2017

The Use of a Patient Mobility Sensor to Decrease Hospital-Acquired Pressure Ulcers

Monica Vassallo Shallow
Walden University

Walden University

College of Health Sciences

This is to certify that the doctoral study by

Monica Shallow

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Kathleen Brewer, Committee Chairperson, Nursing Faculty
Dr. Geri Schmotzer, Committee Member, Nursing Faculty
Dr. Jeffrey Smith, University Reviewer, Nursing Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2017

Abstract

The Use of a Patient Mobility Sensor to Decrease Hospital-Acquired Pressure Ulcers

by

Monica V. Shallow

MSN, Walden University, 2013

BSN, The College of New Jersey, 1988

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

November 2017

Abstract

Pressure ulcers are a serious health condition that have negative consequences for patients and organizations. The primary cause of pressure ulcers is intense and/or prolonged pressure or pressure in combination with shear that results in damage to the skin and underlying soft tissue. Early identification of patients at risk for pressure ulcers and 2-hour repositioning to off-load pressure are key components in reducing pressure ulcer development. Despite ongoing efforts to prevent pressure ulcers, the incidence and prevalence of hospital-acquired pressure ulcers (HAPUs) at the practicum site exceeded the benchmark for Magnet hospitals and the health system's goal of 1%. Patient mobility sensor technology will be implemented on all patients who are at risk for pressure ulcers and who require caregiver-assisted turns to reduce the incidence and prevalence of HAPUs and increase turn-schedule compliance. At risk patients are those with a Braden Scale score of 18 or less; however, nurses often score patients higher than actual. An educational activity, *Braden Scale for Predicting Pressure Sore Risk: It's only as effective as the scores suggest,* will be presented to nurses to provide them with the knowledge and skills necessary to accurately perform a Braden assessment and correctly identify patients at risk for pressure ulcers. A pretest/posttest design will be used to evaluate the effectiveness of the program in improving the nurses' accuracy when performing the Braden assessment. This project will help with the early identification of patients who will benefit from the patient mobility sensor technology and ultimately in decreasing HAPUs.

The Use of a Patient Mobility Sensor to Decrease Hospital-Acquired Pressure Ulcers

by

Monica V. Shallow

MSN, Walden University, 2013

BSN, The College of New Jersey, 1988

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

November 2017

Dedication

I dedicate this project to my husband, Frank, for his unending encouragement, understanding and support. And to my Dad and Mom, whom I miss every day.

Acknowledgments

I would like to formally acknowledge my DNP committee, Dr. M. Kathleen Brewer, PhD, ARNP, BC and Dr. Geri Schmotzer, RN, MPH, PhD, PHNA-BC, for their guidance and support that allowed me to get to this point.

I would also like to acknowledge my preceptors, Bill and Andrea, for generously offering their time and their commitment to my success.

And finally, I would like to thank my family, just for being who they are and making my life full and rewarding.

Table of Contents

Section 1: Overview of the Evidence-Based Scholarly Project

Introduction

The National Pressure Ulcer Advisory Panel (NPUAP, 2016) defined pressure injury as "localized damage to the skin and/or underlying soft tissue usually over a bony prominence or related to a medical or other device...as a result of intense and/or prolonged pressure or pressure in combination with shear" (para. 6). The NPUAP recently announced *pressure injury* as the new terminology to replace *pressure ulcer.* Because the new terminology has not been updated in the literature or in electronic health records, I have continued to use the term *pressure ulcer* in this paper. The National Quality Forum has included Stage 3, Stage 4, and unstageable hospital-acquired pressure ulcers (HAPUs) on the list of *Never Events*. This list identifies those adverse events that are clearly identifiable and measurable, that result in death or significant disability, and are usually preventable (Patient Safety Network [PSNet], 2016).

Problem Statement

Pressure ulcers are a serious health condition that cause significant pain and place patients at risk for significant adverse consequences. Each year, 2.5 million people are treated for pressure ulcers, and 60,000 die from related complications (Sullivan & Schoelles, 2013). The health system where I am completing the practicum experience has chosen to monitor HAPUs as one of the nursing quality indicators. Data from the 1-day pressure ulcer survey are submitted to the National Database of Nursing Quality Indicators (NDNQI) each quarter. Pressure ulcers that are categorized as Stage 2 or greater are included in the data. According to one of the preceptors at the practicum site,

because the health system is on the journey toward Magnet Recognition, it compares its results with the NDNQI benchmark for Magnet hospitals.

Despite ongoing efforts to prevent pressure ulcers, the HAPU rates at my practicum site have exceeded the NDNQI mean for Magnet hospitals and the health system goal of 1%. Standard measures to reduce the risk of pressure ulcer development include daily skin assessments, moisture management, optimal nutrition and hydration, and pressure minimizing strategies (Institute for Healthcare Improvement [IHI], 2011). Using an assessment tool is crucial to early identification of pressure ulcer risk and initiation of appropriate measures to prevent pressure ulcer development (Campbell, 2016). The Braden Scale for Predicting Pressure Sore Risk is a widely accepted assessment tool. The accuracy of the Braden assessment is affected by the nurse's perception of the meaning of the components of the tool and the nurse's understanding of the patient's risk (Warner-Maron, 2015).

The primary cause for pressure ulcer development is exposure to prolonged, unrelieved pressure related to decreased activity and mobility (Moore, Cowman, & Conroy, 2011). Frequent regular repositioning is recognized as a firmly established pressure-minimizing strategy for patients with limited mobility (Rich et al., 2011; Sullivan & Schoelles, 2013). There is little conclusive research evidence about turn intervals; however, the current standard of care, based primarily on expert opinion, is every 2 hours (Rich et al., 2011). Nursing compliance with effective and frequent repositioning was not well-documented in the literature.

Pressure ulcers cost $9.1 to $11.6 billion each year in the United States (Agency for Healthcare Research and Quality [AHRQ], 2014, p. 1). Costs per pressure ulcer range from $20,900 to $151,700 (AHRQ, 2014, p. 1). Patients who develop HAPUs are more likely have significant pain, to have longer hospital stays, to be readmitted to the hospital within 30 days, and to die while in the hospital (Lyder, Wang et al., 2012). Pressure ulcers are second in legal health care claims, accounting for more than 17,000 lawsuits annually (AHRQ, 2014, p. 1).

Most pressure ulcers can be avoided. Avoidable pressure ulcers develop when the provider fails to (a) evaluate the clinical condition and risk factors for pressure ulcer development, (b) implement interventions based on the patient's needs and goals and standards of practice, and (c) monitor the impact of the interventions and revise as appropriate (Black et al., 2011).

Purpose Statement and Project Objectives

The purpose of the Doctor of Nursing Practice (DNP) scholarly project is to determine the effectiveness of a wearable patient mobility sensor in reducing the incidence and prevalence of HAPUs on a medical-surgical unit. Due to the learning curve associated with implementation of new technology, staged improvements in HAPU rates are planned for the project. The measurable objectives of the project are as follows:

- By the end of an educational activity, nurses will be able to accurately identify pressure ulcer risk using the Braden Scale.
- After 3 months of implementation, there will be a 15% decrease in HAPU incidence as evidenced by monthly HAPU dashboard results.

- After 6 months of implementation, there will be a 20% decrease in the HAPU prevalence rate as evidenced by quarterly pressure ulcer survey results.
- After 6 months of implementation, there will be 75% turn schedule compliance by nursing and ancillary staff as evidenced by sensor data collection.

Significance and Relevance to Practice

HAPUs are a significant problem in the health care setting. Patients who develop HAPUs suffer from significant pain, are at increased risk for infection and other adverse consequences, and experience higher rates of morbidity and mortality. Facilities with high HAPU rates can suffer financial as well as reputational consequences and are required to report to regulatory agencies those ulcers determined to be Stage 3, Stage 4, or unstageable.

The HAPU rates at my practicum site have been higher than expected. As part of a quality improvement initiative, the health system applied for and was awarded a 1-year grant to implement new technology to increase compliance with patient turn schedules, and ultimately to decrease the incidence of HAPUs. Prior to the use of the technology, nurses must be able to accurately identify patients at risk for pressure ulcer development using the Braden Scale. All at risk patients (Braden score of 18 or less) who require caregiver-assisted turns will have a patient mobility sensor applied to the anterior chest wall. The patient mobility sensor monitors patient movement, alerts the nurse when a patient requires a caregiver-assisted turn, and confirms that adequate turns are being performed. If the patient makes effective position changes independently, the technology

will adjust the turn schedule accordingly, thereby reducing the frequency of staff intervention.

Project Questions

These are the questions that will be answered through the DNP project:

1. Are nurses able to accurately identify patients at risk for pressure ulcer development using the Braden Scale for Predicting Pressure Sore Risk?
2. What is the percentage of turn schedule compliance by nurses and ancillary staff after implementation of the patient mobility sensor technology?
3. Will there be a decrease in the prevalence of HAPUs with the implementation of the patient mobility sensor technology?
4. Will there be a decrease in the incidence of HAPUs with the implementation of the patient mobility sensor technology?

Evidence-Based Significance of the Project

Pressure ulcers cause considerable harm to patients, resulting in functional decline, significant pain, and the development of serious secondary infections (IHI, 2011). Patients with HAPUs incur longer hospital stays and higher costs and have higher rates of morbidity and mortality (Lyder, Curry, Verzier, & Hunt, 2012). Although many pressure ulcers are considered preventable, HAPUs are one of the most costly hospital-acquired conditions and remain a major concern for hospitals. Medicare no longer pays for Stage 3 or Stage 4 HAPUs, adding to their financial burden on organizations (AHRQ, 2014).

In 2011, the IHI (2011) developed an evidence-based guide to help hospitals improve the quality of health care delivery by reducing pressure ulcers. The Institute identified six essential elements for pressure ulcer prevention: (a) pressure ulcer admission assessment on all patients; (b) daily risk reassessment on all patients; (c) daily skin inspection; (d) moisture management; (e) nutrition and hydration optimization; and (f) pressure minimization (IHI, 2011).

The ability to accurately identify patients at risk for pressure ulcers is a key first step in preventing pressure ulcers (Warner-Maron, 2015). The initial risk assessment should be performed upon admission and a reassessment should be performed daily (IHI, 2011). The use of pressure ulcer predictive tools, such as the Braden Scale, has been found to improve nurses' sensitivity to earlier preventive measures (Lyder & Ayello, 2008). Delay in implementing an appropriate plan of care for at-risk patients increases the chance of pressure ulcer development (Neilson, 2014).

Because the primary cause of pressure ulcers is intense or prolonged unrelieved pressure, repositioning to off-load pressure is a critical prevention strategy (Moore et al., 2011; NPUAP, 2016). Off-loading allows for the redistribution of pressure and maintains circulation to the at-risk skin and underlying tissue. Although nothing in the literature prescribed how often patients should be turned, 2 hours is the maximum amount of time that a person with normal circulatory capacity should remain in a single position (IHI, 2011, p. 11). The NPUAP Conference agreed that every 2-hour turning should be the guideline for care to prevent pressure ulcers when clinically appropriate (Peterson, Gravenstein, Schwab, Van Oostrom, & Caruso, 2012).

Despite incorporation of early risk assessment and 2-hour turn schedules into practice, pressure ulcers have continued to develop among some patients with limited mobility. Accurate scoring of the risk assessment is necessary to correctly identify those patients who are at risk for pressure ulcer development. Inaccurate scoring can result in delayed implementation of prevention measures for patients at risk or overuse of resources for patients not at risk (Maklebust et al., 2005).

Repositioning at-risk patients every 2 hours is time intensive and costly in nursing and assistive personnel resources. One study found that registered nurses paid little attention to pressure ulcer prevention, trusting in and delegating the responsibility to nursing assistants (Sving, Gunningberg, Hogman, & Mamhidir, 2012). Without a process for monitoring actual turning practices, compliance with 2-hour repositioning guidelines is difficult to determine. Additionally, the effectiveness of repositioning efforts in off-loading pressure is not always sufficient, unintentionally subjecting patients to continued prolonged pressure (Peterson et al., 2012).

Patient mobility sensor technology helps ensure nurse compliance with effective patient repositioning practices. The technology monitors and records all patient turns, including adequate patient self-turns that meet prescribed turn angles, monitors the patient's time in a seated position, and notifies staff when interventions are needed (Leaf Healthcare, 2016a). The data obtained from the sensors are wirelessly transmitted to a central computer and then displayed on portable monitors, notifying nurses when a patient is due for a position change (Doucette, Adams, Cosdon, & Payne, 2014). Not only does the technology ensure adequate repositioning, it also recognizes patient self-turn

activity and recalculates the 2-hour time interval from those position changes. This feature has the potential to decrease the nursing hours associated with patient repositioning, to ensure compliance with turn schedules, and to improve nursing workflow and efficiency (Leaf Healthcare, 2016b).

Implications for Social Change in Practice

Early identification of patients at-risk for pressure ulcers and frequent repositioning are two evidence-based recommendations for pressure ulcer prevention (IHI, 2011). The Braden Scale is the most-widely used pressure ulcer risk assessment tool in the United States (Lyder & Ayello, 2008). Proper identification of at-risk patients is reliant upon nurse accuracy when performing the risk assessment (Maklebust et al., 2005). Nurses should be educated on how to properly perform a risk assessment (Neilson, 2014).

Two-hour turn schedules are the NPUAP-recommended guideline to off-load or redistribute pressure to prevent pressure-related tissue breakdown (Peterson et al., 2012). Current practice often includes the use of turn clocks hung at the head of the patient's bed to cue nurses to reposition patients (Accreditation Canada, 2013; IHI, 2016). To date, though, there has been no way to reliably monitor compliance with prescribed patient turn schedules. The patient mobility sensor technology serves as a continual quality assurance tool that captures and records effective patient movement and alerts the nurse when repositioning is needed. The technology analyzes all data received, generates reports with repositioning compliance, and allows for analysis to correlate compliance rates with unit activities (i.e., medication delivery times, shift changes, staffing levels,

etc.; Leaf Healthcare, 2016a). The analytics provided by the technology can be used to reveal areas of needed improvement that serve as the basis for performance improvement initiatives.

Definitions of Terms

Ancillary staff: Includes nursing assistants who participate in repositioning of patients.

Braden Scale: Short for the Braden Scale for Predicting Pressure Sore Risk, an evidence-based risk assessment tool for predicting pressure ulcers that was developed by Barbara Braden and Nancy Bergstrom in 1987. It is the most-widely used pressure risk assessment tool in the United States (Lyder & Ayello, 2008; Prevention Plus, 2016).

Incidence: The number or percentage of patients who develop a new pressure ulcer while in the hospital or on the nursing unit (AHRQ, 2014).

Patient mobility sensor: The Leaf Patient Monitoring system. The system includes a single disposable device that, when placed on the patient's torso, wirelessly transmits information about a patient's movement to a display terminal and alerts nurses when a patient's change of position is required (Leaf Healthcare, 2016c).

Prevalence: The number or percentage of patients who have a pressure ulcer while on the unit (AHRQ, 2014). Prevalence does not distinguish between hospital-acquired or community-acquired ulcers, only the number of patients who have them.

Pressure ulcer survey: The head-to-toe skin inspection of all in-patients who are on the nursing unit at the time of the study, with special attention paid to inspection of bony prominences, soft tissue under or around tubing and medical devices, and under

skin folds of bariatric patients (NDNQI, 2016a). The purpose of the inspection is to assess each patient's skin integrity and detect existing pressure ulcers. Palpation of the skin for temperature, moisture, and consistency is also included in the survey (NDNQI, 2016a).

Unstageable pressure injury: Those ulcers with full-thickness skin and tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar; if slough or eschar is removed, a Stage 3 or Stage 4 pressure injury will be revealed (NPUAP, 2016).

Assumptions and Limitations

By definition, pressure ulcers develop as a result of intense, prolonged, unrelieved pressure to a tissue surface area. Reducing pressure through off-loading and repositioning, then, will result in a reduction of pressure ulcer development. It is expected that the patient mobility sensor technology will improve compliance with every 2-hour turning schedules by alerting the nurse when the 2-hour interval is approaching. The innovative technology to recalculate the time interval from each independent, effective position change has the potential to decrease the frequency of caregiver-assisted repositioning, resulting in decreased use of personnel resources and increased nurse satisfaction.

A limitation of the project is that the patient mobility sensor technology will be used on all units throughout the health system for every patient determined to be at-risk for pressure ulcer development and who requires caregiver-assisted turns; therefore, a true experimental pilot study to evaluate the effectiveness of the technology cannot be

conducted. A second limitation of the project is that the technology cannot enforce compliance with patient reposition schedules, it can only alert nurses that the patient is due to be repositioned. Reduction in pressure ulcer development will ultimately require a commitment from nurses and ancillary staff to respond to the alerts. Finally, although the study may reveal a decrease in the prevalence and incidence of HAPUs, the small sample size and short duration of the study may limit the generalizability of its findings to a larger, more diverse population.

Summary

Pressure ulcers are a serious health condition that cause significant pain and place patients at risk for significant adverse consequences. They also result in increased hospital costs and lengths of stay, and higher rates of patient morbidity and mortality. Accurate identification of patients at risk and repositioning patients to off-load and redistribute pressure are key components in many pressure ulcer prevention protocols. The Braden Scale for Predicting Pressure Sore Risk is the most widely used tool in the United States to determine those patients who are at risk for pressure ulcer development. Turning clocks that are posted in patient rooms have traditionally been used to remind nurses to reposition their at-risk patients every two hours, but compliance rates with repositioning schedules is unknown.

Patient mobility sensor technology is now available to monitor and record all effective patient position changes and to wirelessly alert the nurse when a patient is due for repositioning. This technology, made available through grant funding, will be implemented in the practicum site in an effort to reduce HAPU rates within the health

system. In addition to alerting the nurses to the need for intervention, the technology will provide analytics that identify compliance rates and allow for identification of any trends with low-compliance. This information will serve as a method of quality assurance and will drive performance improvement strategies to help achieve the overall goal of the project, to decrease the incidence of HAPUs in the health system. The following section will provide a review of the scholarly evidence and the theoretical framework on which the project will be developed.

Section 2: Review of Scholarly Evidence

Specific Literature

Pressure ulcer risk assessment is a key component in the prevention of pressure ulcer development. The Joint Commission, the National Quality Forum, and the IHI all recommended that pressure ulcer risk assessment be performed upon admission and reassessed daily (IHI, 2011). Prompt identification of pressure ulcer risk, using an evidence-based assessment tool, is critical to ensure prompt implementation of prevention strategies (IHI, 2011). The Braden Scale, the most-widely used tool in the United States, has been well-tested and has been found to be reliable and valid (Lyder & Ayello, 2008). Nurses should be educated in proper use of the Braden Scale to ensure accurate identification of patients at risk (Neilson, 2014).

Patient mobility sensor technology is an innovative approach to aid in the prevention of pressure ulcers. The technology consists of a disposable wearable sensor that wirelessly communicates patient movement activity to a central monitoring station that displays the information to portable monitors accessible by nurses. Because the technology has only recently been introduced, there is a paucity of literature supporting its effectiveness. It has, though, been shown to increase turn-schedule compliance, to reduce HAPU rates, and to reduce the need for specialty bed rentals, resulting in financial savings. The evidence supporting the technology is described below.

The Veterans Administration Medical Center in Boise, Idaho implemented the technology on a 27-bed medical surgical unit (Doucette et al., 2014). Although turn-schedule compliance was found to be 89%, the technology identified that periods of low-

compliance coincided with medication delivery times, shift changes, and typical admission/discharge times (Doucette et al., 2014). A pre-post implementation clinical trial was conducted in a 39-bed acute medical unit (Tarver, Schutt, & Pezzani, 2014). Turn schedule compliance increased from 63% at baseline to 97% postimplementation, and 87% of nurses reported that the technology was helpful (Tarver et al., 2014). A two-arm randomized trial control study of the technology found a 40% increase in turning compliance among the control and a 5-fold difference in the hospital-acquired pressure injury (HAPI) rate between the treatment and control group (Pickham, Ballew, Duhon, & Mayer, 2016). Another study, conducted on two 25-bed medical-surgical units, revealed a 79% decrease in bed rental cost compared to the previous year, zero HAPUs, and zero skin consults for patients on the monitoring system (Parker, O'Neill, & Tam, 2015).

Scholarly Literature

Pressure ulcers are costly to patients and to health systems. Patients who develop pressure ulcers are subjected to significant pain, are at increased risk for complications, and have longer hospital stays and increased rates of morbidity and mortality (IHI, 2011; Lyder, Curry et al., 2012; Moore, 2013). These individuals are also more likely to be readmitted to the hospital within 30 days of discharge and to die while in the hospital (Lyder, Wang et al., 2012). Each year, 2.5 million people are treated for pressure ulcers, and 60,000 die from related complications (Sullivan & Schoelles, 2013). Pressure ulcers account for approximately $11 billion in U.S. health care each year (Pickham et al., 2016).

Early identification of patients at risk for pressure ulcer development is a major component of pressure ulcer prevention programs. Professional and regulatory agencies have recommended that a pressure ulcer risk assessment be performed on all patients upon admission and daily (IHI, 2011; NPUAP, 2014). The Braden Scale for Predicting Pressure Sore Risk is the most widely used assessment tool in the United States (IHI, 2011). When compared with other assessment tools, the Braden Scale was found to have optimal validity and its score a good predictor of pressure ulcer risk (Pancorbo-Hildago, Garcia-Hernandez, Lopez-Median, & Alvarez-Nieto, 2006). The Braden Scale consists of six components that contribute to a patient's pressure ulcer risk: sensory perception, moisture, activity, mobility, nutrition, and friction (AHRQ, 2014). Possible scores range from 6 to 23, with the lower scores indicating higher risk for pressure ulcer development. Any patient who is determined to be at risk (a Braden score of 18 or less) should have pressure ulcer prevention strategies implemented promptly (IHI, 2011).

The primary cause for pressure ulcer development is exposure to prolonged, unrelieved pressure related to decreased activity and mobility (Moore et al., 2011). Frequent regular repositioning is a highly recognized and accepted strategy to reduce pressure in patients with limited mobility (Sullivan & Schoelles, 2013; Rich et al., 2011). Although it has not been prescribed in the literature how often a patient should be repositioned, the NPUAP recommended off-loading or redistributing pressure at least every 2 hours to prevent pressure-related tissue breakdown (Peterson et al., 2012).

Every 2-hour reposition schedules have been incorporated into many, if not all, pressure ulcer prevention protocols. Despite this, pressure ulcers have continued to be a

major concern for health care systems. Until recently, there has been no reliable method for measuring compliance with reposition schedules or to determine the effectiveness of patient repositions. Pressure mapping technology has found that repositioning often fails to effectively off-load pressure of bedridden patients (Gammon et al., 2016; Peterson et al., 2012). The patient mobility sensor technology not only monitors the frequency of patient repositioning, but also monitors the effectiveness of the repositioning, measured by comparing the actual turn angle to the desired, preset turn angle (Leaf Healthcare, 2016a).

Theoretical Framework

John Kotter, an expert on leadership, discovered through research that change does not occur solely because of knowledge, but more frequently through an emotionally driven process. Kotter (2011) described his discovery as the *see-feel-change* process. To be an effective change agent and gain buy-in from staff members, the leader must tap into their affective domain. The leader must elicit an emotional response in the followers so that they are impassioned to implement and sustain the change.

Kotter (1995) identified eight tasks that must be completed for organizational change to occur and be sustained: (a) establish a sense of urgency, (b) create a guiding coalition, (c) develop a vision and strategy, (d) effectively communicate the change vision, (e) remove barriers and empower broad-based action, (f) generate short-term wins, (g) continually assess effects of change and make adjustments as necessary, and (h) anchor new approaches in the organization's culture. Successful and sustained change is

more likely when these strategies are incorporated from the start of project planning and implementation (Kotter, 1995).

Kotter's change model (1995) will guide the development and implementation of the doctoral project. The first four tasks have been addressed in the health system. The Integrated Shared Governance Council, and more specifically the Quality Council, has been involved in reviewing pressure ulcer data and in developing strategies to address HAPUs. Because the HAPU rates have been higher than the national benchmark and the health system's goal, reducing HAPUs became a system-wide initiative.

Once the grant for the patient mobility sensor technology was awarded, the entire Integrated Council, which is representative of all nursing units across the health system, has been kept apprised of the status of the project. Volunteers from the council were chosen to join the project team. The volunteers are emotionally engaged and committed to the success of the project and serve as project champions to elicit support from larger numbers of staff nurses. Their participation on the team ensures that the voices of those who will be affected by the change are heard.

Kotter's (1995) framework will continue to be used as the technology is implemented, evaluated, and sustained. Small accomplishments will be communicated and celebrated in various ways. Examples include recognizing the unit with the highest reposition-schedule compliance each month at monthly leadership and Integrated Council meetings or recognizing the shift with the greatest compliance each month at the unit staff-meetings. On-going evaluation and revision of the plan will occur, and enculturating

the technology into daily practice will assure that the intervention will be sustained over time. The project evaluation plan is described in Section 3.

Section 3: Approach

Project Design and Methods

The patient mobility sensor technology will be installed on all nursing units throughout the health system. Because the technology will be used for all patients identified as at risk for developing a pressure ulcer and who require caregiver-assisted turns, it will not be possible to conduct a study with a control group or with randomization of subjects. *The Use of a Patient Mobility Sensor to Decrease Hospital-Acquired Pressure Ulcers* doctoral project will be carried out using a pre-post implementation design. Although this study design makes it difficult to determine definite causation, it is the only practical method to assess the impact of the new technology that will be used system-wide (Terry, 2015).

The preimplementation phase of the patient mobility sensor technology included months of planning and contract development. The planning team consisted of two members of the information technology department who served as the project managers, the certified wound care nurse (WCC) from each of the hospitals who served as the content experts, the corporate director of nursing informatics and the corporate director of nursing quality. Two nurse managers and four staff nurses (one medical-surgical nurse and one critical care nurse from each hospital) were added to the team to have staff representation and input into the implementation of the new technology and the policies associated with it. As the scheduled launch date approaches, all nurse managers and nurse educators participate in weekly planning meetings. A team of representatives from the patient mobility sensor technology company also participate in the meetings.

Prior to project implementation, nurses will participate in a one-session educational activity on how to correctly use the Braden Scale to accurately identify patients at risk of pressure ulcer development. Once the technology is installed and ready for use, the 4-week implementation phase will begin. Nurse volunteers from each nursing unit will serve as super-users, or staff resource persons, during project implementation. Training for super-users and staff will be provided by the vendor during Weeks 1 and 2. All will be trained on system use and proper repositioning strategies to ensure proper off-loading. Super-users will receive additional instruction on data collection and data review practices. The monitoring system will be rolled-out in Week 3, starting with one hospital. The sensors will be placed on all in-patients with a Braden Scale of 18 or less and who require a caregiver-assisted turn on the day of project launch. Super-user and vendor support will be onsite for 2 weeks following implementation.

Population and Sampling

The population for the research study will be all in-patients identified as at risk for pressure ulcer development who require caregiver-assisted turns on the medical-surgical unit within the health system with the highest incidence of HAPUs over the previous eight quarters. The Braden Scale for Predicting Pressure Sore Risk will be the tool used to determine at-risk individuals (Prevention Plus, 2016). The Braden Scale consists of six categories: sensory perception, moisture, activity, mobility, nutrition, and friction and shear (AHRQ, 2014). Based on the skin assessment, the patient receives a score of 1 to 3 or 4 (1 for low-level of functioning and 3 or 4 for high-level functioning) for each category; a score of 18 or lower indicates that the patient is at risk for pressure ulcer

development (AHRQ, 2014). Skin assessments will be performed on admission and daily. Any in-patient determined to be at risk (Braden Score of 18 or below) who requires caregiver-assisted turns will have the patient mobility sensor applied and be entered into the monitoring system.

Data Collection

Baseline data of HAPU prevalence and incidence will be determined at the beginning of the project. Ongoing data collection will include reposition schedule compliance and HAPU prevalence and incidence rates. Reposition schedule compliance data will be continually recorded by the patient mobility sensor technology from the time that the patient is entered into the system until he or she is removed from the system. Reposition schedule compliance data for all patients will be reviewed on a weekly basis.

The NDNQI uses the hospital prevalence rate as the quality indicator for pressure ulcer reporting. Therefore, prevalence rates of HAPUs on the designated medical surgical unit will be included in the data collected for the study. Because it is not possible to have a control group in the study, historical prevalence data will be reviewed for the eight quarters preceding the project to establish a trend in HAPU rates. This will reduce the risk of outcomes occurring as the result of chance instead of a result of the technology (Newhouse, Dearholt, Poe, Pugh, & White, 2007). These data will be reviewed quarterly from the time of project implementation.

HAPU prevalence rates are determined during each of the hospital quarterly pressure ulcer surveys. The hospital's skin team, comprised of the WCC and one nurse *skin champion* from each of the inpatient nursing units, conducts the survey. Upon

joining the skin team, each member is required to complete initial and review training on the NDNQI guidelines for pressure ulcer data collection and submission and on staging of pressure ulcers (NDNQI, 2016b). This education serves to improve interrater reliability during data collection (NDNQI, 2016b).

On the day of each quarterly survey, the team divides into groups of two. Each pair is assigned to perform skin inspections of each patient on specific nursing units at the time of the survey. Care is taken to ensure that nurses are not assigned to their own nursing unit(s) to reduce the risk of observation bias (NDNQI, 2016b). Data are collected using the standardized NDNQI pressure ulcer prevalence collection tool. When the survey is completed, all of the data collection forms (one form per patient) are forwarded to the nursing administrative secretary who enters all of the raw data into the NDNQI database. Reports are then generated by NDNQI from the entered data. It is from these reports that prevalence data are obtained.

One drawback of using prevalence rates as the hospital pressure ulcer indicator is that it only provides information of pressure ulcers at one point in time and only four times each year. The NPUAP supports incidence density as the best quality metric of pressure ulcer prevention programs (NPUAP, 2014). Pressure ulcer incidence density is calculated by dividing the number of in-patients who develop a new pressure ulcer(s) by 1,000 patient days. The larger denominator of patient days allows for fair comparisons of pressure ulcer incidence among hospitals of all sizes (NPUAP, 2014).

One of the preceptors at the practicum site reported that the health system has met challenges with reporting incidence density due to unreliable patient coding data and

inconsistent reporting of pressure ulcers on safety reports. In January 2015, a new practice was instituted to capture real-time reporting of pressure ulcer development. Staff nurses are required to generate a WCC referral for every patient with a Stage 2 or greater pressure ulcer. After completing the patient assessment, the WCC records patient information on an Excel spreadsheet. It includes the patient's medical record number, the stage of pressure ulcer, and the reporting unit. As a secondary reporting mechanism, the WCC sends an e-mail to inform the nurse manager, the senior director of the unit, and the corporate director of nursing quality of the presence of the pressure ulcer. Incidence data will be reviewed from January 2015 to determine a baseline incidence rate, and then monthly from the time of project implementation.

Data Analysis

Analysis of reposition schedule compliance is an imbedded feature of the patient mobility sensor technology. The technology continually monitors effective patient repositioning and provides a detailed graph of the percentage of overdue repositions (*x*-axis) plotted against the times of day (*y*-axis). These computer-generated analytics provide instantaneous, real-time compliance results.

The methods for identifying patients at risk for developing pressure ulcers and for collecting and reporting pressure ulcer data are nationally recognized practices (NPUAP, 2014; NDNQI, 2016b). Using standardized assessment and data collection tools assists in fair and easily interpreted comparisons of data. Pre- and postintervention HAPU rates will be compared to determine if rates decreased after implementation of the patient mobility sensor technology. While the sample size and duration of this study may limit

the statistical significance of the results, they may nonetheless provide a rational basis for recommending a more comprehensive study in the future.

Project Evaluation Plan

Evaluation planning is a crucial step in project planning. The evaluation plan for the doctoral project will reflect the reasons for developing the program to ensure that the program is aligned with the program goals and it is on track to meet them (Kettner, Moroney, & Martin, 2017). The evaluation plan will consist of a series of formative evaluations conducted at preset intervals and conclude with a final summative evaluation. Each of the strategies identified in reaching the program's ultimate goal to reduce the prevalence and incidence of pressure ulcers must be evaluated.

Formative evaluation of reposition schedule compliance will be conducted on a weekly basis after implementation of the technology. Data will be reviewed to identify the percentage of compliance and trends with low-compliance. Any trends with low compliance will be communicated to the nursing staff and suggestions for improvement will be discussed and trialed.

Formative evaluations of postimplementation pressure ulcer prevalence will be conducted on a quarterly basis following the quarterly pressure ulcer survey. Postimplementation pressure ulcer incidence evaluations will occur monthly by reviewing the monthly HAPU dashboard results.

A thorough, well-developed evaluation plan will yield important information on all aspects of the program's processes and the outcomes. Because effective, timely repositioning is a fundamental component of the program's success, the formative

reposition schedule evaluations may provide the most useful information. The premise underlying the project is that effective repositioning of patients every 2 hours will reduce the incidence of HAPUs. If staff is noncompliant with reposition schedules, the effects of the technology will not be realized. Weekly evaluations of compliance with reposition schedules will provide crucial information about the program's processes that need to be addressed for successful outcomes.

The formative evaluation for pressure ulcer rates will continually be compared to the baseline data to identify areas of the program's strengths and weaknesses. Monthly incidence data may prove more useful than the quarterly prevalence data due to the timeliness of the data collection and evaluation. HAPU rates will be compared with reposition schedule compliance rates to determine any correlations in data. A comprehensive, ongoing evaluation plan will prove valuable in deciding what revisions are necessary to accomplish the program's goals and what will be needed to sustain the program on a larger scale (White & Dudley-Brown, 2012).

Summary

The overarching goal of *The Use of a Patient Mobility Sensor to Decrease Hospital-Acquired Pressure Ulcers* project is to reduce the incidence of HAPUs. The practicum site has been awarded a grant to implement a patient mobility sensor technology program designed to reduce the incidence and prevalence of HAPUs through staff compliance with timely and effective patient repositioning. The project will evaluate the effectiveness of the technology on the medical-surgical unit with the highest HAPU rates within the health system.

Installation of the technology is currently underway and the launch date is planned for August. Once the project is implemented, data collection will begin. Formative evaluations of reposition schedule compliance rates and HAPU prevalence and incidence rates will be conducted over a 3-month period. Evaluative data will be analyzed and revisions to the project will be made as needed. A summative evaluation will be conducted at the completion of the project, and an analysis of the program findings as well as recommendations for sustainability of the project and for further research will be made after completion of the study.

Section 4: Findings and Recommendations

Introduction

Pressure ulcers are areas of localized damage to the skin and underlying tissue, usually over a bony prominence or medical device, that result from intense and/or prolonged, unrelieved pressure (NPUAP, 2016). Patients who develop pressure ulcers experience significant pain and other serious complications, have longer hospital stays, and many die from related complications. Pressure ulcers are included in the National Quality Forum's list of *Never Events,* those adverse events that are usually avoidable and result in significant disability or death (PSNet, 2016).

Strategies to prevent the development of pressure ulcers include early identification of patients at risk and early implementation of risk-reduction strategies. Risk assessment should be performed upon admission and daily for hospitalized patients. The Braden Scale for Predicting Pressure Sore Risk is a valid and reliable assessment tool that is widely used in the United States (Lyder & Ayello, 2008). Patients who have a Braden score of 18 or less are considered at risk for pressure ulcer development and should have prevention strategies implemented immediately. Patients who are in bed and who are unable to make significant position changes independently should be assisted with repositioning to off-load pressure at least every 2 hours (Peterson et al., 2012) .

HAPU rates at my practicum site have remained higher than the national average and the health system's goal of 1% despite incorporation of early and frequent assessments and 2-hour turn schedules for patients at risk. To date, there has been no formal method for measuring nursing compliance with turn schedules.

In December 2015, the health system received a grant to implement patient mobility sensor technology to reduce HAPUs. The technology includes a wearable patient sensor that detects and transmits information about patient movement to a central monitoring station. The monitor displays information that indicates to the nurse that the patient is due to be repositioned. All in-patients with a score of 18 or less and who require caregiver-assisted turns will have the sensor applied and be entered into the monitoring system. The patient mobility monitoring system is due to be implemented mid-August.

Findings and Implications

The implementation of the patient mobility sensor technology was delayed many times due to organizational and process issues that were beyond the control of the planning team. The team continued to meet on a weekly basis to finalize the inclusion and exclusion criteria, to determine the projected number of patients who will require the monitoring system, to develop the policy and the guidelines for use, and to plan for the roll-out of the project. While assessing for the projected number of patients who will use the technology, it was discovered that nurses frequently score patients higher than actual on the mobility and sensory perception subscales of the Braden assessment. As a result, patients often receive a higher overall score, identifying them as a lower risk for pressure ulcer risk than they actually are. This inaccurate scoring can result in failure to implement preventative measures in a timely manner and may contribute to the development of pressure ulcers.

To respond to this incidental finding, I suggested to the group that the nurses may benefit from education on how to accurately identify pressure ulcer risk using the Braden

Scale. The education department has never offered any formal training on performing the Braden assessment, and the scoring of the subscales is very subjective. The accuracy of the Braden assessment is affected by the nurse's perception of the meaning of the tool's components and the nurse's understanding of the patient's risk (Warner-Maron, 2015). I expect that, after receiving education on how to interpret the scale's components, the nurses will be better able to accurately identify patients who are at risk for pressure ulcers and, therefore, are candidates for the patient mobility sensor technology. The team agreed that education on the Braden Scale would support the overarching goal of the patient mobility sensor project, to reduce HAPUs.

I developed a 1-hour educational activity on how to perform an accurate Braden assessment and requested a meeting with key stakeholders to present the education plan. The stakeholders, the director of nursing education (and my preceptor), the nurse manager from the pilot unit, and the two WCCs for the health system, agreed to meet with me on Friday, June 23, 2017. Prior to the meeting, I developed three patient scenarios and sent them to the wound care nurses for their expert review and comment. I asked them to complete Braden assessments on the three patients in the scenarios and offer suggestions on how to improve the scenarios for use in the educational activity. I revised the scenarios to incorporate their suggestions. I also sent a link to the stakeholders so that they could preview a portion of the video that will be used in the course. An overview of the education plan and the stakeholders' feedback is summarized below.

Presentation of Education Plan to Stakeholders

The educational activity is entitled *Braden Scale for Predicting Pressure Sore Risk: It's only as effective as the scores suggest.* The objectives are as follows:

After completion of this learning activity, the nurse will be able to

- Discuss the importance of performing an accurate Braden assessment.
- Demonstrate how to accurately perform a Braden assessment.
- Select appropriate prevention strategies for patients at risk for developing pressure injuries.

The live presentation will be offered immediately following the mandatory education for the patient mobility sensor technology. All nurses will be required to attend in preparation for the launch of the patient mobility monitoring system.

When the nurses arrive to the class, they will be informed of that the educational activity is part of my DNP scholarly project and will be given a copy of the consent form. Those who wish to participate will be asked to sign the consent form; those who do not wish to participate will be excluded from the pre- and posttest and evaluation of the educational activity. All nurses who agree to be part of the project will be given the pretest (Appendix A). The pretest consists of the three patient scenarios that were developed with input from the wound care nurses and a Braden Scale with three columns. The nurses will be asked to perform a Braden assessment on each of the patients in the scenarios and record the scores for each section of the Braden Scale. The nurses will also be asked to identify themselves on the pretest with a four-digit number to maintain their anonymity. The pretests will then be collected.

The educational component will consist of a brief overview of the Braden Scale, a showing of the *Scoring the Braden Scale* video (Prevention Plus, LLC), and a discussion with time allotted for questions and answers. Then, those nurses who signed consent will be given the posttest (same as the pretest) with the same instructions and they will be asked to use the same four-digit identifying number to allow for anonymous comparison with their pretest scores. The posttests will then be collected.

The class will conclude with a review of the scenarios and the correct scores for each of the subscales. Each scenario will be shown on the screen, highlighting the content that is significant for the correct scoring. This will be followed by a discussion of appropriate interventions that should be implemented for each patient and another question and answer session. The nurses who signed consent will then be asked to complete an evaluation of the educational activity (Appendix B).

Recommendations

The plan was well-received by the stakeholders. All agreed that the education is needed and will support the patient mobility sensor project and the overall goal to reduce HAPUs. Following the presentation, the stakeholders offered valuable feedback and suggestions for course content and implementation.

Pre- and Posttest

The stakeholders agreed that a pre- and posttest design will provide data to determine the effectiveness of the educational program. They supported the use of a four-digit number for nurse identification and anonymous comparison of the pre- and posttest

results. The wound care nurses reviewed and approved the revised patient scenarios, noting that the content was much clearer for assessing risk for pressure injuries.

Content

The actual education of scoring the Braden will be in the form of a video that was purchased from Prevention Plus, LLC, the Braden Scale Company (see permission forms in Appendix D). The video is the original staff training video made by Barbara Braden and Nancy Bergstrom in 1988, just after they developed the Braden Scale. The clothing and hairstyles in the video are reflective of the 1980s, and I suggested to the stakeholders that the nurses may perceive the video as outdated. Although they agreed, they noted that the information is timeless and is still applicable. The director of nursing education suggested that this observation be communicated to the nurses when the video is introduced, with emphasis placed on the fact that the video was made by Braden and Bergstrom, developers of and experts on the tool, and remains valid today.

The nurse manager of the pilot unit noted that the scoring of the Braden is very subjective, and it is not uncommon for patients to be scored very differently from one shift to the next. He provided an example of one patient who had a Braden Score of 17 on the day shift and a score of 21 on the night shift that followed. The patient had no significant change in status between the two shifts. The nurse manager suggested that "hand-off" communication be included in the presentation, stressing the need to communicate Braden scores with rationales during shift report. The stakeholders agreed that this should be included.

The wound care nurses suggested that more time be allotted for discussion of appropriate pressure ulcer prevention strategies. I originally planned to present a general overview of prevention strategies during the last 5 minutes of the presentation. The wound care nurses noted that interventions vary and are specific to each of the subscale components of the Braden. They suggested that the nurses be educated on the importance of developing an individualized prevention plan based on each patient's Braden subscale scores, and that the specific interventions for each subscale be reviewed. All agreed that this should be included also.

Implementation

The actual implementation of the educational activity was the final discussion of the day. The director of nursing education noted that there are four mandatory education programs that will be rolled-out this summer, and it will not be possible to add another to the calendar. She said that the classes can be offered immediately following the mobility sensor education sessions, but they cannot be mandatory. I suggested that I make a module to be placed on the health system's online education platform and require all nurses to complete it by the end of the third quarter. This format would ensure that all nurses receive the information but at their convenience. All of the stakeholders rejected this suggestion, noting that the education will be much more effective as a live presentation that allows for discussion and questions and answers. They also noted that the nurses do not really take the online education seriously; they simply complete the activities and the posttests quickly to fulfill their mandatory requirement.

The director of nursing education proposed that the educational activity be presented as a "lunch and learn" program and that continuing education (CE) credit be awarded as an incentive for nurses to attend. She invited me to attend a meeting with the nursing education department to present the education plan and get the educators' input into the implementation plan. She also suggested that I send the education plan to the nurse planner for the health system's CE provider unit to inquire about eligibility for contact hours. The director said this educational activity will be a great program for the health system's CE provider unit, as the unit is required to demonstrate to the American Nurses Credentialing Center's (ANCC) Commission on Accreditation, outcomes that result from their CE programs.

The director of nursing education also reported that she would like to incorporate the education into orientation for all newly-hired nurses. She proposed that the video be shown in the classroom orientation and asked the wound care nurses if they would include the scenarios in their 1-day skin-care orientation with the new nurses. The wound care nurses agreed and noted that this plan would enable them to reinforce the specific interventions for each of the patients based on their Braden subscale scores. The director of nursing education said that she would add this discussion to the department meeting that I will be attending.

The nurse manager of the pilot unit reported that he is going to make the education mandatory for all of his nurses. He asked me to meet with him to develop a schedule of classes for his nurses and he will hold them accountable for attending. He reported that he has to have his nurses come in from home to complete other mandatory

education this summer. Rather than have them come in for a 1-hour session, he will schedule them for a 2-hour session and include the Braden education.

Following the meeting with the stakeholders, I incorporated the suggested changes into the education plan and sent a copy of the revised education plan to all of the stakeholders (Appendix C). I offered to present the education to the skin team during one of their meetings, as there is a representative from each nursing unit on the team. The wound care nurses were receptive to the idea and they agreed to add the education to the agenda of an upcoming meeting. I will be meeting with the nurse manager of the pilot unit to plan a schedule of classes for his unit when he returns from vacation in July. I sent a copy of the education plan to the nurse educators for review prior to my meeting with them and requested that the nurse planner for the CE provider unit review the educational activity for eligibility for contact hours. I plan to begin to offer the education by the end of July.

Strengths and Limitations

The education plan for *Braden Scale for Predicting Pressure Sore Risk: It's only as effective as the scores suggest* is well-designed and well-aligned with the goal to decrease HAPUs. One strength of the plan is its timeliness with the launch of the patient mobility sensor project, as it will prepare the nurses to more accurately identify patients who will benefit from the technology. Another strength is the incorporation of the Braden Scale training video that was made by the nurses who developed the Braden Scale. The video uses clinical examples, provides rationales for the correct scoring, and allows for expert instruction on the use of the Braden Scale by the developers of the tool

(Prevention Plus, 2016). A final strength is the pre- and posttest design, which will allow for evaluation of the effectiveness of the activity and demonstration of the effectiveness to administration.

A limitation of the education plan is that it will not be mandatory for all nurses to attend the educational activity. Although the plan is supported by all of the stakeholders, the education will only be mandatory for the one medical-surgical unit with the highest HAPU rate. Providing the education in a "lunch and learn" format may increase interest in the program, but full participation of the nursing staff is unlikely. Once the effectiveness of the program is realized, however, I will recommend that all nurses be required to attend.

Section 5: Dissemination Plan

My scholarly project has actually resulted in two separate but related projects. Although the patient mobility sensor project has been delayed, I will remain involved in the conduction of the research study for the health system. My initial plans for disseminating that research are in the forms of a grant report and a poster presentation. I will also disseminate the outcomes of the educational activity, *Braden Scale for Predicting Pressure Sore Risk: It's only as effective as the scores suggest*. The results of this project will be disseminated in the form of a presentation to the nursing leaders and the Nurse Executive Council. I also plan to submit a manuscript of the education project for publication in a peer-reviewed nursing journal.

The health system was awarded a 1-year grant to implement the patient mobility sensor technology. According to the grant award notification letter, the final report must include the following: an executive summary of the project, documents that demonstrate the environment before the project, a detailed description of the measures/metrics used to determine the pre- and postproject outcomes, a description of postmeasurement investigation of root causes of the results, and an analysis of findings with a detailed summary of the supporting information for conclusions. Having the opportunity to author this report will enable me to showcase the professionalism and strength of the organization and will potentially generate a willingness for future and ongoing funding (Johnson, 2016).

I have chosen the poster presentation as my second method to disseminate my findings because it serves as a springboard for discussion and will allow me to tell the

story behind the project and the findings (Hand, 2010). The poster presentation is less formal, and the lack of time restriction provides a forum for more staff participation (Sexton, as cited in Forsythe, Wright, Scherb, & Gaspar, 2010). I plan to present the poster at the health system's annual Nursing Research Day in Fall 2018 so that I can interact with the staff nurses. I hope, through my research and my story, to foster in them a sense of critical inquiry so that they will develop a desire to continually challenge current practice, seek alternate assumptions, and explore best solutions.

I expect the Braden Scale education will be effective in improving the nurses' ability to accurately identify persons at risk for pressure injuries. To date, no formal education on performing a Braden assessment has ever been offered in the health system. After speaking with colleagues, I realize that this is a gap in education and practice in other organizations as well. I plan to submit a manuscript of the educational activity for publication in *MedSurg Nursing*, a peer-reviewed nursing journal dedicated to advancing evidence-based medical-surgical nursing practice (Academy of Medical-Surgical Nurses, 2017). I have chosen this journal because the pilot unit for the education is a medical-surgical unit and the information will be relevant for Academy of Medical-Surgical Nurses members and journal subscribers.

I also plan to submit a manuscript to the *Journal of Wound, Ostomy and Continence Nursing*, the official journal of the Wound, Ostomy and Continence Nurses Society (Journal of Wound, Ostomy and Continence Nursing [JWOCN], 2017). The entire project including the patient mobility sensor technology and the Braden Scale education is well-aligned with the journal's mission to deliver current best evidence to

guide the delivery of expert health care (JWOCN, 2017). As a doctoral-prepared nurse, it will be my responsibility to disseminate best practices with a large population of nurses to improve the standard of care for all patients. Publication of the outcomes of the Braden Scale education in a nursing journal will help me to fulfill that obligation.

Analysis of Self

> The essence of nursing is difficult to describe. It is a profession, but also a passion; it is a science, but also an art; it is individual, but also social; it is tangible, but also spiritual; it is care of the living, but also care of the dying; and it is challenging, but rewarding. Nursing is a health profession dedicated to delivering quality, compassionate care to those it serves. It is the art and science of promoting optimal health in people across the lifespan. Nursing addresses the needs of the individual who is part of a social network. Nursing involves the act of physically caring for another while tending to his or her spiritual needs as well. It is helping one to maintain or restore health, or assisting one to a peaceful, dignified death. The demands of nursing are many and often difficult to manage, but the reward of serving others well is indescribable.
>
> –Monica Shallow, *Professional portfolio: Statement of teaching philosophy*

As I reflect on my career as a professional nurse, I am humbled by the vast experiences that have allowed me to enter into the lives of many whom I otherwise would never have had the chance to meet. I have held various staff and leadership positions and each has afforded me invaluable lessons and opportunities for growth. My role a DNP student has been no different. The DNP degree is designed to prepare nurses to respond

to increasingly complex health care needs, to improve nursing practice and patient outcomes, and to strengthen the delivery of health care (American Association of Colleges in Nursing, 2015). As I conclude my DNP education, I feel well-prepared to assume the responsibility associated with the degree.

The DNP scholarly project allowed me to demonstrate my ability to advance nursing practice in my roles of practitioner, scholar, and project manager. As a practitioner, I sought to understand what contributed to the higher than expected HAPU rate. Although the original project was delayed, I was able to address a practice issue that was discovered incidentally: inaccurate scoring of Braden assessments. The technology will undoubtedly assist with turn schedule compliance, but it will only be effective for those patients on whom it is used.

Early identification of risk is the first step in preventing an event. When it was discovered that the nurses were scoring the Braden assessments incorrectly, I volunteered to perform a literature search about the reliability and validity of the Braden Scale tool. I was able to perform the literature search in a short amount of time and find that, while there was much in the literature to support the use of the tool, there was very little on how to ensure that the nurses score the assessment accurately. Various sources noted that nurses should be educated on how to accurately use the Braden Scale. This led me to develop the educational activity, using the original training video made by Braden and Bergstrom.

I believe that I functioned well in my role as project manager. I was able to arrange a meeting with the stakeholders in just a couple of days after receiving approval

from Walden University's Institutional Review Board (approval number 06-20-17-0279450). I was able to present the education plan in a succinct, efficient manner and was able to elicit valuable feedback from the stakeholders. I revised the program based on their recommendations and am now preparing to schedule the classes. I failed to convince the stakeholders that the education should be mandatory for all nurses, but I remain hopeful that the education will produce positive outcomes and the decision to make it mandatory will be reconsidered.

The DNP scholarly project was the culmination of many months of learning and planning. Although I was not able to execute the plan at the time I am submitting my final scholarly paper, I am confident that both projects will prove to be valuable and result in improved patient outcomes. This experience has ignited in me a desire to continually question nursing practice, seek alternate solutions, and advance the nursing profession. I look forward to implementing the plans and disseminating the results in an effort to share best practices with other nurses and to positively affect patient outcomes.

This project also helped me to realize that, even though it may be valuable to the organization and supported by leadership, implementing a project is challenging and requires patience, persistence, and a positive attitude. I was fortunate, on the advice of my DNP pproject ccommittee, to be able to change the focus of my scholarly project when we realized that the original project was delayed. Although the second project required additional research and planning, it will be valuable in helping nurses to promptly identify patients who will benefit from the patient mobility sensor technology, and ultimately, in decreasing HAPU rates.

I look forward to continuing my work as a doctoral-prepared nurse. Acquiring a terminal degree in nursing does not mean I will have reached a terminal point in my career. Rather, I will have reached a level from which there is no turning back; I can only move forward and take others along with me to advance nursing practice and improve patient outcomes.

Summary

The DNP scholarly project, *The Use of a Patient Mobility Sensor to Decrease Hospital-Acquired Pressure Ulcers,* is projected to be implemented in August 2017. The ultimate goal of the project is to reduce the health system's HAPU rates. The technology is designed to alert the nurse when a patient who is identified to be at risk for pressure ulcers is due for a position change. Early identification of persons at risk is a crucial first step of the project. Nurses often score patients higher than actual when performing the Braden assessment, failing to identify them as at risk. The educational activity, *Braden Assessment for Predicting Pressure Sore Risk: It's only as effective as the scores suggest*, will provide the nurses with the knowledge and skills necessary to accurately score a Braden assessment and to promptly identify patients who are at risk for pressure ulcer development.

References

Academy of Medical-Surgical Nurses. (2017). MEDSURG Nursing Journal. Retrieved from https://www.amsn.org/professional-development/periodicals/medsurg-nursing-journal

Accreditation Canada. (2013). *Implementation of turning clocks for pressure ulcer prevention and management.* Retrieved from https://accreditation.ca/node/7298

Agency for Healthcare Research and Quality. (2014). *Preventing pressure ulcers in hospitals.* Retrieved from http://www.ahrq.gov

American Association of Colleges in Nursing. (2015). *DNP fact sheet*. Retrieved from http://www.aacn.nche.edu/media-relations/fact-sheets/dnp

Black, J., Edsberg, L., Baharestani, M., Langemo, D., Goldberg, M., McNichol, L., ... National Pressure Ulcer Advisory Panel. (2011). Pressure ulcers: Avoidable or unavoidable. *Ostomy Wound Management*, *57*(2), 24-37. Retrieved from http://www.o.-wm.com

Campbell, N. (2016). Electronic SSKIN pathway: Reducing device-related pressure ulcers. *British Journal of Nursing*, *25*(15), S14-S26. Retrieved from https://www.researchgate.net/journal/0966-0461_British_journal_of_nursing_Mark_Allen_Publishing

Doucette, M., Adams, S., Cosdon, K., & Payne, K. (2014, November). *"Drive to zero": Using wearable technology for pressure ulcer prevention on a med-surg unit*. Poster session presented at the Idaho Pressure Ulcer Prevention Coalition Consensus, Boise, ID. Retrieved from

http://www.leafhealthcare.com/pdfs/VAMC-Boise-Idaho_DriveToZero_Poster_2014.pdf

Fosythe, D., Wright, T., Scherb, C., & Gaspar, P. (2010). Disseminating evidence-based practice projects: Poster design and presentation. Clinical Scholars Review, 3(1), 14-21. doi.org/10.1891/1939-2095.3.1.14

Gammon, H., Shelton, C., Siegert, C., Dawson, C., Sexton, E., Burmeister, C., ... Siddiqui, A. (2016). Self-turning for pressure injury prevention. *Wound Medicine*, *12*, 15-18. doi.org/10.1016/j.wndm.2016.02.005

Grove, S. K., Burns, N., & Gray, J. R. (2013). *The practice of nursing research: Appraisal, synthesis, and generation of evidence* (7th ed.). St. Louis, MO: Elsevier Saunders.

Hand, H. (2010). Reflections on preparing a poster for an RCN conference. *Nurse Researcher*, *17*(2), 52-59. doi.org/10.7748/nr2010.01.17.2.52.c7462

Institute for Healthcare Improvement. (2011). *How to guide: Prevent pressure ulcers*. Retrieved from http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventPressureUlcers.aspx

Institute for Healthcare Improvement. (2016). *Preventing pressure ulcers turn clock tool.* Retrieved from http://www.ihi.org/resources/Pages/Tools/PreventingPressureUlcersTurnClockTool.aspx

Johnson, S. (2016). *How to write a grant report*. Retrieved from

http://www.socialsolutions.com/blog/how-to-write-a-grant-report/

Journal of Wound, Ostomy and Continence Nursing. (2017). Retrieved from http://journals.lww.com/jwocnonline/pages/default.aspx

Kettner, P., Moroney, R., & Martin, L. (2017). *Designing and managing programs: An effectiveness-based approach* (5th ed.). Thousand Oaks, CA: Sage.

Kotter, J. (1995, March/April). Leading change: Why transformation efforts fail. *Harvard Business Review*. Retrieved from https://cb.hbsp.harvard.edu/resources/marketing/docs/95204f2.pdf

Kotter, J. (2011). *Before you can get buy-in, people need to feel the problem*. Retrieved from https://hbr.org/2011/02/before-you-can-get-buy-in-peop.html

Leaf Healthcare. (2016a). *Leaf Mobility Continuum* [Fact sheet]. Retrieved from http://leafhealthcare.com/pdfs/LH_Mobility_Continuum_051616-1.pdf

Leaf Healthcare. (2016b). *The financial benefits to monitoring patient mobility* [White paper]. Retrieved from http://leafhealthcare.com/pdfs/LH_WP_Financial-Benefits-Mobility_1856AA_101316.pdf

Leaf Healthcare. (2016c). *The next step in patient mobility monitoring*. Retrieved from http://leafhealthcare.com/pdfs/LH_SO_Patient-Mobility-Monitoring_1875AA_101316.pdf

Lyder, C., & Ayello, E. (2008). Pressure ulcers: A patient safety issue. In R. G. Hughes (Ed.), *Patient safety and quality: An evidence-based handbook for nurses*. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK2650/

Lyder, C., Curry, M., Verzier, N. R., & Hunt, D. R. (2012). Hospital-acquired pressure

ulcers: Results from the national Medicare patient safety monitoring system study. *Journal of American Geriatrics Society*, *60*(9), 1603-1608. doi.org/10.1111/j.1532-5415.2012.04106.x.

Lyder, C., Wang, Y., Metersky, M., Curry, M., Kliman, R., Verzier, N., & Hunt, D. (2012). Hospital-acquired pressure ulcers: Results from the National Medicare Patient Safety Monitoring System Study. *Journal of the American Geriatrics Society*, *60*(9), 1603-1608. doi.org/10.1111/j.1532-5415.2012.04106.x

Maklebust, J., Sieggreen, M., Sidor, D., Gerlach, M., Bauer, C., & Anderson, C. (2005). Computer-based testing of the Braden Scale for Predicting Pressure Sore Risk. *Ostomy Wound Management*, *51*(4), 40-52. Retrieved from http://www.o-wm.com

McEwen, M., & Wills, E. M. (2014). *Theoretical basis for nursing* (4th ed.). Philadelphia, PA: Wolters Kluwer.

Moore, Z. (2013). US Medicare data show incidence of hospital-acquired pressure ulcers is 4.5%, and they are associated with longer hospital stay and higher risk of death. *Evidence Based Nursing*, *16*(4), 118-119. doi.org/10.1136/eb-2012-101112

Moore, Z., Cowman, S., & Conroy, R. (2011). A randomized controlled clinical trial of repositioning, using the 30 tilt, for the prevention of pressure ulcers. *Journal of Clinical Nursing*, 20, 2633-2644. doi.org/10.1111/j.1365-2702.2011.03736.x

National Database of Nursing Quality Indicators. (2016a). *Conduct the study - skin inspection.* Retrieved from https://members.nursingquality.org/NDNQIPressureUlcerTraining/Module3/Press

ureULcerSurveyGuide_5.aspx

National Database of Nursing Quality Indicators. (2016b). *Pressure ulcer survey guide.* Retrieved from https://members.nursingquality.org/NDNQIPressureUlcerTraining/Module3/PressureUlcerSurveyGuide_1.aspx

National Pressure Ulcer Advisory Panel. (2014). *Pressure ulcer incidence density as a quality measure*. Retrieved from http://www.npuap.org/pressure-ulcer-incidence-density-as-a-quality-measure/

National Pressure Ulcer Advisory Panel. (2016). *National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury.* Retrieved from http://www.npuap.org/

Neilson, J. (2014). Using a national guideline to prevent and manage pressure ulcers. *Nursing Management*, *21*(2), 18-21. doi.org/10.7748/nm2014.04.21.2.18.s22

Nelson, A. (2008). What really moves people: How learning changes employees. *Chief Learning Officer*, *7*(5), 34-64. Retrieved from http://www.clomedia.com

Newhouse, R., Dearholt, S., Poe, S., Pugh, L. C., & White, K. (2007). *The Johns Hopkins nursing evidence-based practice rating scale*. Baltimore, MD: The Johns Hopkins Hospital, Johns Hopkins University School of Nursing.

Pancorbo-Hildago, P., Garcia-Hernandez, F., Lopez-Median, I., & Alvarez-Nieto, C. (2006). Risk assessment scales for pressure ulcer prevention: A systematic review. *Journal of Advanced Nursing*, *54*(1), 94-110. doi.org/10.1111/j.1365-

2648.2006.03794.x

Parker, C., O'Neill, M., & Tam, N. (2015). *Strive toward CALNOC excellence: Adopting innovation to improve bedside nursing care*. Poster session presented at the Kaiser Permanente, Redwood City, CA. Retrieved from http://www.leafhealthcare.com/pdfs/Kaiser_RWC_Poster_2015.pdf

Patient Safety Network. (2016). *Never events.* Retrieved from https://psnet.ahrq.gov/primers/primer/3/never-events

Peterson, M., Gravenstein, N., Schwab, W., Van Oostrom, J., & Caruso, L. (2012). Patient repositioning and pressure ulcer risk - Monitoring interface pressures of at-risk patients. *Journal of Rehabilitation Research and Development*, *50*(4), 477-488. doi.org/10.1682/JRRD.2012.02.0040

Pickham, D., Ballew, B., Duhon, P., & Mayer, B. (2016). *RCT evaluating optimal patient-turning procedures for reducing hospital-acquired pressure ulcer: Preliminary results of the LS-HAPU study*. Retrieved from http://www.leafhealthcare.com/pdfs/Stanford_RCT-EvaluatingOptimalPatientTurning_Poster_2016.pdf

Prevention Plus. (2016). Prevention Plus: Home of the Braden Scale. Retrieved from http://www.bradenscale.com/

Rich, S., Margolis, D., Shardelle, M., Hawkes, W., Miller, R., Amr, S., & Baumgarten, M. (2011). Frequent manual repositioning and incidence of pressure ulcers among bedbound elderly hip fracture patients. *Wound Repair and Regeneration*, *19*(1), 10-18. doi.org/10.1111/j.1524-475X.2010.00644.x

Sullivan, N., & Schoelles, M. (2013). Preventing in-facility pressure ulcers as a patient safety strategy: A systematic review. *Annals of Internal Medicine*, *158*(5), 410-416. doi.org/10.7326/0003-4819-158-5-201303051-00008

Sving, E., Gunningberg, L., Hogman, M., & Mamhidir, A. (2012). Registered nurses' attention to and perceptions of pressure ulcer prevention in hospital settings. *Journal of Clinical Nursing*, *21*, 1293-1303. doi.org/10.1111/j.1365-2702.2011.04000.x

Tarver, C., Schutt, S., & Pezzani, M. (2014). We're sensing you! A multiphase clinical trial examining innovative technology to improve patient turning compliance. *ANCC Magnet Conference, Dallas TX*. Abstract retrieved from https://www.elcaminohospital.org/about-us/quality-outcomes/nursing-magnet-program/2013-research-epb-projects

Terry, A. (2015). *Critical research for the doctor of nursing practice* (2nd ed.). Burlington, MA: Jones & Bartlett Learning.

Warner-Maron, I. (2015). The risk of risk assessment: Pressure ulcer assessment and the Braden Scale. *Annals of Long Term Care*, *23*(5), 23-27. Retrieved from http://www.managedhealthcareconnect.com

White, K., & Dudley-Brown, S. (2012). *Translation of evidence into nursing and health care practice*. New York, NY: Springer.

Appendix A: Pretest

Braden Scale for Predicting Pressure Sore Risk:

It's only as effective as the scores suggest

Pre-Test Instructions:

1. Read each scenario below
2. Perform a Braden Assessment on each of the patients
3. Record the score for each section on the attached Braden Scale
4. Enter a 4-digit identifying number to maintain anonymity while being able to match your pre-course assessment with your post-course assessment

Scenario #1:

85-year-old female was admitted 1 day ago with a change in mental status, increased confusion, and decreased appetite for 3 days. She lives with her family but is home alone for several hours each day. She ambulates occasionally with a walker but sits for long periods in a recliner. She wears absorbent briefs at home for urinary incontinence and needs family assistance to change when soiled. Today, the patient has remained in bed, ate half of a muffin at breakfast, and slept through lunch. She has been incontinent of urine multiple times throughout the shift. There is noted redness to perineal area and buttocks.

Scenario #2:

70-year-old with advanced dementia was admitted today from an extended care facility with nausea, vomiting for 2 days and a fever that developed today. He has left-sided hemiparesis and dysphagia from a CVA last year. He is wheelchair-bound and requires a two-person assist for transfers. The patient has a chronic indwelling urinary catheter in place and has been incontinent of frequent loose stools since admission. He has a peg tube that has been clogged for 2 days. He is currently receiving IV fluids, 5% Dextrose in Water and 0.45 Normal Saline Solution at 125 mL/hour.

Scenario #3:

50-year-old male who weighs 376 pounds was admitted yesterday morning for cellulitis and a non-healing ulcer on the left foot. He has a history of diabetes with peripheral neuropathy, osteoarthritis, peripheral vascular disease, and obstructive sleep apnea. He uses CPAP at night and sleeps in a semi-fowlers position. He walks independently at home but has been only ambulating occasionally with a walker since his admission. His skin is intact, but he has a red rash in his abdominal skin folds.

4-Digit Identifying Number: _____ **Date:** _____

Pre-Test

BRADEN SCALE FOR PREDICTING PRESSURE SORE RISK

Patient's Name _____ Evaluator's Name _____ Date of Assessment

					1	2	3
SENSORY PERCEPTION ability to respond meaningfully to pressure-related discomfort	**1. Completely Limited** Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation. OR limited ability to feel pain over most of body	**2. Very Limited** Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness OR has a sensory impairment which limits the ability to feel pain or discomfort over ½ of body.	**3. Slightly Limited** Responds to verbal commands, but cannot always communicate discomfort or the need to be turned. OR has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities.	**4. No Impairment** Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort..			
MOISTURE degree to which skin is exposed to moisture	**1. Constantly Moist** Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.	**2. Very Moist** Skin is often, but not always moist. Linen must be changed at least once a shift.	**3. Occasionally Moist:** Skin is occasionally moist, requiring an extra linen change approximately once a day.	**4. Rarely Moist** Skin is usually dry, linen only requires changing at routine intervals.			
ACTIVITY degree of physical activity	**1. Bedfast** Confined to bed.	**2. Chairfast** Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair.	**3. Walks Occasionally** Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair	**4. Walks Frequently** Walks outside room at least twice a day and inside room at least once every two hours during waking hours			
MOBILITY ability to change and control body position	**1. Completely Immobile** Does not make even slight changes in body or extremity position without assistance	**2. Very Limited** Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.	**3. Slightly Limited** Makes frequent though slight changes in body or extremity position independently.	**4. No Limitation** Makes major and frequent changes in position without assistance.			
NUTRITION usual food intake pattern	**1. Very Poor** Never eats a complete meal. Rarely eats more than ⅓ of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement OR is NPO and/or maintained on clear liquids or IV's for more than 5 days.	**2. Probably Inadequate** Rarely eats a complete meal and generally eats only about ½ of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement. OR receives less than optimum amount of liquid diet or tube feeding	**3. Adequate** Eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products per day. Occasionally will refuse a meal, but will usually take a supplement when offered OR is on a tube feeding or TPN regimen which probably meets most of nutritional needs	**4. Excellent** Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.			
FRICTION & SHEAR	**1. Problem** Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures or agitation leads to almost constant friction	**2. Potential Problem** Moves feebly or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair, restraints or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.	**3. No Apparent Problem** Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair.				
				Total Score			

Appendix B: Evaluation of Educational Activity

Program Title: **Braden Scale for Predicting Pressure Sore Risk: It's only as effective as the scores suggest**

Date: _____

Please indicate with an **X** the response that best reflects your opinion of the program.

CODE: ***A=EXCELLENT, B= GOOD, C = FAIR, D = POOR, E = N/A***

A	**B**	**C**	**D**	**E**	
					How well were the following objectives met? (#1-3)
□	□	□	□	□	1. Discuss the importance of performing an accurate Braden assessment
□	□	□	□	□	2. Demonstrate how to accurately perform a Braden assessment
□	□	□	□	□	3. Select appropriate intervention strategies for patients at risk for developing pressure injuries based on their Braden subscale scores
□	□	□	□	□	4. How well did the objectives relate to the purpose/goals of activity?
□	□	□	□	□	5. How relevant and useful is this information to your nursing practice?
□	□	□	□	□	6. How well did this continuing nursing education program meet your expectations?

7. In the space below, please describe how you will use the information in your nursing practice.

8. Please share any additional comments you may have regarding this educational activity.

Thank you.

Appendix C: Education Plan

Title of Activity: Braden Scale for Predicting Pressure Sore Risk: It's only as effective as the scores suggest

Identified Gap: When performing a Braden assessment, nurses often score patients incorrectly, assigning a higher score and therefore lower risk, than the actual score. This results in failure to correctly identify patients at risk for developing pressure injuries and delayed implementation of pressure injury prevention strategies.

Description of Current State: An incidental finding while planning for the patient mobility sensor project revealed that nurses often incorrectly score patients higher than actual on the Braden assessment, especially in the areas of sensory prevention and mobility.

Purpose: The purpose of this activity is to enable the learner to perform an accurate Braden assessment and, therefore, correctly identify patients at risk for pressure injury development.

Objectives After completion of this activity the nurse will be able to:	**Outline**	**Time Frame**	**Faculty**	**Teaching methods, strategies, materials & resources**
List the program objectives	I. Introduction and Review of Program Objectives	1 minute	M. Shallow	Lecture, PowerPoint presentation
Discuss the importance of performing an accurate Braden assessment	II. Overview of the Braden Scale A. History B. Validity C. Uses	9 minutes	M. Shallow	Pre-test, Lecture, PowerPoint presentation

Demonstrate how to accurately perform a Braden assessment	III. Performing the Braden Assessment A. Subscales B. Scoring C. Handoff communication	30 minutes	M. Shallow	"Scoring the Braden Scale" DVD, Prevention Plus LLC (www.bradenscale.com) Post-Test Review of correct scores
Select appropriate prevention strategies for patients at risk for developing pressure injuries based on their Braden subscale scores	IV. Nursing Interventions A. Prevention B. Subscale specific	15 minutes	M. Shallow	Lecture, Discussion, Case Scenario, Question & Answers
	IV. Program Evaluation	5 minutes	M. Shallow	Program evaluation

Evidence-Based References

Agency for Healthcare Research and Quality. (2014). *Preventing pressure ulcers in hospitals.* Retrieved from http://www.ahrq.gov/professionals/systems/hospital/pressureulcertoolkit/putool1.html

Institute for Healthcare Improvement. (2016). *Preventing pressure ulcers turn clock tool.* Retrieved from http://www.ihi.org/resources/Pages/Tools/PreventingPressureUlcersTurnClockTool.aspx

Lyder, C., & Ayello, E. (2008). Pressure ulcers: A patient safety issue. In R. G. Hughes (Ed.), *Patient safety and quality: An evidence-based handbook for nurses*. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK2650/

Neilson, J. (2014). Using a national guideline to prevent and manage pressure ulcers. Nursing Management, 21(2), 18-21. http://dx.doi.org/10.7748/nm2014.04.21.2.18.s22

Prevention Plus. (2016). Prevention Plus: Home of the Braden Scale. Retrieved from http://www.bradenscale.com/

Warner-Maron, I. (2015). The risk of risk assessment: Pressure ulcer assessment and the Braden Scale. *Annals of Long Term Care*, *23*(5), 23-27. Retrieved from http://www.managedhealthcareconnect.com/article/risk-risk-assessment-pressure-ulcer-assessment-and-braden-scale

Appendix D: Permissions

Date: June 30, 2017

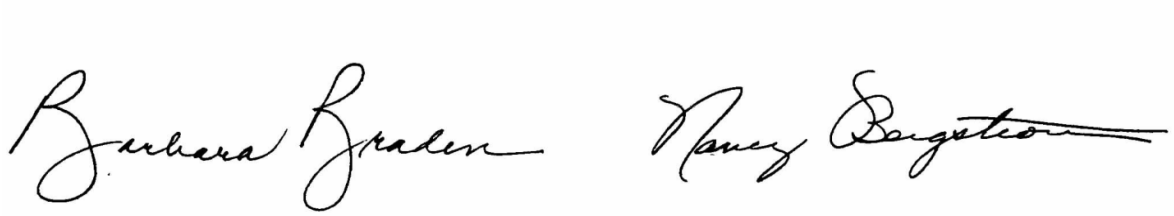
To: Monica Shallow [redacted] Health System

From: Barbara Braden, PhD, RN, FAAN, Nancy Bergstrom, PhD, RN, FAAN

RE: Permission to use the Braden Scale*

As holders of the official copyright for the Braden Scale and the interventions, we hereby grant permission for the use of the scale in the educational activity, "Braden Scale for Predicting Pressure Sore Risk: It's only as effective as the scores suggest," which is to be offered to nurses at [redacted] Health System. This permission also includes the use of the Braden Sale DVD within the educational activity.

*It is understood that the tool must be printed as it appears on the Braden Scale website (www.bradenscale.com) in relation to title, wording and scoring of each subscale, and the acknowledgement, "Copyright, Braden and Bergstrom, 1988. Reprinted with permission. All rights reserved."



Date: June 30, 2017

To: Monica Shallow

From: Barbara Braden, PhD, RN, FAAN, Nancy Bergstrom, PhD, RN, FAAN

RE: Permission to use the Braden Scale*

As holders of the official copyright for the Braden Scale and the interventions, we hereby grant permission for the use of the scale and the Braden Scale DVD in your DNP scholarly project.

*It is understood that the tool must be printed as it appears on the Braden Scale website (www.bradenscale.com) in relation to title, wording and scoring of each subscale, and the acknowledgement, "Copyright, Braden and Bergstrom, 1988. Reprinted with permission. All rights reserved."