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Reducing HAPI in High-Risk Patients: A Quality Improvement Project

Gia Lynne Frank
Seattle Pacific University

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Reducing Hospital Acquired Pressure Injury (HAPI) in High-Risk Patients: A Quality
Improvement Project

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Seattle Pacific University, School of Health Sciences

A project submitted in partial fulfillment of
the requirements for the degree of Doctor of Nursing Practice

2022

Executive Summary

Introduction: Pressure injuries (PI) are wounds caused by pressure, friction, or sheer on the skin and the underlying structures, resulting in cell death (Berlowitz et al., 2014). When hospital-acquired pressure injuries (HAPI) occur, they severely affect a patient's quality of life. It is estimated HAPI is the cause of death in 41 out of every 1000 patients (AHRQ, 2017). Annual costs related to HAPI in the United States are estimated at \$26.8 billion (Padula & Delarmente, 2019). HAPI prevention is a priority in the hospital setting as it is a quality indicator. There is emerging evidence that foam dressings over the sacrum, as an addition to the standard of care, may further reduce the incidence of HAPI.

Problems and Purpose Statement: Currently, nurses use foam dressings as PI prevention as an independent practice decision at the project hospital. The purpose of this project was to determine whether the application of sacral foam dressings over intact skin by hospital staff RNs as PI prevention would reduce the incidence of HAPI in high-risk adult patients. Eligibility criteria included a) <24 hours admission to the unit; b) Braden score ≤ 18 ; c) Braden sub-category moisture > 2 ; d) no tape allergy; e) intact sacral skin, no history of sacral PI, or sacral scar; f) continent or contained urine/stool; g) no diarrhea even if continent. After implementation, additional exclusion criteria included patients who became incontinent, those with a history of noncompliance with care, and patients who refused skin assessment. Specific aims included a reduction in the incidence of HAPI, and successful adoption of the intervention by nursing staff on the project unit. Though evidence supports the use of foam dressings as HAPI prevention, the overall goal of this study was to incorporate the intervention into hospital policy to help standardize the practice and improve patient safety.

Methods: The project was implemented on one inpatient unit at the project hospital. Lewin's Change Theory (Lewin, 1947) and the Plan-Do-Study-Act (PDSA) framework guided the project (IHI, 2020). Patients and nurses were considered participants. All nurses and a convenience sample of all eligible high-risk patients from May through June 2021 were eligible to participate. Nurses charted skin assessment, dressing application, and interventions using an existing wound tracking flowsheet in the EHR. Additional chart data was collected regarding interventions reflecting the standard of care for PI prevention. The RN Unit Post Satisfaction Survey was used to assess whether the project protocol was acceptable and feasible to the nursing staff on the unit as a measure to promote sustainability.

Results/Outcomes: Of the 243 patients admitted to the unit during the project, 23 met eligibility criteria, with 6 enrolled in the project. Most of those eligible were excluded. The sample included 3 males and 3 females, ages 53 to >90 years, with Braden scores ranging from 16-18.

No patients developed a pressure injury during the project. Though low enrollment, the foam dressing showed promise in mitigating pressure injury, which is in line with the research. Anecdotally, 2 of the 6 patients exhibited improved skin under the dressing when compared to the surrounding skin.

Whether the standard of care for pressure injury had been met was poorly understood by staff and the project lead. While there were aspects of nurse charting which were measurable, time-sensitive, and could be quantified (e.g., assessments and hourly rounding) due to the complexity and the intradisciplinary nature of PI interventions, the measure of standard of care was unknown to nursing staff.

The RN Unit Post Satisfaction Survey included 5 questions with 5-point Likert type survey response sets, plus space for comments. The survey was available for two weeks post-intervention, was anonymous, and open to every RN regardless of experience with a patient in protocol. With 64 nurses assigned during the project period, 30 responses were returned (47%). Participant responses showed variability, which may be an indicator of thoughtful responses rather than socially desired answers. Results considered favorable were those marked as either agree or strongly agree. Unfavorable results were marked disagree or strongly disagree. There was also a neutral option.

The items related to the protocol intervention were favorable: a) understanding the inclusion criteria (97%); b) availability of dressings (83%); c) low impact on time management (82.7%); and d) understanding the charting protocol (76%). When asked if nurses were more aware of PI prevention because of the project, 83% responded favorably as well.

Sustainability: Though the project had the support of nurses, there were barriers to sustainability that would need to be addressed in future projects. The inclusion/exclusion criteria should be simplified. Though nurses endorsed the necessity of a tracking tool for the prevention dressing, using the existing EHR wounds flowsheet was cumbersome and complex. Time was also a factor noted in the survey. With chronic short-staffing related to Covid-19 as a global concern, adding a new process would be challenging as even the best ideas need front-line support.

Understanding whether the standard of care for PI interventions had been met remained poorly understood. Though nurses and CNAs were actively engaged in PI prevention, the measure at the staff level remained unclear. Additional education on how to pair Braden scores with specific interventions may bring clarity.

Limitations: Limitations included implementing a QI project during the Covid-19 global pandemic, which had already placed unprecedented stress on healthcare systems, including critical staffing shortages. Though the survey results supported the project, the project lead was aware from 1:1 conversations that staff were burdened by the extra work the project was generating. In response, the project lead took on more responsibility which impacted sustainability.

Implications: Implications for practice suggest creating a new protocol during the stressors related to the ongoing Covid-19 pandemic may be poor timing. However, despite pandemic-related complications, the study results showed the nursing staff were able to successfully adopt the intervention, though some aspects were confusing at times.

Despite promising results both for patients and adoption by nurses, challenges remain in integrating the protocol steps into a usable model. However, nurses who are well versed in evidence-based practice may be more willing to use a simple to implement protocol where the benefits are easily understood.

Finally, these results show there is value in doing a unit-based QI project as participation can elevate knowledge of this practice or others. Here, 83% of nurses agreed they had increased knowledge of pressure injury prevention because of exposure to the project. Even those nurses who were not directly involved with patients in protocol received the secondary benefit of deeper understanding regarding HAPI prevention practices. Future endeavors might consider this secondary benefit when planning evidence-based practice projects and find ways to engage staff even during times of extreme challenges in the healthcare setting.

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Reducing HAPI in High-Risk Patients: A Quality Improvement Project

Pressure injuries (PI) are wounds caused by pressure, friction, or sheer on the skin and the underlying structures (Berlowitz et al., 2014). Risk factors for developing PI include increasing age, reduced sensation, malnutrition, incontinence, impaired mobility, chronic disease, and hospitalization (Berlowitz et al., 2014; Fulbrook et al., 2019). Though PI can develop on any bony area where the skin is thin, the heels and sacrum are areas often susceptible to injury (Berlowitz et al., 2014; Forni et al., 2018; Fulbrook et al., 2019; Kalowes et al., 2016; Padula, 2017; Ramundo et al., 2018; Riemenschneider, K., 2018; Santamaria et al., 2015; Strauss et al., 2018).

Pressure injuries are a significant cause of morbidity and mortality in hospitalized patients (AHRQ, 2017; Fulbrook et al., 2019; Padula, 2017). Hospital acquired pressure injuries (HAPI) cause extended hospital stays, contribute to chronic pain, and negatively impact quality of life (Berlowitz et al., 2014; Miller et al., 2019). The Agency for Healthcare Research and Quality (AHRQ) (2017) estimates HAPI is the cause of death for 41 in every 1000 patients. Unfortunately, evidence-based prevention practices designed to mitigate HAPI in hospitalized patients have reduced but not eliminated the incidence of pressure injury (AHRQ, 2017; Berlowitz et al., 2014; Rondinelli et al., 2018).

The financial burden of HAPIs is substantial as well, with an estimated annual cost of \$26.8 billion in the United States alone (Padula & Delarmente, 2019). Estimated costs of HAPI for each person can run as high as \$25,145 (AHRQ, 2017). Given the cost, in human and fiscal terms, new and innovative approaches are needed to combat HAPI. One intervention showing positive results is adding a foam dressing over intact skin in addition to the established standard of care for PI prevention (Forni et al., 2018; Fulbrook et al., 2019; Kalowes et al., 2016; Padula, 2017; Ramundo et al., 2018; Riemenschneider, K., 2018; Santamaria et al., 2015; Strauss et al., 2018).

Background and Significance

Improving the incidence and prevalence of HAPI is a goal shared by many. Hospital-acquired pressure injuries severely affect patients' quality of life. Treating these sometimes

preventable injuries add to the costs of an overburdened healthcare system (Centers for Medicare & Medicaid Services [CMS], 2020). Identifying hospital-acquired conditions that contributed to high costs was mandated by the Deficit Reduction Act of 2005. By 2008, the CMS declared costs related to the secondary diagnosis of stage 3 and stage 4 HAPI would not be reimbursed (CMS, 2020). The Joint Commission (2016), the largest healthcare accreditation body in the United States, considers stage 3 pressure injuries a significant patient safety event. The 2020 Healthy People initiative aims to reduce HAPI in people over 65 by 10% (Office of Disease Prevention and Health Promotion, n.d.). The AHRQ (2019) lists pressure injuries as one of the ten tracked hospital-acquired conditions where reductions can result in fewer deaths and cost savings in the billions.

Learning how to improve HAPI has been achieved by gathering strong evidence from well-designed studies exploring solutions that eliminate or mitigate these wounds. Over time, accumulated evidence shows improvement in HAPI incidence and prevalence when nursing interventions for pressure injury prevention have been implemented as a group, known as the standard of care for pressure injury prevention or HAPI prevention practices (AHRQ, 2017). In addition, hospitals that have implemented these evidence-based HAPI prevention practices have seen a reduction in PI rates (AHRQ, 2017; Berlowitz et al., n.d.; Forni et al., 2018; Fulbrook et al., 2019; Kalowes et al., 2016; Padula, 2017; Ramundo et al., 2018; Riemenschneider, K., 2018; Santamaria et al., 2015; Strauss et al., 2018).

Research supports the use of foam dressings in addition to standard prevention practices to reduce the incidence of HAPI (Forni et al., 2018; Fulbrook et al., 2019; Kalowes et al., 2016; Padula, 2017; Ramundo et al., 2018; Riemenschneider, K., 2018; Rondinelli et al., 2018; Santamaria et al., 2015; Strauss et al., 2018). Using this evidence, some hospitals include using foam dressings over intact skin on the sacrum and other high-risk areas as a part of their standard of care.

Problem Statement

Like other hospitals accredited by the Joint Commission (2016), the project hospital had a

standard of care policy for PI prevention. The standard of care is a group effort managed by nursing staff, licensed medical professionals, therapists, nutritionists, analysts, and policymakers. This interdisciplinary group acts in concert to improve the incidence and prevalence of HAPI. Nursing staff implement the standard of care by utilizing the Braden Scale for Predicting Pressure Score Risk (Appendix A), the validated PI risk assessment tool used at the target hospital. Used by nurses to evaluate which patients are at high risk for pressure injury, the Braden Scale is the tool that supports nursing in choosing specific interventions designed to mitigate the incidence and prevalence of HAPI.

While hospital policy has specific HAPI interventions based on Braden scores, policy also allows nurses to use nursing judgment when implementing HAPI interventions for high-risk patients. These outside-the-box interventions sometimes include nurses applying foam dressings over intact skin as HAPI prevention. Though the literature supports the prevention benefits of foam dressings as prevention, there is nothing in the policy directing this practice, such as a) awareness of the inclusion/exclusion criteria, b) which type of foam dressing is appropriate, c) when to initiate the dressing, d) the process of applying and changing the dressing, e) when to assess the skin under the dressing, and f) reasons for discontinuing the dressing. Having foam dressings as part of hospital policy will help standardize the practice and subsequently improve patient safety.

The purpose of this project was to evaluate whether sacral foam dressings over intact skin reduce the incidence of HAPI in high-risk adult patients. A second aim was the successful adoption of the intervention protocol by nursing staff.

Clinical Question

In patients with a Braden score of ≤ 18 who are admitted or transferred to the project unit, how does the application of a foam dressing to intact skin on the sacrum in addition to the HAPI standard of care influence the occurrence of HAPI? Specific aims of the project included a reduction in the incidence of HAPI and successful adoption of the intervention by nursing staff on the project unit.

Literature Review

Search Strategy

A search of the literature was done related to whether applying foam dressings to intact skin over pressure points would reduce HAPI. Academic literature searches were limited to (a) 2014-2021, (b) full text, (c) date published, (d) peer-reviewed, and (e) academic journals. The following search terms were used to locate literature and information specific to this problem, including (a) foam dressing prevent pressure sore, (b) foam dressing decubitus, and (c) foam bony prominence. Literature was found via online databases, including Cumulative Index of Nursing and Allied Health Literature (CINAHL), MEDLINE, PUBMED, Wiley Online, and Elsevier ClinicalKey. Google Scholar was accessed for a literature search with the same search terms. The Google search engine was accessed for gray literature, statistics, and background information.

Abstracts of 75 resultant studies were examined for inclusion and exclusion criteria. Studies were excluded where foam dressings were not used as an addition to an existing standard of care for PI prevention. Other exclusions were for studies examining whether foam dressings improved existing PI. Studies were selected where the clinical question was aimed at the prevention of PI. Studies using the Braden Scale were chosen if a risk assessment tool was used. After a careful review of comparability and exclusion criteria, nine studies were selected for this literature review. The final results included two level I, two level II, three level IV, and two level VI studies. The AHRQ toolkit was also referenced in the literature review, which was created in collaboration with the United States Department of Health and Human Services and last reviewed in 2014 (Berlowitz et al., n.d.). The AHRQ toolkit was tested in six medical centers for validation based on the best evidence-based practice found in the literature for PI prevention.

Hospital Acquired Pressure Injury

HAPI is a serious health condition affecting more than 2.5 million people in the United States every year (Berlowitz et al., n.d.; Padula, 2017). This disruption of skin integrity can be caused by pressure that deprives the skin of oxygen, causing cell death (Berlowitz et al., n.d.;

NPUAP, EPUAP, PPPIA, 2016). These painful skin injuries are graded 1 through 4 (most severe).

There is also a category for suspected deep tissue injury, which presents as a deep purple/black area that may degrade to an open injury (Berlowitz et al., n.d.; NPUAP, EPUAP, PPPIA, 2016).

Hospital acquired pressure injuries increase the risk of infection and death (Berlowitz et al., n.d.; Fulbrook et al., 2019; Kalowes et al., 2016; Padula, 2017).

Validated Risk Tool

The AHRQ (n.d.a.) endorses two risk assessment scales or tools that are commonly used due to having established reliability and validity: the Norton Scale and the Braden Scale (Appendix A). The Braden scale scores patients in the six Braden sub-categories of a) sensory perception, b) moisture, c) activity, d) mobility, e) nutrition, f) friction, and sheer. Friction and sheer have a "no impairment" or "high" score of 3, whereas the rest have a "high" score of 4. Those six sub-categories feed a total Braden score ranging from 6 to 23. The lower the sub-category or total score, the higher the risk of pressure injury. The project hospital employs the Braden scale and a pressure injury prevention policy with specific interventions for low Braden sub-category scores and low total Braden scores ≤ 18 .

Standard of Care

Prevention of HAPI has improved by implementing standardized care interventions designed to mitigate or prevent PI in the hospital setting (Berlowitz et al., n.d.; NPUAP, EPUAP, PPPIA, 2016). Interventions include a) the use of specialty beds or overlays, b) friction management by using lifts or slide sheets to move patients, c) regular repositioning, such as turning patients every two hours or getting patients out of bed for meals, d) moisture management like prompt incontinence care, and e) nutrition consults that include nutritional supplements or extra protein for improved skin integrity and healing (Berlowitz et al., n.d.; Miller et al., 2019; NPUAP, EPUAP, PPPIA, 2016). Hospitals utilizing a standard of care in pressure injury prevention have experienced a decreased incidence of HAPI in acute care patients (Fulbrook et al., 2019; Kalowes et al., 2016; Padula, 2017; Ramundo et al., 2018; Strauss et al., 2019).

Efficacy of Foam Dressings in Preventing HAPI

There is growing evidence supporting a reduction in the incidence of HAPI in the ICU, operating room, and acute care setting when foam dressings are placed over intact skin as PI prevention in addition to the HAPI standard of care already in place (Forni et al., 2018; Fulbrook et al., 2019; Kalowes et al., 2016; Padula, 2017; Ramundo et al., 2018; Riemenschneider, 2015; Santamaria et al., 2015; Strauss et al., 2019). For example, patients in the ICU receiving foam dressings as prevention showed a reduction of HAPI up to 88% (Fulbrook et al., 2019; Kalowes et al., 2016). In surgical patients, foam dressings have shown a clinically significant reduction in post-operative sacral HAPI, especially in high-risk cardiac patients (Forni et al., 2018; Riemenschneider, 2018; Strauss et al., 2019). In acute care, foam dressings have shown a significant reduction in HAPI and are less likely to cause trauma to fragile skin than standard dressings (Padula, 2017; Ramundo, et al., 2018; Riemenschneider, 2018). Table 1 summarizes the study type, clinical population, and sample size for the studies cited.

Table 1

Efficacy of Foam Dressings in Preventing PI in the Hospital Setting

Study Type	Population	Sample Size	Study
Meta-analysis	ICU Acute Care	1872	Fulbrook et al., 2019
Meta-analysis	Acute Care	>440	Ramundo et al., 2018
RCT	ED Post Op Wards	359	Forni et al., 2018
RCT	ICU	366	Kalowes et al., 2016
Cohort study	Acute Care	38 Hospitals/5 years	Padula, 2017
Cohort study, prospective	ICU	150	Santamaria et al., 2015
Cohort study, retrospective	ED to inpatient admission	35 hospitals	Rondinelli et al., 2018
QI	Operative	81	Riemenschneider, 2018
QI	Operative	224	Strauss et al., 2019

Organizational Assessment

Organizational Description

This project was implemented in a federally funded, 601 bed, adult level II Trauma Center,

nonprofit community hospital located in Washington State. The project hospital is the largest in the county and is in a city where close to 25% of the population spoke a first language other than English in the home, close to 12% of the people were over 65 years of age, and an equal number under 65 were disabled (United States Census Bureau, 2019). In addition, there were economic disparities between families living in the city limits and those in the surrounding county, with city dwellers having a lower median income and a higher rate of poverty at almost twice the rate. (United States Census Bureau, 2019).

Initially, a needs assessment was done by interviewing a clinical educator for the project hospital. During this planning session, a variety of projects were discussed with the focus on work that would benefit patients during the Covid-19 pandemic and be cost-effective in a time of economic uncertainty. One project kept rising to the forefront as the projects were discussed. The clinical educator produced previous work that had shown compelling scholarly evidence supporting the use of foam dressings as pressure injury prevention in the acute care setting. The decision was made to extend this work on PI prevention when foam dressings were added to intact skin on at-risk patients.

Stakeholder Analysis

Developing the project began by identifying stakeholders. The project lead (PL) completed stakeholder analysis (Appendix B) after discussions with the clinical educator team and the unit assistant manager, who also served as the agency mentor (AM). The project was referred to nursing governance for monitoring, and the Chief Nursing Officer (CNO) team was notified. Gaining electronic health record (EHR) access for student projects when the PL was also a staff member was granted by the director of clinical research, who managed other systems-sensitive aspects of the project. Throughout the stakeholder analysis, the AM showed strong advocacy for change and repeatedly provided creative solutions for complex project-related problems. As one who was poised to accept change and in a position of power to make it happen, the AM was identified as critical to the project's success.

SWOT Analysis

A strengths, weaknesses, opportunities, and threats (SWOT) analysis was used (Appendix C). Some of the strengths identified were in the existing organizational structure. The project hospital has strong nursing governance. For example, when the PL presented the project to the CNO group, team members identified areas where the PL could improve the project design. Other identified strengths were the AM, who, as a senior leader and assistant manager on the unit, was experienced in quality improvement projects. The unit RN staff were also a strength as the staff was frequently involved in small tests of change using an iterative 4-stage problem-solving model known as Plan-Do-Study-Act (PDSA) (Institute for Healthcare Improvement [IHI], 2020). In addition, RNs on the unit were familiar with the project concept and used foam dressings as an individual practice decision for PI prevention.

The SWOT analysis acknowledged a few weaknesses and threats to the project's success, which were validated, and then mitigated using the PDSA model (IHI, 2020). The most significant threat to the project's success was the ongoing Covid 19 pandemic. Like other hospitals nationwide in 2021, the project hospital was critically short-staffed as the project rolled out (American Hospital Association, 2021). Short staffing resulted in more patients assigned per nurse and charge nurses taking patients. The added workload left little time to learn the project protocol.

Purpose Statement

The purpose of this project was to determine whether the application of sacral foam dressings on the sacrum over intact skin by hospital staff RNs as PI prevention would reduce the incidence of PI in high-risk hospitalized patients. Specific aims of the project included a reduction in the incidence of HAPI and successful adoption of the intervention by nursing staff on the project unit.

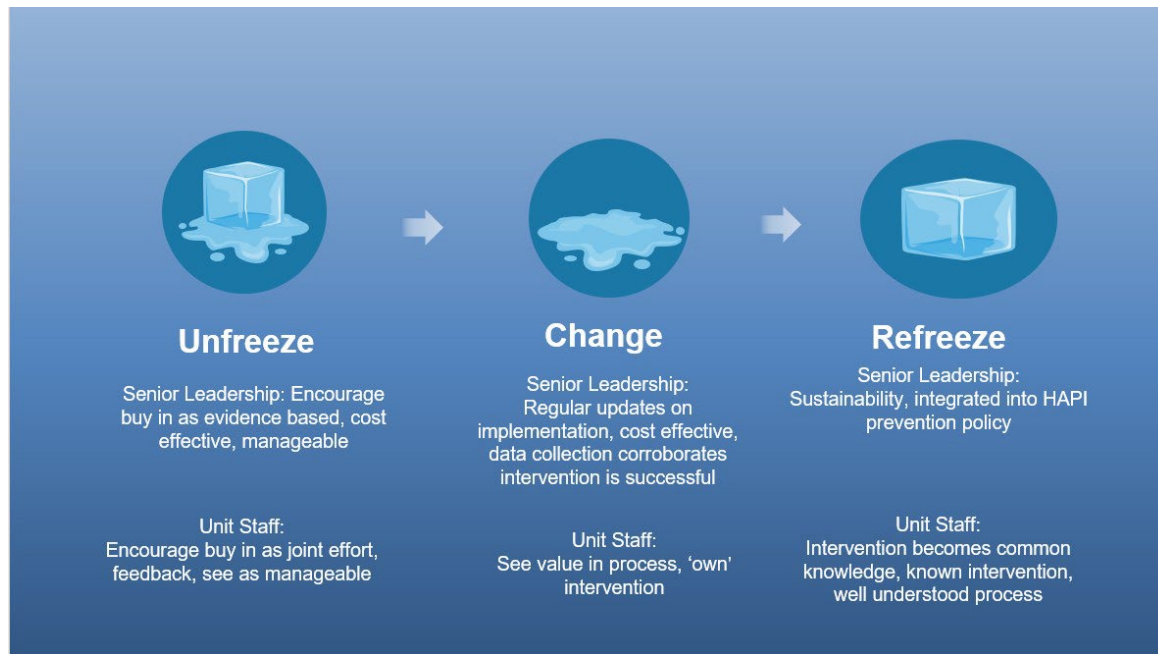
Theoretical Framework

Lewin's Change Theory guided the project plan (Lewin, 1947). Developed by social psychologist Kurt Lewin, his foundational theory is a three-stage change model using the concepts

of *unfreezing, change, and refreeze* (Figure 1). Unfreezing is about the person being open to change, which can be encouraged by Lewin's concepts of driving forces, restraining forces, and equilibrium. The change or improvement is then free to happen, and when it does, Lewin theorizes it refreezes or becomes the new guideline.

Lewin's concepts of *driving forces, restraining forces, and equilibrium* can also support sustained change. However, if driving forces and restraining forces are balanced, equilibrium is reached, and the change may stagnate. The SWOT analysis (Appendix C) provides insights into key driving and restraining forces that may influence the progression from unfreezing through change and refreezing for this project. Lewin also notes that participation by key stakeholders in the change process can help create a new normal. As noted previously, both senior leadership and unit staff are critical to the success of the improvement project. Figure 1 summarizes strategies to address each step of the change process for both stakeholder groups.

In summary, looking to Lewin's theory, successful change happens when ways are found to motivate those who are resistant to change and tip equilibrium towards advocacy rather than resistance. With advocacy, refreezing and sustained change can be achieved.

Figure 1*Lewin's Change Theory***Methodology****Project Design**

In designing the QI project, the Institute for Healthcare Improvement ([IHI] 2020) Model for Improvement (MFI) framework was used as a guide. The MFI offered a robust method to assess, plan, and implement a clinical improvement through the PDSA model—in this case, to prevent HAPI (IHI, 2020). The PDSA model supported a format for change through every level of the project (IHI, 2020). Especially useful with QI projects, the framework offered strong support for testing change by documenting what worked, what did not, and what may work better when modified. Creating worksheets using the IHI (2020) model was effective in making modifications to through the PDSA format.

Setting

The project was implemented on one inpatient unit at the project hospital, a 29-bed medical telemetry renal unit. When fully staffed, the unit day shift nurses work either 8- or 12-hour shifts with a patient-to-nurse ratio of 3-4:1. Night shift nurses may have a 3-5:1 patient ratio. Charge

nurses do not carry a patient care assignment. The unit also employs certified nursing assistants with an 8-12:1 patient ratio for tasks related to activities of daily living such as turning, feeding, hygiene, movement, and toileting.

Participants

Specific aims of the project included a reduction in the incidence of HAPI and successful adoption of the intervention by nursing staff on the project unit. Due to the twofold nature of the project, the target patient population who received the intervention and the nursing staff who implemented it were considered participants.

Patients

Inclusion and exclusion criteria for patients are summarized in Table 2. Patients assessed to be at risk for PI on admission (Braden score ≤ 18), with intact skin over the sacrum and no tape allergy, were eligible for inclusion. Because foam dressings should be avoided in the setting of high moisture, patients with a Braden sub-category score for moisture of < 3 , or those with incontinence (urinary or fecal), or uncontained diarrhea were excluded. Patients with a history of sacral PI or scarring were also excluded.

Table 2

Summary of Inclusion and Exclusion Criteria for Patient Participants

Inclusion	Exclusion
<24 hours admission to unit	Braden sub-category: Moisture < 3
≤ 18 Braden score	Incontinence or free soiling onto skin
No tape allergy	Uncontained liquid diarrhea even if continent
Intact sacral skin	Sacrum: history of sacral PI, sacral scar, or patient states prior sacral PI

The total number of participants in the study was based on a convenience sample of all eligible patients admitted to the unit during the project timeline from May through June 2021.

Nurses

The project initially was intended to begin with staff nurses who were voluntarily recruited from core staff on the unit to assess and enroll patients. However, due to staffing complexities and

the difficulties of only assigning patients to volunteers, the AM and the PL determined project implementation would be most successful if the PL assessed patients for eligibility and initiated the protocol. The PL, AM, and charge RNs briefed all unit staff on the protocol and provided whiteboard updates for protocol details and the particulars of the intervention charting. All staff RNs on the project unit were invited to complete a post-project survey.

Implementation and Data Collection

A comprehensive workflow document was created that detailed staff roles (Appendix D). Using the PDSA (IHI, 2020) cycle, the PL modified the workflow by simplifying roles, clarifying procedures, and eliminating some protocol charting requirements related to staff input.

Implementation

Patients. The patient was fully informed using an approved script and then assented to the project by the charge nurse, assigned nurse, or PL (Appendix D). The foam dressing was then placed on the patient's cleansed coccyx. Every 12 hours, the dressing was lifted from the top, and the sacral skin was viewed. On the third day, the dressing was replaced, and on the sixth day, the dressing was removed. The dressing may also have been replaced if soiled or dislodged. The dressing would have been removed at patient request, on discharge from the hospital, or when transferred to another unit.

Nurses. Nurses were fully informed regarding the project protocol through huddle, email, and fliers posted on the unit. Assessing the nurses' willingness to adopt the intervention was done through the RN Unit Post Satisfaction Survey (Appendix E).

Data Collection Instruments

Patient Data Collection Sheets. When using the data collection sheet with the first patient, it was evident that the sheet did not include the best information. The data collection sheet was split into two documents (Appendix F). Datasheet A was primarily used to collect charting data regarding the standard of care, whereas datasheet B was used to collect charting data regarding protocol specifics.

RN Unit Post Satisfaction Survey. The RN Unit Post Satisfaction Survey (Appendix E) was used to assess whether the intervention created a sustainable project that was acceptable and feasible to the nursing staff on the unit. The emailed survey had a QR code as an option and a clickable hyperlink (Appendix G). Anticipating emails may not be widely read, the PL also provided hard copy, pen and paper surveys which were placed at the charge nurse desk.

Ethical Considerations

The project was reviewed and approved by the Seattle Pacific University Internal Review Board (IRB). In addition, a hospital IRB for the project was submitted, reviewed, and approved.

Results

Ultimately, none of the six patients enrolled in the project developed a pressure injury when a sacral-specific foam dressing was placed on the sacrum over intact skin. The intervention was designed to be staff-driven and provide uniformity for the existing practice of utilizing foam dressings as prevention for PI. A second aim of the project was to discover whether the new protocol would be readily adopted by RN staff.

Patients

There were 243 patients admitted to the unit during the project timeline (Appendix H). Of those 243 patients, 237 or 98% were excluded. Total Braden scores were the predominant disqualifier as out of those 237 patients, 107 or 45%, had a score ≥ 18 . Of those who met inclusion criteria, just 23 or 9% were excluded, with having been on the unit >24 hours as the primary disqualifier. Other exclusions related to the logistics of accessing patients. Of the patients admitted to the unit, 76 or 31% were not assessed for inclusion or exclusion criteria.

For the six patients enrolled, no patient developed a pressure injury. The ages of patients enrolled ranged from 53 to >90 years of age, with three females and three males. Total Braden scores on admission ranged between 16-18 with the moisture sub-category of either 3 or 4, and with two patients at each level. The total time in protocol ranged between 4 hours to 6 days.

Table 3*Summary Demographics with Braden Scores for Patient Participants*

Patient ID	#1	#2	#3	#4	#5	#6
Age	68	73	>90	53	89	62
Sex	Male	Female	Female	Male	Female	Male
Braden Score with Sub-Categories						
Sensory	3	3	4	4	3	3
Nutrition	3	2	2	2	2	3
Moisture	4	3	4	4	3	3
Friction/Shear	3	2	2	3	3	3
Activity	2	3	3	2	2	3
Mobility	2	3	3	2	3	3
Total Braden	17	16	18	17	16	18
Time in Protocol	6 days	4 hours	4 days	3 days	5 days	2 days
Pressure Injury Yes/No	No	No	No	No	No	No

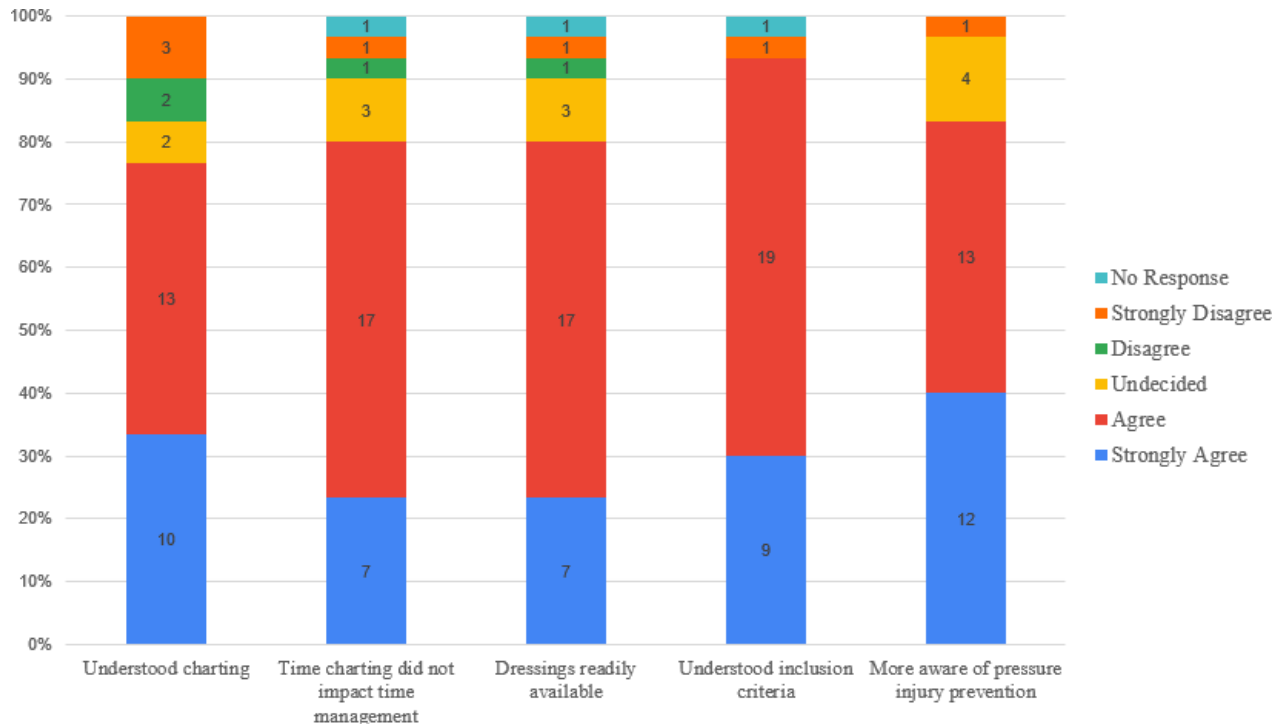
Nurses

A second aim of the project was the successful adoption of the intervention by nursing staff. The intervention was assessed by encouraging RNs to participate in the RN Unit Post Satisfaction Survey (Appendix E). The survey was available for 17 days. With 64 nurses available to complete the survey, 30 were returned (47%). Staff demographic data were not collected to protect staff privacy.

As noted in Figure 2, survey results showed close to 80% of RNs indicated agree or strongly agree in all areas. The single category dropping below 80% queried whether RNs understood the charting requirements. The category rising above 90% asked if RNs understood the inclusion criteria for the intervention. Eight surveys were returned with remarks added in the free writing section. Some comments endorsed the protocol as effective PI prevention with an easy-to-follow protocol. Other remarks referred to the restrictive exclusion criteria and the added workload. One commenter stated that the charge nurse's role was unclear when the PL was unavailable. There were also a few personal congratulatory notes.

Figure 2

RN Unit Post Satisfaction Survey



Discussion

No patient enrolled in the project developed a pressure injury, and the dressing showed promise in mitigating the incidence of HAPI. However, with limited enrollment, it is appropriate to give a cautious endorsement of the intervention rather than a sweeping one. Specific aims of the project included a reduction in the incidence of HAPI and successful adoption of the intervention by nursing staff on the project unit. The project aims will each be discussed, along with recommendations.

The Patient Experience

Information gathered from the patient experience was integral to many PDSA modifications and added a layer of complexity to the project that was not anticipated. For example, one patient agreed to the dressing placement but then refused skin assessment. As this was a safety issue, patients who refused assessment were removed from the project. Another example was the vendor recommendation to apply skin prep before the foam dressing to promote dressing adherence.

However, when skin prep was applied, patients reported discomfort when nurses lifted the dressing to assess the skin. The skin prep was then discontinued from the protocol. Finally, one patient initially met all criteria for inclusion in the when protocol; however, after five days in the hospital, this elderly patient had become incontinent, though the skin remained intact. The protocol was again modified to remove patients from protocol who no longer met inclusion criteria for continence.

Standard of Care for Pressure Injury Prevention

Although the hospital has defined a standard of care based on overall Braden scores and includes some but not all sub-scores, determining whether the standard of care was met (i.e., process indicators/measures) was difficult. The literature was reviewed for guidance on how researchers determined that the standard of care was met during data analysis for those projects. Many of the studies offered detailed descriptions of what encompassed the standard of care; however, the detailed process measure was not discussed, and it remained unclear if the expected standard of care had been met in those studies (Forni et al., 2018; Fulbrook et al., 2019; Kalowes et al., 2016; Padula, 2017; Ramundo et al., 2018; Riemenschneider, K., 2018; Rondinelli et al., 2018; Santamaria et al., 2015; Strauss et al., 2018).

Next, the *Prevention and Treatment of Pressure Ulcers: Quick Reference Guide* [Guide] was examined (NPUAP et al., 2014). The Guide detailed what actions constituted the standard of care. These included the organization creating a systems-level PI prevention protocol using a validated PI risk tool, establishing mandates for PI assessment and interventions, a pressure ulcer prevention plan using a validated risk tool like the Braden Scale, patient treatment plans and goals, pain management plans and appropriate patient/family education. When these items were implemented at the systems level, the standard of care was in place. Due to the complex interactions of a multidisciplinary team required to plan and implement the standard of care, assessing whether that measure had been met during the protocol remained unknown to the nurses charting interventions at the bedside.

The RN Experience – RN Unit Post Satisfaction Survey

This charting uncertainty was reflected in the RN Unit Post Satisfaction Survey (Appendix E), which evaluated the project aim, exploring how RNs perceived the project with the goal of sustainability for the intervention. The survey was anonymous and open to every RN assigned to work during the project, regardless of having a patient in the protocol. In analyzing the data, the results showed variability in replies, which could indicate thoughtful responses rather than socially desired answers, as the PL was also a staff member of the unit. Nevertheless, with a 47% response rate, the survey was considered an adequate representation of RN opinions of the project.

Overall, the results were positive. The responses were categorized into two general categories: agree (strongly agree) and disagree (undecided, disagree, and strongly disagree). The survey showed three questions with 80% of respondents choosing agree, one question with >90% in agreement, and one with >75% agreeing. Though the responses were positive, the questions relating to time management, whether the dressings were available, and significantly, the charting protocol may be a barrier to sustainability.

The charting protocol continued to be poorly understood throughout the project, in part because it evolved so quickly. This difficulty in charting was reflected in the survey. Though 76.6% of respondents agreed or strongly agreed they understood the charting protocol, this question was the only one dropping below 80%. Problems with charting were identified quickly and then modified. Though necessary, this action also created a barrier to sustainability as nurses had to learn the latest version when assigned a patient in protocol. Among other modifications, the five-page protocol was reduced to one page, and protocol remarks initially required in multiple areas in the EHR were reduced to two. Clearly, stabilizing the charting protocol remains a priority to support sustainability.

The impact on time management was not considered a significant problem, with 82.7% of nurses strongly agreeing or agreeing. This finding contrasted with <80% agreeing the charting protocol was understandable. The differences could have been due to nurses responding to the

survey who had not worked with a patient in protocol. Another reason may be nurses who responded worked with patients in protocol towards the end of the project when the charting requirements were vastly more simplified.

Interestingly, when posed with the question of whether they were more aware of pressure injury prevention after the project was complete, 83% of nurses (n=30) resoundingly agreed they were more aware after exposure to the project. Though the project never became self-sustaining, this finding may translate to other projects where exposure may bring learning.

Sustainability and Dissemination Plan

No pressure injuries or adverse effects were noted during the project. Due to time constraints and complexity, the protocol and the dressing tracking tool should be simplified to promote sustainability. With limited enrollment, the dressing showed promise, which validated nurses' independent practice decision to use foam dressings for pressure injury prevention. Though nurses endorsed using a tracking tool for prevention, feedback from nurses confirmed the project protocol and suggested the tracking tool documentation was too complex. Time was also a factor noted in the survey. With chronic short-staffing related to Covid-19, a global concern, adding a new process would be challenging as even the best ideas need front-line support.

Understanding whether the standard of care was met for PI interventions at the unit level remained poorly understood. Though nurses and CNAs were actively engaged in PI prevention through actions and charting those interventions, the measure at the staff level remained unclear. Additional education on how to pair Braden scores with specific interventions may bring clarity.

Plan for Dissemination

An executive summary was prepared, which offered a concise representation of the project findings, limitations, and plan for sustainability in a two-page document. The final project will be presented to the CNO committee with recommendations, including prioritizing a tracking tool for the prevention dressing in the EHR.

Future projects should consider including patients who met exclusion criteria that may

benefit from a prevention dressing. For example, patients who are obese or cachectic should also be considered regardless of Braden Score. In addition, on the next EHR upgrade, the flowsheet tracking existing lines, drains, and wounds should be modified to include prevention dressings.

Finally, the survey results supported how 83% of RNs were more aware of PI prevention after exposure to the project. Surveying staff interests and supporting QI projects may also increase knowledge at the staff nurse level, promoting sustainability in various areas.

Strengths and Limitations

A significant strength for the project was found in the PLs relationship with the project unit, which allowed adjustments in real-time, based on the PDSA format. Another strength was the unwavering support for the project's success from unit leadership and other key stakeholders.

What was considered a strength could also be a limitation. For example, the RN Unit Post Survey answers may have reflected bias as the PLs colleagues were subjects in the project and wanted her to succeed. In addition, that close relationship made the PL acutely aware that staff were burdened by the extra work the project was generating. In response, the PL took on more responsibility which may have impacted sustainability. Another significant limitation was how little the existing documentation system could be altered to support a tracking tool for the prevention dressing. Finally, perhaps the most telling limitation was implementing a QI project during the ongoing Covid-19 global pandemic, which has already placed unprecedented stress on healthcare systems, including critical staffing shortages.

Implications for Practice

Implications for practice suggest creating a new protocol during the stressors related to the ongoing Covid-19 pandemic may be poor timing. However, despite pandemic-related complications, the study results showed that the nursing staff could successfully adopt the intervention, though some aspects were confusing at times.

Despite promising results both for patients and adoption by nurses, challenges remain integrating the protocol steps into a usable model. Nurses who are well versed in evidence-based

practice, may be more willing to use a simple to implement protocol where the benefits are easily understood.

Conclusion

Though a limited sample size, this single unit in an acute care hospital experienced no pressure injuries during the application of foam dressings as PI prevention, specifically ALLEVYN™ (n.d.) Life 9" x 9" sacral dressings. These findings offer further evidence that the application of a sacral dressing to the sacrum over intact skin, in addition to the standard of care for PI prevention, is effective in preventing HAPI in acute care hospitalized patients. Health system leadership responsible for policy should consider adding the sacral foam dressing as HAPI prevention. During the planning phase, the team should consider that nurses currently apply preventative dressings to intact skin as an individual practice decision. The importance of a tracking tool for skin or wound management cannot be overemphasized. There is also a need for a simplified protocol that will not tax nurses who are already overburdened with the ramifications of the ongoing Covid-19 pandemic. Though not easy to implement during the current extreme challenges, QI projects designed to improve patient outcomes should continue. Our best hope is to support new practice by implementing evidence-based interventions as we seek ways to improve the lives of patients and their families.

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Appendix A

Braden Scale for Predicting Pressure Sore Risk

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

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 1/2 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 1/2 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 1/2 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.					
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Appendix B

Stakeholder Analysis

Stakeholder	Expertise		Willingness	Value	
	Contribution	Legitimacy	Willingness to Engage	Influence	Necessity of Involvement
Patient	Low	Low	High	N/A	High
Bedside RNs	High	High	High	High	High
Charge RNs	Medium	High	Medium	High	High
Unit Assistant Manager	High	High	High	High	High
Unit Manager	Low	Low	Low	High	Low
Materials Management	High	Low	Low	Low	Low
CNO Team	High	Low	Low	High	Low
Wound Care Team	Medium	Low	Low	Medium	Low
Stakeholder Terms (IHI, 2020)					
Contribution:	Does the stakeholder have expertise or knowledge that could be helpful to the project?				
Legitimacy:	Is the stakeholder’s claim for engagement legitimate? Directly affected by activity?				
Willingness to Engage	Is the stakeholder willing to engage? Proactive and already engaging?				
Influence:	Does the stakeholder have influence over other stakeholders necessary for the project to succeed?				
Necessity of Involvement:	Is this stakeholder someone who could delegitimize the project if not included?				

Appendix C

SWOT Analysis

STRENGTHS

- Teaching hospital
- Committed to outreach for the poor and underserved
- Dynamic Nurse Educator team engaged in quality improvement with experience in successful project development
- Agency Mentor/Project Mentor (PM) is a senior leader in QI projects and the unit assistant manager

WEAKNESSES

- Resources may be limited during 2021 related to COVID-19 Pandemic
- Nationwide, hospitals are short staffed
- Nursing will be the front-line implementation team and may be already stretched related to staffing and COVID-19 related difficulties
- Sourcing sufficient foam dressings and having them available on hand

OPPORTUNITIES

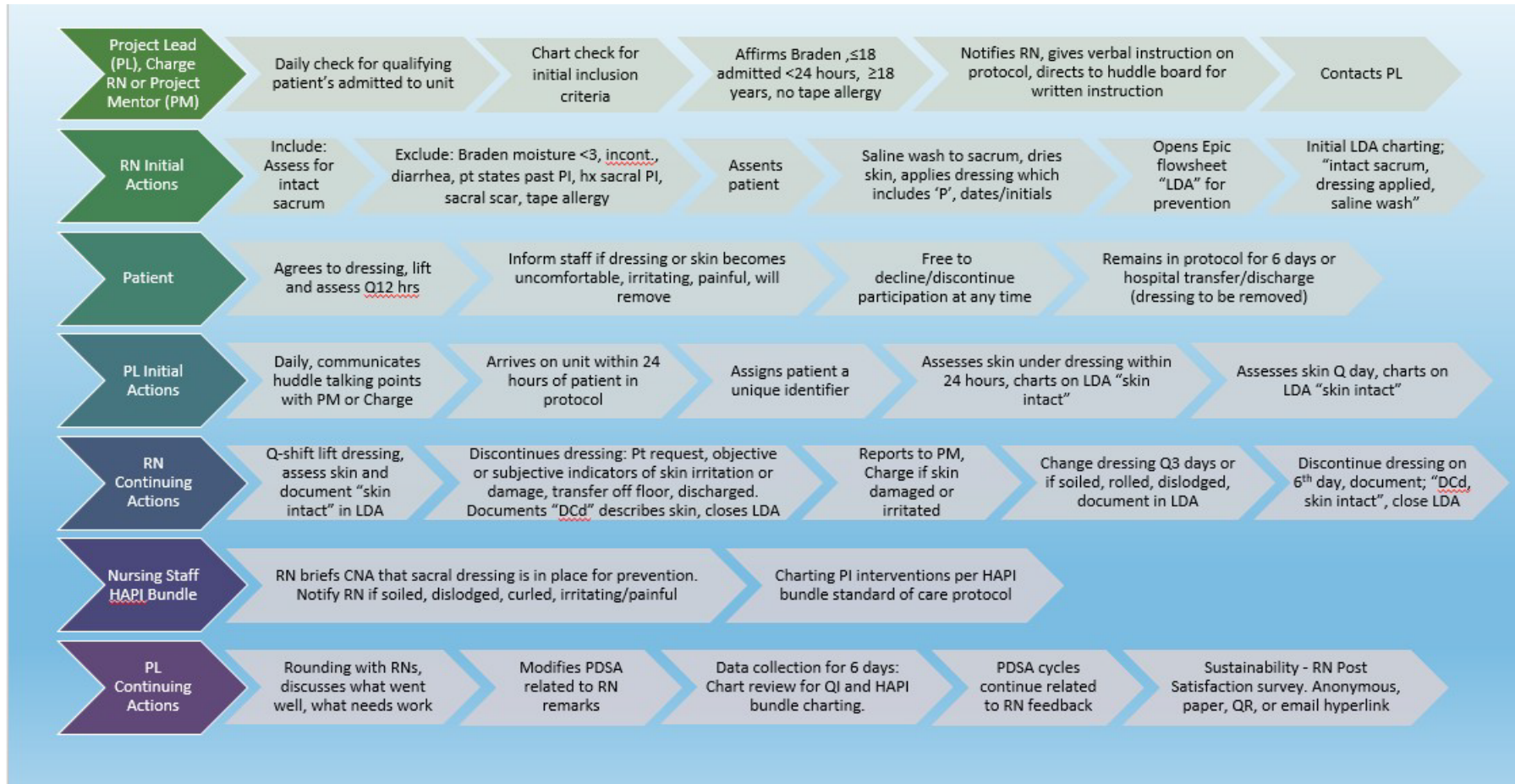
- Using foam dressings to improve HAPI rates has been discussed by the Nurse Educator team
- Leadership is on board with efforts to reduce HAPI
- Nurses use foam dressings for HAPI prevention as an individual practice decision

THREATS

- Nurses may be resistant to adding 'one more thing' to worklist
- Lack of knowledge regarding implementation
- Costs of foam dressings may be prohibitive in current economic situation related to COVID-19
- Momentum stalled by lack of supplies, communication with frontline staff

Appendix D

Workflow Diagram



Appendix E

RN Unit Post Satisfaction Survey

1. I understood the charting protocol

Mark only one oval.

- Strongly disagree
 Disagree
 Undecided
 Agree
 Strongly agree

2. The dressings were readily available

Mark only one oval.

- Strongly disagree
 Disagree
 Undecided
 Agree
 Strongly agree

3. The time spent charting did not impact my time management significantly

Mark only one oval.

- Strongly disagree
 Disagree
 Undecided
 Agree
 Strongly agree

4. I understood the inclusion criteria

Mark only one oval.

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree

5. I am more aware of pressure injury prevention

Mark only one oval.

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree

6. Please offer suggestions for improvement. Thank you! (feel free to use the back!)

Appendix F

Data Collection Sheet A – Standard of Care

DEMOGRAPHICS					SACRAL DRESSING						HAPI BUNDLE INTERVENTIONS QUICK CHARTED									
Project ID	Dates in Protocol	Age	Sex	5A Admit Braden	Sacral Dsg placed/replaced/why?	LDA? Opened? Charted? Not Charted?	Dressing dated per protocol?	Q12 hours: Lift and Assess?	Pressure Injury Sacrum	Pressure Injury Staging	Sensory Perception Braden	interventions	Nutrition Braden	interventions	Moisture Braden	interventions	Friction Shear Braden	interventions	Activity Mobility Braden	interventions
												elevate heels		nutrition consult		daily skin hygiene		bed linens: clean, dry and wrinkle free		turning Q2 hrs scheduling for Braden, <3
												waffle mattress overlay		out of bed for meals		incontinence skin protection: barrier wipes and dimethicone based cream		HOB <=30 degrees		micro turns ok
												pillows in use				denuded or damaged top layer skin: dimethicone based cream		2 person lift with draw sheet to pull patient up in bed		PT consult
												patient report pain to skin, muscles, bones, joints				disposable incontinence pads rather than diapers, check with turning				mattress overlay for total Braden 13-18
																condom or urethral catheter for incontinence				encourage mobility, ambulation if possible
																fecal management system for incontinence or diarrhea x3/24hr				

Appendix G

RN Unit Post Satisfaction Survey Email

Hello Work Family!

The unit quality improvement project of applying Allevyn sacral dressings to intact skin on the sacrum is winding down.

Our project will complete close to the end of June. The survey will continue well into July, exact date to be determined.

Part of my data collection is asking nurses a few questions in the RN Post Satisfaction Survey.



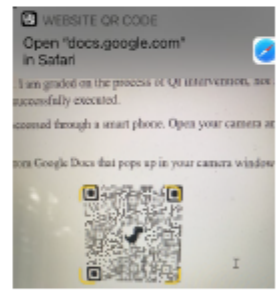
All RNs are invited to respond even if you didn't work with patients in the protocol.

This survey is anonymous. Please take the survey just once.

There is a free write section for suggestions.

Please be honest! I am graded on the process of QI intervention, not if the intervention was successfully executed.



<p>The QR code is accessed through a smart phone. Open your camera and focus on this image. </p>		<p>Click the URL from Google Docs that pops up in your camera window.</p>	
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Thank you for working so hard and making this project a success!!

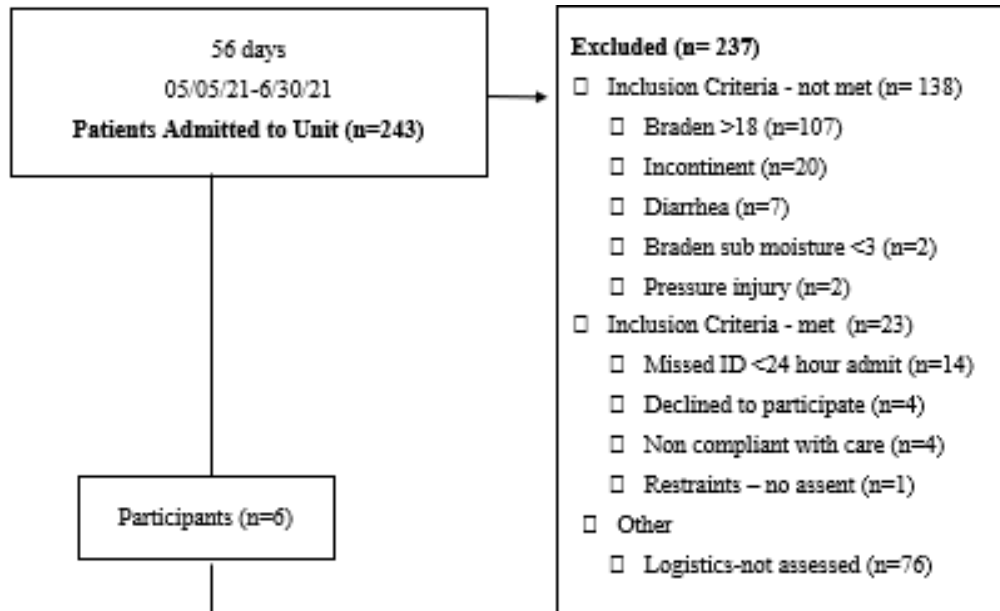
Forever Grateful,

Gia

(If you prefer a paper survey, no names and please place in Nina's file box by her office door.)

Appendix H

Patients Enrolled



Patient ID	#1	#2	#3	#4	#5	#6
Age	68	73	>90	53	89	62
Sex Assigned at Birth	Male	Female	Female	Male	Female	Male
Time in Protocol	6 days	4 hours	4 days	3 days	5 days	2 days
Pressure Injury Y/N	N	N	N	N	N	N
Braden Score with Sub-Categories						
Sensory	3	3	4	4	3	3
Nutrition	3	2	2	2	2	3
Moisture	4	3	4	4	3	3
Friction/Shear	3	2	2	3	3	3
Activity	2	3	3	2	2	3
Mobility	2	3	3	2	3	3
Total Braden	17	16	18	17	16	18