improve outcomes.

Summary of the Project

It was not known if or to what degree the translation of Boynton et al.'s research on the use of the Hillrom bedside mobility assessment tool (BMAT) used in conjunction

with current evidence-based bedside practices would impact fall rates when compared to the current practice among adult patients in an emergency department. The Hillrom BMAT aligns with the American Nurses Association (2015) SPHM Interprofessional Standards and improves patient and workplace safety in establishing a uniform approach for a safe move and transfer of patients. The manual lift technique is a high-risk method for lift and transfer tasks. A functional mobility assessment that links the assessment findings to what SPHM technology is best for use with the patient is the Hillrom BMAT. A recent practice improvement project focused on fall prevention in the ED recommended fall prevention should include (1) population identification, (2) risk factor screening, and (3) an individualized plan of care (Cook et al., 2020). This project accomplished all three of these recommendations.

Identification of patients at risk for falling using data from the past year showed that the population at risk for falling in the ED are adult patients. The ability to follow commands to achieve an accurate assessment of functional mobility, as well as being oriented to person and place, were key factors for achieving agreement on the plan of care. An individualized plan of care aligned with Pender's HPM by which staff improved patient education and established patients' understanding of their limitations. This patient-centered approach resulted in mutual agreement on the plan of care to support the use of patient handling technology to improve safety.

A review of the literature focusing on the use of a mobility assessment tool to guide the clinician in the application of safe patient handling and mobility interventions to improve fall safety identified key themes. Throughout the literature, the importance of the environment when considering quality improvement strategies to improve outcomes

was evident. Evidence-based interventions to solve the problem of falls were also prevalent; however, combined with the unique environment of the ED, few studies provided clear evidence of the applicability. One strategy that aligned with the American Nurses Association is safe patient handling technology use. Leadership is a key in all successful quality improvement intervention studies. These key themes and the subthemes of the unique patient population, communication, safety climate, assessment, equipment use, legislative influence, education, program standardization, and just culture was used to support the importance of the evidence-based strategy of a clinical practice change of using the BMAT to improve safety. This body of evidence supported the selection of the project method and design of a quantitative, quasi-experimental design to implement the Hillrom bedside mobility assessment tool to impact fall rates when compared to current practice among adult patients in an emergency department.

This project used a quantitative, quasi-experimental design to determine if the use of a standardized mobility assessment clinical practice change would improve patient safety, reduce manual lift technique, improve the use of SPHM technologies, and reduce the rate of falls. The independent variable was the implementation of the Hillrom BMAT as a clinical practice change among direct patient care staff. Fall rate was the outcome variable (dependent variable). Before the introduction of the Hillrom BMAT education, baseline fall data and patient volume data were collected to calculate the rate of falls for four weeks before implementation. Education was provided using the BMAT education video from Hillrom, with permission, as reflected in Appendix C. Implementation began on August 24, 2021, with an introduction to the quality improvement project and ease of access to the education of the BMAT. Rounding occurred daily throughout the

implementation phase, with clinical managers, the unit educator, and the safety champion to discuss the benefits of using the BMAT to improve safety and reduce falls. On September 22, 2021, data was run to provide the total number of patients seen during the four-week intervention period. An additional week was allowed to ensure no fall reports were subsequently reported by comparing the EMR data with organization incident reports.

Chapter 5 provides a concise summary of the findings and conclusions of the chi-square test on fall rates. The project's data analysis and significance are presented using the outcome data specific to fall rates collected in the comparative and implementation periods of the project. Theoretical and practical implications for future study and practice are summarized, and then recommendations for projects and practice are made.

Summary of Findings and Conclusion

This project was implemented over four weeks in a 60-bed emergency room of a busy hospital in Southern California. Baseline data from the prior four weeks were used for data analysis. The project was identified and developed through collaboration with leadership at the unit and senior levels based on the significance of the long-standing problem of safety and the high fall rate of the ED. The voluntary participation in data submission of quarterly fall rate data to the Press Ganey, Patient Falls, Ambulatory Indicator (2021) NDNQI validates the significance of the problem by showing comparisons among like units. Over the four quarters of 2020, the project unit exceeded the national benchmark in three out of the four quarters as described in chapter 4.

Data on patient falls were provided from the project site data analyst for the four weeks preceding the implementation phase of the project. For this project, a total of 10,

469 patients were included (n = 5,456 in the comparative group and n = 5,013 in the implementation group). A chi-square test was conducted to compare the fall rate at comparative and implementation and showed that the percentage of falls changed from 0.05% (n = 3) to .02% (n = 1), X^2 (1, N = 10, 469) = .840, p = .359. Statistical significance was not supported as the p-value was greater than .05.

The results show that the implementation of the Hillrom BMAT did show clinical improvement of the fall rate as shown by a reduction in falls from comparative to implementation periods; although, the improvement was small (.03%). Results from this project did not produce data to support statistical significance. However, the results are clinically significant as there was a decrease in the number of falls that occurred following the implementation of the Hillrom BMAT. This project succeeded in decreasing the fall rate, which will translate into achieving meeting the NDNQI benchmark through sustained improvement. An additional benefit of using the Hillrom BMAT is the reduction seen in work-related injuries. Because of the clinical significance and improvements seen in the improved use of SPHM technologies, the project site has adopted the use of the BMAT to assess all adult patients. A recommendation is to repeat the project for an extended period. The current pandemic volumes that have resulted in the highest patient visit volumes on record for the project site are recognized as a limitation that could not be controlled or reasonably predicted during the planning for this quality improvement project and restricted timeframe.

This project highlighted the importance of completing a functional mobility assessment before performing a patient's move and transfer tasks. The importance of identifying immobility or functional limitations is a predictor of risk in acutely unwell

patients and serves as a marker of patient current ability and decline that improves communication among all members of the care team (Radecki et al., 2020). A clinical practice change of completing a mobility assessment on all adult patients promotes consistency among the care team, using a common language for identifying equipment needs to improve safety. Sustainability occurs when the staff adopts the clinical practice change as an innovation for providing the best quality and safest care for patients (Mohammadi et al., 2018).

This project advanced the body of scientific knowledge by improving the understanding of the implementation of evidence-based practice strategies to solve clinical practice problems. Falls are a nurse-specific quality indicator (Press Ganey, 2021). Poor outcomes in the form of a high rate of falls reflect the nursing quality of care gaps (Stoeckle et al., 2019). At the project site, high-performance measure rates, quarter after quarter, created the need to examine clinical and organizational processes related to the identification of and care for patients at risk for falling in the ED. Inadequate understanding of patient safety contributes to the risk of a fall and hampers the development of patient safety processes and practices. The importance of standardization in the approach and classification of patients is fundamental to nursing practice and is shown to improve patient outcomes.

Completion of the mobility assessment using the BMAT improves patients' understanding of their limitations. While assessing the patient's mobility status, the importance of Nola Pender's HPM is used to achieve understanding and alignment with the plan of care to use the call light before attempting movement without assistance. Staff's intention to provide for a safe environment is better realized when a patient is

shown the limited ability to sit at the side of the bed without assistance or how small movements can contribute to difficulty in maneuvering. This patient-centered approach improves safety in allowing the patient to process their struggle for independence with their desire to be safe and accept help when needed. A benefit to the implementation of this clinical practice change was the improved communication between the direct patient care team and the patient when developing a care plan. A second benefit to the implementation of this project was the shift in practice that occurred among the staff of the practice site in using SPHM technologies rather than the manual lift technique. This is a significant change in practice that is known to improve safety for both the patient and healthcare worker (Dennerlein et al., 2017; Olinski & Norton, 2017).

The project provided detailed information about the significance of patient falls in the ED. Falls occur in all practice settings; however, little was known about the complex nature of falls that occur in the ED (Stoeckle et al., 2019). Inconsistency in practice across a care team is a barrier to achieving success in fall prevention strategy implementation (Turner et al., 2020). During handoff communication, staff become more aware of patient mobility status and are better at preparing interventions to improve patient safety (Radecki et al., 2020). For instance, mobility equipment can be prepositioned for easy access. As a result of this project, SPHM equipment was moved to strategic areas of the department to provide easy access. Staff reported ease of use as a factor for improved equipment use during the project implementation period. The common language shared by all members of the care team shortens the time of handoff and reinforces the care plan communication to the patient.

The project findings emphasize how the Hillrom BMAT is quick, easy-to-use, and standardized, allowing for clinicians to communicate fall risk and fall prevention interventions to patients and other providers. Results of this project illustrate clinical significance as shown by the decrease in the number of falls that occurred over four weeks following the clinical practice change implementation. Patient safety is a fundamental principle of nursing quality care. Preventing falls reflects in nurse-specific quality outcome measure achievement, which translates into reduced rates of unnecessary hospital care and cost savings for an organization. The project site has recognized the use of the BMAT to be effective in improving communication among team members and offers a standardized approach to improving the use of safe patient handling technology to improve the safety of staff and patients. As a result, the project site has continued to promote the use of the BMAT on all adult patients as a fall prevention strategy.

Implications

There was limited literature related to fall prevention programs and interventions specific to the unique environment of the ED. The project site made the initial investment of purchasing extensive safe patient handling equipment for use and provided baseline and annual education on its functions. However, as with many other organizations, these administrative interventions had done little to influence its use. This project explored whether the implementation of a standardized functional mobility assessment using an evidence-based nurse-driven tool would impact patient falls that occur in the unique environment of the ED over four weeks.

A strength of this project was the clinical nurse leadership support for implementing evidence-based practice to solve the problem of falls. Beginning on day

one of the implementation phase, the clinical educator began introducing the BMAT to newly hired staff as a core competency. Additionally, the unit safety champion began championing the clinical practice change by communicating the value of the proposed change and sharing success stories that validate its effectiveness in improving communication and outcomes. As the project progressed, flyers were shared among members of the direct patient care team to advance the adoption and solidify the clinical practice change. Staff expressed feeling more confident in using the department SPHM technologies.

The project weaknesses involved the quality improvement project intervention timeframe. Patient volumes at the project site represented an unusually high volume related to the third surge of patient volumes related to the COVID pandemic. Prolonged wait times and boarding in the ED contributed to patient immobility, fatigue, and overall dissatisfaction. Baseline and post-implementation volumes of patient visits exceeded predicted project sample size estimates using a power analysis. Convenience sampling of all patient visit volumes was used due to the limited timeframe of the project of four weeks and to remain consistent with quality improvement. A second project weakness was that data was not collected related to the observed increase in the use of SPHM technologies.

Theoretical Implications

The quantitative, quasi-experimental quality improvement project used the theoretical framework of Nola J. Pender's health promotion model (HPM) and Everett Rogers' diffusion of innovation (DOI) change theory for introducing evidence-based practice, clinical practice changes in a busy ED in Southern California. These theories

worked to support achieving greater understanding and adoption of evidence-based practice to improve quality of care and safety. Pender's (1982) conceptual model is founded on an individual's decision-making process about their health care. Pender's model focuses on preventative health measures and describes the nurses' role in helping patients prevent injury and illness by promoting self-care and innovation (Pender, 1982). While being assessed with the BMAT, the patients become more acutely aware of limitations and the need for help, which translated into a greater understanding of personal limitations. Health promotion by avoiding added complications and understanding the need for additional care and treatment helps patients and clinical staff ensure the safest practices are used and followed. Pender's HPM supported a philosophical framework for creating and sustaining health-promoting safe care and work environment.

Pender's model focuses on three areas: individual experiences, behavior-specific cognitions, and behavioral outcomes (Pender, 1982). A person who understands the plan of care acknowledges the agreed-upon plan to improve safety is more motivated to be a part of the solution of foregoing preference that could derail intended actions to improve outcomes. The HPM was coupled with Rogers' (2003) DOI to enhance the clinical practice change of evidence-based practice adoption. Clinicians who see the adoption of the best evidence-based practice could reduce fall risks and personal injury were more likely to adopt the BMAT assessment process. As more individuals accept the process, the change is spread among all members of the care team through early adopters' role modeling the change as an innovation (Rogers, 2003). Nurses were reconnected with the fundamentals of nursing practice, and how using an assessment can be both informative

to the clinician and revealing to the person being assessed. Applying the assessment findings to a patient-centered intervention for safe patient handling allowed for strategic placement of the mobility equipment which reinforced the adoption of the change as an innovation.

Practical Implications

The project used a quality improvement approach to enhance the adoption of evidence-based practice in a busy Southern Californian ED. This project's focus was to decrease patient fall rates that occur in the ED using the Hillrom BMAT. Implementation of the Hillrom BMAT created by Boynton et al. (2020) not only promoted the completion of an assessment of a patient's functional mobility status but also contributed to an increase in the use of safe patient handling and mobility technologies. The Hillrom BMAT answers the question of what safe patient handling and mobility equipment is best used to move my patient. Completion of the BMAT enhanced patient safety through the promotion of health in a shared care plan between the direct patient care staff and the patients. Additionally, communication improved between all members of the care team as staff began to share a common language of mobility assessment scores 1, 2, 3, or 4. Active participation during the completion of a mobility assessment using the BMAT promoted better communication, improved safety, and improved quality outcomes for patients by reducing the fall rate.

Future Implications

This quality improvement project provides a foundation for future study to assess the importance of using the Hillrom BMAT for improving fall rates in the unique environment of the ED. Traditional fall risk assessment tools provide valuable

information on the risk of a patient falling; however, they do not guide the clinician in clinical decision-making to reduce the risk through patient-centered interventions. Since the BMAT can be learned in under ten minutes, this evidence-based strategy is feasible for all direct patient care staff to learn in the fast-paced environment of the ED. In less than two minutes, the head-to-toe assessment provides valuable information on what equipment is best used to safely move and transfer patients. Adoption of this standardized functional mobility assessment tool throughout the hospital has the potential for improving fall safety by reducing falls, while also improving team dynamics during handoff communication. Lastly, the completion of the BMAT each shift adds vital information to determining patient functional mobility decline, which could result in more timely interventions to support safety and improve outcomes.

Recommendations

This quantitative quality improvement project was designed and implemented to address the significant problem of falls that occur in the ED. Implementation of a validated, evidence-based, nurse-driven functional mobility assessment tool was shown to have clinical significance as fall rates slightly decreased. Sustained use of the Hillrom BMAT by all members of the care team would continue to decrease fall rates in the ED. Expansion of this standardized mobility assessment tool to other areas of the hospital could potentially improve fall rates in all care settings, while also creating a common language among direct patient care staff that will enhance patient safety and improve quality of care.

Identifying areas for quality improvement in clinical practice are important. Projects which present results of how new evidence-based practice works and the

improvement in patient outcomes answer the important question about the care nurses deliver. Findings from this project show a safety improvement in the ED. As a result of this project, it is recommended that the BMAT be considered appropriate and effective for use in the emergency room and other acute care settings.

Recommendations for Future Projects

Although statistical significance was not shown in this project, clinical significance was evident as seen in the reduced number of falls following implementation of the Hillrom BMAT. The following four recommendations are provided as a basis for future projects. The first recommendation for a future project is to use a mixed-method research design that incorporates qualitative information and data to address the problem of falls that occur in the unique environment of the ED. A mixed-method design takes significantly more time, more resources, and requires the primary investigator to develop expertise in qualitative and quantitative analysis techniques. From a study of this nature, additional insights would be gained on the staff perceptions of the tool's usefulness. These insights would provide for further manipulation of the independent variable in future studies to examine the best approach for achieving standardization, adoption, and sustainability.

A second recommendation is extending the time of the implementation phase in future projects. There would be no need to modify the study design or method as the quantitative, quasi-experimental design would still provide an answer to the clinical question. Longer duration for the introduction of the independent variable would provide for teaching communication strategies and techniques to enhance the adoption of the

clinical practice change. The longer duration would provide additional data that might equate to achieving statistical significance. As such, an extended duration is warranted.

A third recommendation is to perform a correlational study to explore the relationship between two or more variables using correlational analysis. A study of this nature would determine if and to what degree two independent variables are related. The quantitative, correlational design is recommended to examine the relationship if the completion of the assessment using the Hillrom BMAT has any influence on the use of SPHM technology as compared to not completing the assessment. A study of this nature would provide useful information in the continued effort to achieve zero lift practices for improving safety. This study would provide information that correlates if the use of the BMAT improves both healthcare worker safety and patient safety.

Lastly, the fourth recommendation is to conduct a retrospective review examining patient fall events to better understand the contributing factors to the events. Among the limited number of recent empirical studies examining falls that occur in the ED, none have occurred in the southwestern region of the United States. The unique environment of the ED coupled with the unique subset of patients who live in the Southwest region may reveal unique circumstances and special considerations for choosing an effective fall prevention strategy. There is a need for future studies that examine fall prevention in the fast-paced, acute care setting of the ED. Comparing various regions of the U.S. that are influenced by different environmental factors and laws that govern the state would provide further insight into what contributes to reducing the rate of falls and improving patient outcomes.

Recommendations for Practice

The Hillrom BMAT is a nurse-driven assessment tool that adds to the analysis of a patient's functional mobility level and their ability, willingness, and agreement to the plan of care. Prevention of harm and errors in healthcare is dependent on adherence to the principles of patient safety. Ten years ago, the State of California acted upon knowledge that the manual lift technique places patients at unnecessary risk and is also responsible for the high rate of injury among direct patient care workers (Lee et al., 2021). The legislation was passed that required healthcare organizations to implement SPHM programs to stop this pattern of preventable harm (Lee et al., 2015). However, healthcare workers are unaware of this change in practice recommendation. It is recommended, therefore, that an administrative no-lift policy be put into place to change practice during patient moving and lifting tasks. Technologies for SPHM exist in sufficient quantity, yet the staff still believe that manual lift is an acceptable practice. A no-lift policy would redefine what is an acceptable practice, based on the most current evidence, to improve patient outcomes and workplace safety.

A key issue for the clinical team at the project site was the lack of awareness of the significance of the problem of falls. Evidence supported that the risk factors for a fall that occurs in the ED are unlike what poses a risk to a patient in the hospital (McErlean & Hughes, 2017). Quality boards are invaluable communication tools for informing staff of new evidence-based practice strategies, current trends and celebrating successes. Despite NDNQI fall data having been reported since January of 2020, very few staff were aware of the fall rate of the ED as compared to other similarly sized departments. The sharing of successes and challenges creates awareness among the staff that a problem exists.

Information is a key factor in improving overall communication, instilling a culture of safety, and developing a just workforce culture.

Documentation of assessment findings and scoring of the BMAT using a standardized manner improves communication among all members of a care team. Leveraging the electronic medical record tools for fall prevention was recognized as an invaluable, underutilized tool (Turner et al., 2020). Therefore, the ED should establish a formal process for documenting the assessment of functional mobility status consistently and uniformly throughout the department in the EMR. Standardization in practice improves communication and has the potential to identify a change in a patient's condition more rapidly. Monitoring for performance is an important first step in ensuring the adoption of documentation standardization. Data from the functional mobility assessment could be used to monitor patient deterioration and help to support cause and effect analysis of patient events. The EMR is an invaluable tool and resource for understanding cause and effect that should be better leveraged to promote quality improvement and safety related to falls.

Education and training of clinical practice change initiatives are enhanced through staff involvement in decision-making on how best to implement change. The literature supported that careful consideration should be given to training and education when implementing evidence-based SPHM programs; however, it is often the least considered aspect of program implementation (Monaghan, 2019). A factor related to the clinical success despite the short timeframe of this project was the presence of an engaged department safety champion. The department safety champion at the project site was a major influencer in the adoption of the clinical practice change. In a department that runs

24 hours a day, seven days a week, safety champions on all shifts would provide for a consistent resource for staff to develop and adopt new knowledge. A recommendation for improving safety in healthcare is the adoption of workplace safety champions on all shifts.

Finally, debriefs should occur for all falls that occur in the department to enhance awareness among all members of the care team. A fall that occurs in the ED is complicated by the high acuity of patients, fast pace, and crowded environment. Pinpointing the intrinsic and extrinsic factors that are associated with each fall is the key to better understanding the influence various factors have on risk. These insights could be the foundation for considering future interventions aimed at inhibiting the cause. Debriefing about falls also serves to raise awareness among the care teams. When staff is involved in the debriefing process, they become more acutely aware of their role in safety, which translates into health promotion education for future patient care.

This project, its findings, and the recommendations for future practice could benefit staff and leaders at all levels of an organization who seek to implement quality improvement to solve the problem of falls. Leading change to improve safety is best supported by leaders who use the transformational leadership style, who are authentic, and who lead ethically (Yodang & Nuridah, 2020). It is each clinician's responsibility to provide safe patient care. When leaders lead for safety, safety behaviors are strengthened, and quality outcomes follow.

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Appendix A

Grand Canyon University Institutional Review Board Outcome Letter

GRAND CANYON UNIVERSITY

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DATE: August 23, 2021

TO: Tracy Abrams

FROM: COLLEGE OF NURSING AND HEALTH CARE PROFESSIONALS

STUDY TITLE: Use of the Bedside Mobility Assessment Tool to Improve Emergency Department Safety

ACTION: DETERMINATION OF QUALITY IMPROVEMENT/PROGRAM EVALUATION STATUS

DATE: August 23, 2021

REVIEW CATEGORY: QUALITY IMPROVEMENT/PROGRAM EVALUATION

In collaboration with the Institutional Review Board, The College of Nursing and Health Care Professions at Grand Canyon University has determined that this submission does not meet the definition of human subject research. The submission qualifies as Quality Improvement and/or Program Evaluation; therefore, further IRB review is not required. In future publications and/or presentations, please refer to this submission as Quality Improvement and/or Program Evaluation, not research. If the results of the project will not be published, presented, or disseminated outside of the institution, ensure that all those associated with the project are aware that the project is ongoing.

We will put a copy of this correspondence in your student file in our office. If you have any questions, please contact The DNP Program Lead Faculty, Dr. Katherine Fetter in the College of Nursing and Health Care Professions, Katherine.Fetter@gcu.edu.

Please include your project title and reference number in all correspondence with this office.

Appendix B

Hillrom Bedside Mobility Assessment Tool

BMAT- PICTURE GUIDE: ADULT

Assessment Level 1- **Sit and Shake** 1. From a semi-reclined position, ask patient to sit up and rotate to a seated position at the side of the bed **may use the bedrail.* 2. Ask patient to reach out and grab your hand and shake making sure patient reaches across his/her midline		**PASS**= Patient is able to come to a seated position, maintain core strength. Maintains seated balance while reaching across midline. Move on to Assessment Level 2 **FAIL**= Patient unable to perform tasks, patient is **MOBILITY LEVEL 1**
Assessment Level 2- **Stretch and Point** 1. With patient in seated position at the side of the bed, have patient place both feet on the floor (or stool) with knees no higher than hips. 2. Ask patient to stretch one leg and straighten the knee, then bend the ankle/flex and point the toes. If appropriate, repeat with the other leg		**PASS**= Patient is able to demonstrate appropriate quad strength on intended weight bearing limb(s). Move onto Assessment Level 3 **FAIL**= Patient unable to complete task. Patient is **MOBILITY LEVEL 2**
Assessment Level 3- **Stand** 1. Ask patient to elevate off the bed or chair (seated to standing) using an assistive device (cane, bedrail). 2. Patient should be able to raise buttocks off be and hold for a count of five. May repeat once.		**PASS**= Patient maintains standing stability for at least 5 seconds, proceed to assessment level 4. **FAIL**= Patient unable to demonstrate standing stability. Patient is **MOBILTY LEVEL 3**
Assessment Level 4- **Walk** 1. Ask patient to march in place at bedside. 2. Then ask patient to advance step and return each foot. *There are medical conditions that may render a patient unable to step backward; use your best clinical judgment.		**PASS**= Patient demonstrates balance while shifting weight and ability to step, takes independent steps, does not use assistive device patient is **MOBILITY LEVEL 4** **Fail**= Patient not able to complete tasks OR requires use of assistive device. Patient is **MOBILITY LEVEL 3**

B.M.A.T. - A Bedside Mobility Assessment Tool for Nurses

Test	Task	Response	Fail = Choose Most Appropriate Equipment/Device(s)	Pass
Assessment Level 1 Assessment of: -Trunk strength -Seated balance	**Sit and Shake**: From a semi-reclined position, ask patient to sit upright and rotate* to a seated position at the side of the bed; *may use the bedrail.* Note patient's ability to maintain bedside position. Ask patient to reach out and grab your hand and shake making sure patient reaches across his/her midline.	**Sit:** Patient is able to follow commands, has some trunk strength; caregivers may be able to try weight-bearing if patient is able to maintain seated balance greater than two minutes (without caregiver assistance). **Shake:** Patient has significant upper body strength, awareness of body in space, and grasp strength.	**MOBILITY LEVEL 1** - Use total lift with sling and/or repositioning sheet and/or straps. - Use lateral transfer devices such as roll board, friction reducing (slide sheets/tube), or air assisted device. **NOTE:** *If patient has 'strict bed rest' or bilateral 'non-weight bearing' restrictions, do not proceed with the assessment; patient is MOBILITY LEVEL 1.*	Passed Assessment Level 1 = Proceed with Assessment Level 2.
Assessment Level 2 Assessment of : -Lower extremity strength -Stability	**Stretch and Point**: With patient in seated position at the side of the bed, have patient place both feet on the floor (or stool) with knees no higher than hips. Ask patient to stretch one leg and straighten the knee, then bend the ankle/flex and point the toes. If appropriate, repeat with the other leg.	Patient exhibits lower extremity stability, strength and control. **May test only one leg and proceed accordingly (e.g., stroke patient, patient with ankle in cast).**	**MOBILITY LEVEL 2** - Use total lift for patient unable to weight-bear on at least one leg. - Use sit-to-stand lift for patient who can weight-bear on at least one leg.	Passed Assessment Level 2 = Proceed with Assessment Level 3.
Assessment Level 3 Assessment of: -Lower extremity strength for standing	**Stand**: Ask patient to elevate off the bed or chair (seated to standing) using an assistive device (cane, bedrail). Patient should be able to raise buttocks off bed and hold for a count of five. May repeat once. Note: Consider your patient's cognitive ability, including orientation and CAM assessment if applicable.	Patient exhibits upper and lower extremity stability and strength. **May test with weight-bearing on only one leg and proceed accordingly (e.g., stroke patient, patient with ankle in cast).** **If any assistive device (cane, walker, crutches) is needed, patient is Mobility Level 3.**	**MOBILITY LEVEL 3** - Use non-powered raising/stand aid; *default to powered sit-to-stand lift if no stand aid available.* - Use total lift with ambulation accessories. - Use assistive device (cane, walker, crutches). NOTE: Patient passes Assessment Level 3 **but requires assistive device** to ambulate or **cognitive assessment** indicates poor safety awareness; *patient is MOBILITY LEVEL 3.*	Passed Assessment Level 3 **AND no assistive device needed** = Proceed with Assessment Level 4. *Consult with Physical Therapist when needed and appropriate.*
Assessment Level 4 Assessment of: -Standing balance -Gait	**Step:** Ask patient to march in place at bedside. Then ask patient to advance step and return each foot. Patient should display stability while performing tasks. Assess for stability and safety awareness.	Patient exhibits steady gait and good balance while marching, and when stepping forwards and backwards. Patient can maneuver necessary turns for in-room mobility. Patient exhibits safety awareness.	**MOBILITY LEVEL 3** If patient shows signs of unsteady gait or *fails* **Assessment Level 4,** refer back to **MOBILITY LEVEL 3;** *patient is MOBILITY LEVEL 3.*	**MOBILITY LEVEL 4** MODIFIED INDEPENDENCE **Passed = No assistance needed to ambulate**; use your best clinical judgment to determine need for supervision during ambulation.

Always default to the safest lifting/transfer method (e.g., total lift) if there is any doubt in the patient's ability to perform the task.

Reference

Safe Patient Handling Solutions. (2018). *BMAT implementation workbook. Safe Patient Handling Solutions: Innovative Outcomes Management*. (pp. 1-35). https://www.sph-solutions.com/wp-content/uploads/2017/12/BMAT-Implementation-Workbook-2018.pdf

Appendix C

Permission to use BMAT from Hillrom

AGREEMENT

This AGREEMENT, dated June 7, 2021 ("Effective Date"), is by and between June 7, 2021 - December 1, 2021, a Tracy Abrams corporation ("Institution"), and Liko R&D AB, a Hill-Rom Company, ("Hillrom"). Institution and Hillrom may individually be referred to as "Party" and collectively referred to as "Parties".

Hillrom:
Hill-Rom Services, Inc.
1069 State Route 46 East
Batesville, IN 47006
ATTN: General Counsel

Institution
Tracy Abrams, Doctor of Nursing Practice Student

Grand Canyon University, Direct Practice Improvement Project
Summer/Fall 2021 Sessions; quality improvement project intervention

Hillrom and its respective employees, agents, and collaborators have made contributions to the scientific literature and development of best practices in the field of safe patient handling and mobility, and arising out of these efforts, the 'Bedside Mobility Assessment Tool,' also known as the 'BMAT,' shown in Exhibit A on the reverse side of this Agreement (collectively the "Mobility Tool"), has been developed and made available to medical professionals at conferences, online, and in the medical literature, in written, audio, and video formats. Exhibit B is BMAT 2.0.

Banner Health ("Banner Health") collaborated with Hill-Rom/Liko in the creation of the Mobility Tool, and pursuant to a license agreement has granted Hill-Rom/Liko the right to use and license others to use any of Banner Health's rights in the Mobility Tool on the terms set forth herein; and Institution desires to obtain a no cost license to use the BMAT Mobility Tool in its ordinary business operations on the terms set forth herein.

The Parties acknowledge that patient mobilization is a growing healthcare issue, and further acknowledge that the Mobility Tool is being used by a growing number of healthcare providers and networks across the country and around the world, and the Parties intention in entering into this Agreement is to improve safe patient handling practices to minimize injury to healthcare workers and patients, including by continued promotion of the Mobility Tool.

The undersigned authorized officer or representative of Customer acknowledges and agrees that the information above is correct and complete. The undersigned has read and understands the "Terms and Conditions" on the reverse side of this Agreement, and agrees that such "Terms and Conditions," including but not limited to the limitations of Hillrom's liability, disclaimer of warranties and limitation of remedies, are an integral part of this Agreement.

Liko R&D AB ("Hillrom")

By:

Name:

Title: SPHM Clinical Consultant

Tracy Abrams, DNP Student ("Institution")

By: Grand Canyon University, Direct Practice Improvem

Name: Tracy Abrams

Title: Student

The following terms and conditions are part of this License Agreement:

1. Grant of License. Subject to the terms and conditions of this Agreement, Hillrom hereby grants Institution and its corporate affiliates a non-exclusive, non-transferable, and royalty-free limited license under any rights it has in the Mobility Tool to use, reproduce (and have reproduced for it), distribute (and have distributed for it), display, publish, and prepare derivative works of the Mobility Tool in connection with Institution's ordinary internal business operations, including training its personnel in safe patient handling, and in the dissemination of that information for the purposes of promoting safe patient handling, mobility practices, and other services at Institution's facilities (collectively, "Materials"). The Mobility Tool and all derivative works thereof shall comply with the highest standards, including that it cannot be used for price comparisons, derogatory comparisons or negative comparisons among competing products, or in derogatory or negative commentaries about the products of Hill-Rom/Liko. In addition, the use of the Materials shall conform to the terms and conditions herein. Institution shall have sole liability for any and all Materials and representations made by Institution regarding the use, operation, quality, etc. of Hillrom product(s) unless such representation is specifically approved by Hillrom in writing. Institution shall ensure that its use of all Materials complies with federal, state and local laws.

2. Ownership. The Parties acknowledge that this Agreement shall not act to create or vest in the other Party any ownership rights in the granting Party's intellectual property.

3. Acknowledgement of Interest. Institution agrees that all publications, presentations, or promotion of the Mobility Tool, including all uses of the Mobility Tool in Materials created after the Effective Date hereof, will ascribe credit to Hillrom and Banner Health by including the following statement (as such statement may be reasonably amended by Hillrom upon notice from time to time): "Reproduced with permission from Liko R&D AB, a Hill-Rom Company, and Banner Health. © 2013." Except for such credit, this Agreement shall not act to grant the other Party any right to use the trademarks, service marks logos or other indicia of the other Party without such other Party's written consent.

4. Sublicense. Institution shall not grant any sub-license to third parties to practice any of Hillrom's rights in the Mobility Tool.

5. Representations and Warranties. Each Party represents and warrants to the other Party that: (a) it has the full right and authority to enter into and perform this Agreement; and (b) it is not under any obligation, disability, agreement or adverse claim that may restrict the performance of its obligations under this Agreement.

6. Future Promotion of the Mobility Tool. The Parties agree that it is important to both Parties that continued use of the Mobility Tool be retained and enhanced in promoting safe patient handling and patient mobility. To this end, at the mutual agreement of both Parties, the Parties may agree to work together on future projects including publications and trainings, either jointly or in association with additional contributors. This Agreement does not create any exclusivity and either Party shall be entitled to collaborate with others regarding safe patient handling, patient mobility and other initiatives.

7. Disclaimer and Limitation of Liability. Hillrom disclaims any warranty or liability with respect to the Mobility Tool and/or Hillrom's rights or lack of rights therein, and the license granted hereunder is given "AS IS." HILLROM AND BANNER HEALTH SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE OF ANY TYPE ARISING FROM THIS AGREEMENT, THE MOBILITY TOOL OR THE INSTITUTION'S USE THEREOF OR REPRESENTATIONS MADE IN CONNECTION THEREWITH EVEN IT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

8. Counterparts. This Agreement may be executed in one or more copies or counterparts, each of which when signed shall be an original, but all of which together shall constitute one instrument.

9. Governing Law. This Agreement shall be governed by the internal substantive law of the State of Indiana, without regard for conflicts of laws.

10. Integration. This Agreement contains the entire agreement between the parties. All prior negotiations between the parties are merged in this and there are no understandings or agreements other than those incorporated herein. This Agreement may not be modified except by written instrument signed by both parties. If any provision of this Agreement is held to be invalid by a court of competent jurisdiction, then the remaining provisions shall remain, nevertheless, in full force and effect. The parties agree to renegotiate in good faith any term held invalid and to be bound by the mutually agreed substitute provision in order to give the most approximate effect intended by the parties.

11. Notice. Any notice required to be given under this Agreement shall be in writing, and shall be deemed delivered when personally delivered or three (3) days after the same is sent by certified mail, postage prepaid to the addresses identified on the front page of this agreement.

12. Term of License. The license granted herein shall commence upon the Effective Date and shall remain in force unless otherwise terminated by one of the Parties in writing on 10 days' notice.

13. Please note that that nothing contained in this Agreement is or is intended to be an offer, payment, solicitation or receipt of any remuneration in return for the referral or inducement of referral for which payment may be made by government programs or the purchase, lease or order or the recommendation for purchase, lease or ordering of any goods, service or item for which payment may be made by government programs.

Exhibit A
Bedside Mobility Assessment Tool

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