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Successfully Spreading Improvement Work Using a Proven Framework

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Section I: Abstract

Background: Hospital-acquired pressure injuries (HAPIs) are rising in the United States, increasing six percent between 2014 and 2017 alone (Agency for Healthcare Research and Quality [AHRQ], 2019). Approximately 60,000 patients die from complications related to HAPI annually (Padula & Delarmente, 2019).

Local Problem: In a Northern California Level II Trauma acute care hospital, HAPIs increased by 422% over two years, 2016-2018, with most of the HAPIs occurring in the Intensive Care Unit (ICU).

Context: This project sought to spread the *Interventions by Braden Subscale* protocol to seven medical-surgical units in the hospital using the Institute for Healthcare Improvement's (IHI) Framework for Spread and Lewin's Change Management Theory.

Interventions: A baseline survey was disseminated to ascertain the level of knowledge on the IHI Framework for Spread, and education was subsequently developed based on the results. The *Interventions by Braden Subscale* protocol was spread utilizing the framework to multiple medical-surgical units with the goal of reducing HAPIs.

Outcome Measures: Improve the level of knowledge among nurse leaders by 30% on the IHI Framework for Spread and reduce HAPIs in the medical-surgical units by 30%.

Results: The successful spread led to a net reduction of 34% in the incidence of all-stage HAPIs. No improvement was seen in the level of knowledge among nursing leaders on the IHI Framework for Spread. Results were analyzed from the pre-and post-education surveys and were found to not be statistically significant and may have been impacted by the SARS-COV-2 pandemic.

Conclusions: Using a structured framework to spread improvement work demonstrated benefit in this project and became the platform for the development of a committee where improvement work could be reported in a standardized way, monitored for performance, spread, and sustained over time.

Key Words*: IHI Framework for Spread, HAPI, improvement, Braden Scale*

Section II: Introduction

Background

Hospital-acquired pressure injuries (HAPIs) are rising in the United States, increasing six percent between 2014 and 2017 alone (Agency for Healthcare Research and Quality [AHRQ], 2019). Approximately 2.5 million people develop a pressure injury during hospitalization; an estimated 60,000 of those patients die from complications related to HAPI (Padula & Delarmente, 2019). The cost per HAPI ranges from $500 to $70,000, while the impact on healthcare costs nationally ranges from $3.3 billion to $11 billion (Padula & Delarmente, 2019). A patient who develops a HAPI may experience longer lengths of stay in the hospital, acute pain, infection, difficulties with mobilizing or sitting, and potential to discharge from the hospital to a non-home-based care environment, such as a skilled nursing facility.

In a Northern California Level II Trauma acute care hospital, hospital acquired pressure injuries (HAPIs) increased by 422% between 2016 and 2018, with most of the HAPIs occurring in the Intensive Care Unit, (Appendix A) a 30-bed mixed population of medical/surgical, cardiac, and trauma patients. In July 2018, the rate of HAPIs in the ICU was 9.515/1000 patient days (B. Cruz, personal communication, June 30, 2020). In June of 2018, a team came together that consisted of frontline staff from the ICU, the ICU manager, the Clinical Adult Services Director (CASD), quality nurse consultant, quality analyst, area quality leader, and a managerial consultant. The team's purpose was to identify the root cause of the increase in HAPIs and implement targeted process improvement plans to decrease the incidence of HAPIs in the ICU. The process improvement framework used was the plan-do-study-act (PDSA). Several different PDSA cycles were trialed with little improvement, all based on using the total Braden score. By October 2019, after four significant interventions were implemented to reduce HAPIs, the rate

was 2.812/1000 patient days (B. Cruz, personal communication, June 30, 2020). The goal was to reach zero— or get as close as possible to zero, given current literature suggesting a subset of HAPIs to be unavoidable.

In September of 2019, the American Association of Critical Care Nursing (AACN) published Hospital-Acquired Pressure Injuries in Critical and Progressive Care: Avoidable Versus Unavoidable (Pittman et al., 2019). Pittman et al. (2019) aimed to develop a scientific instrument for use in a study of 165 patients to determine who developed an avoidable versus unavoidable HAPI. Pittman's 2019 study fostered a desire to develop a protocol for evidence-based interventions implemented at specific subscale scores instead of a total score (Appendix B). Pittman's research evaluated the use of specific interventions, based on the Braden subscales, though the methodology was retrospective. The protocol applied the same use of specific interventions based on the Braden subscale; however, the application was prospective. For the Interventions by Braden Subscale protocol pilot in the ICU, baseline data were collected, and the nursing staff educated on the new protocol. Implementation began in November 2019 and was completed in May 2020. At pilot completion, HAPIs in the ICU had been reduced from a rate of 2.812/1000 patient days to 0.572/1000 patient days (Appendix C) (B. Cruz, personal communication, June 30, 2020).

Massoud et al. (2006) recognized that that ability to spread innovations and new ideas is the difference between a best practice and a common practice. The successful reduction of HAPIs in the ICU became a best practice, to make it a common practice across the medical center this author sought out to spread the protocol and further reduce the incidence of HAPIs. Spreading the pilot to seven additional nursing units represented a large project that would benefit from using a framework for spread, rather than an organic method, such as word-of-

mouth. Barker et al. (2016) noted that without use of a framework to scale up, it could take years for spread implementation. Formally spreading best practices is also seen as an important element to sustainability. Ament et al. (2017) performed a qualitative case study to identify factors related to sustainability of quality improvement work after a successful implementation. Spread was identified as an important factor because it represented a validation of the effectiveness of the quality improvement implemented, and thus improved the intention to sustain the gains (Ament et al., 2017).

For the spread of the *Interventions by Braden Subscale* protocol, this author chose to use the IHI Framework for Spread. The Institute for Healthcare Improvement (IHI) Framework for Spread is founded on Everett Rogers's diffusion theory and organizational experience of spreading improvement work from a local site to an entire system (Massoud et al., 2006).

Problem Description

Spreading a best practice in healthcare institutions is challenging and takes considerable time (Morgenthaler et al., 2012). Mittman (2014) noted that success of a single pilot may be due to the resources extended to the pilot, and that spreading and scaling the same work successfully requires at least equivalent resources, if not more. The Interventions by Braden Subscale protocol pilot was implemented at a hospital where process improvement is ingrained in the culture, although spreading improvement via a specific framework is not. The hospital did not have a formal structure to monitor improvements over time, an impediment to advocating for change, or spreading, scaling, and sustaining a successful project.

Setting

The setting for this project was a 241-bed, acute care, Level II Trauma hospital in Northern California; herein referred to as Hospital A. Hospital A serves a catchment area

population of 509,062 and has 221,878 members. The hospital employs over 4,500 healthcare workers and has over 550 physicians on staff (B. Cruz, personal communication, August 7, 2020). Total patient days in 2019 were 60,018, adult medical/surgical patient days were 35, 851, and the average length of stay was 3.62 days (B. Cruz, personal communication, August 7, 2020). The hospital had 132,565 emergency room visits in 2019 (B. Cruz, personal communication, August 7, 2020).

Specific Aims

The purpose of the project was to implement a formal spread model within the hospital and assess the knowledge attainment of leadership of the key principles of spread. The project had three specific aims. The first aim was to improve the level of knowledge among hospital leaders about spreading quality improvement work to sustain gains over time. The quality improvement framework selected was the IHI Framework for Spread (Appendix D); the target was a 30% increase from baseline within six months. The second aim was to decrease the incidence of avoidable HAPIs through the implementation of the Interventions by Braden Subscale protocol in other units by 30% in six months. The proposal's final aim was to spread the *Interventions by Braden Subscale* protocol from the ICU, using the IHI Framework for Spread, to seven medical-surgical units by September 1, 2021. The aim to reduce HAPIs was a result of instituting the IHI spread model within the identified units within the facility.

Available Knowledge

PICOT Question

A question was developed using the structured PICOT (Patient Population, Intervention, Comparison, Outcome, and Time) format to evaluate the evidence in the literature related to the IHI Framework to spread improvements. The PICOT question used to guide the literature search

was: In organizations (P), how does using the IHI Framework for Spread(I) compared to no framework(C) impact spread and sustainability (O) within six months (T).

Search Methodology

The following databases were used in the literature search: the Cochrane Database of Systematic Reviews, Cumulative Index of Nursing and Allied Health (CINAHL), and PubMed. Articles not printed in English or published before 2004 were excluded from the search. Search terms included “pressure injury”, “risk assessment”, “prevention”, “Braden subscale”, “Braden scale”, “IHI Framework for Spread”, “quality improvement”, “spread”, and “sustainability”. Search terms were combined using Boolean phrases “OR” and “AND”. Additional articles were found from cited material in articles reviewed from the above databases. Articles were chosen based on the applicability to acute care hospitals, Braden subscale utilization to prevent HAPIs, use of a framework to spread improvement work, and articles published most recently. All articles were appraised using the Johns Hopkins Nursing Evidence-Based Practice Appraisal Tools (Appendix E) (Dang & Dearholt, 2018).

Integrated Review of the Literature

The use of a specified framework to spread improvement work is superior to relying on organic methods of spread (Barker et al., 2016). A detailed framework, such as the IHI Framework for Spread, provides seven components to a comprehensive spread program that is likely to be sustained. First and foremost, the organization where the spread is to take place must be supportive of the work and the work must align with the overall strategic plan. Another important factor in spread work is to apply the appropriate number and type of resources, otherwise spread is likely to stall or halt completely. Lastly, continuous monitoring and feedback create a loop that supports the sustainability of the work.

The literature identified an opportunity to of using the same old Braden Scale in a new way. Instead of implementing interventions based on the total score, evidence showed improved sensitivity and specificity in the subscale scores. Using the subscale scores to define appropriate interventions may lead to improved rates of HAPIs and better utilization of resources.

Synthesis of the Evidence

The first part of the review below is related to the use of a specific framework to spread improvement work. The second part is a synthesis of the evidence for the use of Braden subscales to guide interventions in preventing HAPIs.

Massoud et al. (2006) published an article outlining how the use of the IHI Framework for Spread expanded improvement work around patient access in The Veterans Health Administration (VHA) to over 1,800 outpatient clinics over a two-year period. Using the framework, waiting times for a patient to get an appointment decreased from 60.4 days to 28.4 days over the course of the project (Massoud et al., 2006). Two years later, the VHA sustained and continued to improve the waiting times to less than 25 days (Massoud et al., 2006). The authors found that using a framework allowed an organization to consider specifics, including if the organization is ready for spread (Massoud et al., 2006).

A quality improvement project to implement venous-thromboembolism (VTE) prophylaxis, via computerized order sets, in two hospitals was found to be successful in reducing VTE (Morgenthaler et al., 2012). Realizing this was a best practice, Morgenthaler et al. (2012) set out to diffuse the best practice to 79 other hospital services. Moving best practices from research to the patient's bedside can take as long as 17 years (Balas & Borden, 2000). Morgethaler et al. (2012) had a successful pilot, the next step was creation of a spread leadership team, the setup plan, and strengthening the social system through consistent and adaptable

communication methods. The authors used an adapted version of the IHI Framework for Spread and noted that success of the diffusion, and sustainability, was mainly attributed to the spread team, willingness of stakeholders to adapt to new ideas, measurement and feedback, and commitment from the organization for resources to complete the work (Morgenthaler et al., 2012).

In a qualitative study to uncover feedback from leaders on spreading, scaling, and sustaining quality improvement work, Gramlich et al. (2020) interviewed 44 physician and hospital leaders. A survey was created after work on spreading an Enhanced Recovery After Surgery (ERAS) process improvement project was implemented and completed. The survey found that a supportive environment, role of nurse coordinators and champions, and leadership all play a significant role in the success of spreading, scaling, and sustaining improvement work (Gramlich et al., 2020). Key findings from this survey align with the IHI's Framework for Spread and validates the benefit of using a structured method to expand improvement work.

Further validation of Gramlich et al.'s work (2020), is found in Sandberg's (2018) article where she relays her personal experience as a quality improvement leader using the IHI Framework for Spread. Sandberg is a physician who was a key member of a small team that implemented several small PDSAs which led to a large, and successful, spread effort. Support systems, such as culture and leadership, are vital to the success of any project. Teams can be made up of just a few individuals, to groups of individuals, but the bottom line is that successfully implementing and spreading improvement work cannot be done alone. Sandberg (2018) notes that leaders play a large role in purposefully planning quality improvement spread work, helping to identify the right team members, and allocating the resources needed for the work.

Ament et al. (2017) performed a survey of 26 individuals involved with improvement work that occurred three to six years prior, to understand factors that lead to sustainability. Several factors were identified as having led to sustainability several years later: adaptability of the work, cost-effectiveness, low turnover of staff, short formal and informal communication lines, and spread (Ament et al., 2017). It is interesting to read how the simple fact that improvement work was spread sets the stage for its intention and aids in sustainability. Comparing factors that led to sustainability to the IHI's Framework for Spread, further validates that a structured process to magnify successful projects indeed has great benefits. Another valuable discovery is that the implementation process of the initial work was not found to be related to sustainability, rather continuous monitoring and feedback supporting sustainability (Ament et al. 2017).

Braden Scale and Subscale

The Braden Scale was developed in 1987 based on a study of nursing home patients, to be used as a risk assessment tool predicting risk of pressure injuries (Braden & Bergstrom, 1987). Six subscales make up the total Braden score: sensory perception, moisture, activity, mobility, nutrition, and friction/shear. Each subscale has its scoring system, starting with one, the lowest score and highest risk, up to four, the highest score, or least at risk. The friction/shear subscale is the only subscale where the max score is three, least at risk. The lower the total Braden scale score, the higher the risk the patient has of HAPI development. Generally, several different preventative measures will be implemented for the patient, not knowing what to target. If the patient's total score is 15, and reviewing the subscales, the patient scored lowest on moisture and friction/shear, then preventative measures targeting decreasing moisture and friction/shear can be implemented.

In much of the literature reviewed, the Braden Scale is considered outdated and lacking in its ability to predict pressure injury (PI) development in current-day settings. Cox (2012) identified advanced age, length of stay in the intensive care unit (ICU) beyond five days, emergent admission to the ICU, the severity of illness, use of vasopressors, and other factors that the Braden scale does not address. Cox recommends modifications to the current Braden Scale in relation to critical care patients. The Braden scale is a significant predictor of PI development in critical care though it has low specificity (64%), and positive predictive value (61%) (Cox, 2012).

Several articles have reviewed the sensitivity, specificity, positive predictive value, and negative predictive value of some or all the subscales, versus the total score. Evidence in the literature is mixed on the sensitivity and specificity of the Braden Scale and at which cut-off score provides the most sensitivity and specificity. Alderden et al. (2018), in a literature review, found the sensitivity to be anywhere between 75%-92.5% and specificity to be between 26%-100%. Variation exists with the Braden total cut-off score use; 18 is the most-widely used cut-off score in the United States (Mordiffi et al., 2018). Sensitivity is high in the Braden scale, though specificity is lower, the effectiveness of using the Braden Scale in the critical care population as it exists is diluted, as almost all critical care patients are at risk. This phenomenon may answer why there is an increasing rate of HAPIs developing though a highly predictive risk assessment scale is widely in use. Many articles point to the potential benefit of using subscales to predict PI development, though there are limited studies available in the literature.

Most protocols implement preventative measures for HAPIs based on the cumulative Braden scale score. The Braden scale cut off score for risk is at or below 18, at which time interventions are typically implemented (Alderden et al., 2017). Patients may have a cumulative

Braden score over 18, though the patient has a risk in one of the Braden scale's six subscales. Lim et al. (2019) found that all Braden subscales were individually predictive of PI development, with the activity subscale as the highest predictor, followed by friction and shear. This retrospective case-control study examined PI risk factors from demographic and clinical data; predictabilities of Braden and Braden subscales; sensitivity and specificity of the Braden scale and subscales; and determined the "cut-off score level" for patients in Singapore. Findings from the study found the total Braden score and subscales were statistically significant predictors of PI development (Lim et al., 2019). The patients in the study who had a risk assessment completed were 24% less likely to develop a pressure injury, and the activity and friction/shear subscales were the most predictive seen in this population (Lim et al., 2019). Lim et al. concluded that the total Braden scale score does not aid in planning for PI prevention and that subscale scores should be individually evaluated and interpreted to guide the plan of care.

In three of the articles reviewed, friction and shear, mobility, moisture, and sensory subscales are predictive of PI development individually (Gadd & Morris, 2014, Alderden et al., 2017, & Cox, 2012), A large retrospective study of 6,377 patients found that risk varied within subscales; the lowest score within the subscale was not the highest predictor of PI development; it was the moderate risk within the subscale (Alderden et al., 2017). Alderden et al. used a time-varying Cox regression to evaluate all Braden scores assessed on each patient as the Braden score may change when the patient's condition changes. The Braden Scale may be assessed two to three times a day in most critical care patients, using one score a day would have been a constraint in the study. A limitation of Alderden et al.'s study is that no information on preventative measures was included to understand the impact on the development of HAPIs

based on the implementation of specific preventive measures. Tailoring interventions to subscale could allow for the most appropriate preventative measures to be implemented.

Found cited in Alderden et al.'s study (2017), was Gadd & Morris's study looking to validate if PI preventative measures are implemented when the Braden total score predicts the patient to be at risk (Gadd & Morris, 2014). Gadd & Morris completed a retrospective chart review of 20 patients with confirmed HAPIs in a mid-western acute care facility. The authors found that 19% of patients were found not at risk on the Braden Scale measurement (per Braden cut-off score of 18) though they had a subscale score at risk and 81% of patients had at least one day at risk (Gadd & Morris, 2014). However, interventions were not tailored to specific subscale risk 46-97% of the time (Gadd & Morris, 2014). This study's findings concluded no statistically significant relationship between the Braden cumulative score and implementation of preventative measures; there may need to be more scrutiny in subscales and to apply specific interventions related to subscale scores (Gadd & Morris, 2014).

Education of staff for the Braden scale and thoroughness of documentation are critical aspects of pressure injury prevention (PIP) programs. Lin et al. (2020) evaluated pressure injury prevention programs' effectiveness in reducing pressure injury prevalence and incidence in adult intensive care patients. In a systematic review of 21 peer-reviewed papers, most PIP programs contained 2-11 components, and the methods of staff training included posters, videos, e-learning modules, conferences, and other means (Lin et al., 2019). In five of the papers included in the systematic review, PIP programs resulted in significant decreases in pressure injury incidence (Lin et al., 2019). Limitations in Lin et al.'s systematic review was an inability to prove which interventions worked better than others.

Consideration of what constitutes a HAPI as avoidable or unavoidable has garnered recent research. Pittman et al. (2019) sought to determine the percentage of HAPIs that are unavoidable and to identify risk factors that distinguish avoidable from unavoidable PIs. The Pressure Injury Prevention Inventory and the Braden Inventory Worksheet are two instruments developed that objectively identify a HAPI as avoidable or unavoidable (Pittman et al., 2019). In this study of 165 closed electronic patient medical records from critical or progressive care units that developed a HAPI, 41% were deemed unavoidable (Pittman et al., 2019). Of the 41%, the ICU lengths of stay were longer, the incidence of bowel management devices in place was higher, and those who previously had a PI were more likely to have an unavoidable HAPI (Pittman et al., 2019).

Mordiffi et al. (2018) found that mobility subscale is a comparable predictor of PI. The Braden mobility subscale was 5.7 (95% CI 2.062, 15.676, p=0.001) times more likely to predict pressure injury development than the other five subscales (Mordiffi et al., 2018). In the comparison of the Braden scale to the mobility subscale, at the cut-off score of 17, the Braden scale has a sensitivity of 56%, a specificity of 73%, a positive predictive value (PPV) of 67.5%, and a negative predictive value (NPV) of 62.4% (Mordiffi et al., 2018). In the United States, a cut-off score of 18 is most used (Mordiffi et al., 2018). At a cut-off score of 2, the mobility subscale was found to have a sensitivity of 48%, a specificity of 85%, a PPV of 76.2%, and a NPV of 62% (Mordiffi et al., 2018). This single-site study is not generalizable, however, and there are many limitations. Collecting data retrospectively poses several risks, such as inaccuracy and incomplete medical records, and only using event reports to identify cases limits the population.

Conceptual Framework

The Institute for Healthcare Improvement's Framework for Spread was used as the framework to spread the Interventions by Subscale pilot from the ICU to seven other nursing units in Hospital A. In Massoud et al.'s (2006) white paper on using a spread framework, the authors identified key elements to recognize that a project is ready for spread. Leadership is recognized as a critical factor in any spread plan, and leadership support must be sought before projects are spread. The following seven categories are recognized as the pillars of spread: leadership, setup, better ideas, social system, communication, knowledge management, and measurement and feedback (Nolan et al., 2005) (Appendix C). Morgenthaler et al. (2012) aimed to spread the best practice for venous thromboembolism prophylaxis using a framework for spread based on IHI's framework. Morgenthaler et al. recognized that using a framework was a best practice to move research to clinical practice. Leadership was again noted to be the main ingredient in supporting a project from pilot to spread and sustainability. The use of a framework allowed for better planning and predicting needs and barriers (Morgenthaler et al., 2012). Gramlich et al. (2020) performed a qualitative study through structured interviews to identify best practices to spread, scale, and reach sustainability in improvement work. Gramlich et al. distinguished three significant themes in the interviews: resources, data, and leadership. These three themes show up as components of the IHI Framework for Spread and Gramlich et al.'s study sparked the qualitative question in this author's pre-and post-intervention survey to ascertain what Hospital A's leaders felt necessary to foster spread.

Change Management Theory

Commonly used in clinical nursing practice is Kurt Lewin's Change Management Theory, which describes change as happening in three stages; unfreeze, change, and refreeze

(Shirey, 2013). The spread aim is to spread the *Interventions by Braden Subscale* protocol to reduce avoidable HAPIs; the driving force to change this problem is the oath taken as a Registered Nurse to prevent patient harm. The aim for this project is to ascertain a baseline level of knowledge of hospital leaders in relation to the IHI's Framework for Spread, provide tailored education from the results of a baseline survey, and re-survey the same leaders. This process closely aligns with the Change Management Theory of Lewin to unfreeze, change, and refreeze (Shirey, 2013). Restraining forces, or elements that may prevent change, are habits or behaviors and lack of knowledge of hospital leaders. According to Change Management Theory, hospital leaders will unfreeze old habits of how improvement work moves through a system, change to a structured process once trained, and freeze into a new standardized method to spreading improvement work. An equilibrium will exist when the driving force can balance the restraining force, as evidenced by an improved level of knowledge of the IHI Framework for Spread, and how to utilize the framework, among hospital leaders.

Rationale

Reducing HAPIs is to reduce patient harm, and thus aligns with the mission of the organization. The *Interventions by Braden Subscale* protocol in the ICU was successful by evidence of a 58% reduction in the incidence of all-stage HAPI in the ICU thus the next logical step was to spread the work to reduce HAPIs hospital wide. The setting for this project has a dedicated department, Portfolio Management, with subject matter experts to guide process improvement work following Lean methodology. One weakness in Portfolio Management is that no structured format has been employed to sustain their work overtime. Also, the hospital did not have a formalized process to monitor and provide feedback for ongoing improvement work to support sustainability.

The project was framed to align with both the IHI Framework for Spread and Lewin's Change Management Theory. The IHI Framework for Spread (Appendix D), has several key elements; leadership, measurement and feedback, knowledge management, and communication. These four elements create a cycle where, after ideas are accepted and a team brought together, act as cogs in a wheel to lead a spread project to success.

Lewin's Change Management Theory is based on impacting the outcome by adjusting or altering the restraining or driving forces. Lewin's theory is flexible and adaptable to the dynamic healthcare environment, much like the primary elements of the IHI Framework for Spread. Lewin's theory also focuses more on the group, versus the individual; the spread project was almost entirely dependent on the group unfreezing use of the total Braden score to prevent HAPIs. The Adult Services group supported the project, advocated for change, and led the process of refreezing to the new Interventions by Braden Subscale protocol.

Section III: Methods

Context

The setting for the spread project was a 241-licensed bed Level II Trauma acute care hospital, located in Northern California, and one of more than twenty hospitals within a much larger organization in the region. The organization is a non-profit integrated healthcare system that is membership based. The immediate catchment area for the medical center is a population of 79,770, with 24.9% of the population categorized as White, 24.1% Asian, and 18.6% Black/African American (Be Healthy Sacramento, 2021). The largest percent of the population fall into age brackets of 25-54 and are more female than male (Be Healthy Sacramento, 2021). The median household income is $51, 547 compared to $74,806 in the remainder of the county. Almost 20% of families are below poverty level, compared to 10% in the remainder of the county. Lastly, the primary catchment area is undereducated compared to the rest of the county, almost 14% of the population have less than a 9th grade education level compared to 6% in the rest of the county.

Key stakeholders in the project were registered nurses, patient care technicians, respiratory therapists, wound care nurses, nurse managers, and patients. Other stakeholders were physicians, hospital leaders, and senior leaders. At the pilot's onset, senior leadership supported the work based on the sudden and significant increase of HAPIs in the ICU. The pilot was successful in the ICU; a closing presentation was made to senior leaders on the reduction in HAPI incidence and resultant cost savings/avoidance. The Chief Nursing Executive and Area Manager approved the Interventions by Braden Subscale protocol to be spread to the seven remaining Adult Services units. Hospital A’s strategic plan includes the improvement in patient safety, quality, and outcomes. The purpose of the project was to improve patient outcomes by

reducing HAPIs, and educating leaders on how to spread best practices, thus leading to improved safety and quality. The project aligned with the hospital's strategic plan to improve the quality of patient care and reduce patient harm.

Interventions

Hospital A lacked a defined and structured process to enhance quality improvement work from one service area to another. Evidence from the literature supported the use of a structured system for spreading improvement work. A baseline survey was developed in January 2021 and disseminated via email to nursing leaders in Adult Services in April 2021. The intervention was a planned educational event, developed based on the pre-intervention survey results, to improve the knowledge of Adult Services leaders on the use of a framework to spread improvement work. The education was delivered via a self-learning module, sent through email to the same nursing leader distribution list in early September 2021. A link to the post-intervention survey was included in the email, with the learning module, and two weeks were allotted for completion of the post-intervention survey. The second intervention, to achieve the aim of overall HAPI reduction, was the spread of the *Interventions by Braden Subscale* protocol. Using the IHI Framework for Spread, the *Interventions by Braden Subscale* protocol was spread to seven medical-surgical and cardiac monitoring units. In following the framework, utilization of the protocol was monitored through process measures, and the outcome measure was the incidence of all-stage HAPIs in the targeted units (Massoud et al., 2006).

Gap Analysis

A Gap Analysis completed before the project initiation revealed six gaps between the current state and the proposed future state related to knowledge of the use of the Braden subscales (Appendix F). The six gaps identified were: 1) preventative measures for HAPIs are

implemented based on Braden total score, 2) only HAPIs in the ICU are evaluated on whether it is avoidable or unavoidable, 3) there is currently no monitoring in place to track the rate of interventions implemented based on Braden subscale, 4) quality improvement work is spread organically, 5) lack of leadership training on the Institute for Healthcare Improvement Framework for Spread, and 6) no formal process exists to oversee sustainability of quality improvement work.

Absence of training was apparent in several situations. As such, specific training was developed for the frontline nurses and patient care technicians on the use of Braden subscales to guide the implementation of HAPI preventative measures. The training was conducted prior to each unit implementing the *Interventions by Braden Subscale* protocol. Education was handled peer-to-peer and the outcomes from the pilot in the ICU were used as a springboard to gain momentum.

A survey was developed to ascertain the baseline knowledge of the nurse leaders within Adult Services and used as a guide to build the training on the use of the IHI Framework for Spread. Another gap identified was that the *Interventions by Braden Subscale* protocol was only used in one unit, the ICU, leading to potential variability in the application of interventions to prevent HAPIs across the medical center. Hospital A lacked continuous monitoring of process measures over time, to monitor performance and there was no formalized method of feedback. The gap analysis was beneficial to the project by providing a guide on what actions were needed to close the gaps.

Gantt Chart

A timeline of work highlighting the key points of this project are outlined in the Gantt chart (Appendix G). The pilot work began in January 2020 and closed in June 2020. The completed pilot work, including outcomes, was presented to senior leaders in June 2020. The

project began with a literature review on how to spread improvement work in a structured manner, conducted between June and September 2020. The pre- and post-survey was developed in November 2020 and submitted to the Internal Review Board (IRB) for Hospital A in November 2020. The intervention, which was the education on the IHI Framework for Spread, was planned for April and May 2021 via several "lunch and learns." Due to multiple patient surges related to the COVID 19 pandemic, the original timeline had to be modified. As no in-person gatherings were allowed due to the pandemic, the in-person planned "lunch and learn" sessions were changed to virtual. The most significant impact to the original timeline, however, was that the intended recipients of the surveys and education were taking care of patients instead of filling their normal roles as Nurse Manager or Assistant Nurse Manager. The DNP project lead was the acting Chief Nurse Executive throughout the pandemic and often served as Incident Commander in the hospital's Command Center. There was little available time to develop surveys and education, let alone deliver the education. The hospital was in crisis mode seven days a week.

Though many elements of the project experienced a delayed start, the spread work was completed by August, education was delivered via a self-paced learning module sent in email in September, and the post-intervention surveys were completed by early October. The final step in the Gantt was to develop a formal structure to monitor for sustainability in the hospital. This gap was identified in the gap analysis and applied to many projects at the hospital in addition to the *Interventions by Braden Subscale* protocol. As such, the Hospital and Emergency department Reliability, Operational Excellence, and Safety (HEROES) committee was launched in May 2021. HEROES serves as a steering group to collaborate on and monitor performance improvement and sustainability practices in the hospital. Standardized tools for reporting,

monitoring, and reporting on sustainability were developed within the HEROES committee which is co-led by the CNE and Area Quality Leader.

Work Breakdown Structure

A work breakdown structure is a project management tool that outlines the needed elements of the project and organizes the work into phases in a hierarchical way (Waxman, 2018). Appendix H displays the Work Breakdown Structure for the spread, scale, and education project. The project began when senior leadership approved (Level 2). This first step is also the first step in IHI's Framework for Spread. The project was then separated into six phases (Level 3): literature review, budget, spread, and scale, education, measurement and feedback, and evaluation. The first phase of Level 3, the literature review, began in January 2020 and was completed by June 2020. The budget phase, which included a five-year pro forma income statement and a cash burn projection for spreading, and sustaining, HAPI improvement work, was finalized in February 2021. The education component of the project was delivered in late summer 2021. Measurement and feedback, a focal point during the spread, is planned to continue after project completion to sustain the gains. Evaluation, the last phase, concluded with a post-intervention survey in September 2021.

Responsibility/Communication Plan

The responsibility and communication plan were used to document who is responsible for creating the type of communication requested by a specific deadline, how to deliver the communication, and to whom (Appendix I). Many components of the communication plan included emails to hospital leaders to keep them engaged in the project; the pre- and post-survey, thanking the leaders for their time in participating, and what the next steps were going to be. Communication on the *Interventions by Braden Subscale* protocol, in terms of education, was

accomplished through frontlines staff champions. As noted in the matrix, there were many checkpoints for measurement and feedback with the staff, who are the end users of the protocol. This author was the Clinical Adult Services Director (CASD) until October 1, 2020, when this author became the Interim Chief Nurse Executive (CNE). This author continued with the project, serving as the Sponsor, while the incoming Interim CASD was the day-to-day Operations Leader, supported by the Wound and Ostomy Certified Nurse, a subject matter expert.

SWOT Analysis

A SWOT (strengths, weaknesses, opportunities, and threats) analysis is another project management tool with a more strategic planning perspective (Waxman, 2018) (Appendix J). One of the SWOT analysis benefits is that it assesses internal and external factors related to the project. A strength of this project is that the project was based on a pilot that had a successful outcome and garnered attention from many nurses who work on units where the protocol was set to be spread; there were many early adopters. The weakness in Hospital A was the basis for the project as Hospital A lacked a standardized method to spread improvement work and sustain that work overtime. Hospital A often implements a great idea, though struggles with sustaining the work as another great idea will roll in that needs to be implemented. An opportunity identified is that Hospital A maintains a strong culture of support for process improvement work and adoption of new ideas. A significant threat is one that can halt improvement work altogether: competing priorities. The start of the project was to be in January 2021, which is a time that typically aligns with flu season, creating a busy time in hospitals where leaders are often pulled more in clinical directions. However, we remained throughout this time in a pandemic which created the same challenge for leaders and healthcare workers, though on a much larger scale. Leaders, and frontline staff, were, and still are, working significant amounts of hours to maintain

hospital operations during intense surges of patients. Not only are the staff and leaders physically exhausted, but the healthcare workers were also mentally exhausted from the pandemic, creating unprecedented levels of burnout and compassion fatigue. A couple of the threats related to the pandemic included the inability to hold in-person training and leadership engagement due to burnout from the ongoing pandemic. Though what we realized was with the use of project management tools and a dedicated spread team well thought out beforehand, these threats were mostly mitigated. The timeline went astray, though the project still completed on time, and we realized a HAPI reduction beyond the aim. Some elements of the plan, such as an in -person training, had to be moved to virtual as all in-person gatherings or meetings at Hospital A remained suspended; virtual trainings have become more of a norm now. Due to the intense patient surge, the virtual training became a self-paced module sent via email, along with the follow-up survey.

Budget

The primary cost associated with this project was labor related to training staff to the Braden subscale protocol, the time for the Nurse Leaders to complete training for spread, and the pre-and post-surveys. The organization was fully supportive of the project and provided the necessary resources to ensure its success. The pro-forma income statement (Appendix K) forecasts expenses and revenue over the next five years and should invest in training to reduce HAPIs to continue beyond completion of the spread project. Expenses are based on the training of frontline registered nurses (RNs), patient care technicians (PCTs), assistant nurse managers (ANMs), and nurse managers (NMs) in Adult Services. There are 570 nurses, of which 80 are per diem and do not have the 40% benefit package of the other 490 nurses, 50 PCT's, five NMs, and 28 ANM's. Training for the *Interventions by Braden Subscale* protocol is 30 minutes,

completed initially, and then annually. Each year a 2.5% increase in pay is added for staff RNs and PCTs based on contract requirements. The cost of HAPIs, by stage, includes excess length of stay (LOS) attributed to the patient acquiring the HAPI. Padula and Delarmente (2019) simulated what the daily accumulation of costs are to treat patients with HAPIs based on transitions between different HAPI stages and death within acute care. The cost of a Stage 1 HAPI, with excess LOS included is $893.00; Stage 2 is $3,560.00; Stage 3/ 4 (as it can be difficult to distinguish between a 3 or 4) is $2,995.00, and a complicated Stage 3/4 (also considered unstageable) is $3,260.00. Using a baseline HAPI count as year one, the costs were $82,764.00. In year two a 64% reduction in HAPIs is potentially realized, resulting in HAPI-related expenses of $26,513.00. The expected reduction, based on continued training and spread of the *Interventions by Braden Subscale* protocol, projects total expenses in year five to be $49,673.33, of which $42,553.33 is related to training expenses.

Revenue is projected from the cost avoidance of HAPIs for Hospital A, expressed as Cash Burn Projections in Appendix L. Year One is baseline; in Year two we project a 64% reduction in HAPIs, and this is where we will begin to see a cost avoidance. Continued reduction of HAPIs is expected through Year 5 where we will see an overall reduction in HAPIs by 95% from baseline. Research shows that some HAPIs are unavoidable, thus projected reduction is capped at 95% (Pittman et al., 2019). We expect to see a return on investment, the investment spent on staff training, in Year Three. The project can lead to improved staff and patient satisfaction related to reduction in iatrogenic harm. These improvements can lead to improved financial returns through reduced turnover and value-based dollars for patient satisfaction surveys, though are not included in the Pro Forma. Thus, the cost avoidance could be underestimated.

The Cash Burn Projections represent expenses incurred before the implementation of the Intervention by Braden Subscale protocol; the baseline is the culmination of the 400% increase from the prior three years. Splitting the 400% over three years, assuming that no protocol is implemented, and no protocol training occurs, HAPI incidence would continue to increase 133% year on year. At baseline (Year One), cash burn would be $82,764; in a "do nothing" scenario, cash burn would be projected to skyrocket to almost $2.5 million by Year Five.

Based on the financial plan, with Year One as baseline, a positive return on investment of $22,946.00 will be realized by Year Three; however, in a "do nothing" scenario, the positive return negated by a cash burn of $456,403 for a net loss of $433,457. While patient and staff satisfaction measures are not included in the financial projections, there is strong evidence in the literature for extended financial benefit from staff empowerment and patient harm reduction.

The pro-forma and cash burn analysis that was completed demonstrate the need, and the ability to forecast, improved budgeting to ensure future improvement work aligns with the operational budget.

Study of the Interventions

The two primary interventions for this project were 1) spread the *Interventions by Braden Subscale* protocol using the IHI Framework for Spread, and 2) educate frontline leaders on the use of the IHI Framework for Spread. The success of the ICU pilot instilled confidence that the protocol could be spread; results of the gap and SWOT analyses suggested linking the two interventions to leverage the benefit of each. Spreading improvement work organically has been the long-standing practice at Hospital A, often with unanticipated and less than satisfactory results. Evidence from the literature (Gramlich et al., 2020; Massoud et al., 2006; Morganthlaer et al., 2012) supports using a structured framework for spread to achieve desired outcomes with

lasting impact.

Process and outcome measures were selected to assess the impact of the two interventions. Run charts were used to monitor adherence to the *Interventions by Braden Subscale* protocol per department. A control chart was used to monitor HAPI incidence among the seven departments over a period of six months. Nurse leader education on the IHI Framework for Spread was measured via pre- and post-intervention surveys, with results analyzed using an independent *t*-test. An independent *t*-test was used as responses were anonymized and the response rate differed between groups; the leaders who took the pre-intervention survey may not have been the leaders who took the post-intervention survey, but they were all given the opportunity to participate in the educational intervention.

Outcome Measures

The outcome measures for the *Interventions by Braden Subscale* protocol using the IHI Framework for Spread were (a) spread of the protocol to the remaining non-critical care units, and (b) the incidence of HAPIs. The planned rate of spread was documented in the Gantt chart and tracked via a Microsoft Excel spreadsheet. Event forms, placed when HAPIs are identified, served as the source of data for HAPI incidence. Using event forms to quantify HAPI incidence is a standard process at Hospital A. The Quality Department at Hospital A provided data on the incidence of HAPIs across the medical center and by department.

The outcome measure for educating frontline leaders on the use of the IHI Framework for Spread was knowledge related to the use of the IHI Framework for Spread, measured as an increase from baseline. A pre- and post-intervention survey was developed by the DNP project lead (Appendix M). Surveys were administered using the University of San Francisco's Qualtrics program and analyzed using Microsoft Excel.

A run chart was used to represent the protocol's utilization as a process measure by evaluating the number of times the appropriate number of interventions were implemented based on the Braden subscale, broken down by the six subscales, by department. The process measure results were assessed using iRounds, a software application unique to Hospital A. Frontline staff and leaders completed a specified number of audits per week to represent the population in the pilot's spread. The raw data from iRounds was exported to Microsoft Excel and provided as feedback to the individual nursing departments as part of the spread framework's measurement and feedback element. A control chart was used to monitor the rate of HAPIs, per 1,000 patients, over the period of six months in the seven targeted departments. The run and control charts, and data from monitoring department-specific interventions were maintained in an A3 report throughout the project.

CQI Method and Data Collection Instruments

Qualtrics Survey

A 23-item Qualtrics survey was developed consisting of multiple-choice, ranking, and free text questions. The survey started with a disclosure of its purpose, non-research status, anonymity of responses, and expected length of time to voluntarily complete. Four questions asked for demographic information, which was used to create the educational content on using the IHI Framework for Spread. The remaining 19 questions were developed to assess the respondent’s level of knowledge regarding process improvement, tools and reports used in process improvement, and the IHI Framework for Spread. Each multiple-choice question was awarded one point if correct. One ranking question was worth eight points, one point for each of eight steps placed in the correct order. Questions that were not answered or incompletely

answered received zero points. The completed surveys were exported to Microsoft Excel for statistical analysis.

MIDAS

The software application MIDAS is an internal database for quality and patient safety reporting at Hospital A. Hospital A policy requires an event form be submitted through MIDAS each time any stage HAPI is identified. As standard practice for Hospital A, tracking HAPI incidence through MIDAS was followed for the project.

iRounds

Hospital A has invested in iRounds, a software application accessible via a mobile device. The application allows the organization to develop internal audits or questionnaires, and then export the raw data to Microsoft Excel for analysis. An iRounds audit was used to track the number of interventions implemented based on the Braden subscale score. The results were tabulated into a run chart which was shared with stakeholders on an ongoing basis for feedback.

Microsoft Excel

Microsoft Excel was used to analyze data collected from Qualtrics and iRounds and served as an instrument to track the project's spread. A simple spreadsheet was created to monitor the spread rate outlined in the Gantt Chart and was included in the A3 report.

Braden Inventory Worksheet and Pressure Injury Prevention Inventory

The Braden Inventory Worksheet and the Pressure Injury Prevention Inventory (PIPI) are two instruments developed by Pittman et al. (2019) to evaluate whether a HAPI is avoidable or not. The DNP project lead received approval to use the instruments prior to implementing the pilot in the ICU (Appendix N). The Braden Inventory Worksheet is an instrument used to validate the number of correct evidence-based interventions implemented based on the patient's

Braden subscale score. The PIPI is used to aggregate the Braden Inventory Worksheet information and evaluate other documentation requirements to conclude whether the HAPI was avoidable or unavoidable (Appendix O).

All data collection tools, and analysis methods embody the continuous quality improvement (CQI) model used for this project (Appendix P).

Analysis

Both the pre-and post-intervention survey results were exported from the University of San Francisco's Qualtrics program into Microsoft Excel. Microsoft Excel was used to complete the quantitative analysis of the data. A word cloud was generated from the qualitative results of the post-survey (Appendix Q). The qualitative responses were analyzed by reviewing key terms and themes and took into account issues related to repetition.

For the 14 frontline leaders who responded to the pre-intervention survey, 57% (n= 8) held a bachelor's degree as the highest level of education, 43% (n= 6) had 10-15 years of experience in leadership roles, 100% (n= 14) had completed quality improvement work, and 57% (n = 8) had led quality improvement work within the prior two years. For the nine respondents in the post-intervention survey population, 66% (n = 6) had achieved a master's degree as their highest level of education, 44% (n = 4) had 10-15 years in leadership experience, 100% (N = 9) all had participated in quality improvement work, and 100% had led a quality improvement work within the prior two years.

Appendix R displays the results of the data analysis. The pre-intervention survey results had a M = 63.9%, and the post-intervention survey had a M = 62.5%. There was a large variation in the respondents to the post-survey. Overall, there is not sufficient evidence to say that the variance between the pre- and post-intervention surveys is statistically different. There are

several reasons why the variation may exist: (a) the nine individuals that completed the post-survey did not complete the pre-survey; (b) the self-paced module was not reviewed prior to completing the post-survey; (c) mental exhaustion creating limited brain-width to complete the requested task; (d) technological problems such as using a mobile device and not being able to review the learning module in its entirety, and/or (e) selection bias due to the fact that all respondents in each group had prior experience with quality improvement work.

Microsoft Excel was used to develop a run chart based on the data exported from iRounds ascertaining how compliant a department was utilizing the new protocol. A control chart was used to track the incidence of HAPIs per 1000 patients in the targeted departments. The run charts, data tables, and the control chart can be found in Appendix S.

Ethical Considerations

Hospital A's local Internal Review Board (IRB) determined the project was not research. A letter of non-research determination was issued by Hospital A's local IRB Research Determination Committee (Appendix T). As Hospital A requires the Principal Investigator (PI) of a project to be a PhD-prepared individual, the prior Chief Nurse Executive of Hospital A supported the project and was named PI. Leader participation was voluntary, and anonymity was protected. There were no identifying characteristics asked of the participants to the survey and the survey link response was anonymous. Participation in the survey did not affect job performance evaluations.

Two ethical principles (autonomy and beneficence), which are part of the American Nurses Association Code of Ethics, and the University of San Francisco's Jesuit Values are embodied in this quality improvement project. Autonomy, as described by Grace (2018), is a combination of self-determination, independence, freedom of will, and the ability of an

individual to self-govern their conduct. The protocol that was spread was developed from current evidence and clinical practice guidelines to reduce HAPIs. Nurses, as scientists and patient advocates, work autonomously in caring for patients, guided by scientific evidence to obtain the best patient outcomes. A large part of the IHI Framework for Spread is communication; considerable time was spent communicating the reason the protocol was developed, piloted, and spread to other units, and reinforcing the importance of continuous monitoring of performance and patient outcomes.

Beneficence, a duty to provide good, or to benefit a person (Grace, 2018), is the ethical principle most closely related to the DNP project. The *Intervention by Braden by Subscale* protocol is intended to provide the best care for patients and prevent harm. Through specific interventions based on the patient's individualized risk, the nurse is providing care in a manner to prevent harm and produce the best possible outcome, which benefits the patient. A potential risk to patient privacy was identified, as medical records were reviewed for HAPI assessments and interventions. This risk was mitigated by omitting the collection of protected health information; and anonymizing data such that patient names, medical record numbers, or dates of birth were not identified. The Quality Department provided the number of HAPIs, stage, and associated department rate from event forms. Only HAPI outcomes and associated stages were shared with the project group. Specific patient information for each patient with a HAPI is routinely reviewed by the Wound and Ostomy Certified Nurse who completes a root cause analysis and evaluates if the HAPI was avoidable. This process was adhered to throughout the project.

Three provisions from the American Nurses Association (ANA) Code of Ethics relate to this project: Provision 1.5 Relationships with Colleagues and Others, Provision 2.3 Collaboration, and Provision 3.4 Promoting a Culture of Safety (ANA, 2015). Provision 1.5

addresses the nurse maintaining professional and respectful relationships with others, and to create an environment of civility where individuals feel welcome and free to express their opinions or beliefs. Provision 2.3 is based on the nurse working collaboratively with others, inside and outside the nursing profession. Nursing does not occur in a silo. To bring evidence from the literature and practice to the bedside, the nurse must develop respectful intra and interprofessional relationships, or risk inadvertently adding barriers to improvements in patient care. Without collaboration, implementing, spreading, and sustaining improvement work would be impossible. Having respect for those who contribute to the work is vital to fulfilling Provision 3.4, Promoting a Culture of Safety (ANA, 2015). Lastly, the inclusion of ethical considerations in the advanced competency education is consistent with the University of San Francisco Jesuit values embracing care and education of the whole person (University of San Francisco, 2019).

Section IV: Results

The initial step of the Spread Project intervention was to gather a project team together. The Wound and Ostomy Certified Nurse (WOCN) joined the team as the subject matter expert, supported by two Nurse Managers as operational leaders. The Chief Nurse Executive was the project sponsor. The seven units in the Spread Project were medical-surgical and cardiac monitoring units, three cardiac units on the South Tower, and four medical-surgical on the North Tower. Both towers have their own education councils made up of front-line staff. These two councils were presented information on the pilot in the ICU, educated on the protocol, and informed that the spread of the protocol (with stakeholder approval) was planned. Council staff self-selected to participate on the Spread Project Team. All frontline staff on the team were Measureventionists; specially trained staff to correctly collect data and enter it into the iRounds application. Measureventionist is the verb used to describe the staff who are performing Measurevention. Measurevention is a simultaneous measurement and intervention process recognized by the Agency for Healthcare Research and Quality (2016).

Once the team had been formed, an A3 report was started. The project aims and the outcome measure was to reduce the incidence of all-stage HAPIs by 30% in the target units, between January and September 30th, 2021. The team developed process measures to monitor the adoption and utilization of the protocol per subscale. The South Tower, with three cardiac monitoring units, was selected to go first. Baseline data collection took place for two weeks, followed by project team members educating department staff through one-on-one education, huddle messages, and visual board notes. The South Tower had many early adopters and began to see quick pickup of the protocol, attributed to some organic spread that had taken place prior to the intervention. By the end of the project, South Tower had experienced improvement in

process measures from baseline between 3% (Moisture subscale) up to 17% (Friction and Shear subscale). The lowest performing subscale was Nutrition, though it improved from a rate of 50% compliance of interventions implemented, to 65%, like what was observed in the ICU pilot. Two HAPIs occurred within the South Tower during the project; both were evaluated and found to be unavoidable.

The North Tower had a slightly different experience. Uptake of the protocol took much longer. The education started two weeks after baseline data collection. Education consisted of huddle messages and visual board notes, but not the one-on-one training delivered in the South Tower units. The difference in education methods was based on the unit champions selecting methods they thought best for their units. The same performance measures showed much slower utilization than had occurred on South Tower. The WOCN rounded with the staff and found that most of the staff had not understood the protocol. The North Tower staff opted to only educate via huddle messages, whereas the South Tower staff used huddle messages and one-on-one training peer-to-peer. When discussing with the WOCN the difference in uptake between the two towers, it was felt that the one-on-one education from a peer was the best method to educate. One of the benefits of one-on-one education was the ability to teach back, reading a huddle message is very one-dimensional. The project team regrouped and decided to redo the education, adding peer and one-on-one education like the South Tower experience. After the second round of education, performance measures began to improve rapidly, with improvements sustained. By the end of the project, the North Tower had experienced the biggest improvement in the Friction and Shear subscale with 32% improvement. Interestingly, the Nutrition subscale, still the lowest performing of all subscales, though improved the most of all departments in the North Tower, moving from 60% at baseline to 81%. By the end of the spread project, September 30, 2021, the

HAPI incidence had moved from 0.85/1000 patients to 0.29/1000 patients, a 34% reduction that exceeded the specific aim by 4%. The results encompassed performance from all seven units where the protocol was spread.

The second intervention was the training for the nursing leader group within Adult Services on the IHI Framework for Spread. The aim was to improve the nurse leader's knowledge on the IHI Framework for Spread by 30% by September 30, 2021. The original Gantt Chart proposed a baseline assessment be disseminated by January 2021. However, due to the winter surge of patients related to the COVID-19 pandemic, the survey and project launch dates were adjusted. The baseline assessment survey was distributed in March to the Adult Services nursing leaders e-mail distribution group, which includes nurse managers, assistant nurse managers, and quality nurse consultants. Fourteen nurse leaders completed and returned the survey by the end of March. The baseline survey results were analyzed, and education was developed with the expectation to deliver the education in April and May. Again, due to pandemic-related extreme hospital operations, the class was rescheduled three times. By September, the plan for even a virtual class was abandoned and substituted with a self-paced learning module (PowerPoint presentation), which was sent to the same e-mail distribution group. A link to a post-education survey was included in the e-mail.

Nine nurse leaders responded to the post-intervention survey. Most (66%) had achieved a master's degree as their highest level of education, 44% had 10-15 years of leadership experience, all had participated in quality improvement work, and most had led quality improvement work within the prior two years.

The aim to improve the level of knowledge among nurse leaders by 30% over baseline was not met. The mean score for the pre-intervention survey was 63.9%; the post-intervention

survey mean score was 62.5%. The results from the two groups did not show a statistically significant difference. Analysis of the results revealed greater variation in responses with the post-intervention group than the pre-intervention group. In the first group, the median score was 60% and the median in the post-intervention survey was 50%, the variance, according to the t-Test was 2.09% versus 4.73%, respectively. The variations are thought to exist for several reasons; 1) difference in respondents from 14 to 9 in the second survey, 2) potentially all respondents were different in the post-intervention survey from the pre-intervention survey, and 3) the education was delivered via a self-learning module, leaders may not have completed the module before taking the survey.

One question in the survey, “What provides a supportive environment for implementing and spreading improvement work?” required a free text response, which was provided by15 of the 23 respondents to both surveys. The most common response, in the respondent’s own words, was that feedback was the most important element (40%), followed by stakeholder buy-in (33%), and leadership (29%). These results align with Gramlich et al.’s (2020) qualitative study showing that leadership was among the top support structures required to be successful, as was data, in the sense that data provided feedback.

Section V: Discussion

Summary

Kaiser Permanente exists to provide high-quality, affordable health care services and to improve the health of the members and the communities served (Kaiser Permanente, 2021). As part of the strategic plan for Hospital A, the Safety Priority Index will improve with a reduction in hospital-acquired conditions such as HAPIs. The project netted a reduction in HAPIs of 34%, meeting one of the projects aims, and aligns with Hospital A's strategic plan to improve patient safety and quality. The HAPI outcome is a result of the successful spread of the *Interventions by Braden Subscale* protocol to the remaining seven units within Adult Services. Using a structured framework to spread improvement work proved to be the strength of the project, especially during a critical time in the hospital related to the pandemic. The vision for nursing is that as leaders, clinicians, researchers, innovators and scientists, Kaiser Permanente nurses are advancing the delivery of excellent, compassionate care for members across the continuum, and boldly transforming care to improve the health of communities and the nation (Kaiser Permanente, 2021). By investing in staff, providing the tools, resources, and training to do their jobs, is the duty of leaders. The DNP project, starting from the ICU pilot to the spread of the protocol, and educating nurse leaders on the IHI Framework for Spread, parallels the vision for Nursing. The DNP applies research to advance nursing practice through the use of evidence-based practice (Dreher and Glasgow, 2017). Hence the partnership between a DNP and PhD is significant. Joyce Pittman, who led the team in the development of the Braden Inventory Worksheet and the PIPI, is a PhD-prepared nurse (Pittman et al., 2019). The *Interventions by Braden Subscale* protocol was developed based on research a PhD-prepared nurse completed.

The advanced practice nurse, such as a DNP, is positioned well to translate that research into practice.

Interpretation

The survey results do not paint a clear picture of any distinct results; there were no significant differences in the responses to the pre- and post-surveys. Both surveys were administered coming down from a COVID-19-related patient surge. The baseline survey was administered in March, at the start of a decreasing COVID-19 census from the winter. The post-intervention survey was administered in September, at the start of a decreasing COVID-19 surge from the late summer. Anecdotally, the baseline survey results represent the level of knowledge among nurse leaders in Adult Services particularly to process improvement and formalized spread. The post-intervention survey was essentially an "open-book" test with the learning module and survey in the same e-mail. The learning module, intentionally simple, was still something more to learn for a staff of leaders who had just completed their fourth COVID-19 surge and were mentally and physically exhausted. There was more variation in the post-education survey responses, perhaps attributable to some respondents reading the module, while others did not. The post-education survey scores ranged from 42% to one 100% score. The single qualitative question that surfaced is to ask where the meat of the learning lies. The respondents clearly recognized that leadership, feedback, and time/tools/resources are needed to implement, spread, and sustain improvement work. The qualitative responses aligned with Gramlich et al.'s (2020) qualitative research identifying what leaders need to support implementation, foster spread, and sustain improvement work.

The spread of the *Interventions by Braden Subscale* protocol was a success. The strength of the work lies in using a structured framework for spread. Ament et al. (2017) demonstrated

that using the IHI Framework for Spread created sustainability in work three to six years after spread was complete. Gramlich et al. (2020), and the pre-and post- qualitative responses for this project, established that the IHI Framework for Spread sets the stage for what is needed to be successful from the local leadership point of view. Before spread work is started, the beginning step of the framework, ensuring alignment with the organization's strategic plan, leadership support, and adequate resources allocation is essential. Staff and leaders were working in "survival-mode" due to the COVID-19 pandemic, which took focus away from anything except "survival." Had spread occurred organically, and not via a framework, it is unlikely that the same outcomes would have been achieved. The IHI Framework for Spread sets one up for success, with a designated team, monitoring, communication, and feedback. With organic spread, there is no dedicated team, no monitoring of process or outcome measures, and no formalized communication and feedback loop. The reduction of HAPIs seen in this project, is a testament to the use of a structured format for spread.

A beneficial tool for the project was the A3 report, which provided a standardized format for providing feedback to the targeted departments. With data monitoring it was clear that the North Tower units needed a change from the planned education. The adjustment led to improvement and sustained utilization of the protocol. Sharing the data with those doing the work enabled the staff to link the staff's tangible efforts (process measures) with the HAPI reduction (an outcome measure). The data provided content for powerful storytelling.

The implications for future practice are to extend to frontline staff education and training on the benefits of a structured process to spread great ideas. Frontline staff must be involved in all aspects of decision making, including the work to sustain gains when spread is complete. Hospital A formed the HEROES committee, a reporting structure where improvement and

spread work can be shared. At the completion of the project, front line staff had not been added to the HEROES committee. Upcoming agendas for the HEROES committee will include discussions of the importance of having all-levels of healthcare providers, from the frontline providers to the executive leaders, at the table to ensure continuance of the journey to prevent all patient harm.

Limitations

The project had several limitations. The largest limitation was the disparity in the pre-and post-survey sample number. All project work was done during the COVID-19 pandemic, limiting the generalizability of the outcomes. Participation was voluntary, introducing the possibility of self-selection bias for survey responses. Since surveys were disseminated via e-mail, it is possible that those frontline leaders who check e-mail most often were the leaders who completed the survey, versus those leaders who do not check email as often may have missed the survey. This limitation could be mitigated in future studies by using various modes of dissemination and limiting the level of response anonymity to the PI. Using validated, trustworthy process improvement tools helped mitigate barriers to implementation.

Conclusions

The project implemented and spread an already successful pilot to reduce avoidable HAPIs, using the IHI Framework for Spread. The aim set forth to reduce HAPIs was achieved, through a pandemic, which may show further benefit of using a structured format for spread. For Hospital A, future spread work will continue in alignment with the IHI Framework for Spread. Spread is not the last step in improving outcomes, sustainability is the true evidence of success. Hospital A implemented the HEROES Committee to be that driving force for sustainability. Now that the *Interventions by Braden Subscale* has been successfully spread, with proven outcomes to

reduce patient harm, the next potential step is to spread the protocol to other hospitals within the same organization. Though little was gleaned from the post-intervention survey, the results from the pre-intervention demonstrate a need for further education and training for leaders performing process improvement work. The cost-avoidance related to decreasing HAPIs supports future education on the protocol, and overall, the needed investment in training to enable staff and leaders to translate research into practice through formalized structures.

Section VI: Funding

Hospital A provided no direct funding for this project. Project time and resources required were allocated from within the fiscal year operational budget. Hospital A provided “in kind” funding for the employee’s time. The project design, implementation, interpretation of results, and reporting were all handled by employees of Hospital A as part of their regular job duties.

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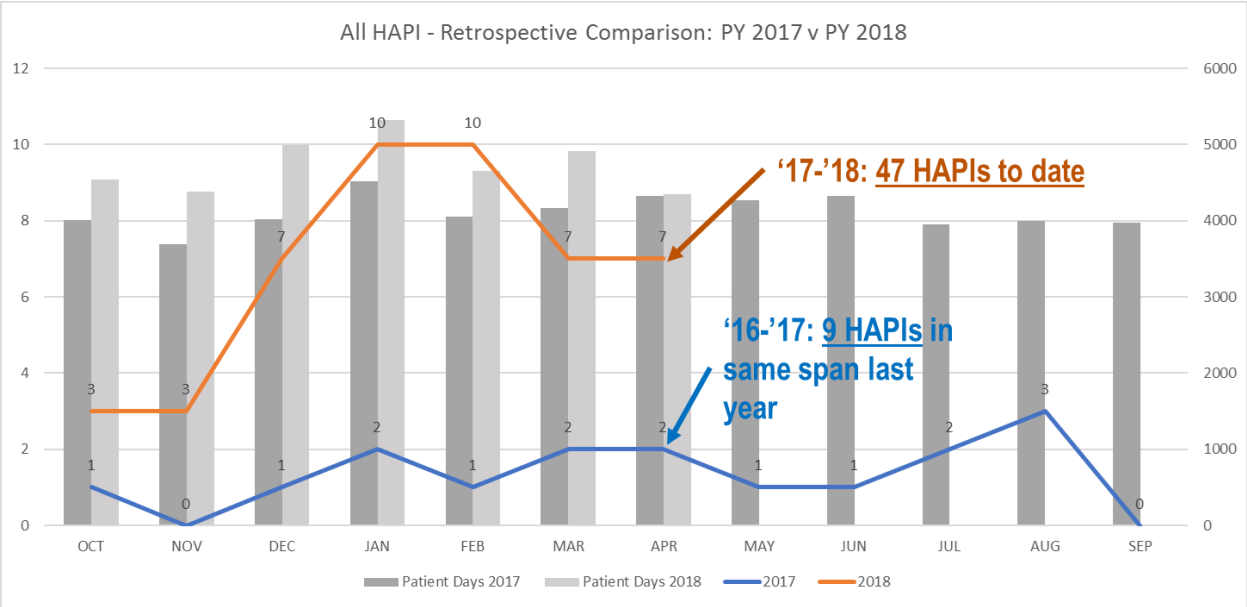
Section VI: Appendices

Appendix A

Hospital A Baseline HAPI Data



Appendix B

Interventions by Subscale Protocol

Interventions by Braden Sub Scale – ICU Pilot

Sensory Subscale <=3
Offload heels (Heel protector boot or pillow)
Pressure redistribution (waffle cushion in chair – limit 1 hour)
Protect bony prominences (Mepilex)

Moisture Subscale <=3
Keep skin folds clean and dry (InterDry, Nystatin, Antifungal Cream)
Protect skin (barrier cream)
Urinary or Fecal Management Systems (consider external first)
LAL Surface (ICU Hil-Rom beds are LAL, Stryker and others – validate pump on)
Avoid multiple layers of linens/pads (max 3 layers)

Mobility/Activity Subscales <=3
Avoid positioning on red areas, protect bony prominences (Mepilex)
Promote out of bed mobility (limit 1-hour OOB)
Avoid multiple layers of linens/pads; remove transfer/sling sheet from under pt. (limit 3 layers)
Reposition frequently (at least q2hours)
Pressure redistribution (waffle cushion in chair – limit 1 hour)

Nutrition Subscale <=2
Maximize protein and caloric intake, fluids (PO >50% or encouraged intake)
RD Consult (at any point, re-consult as condition changes)
Early nutrition (enteral/parenteral)
Supplements as recommended (by RD)

Friction/Shear Subscale <=2
Raise knee gatch 10-20 degrees before raising HOB
Limit HOB to 30 degrees
Offload heels, bony prominences (Heel protector boot or pillow, Mepilex)
Promote out of bed mobility (limit 1hour OOB)
Moisturize Skin (Moisturizer)

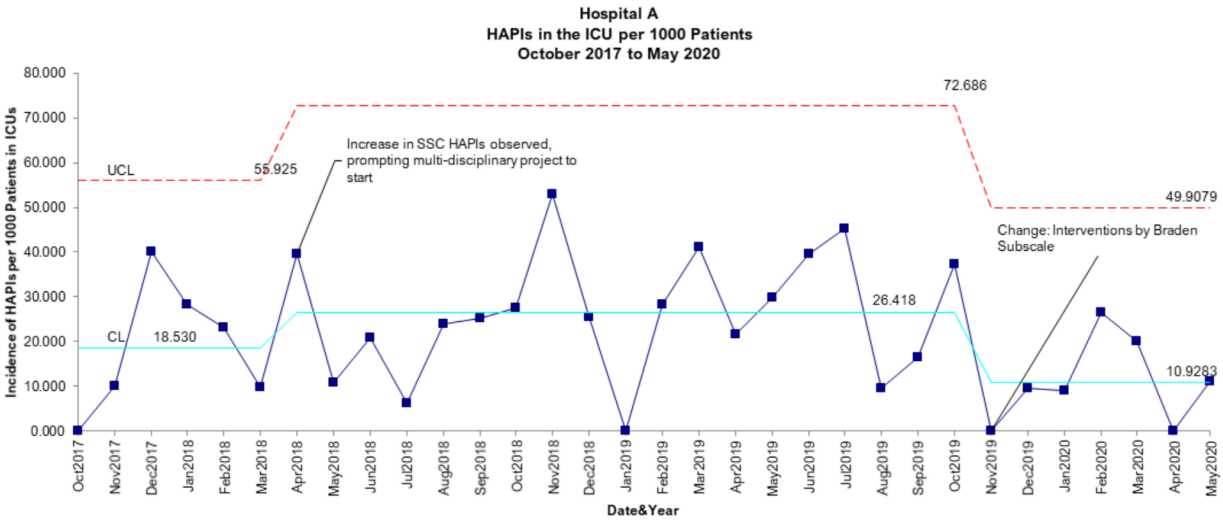
Number of Interventions Required by Subscale

Subscale	**Score**	**# of Interventions**
Sensory	1 or 2	2
Sensory	3	1
Moisture	1 or 2	2
Moisture	3	1
Mobility	1 or 2	2, one must be turning
Mobility	3	1
Activity	1 or 2	2
Activity	3	1
Nutrition	1 or 2	2, one must be RD Consult or contraindication
Nutrition	3	1
Friction/Shear	1 or 2	2
Friction/Shear	2	1

Pittman, J., Beeson, T., Dillon, J., Yang, Z., & Cuddigan, J. (2019). Hospital-acquired pressure injuries in critical and progressive care: avoidable versus unavoidable. *American Journal of Critical Care, 28(5),* 338-350. https://doi.org/10.4037/ajcc2019264

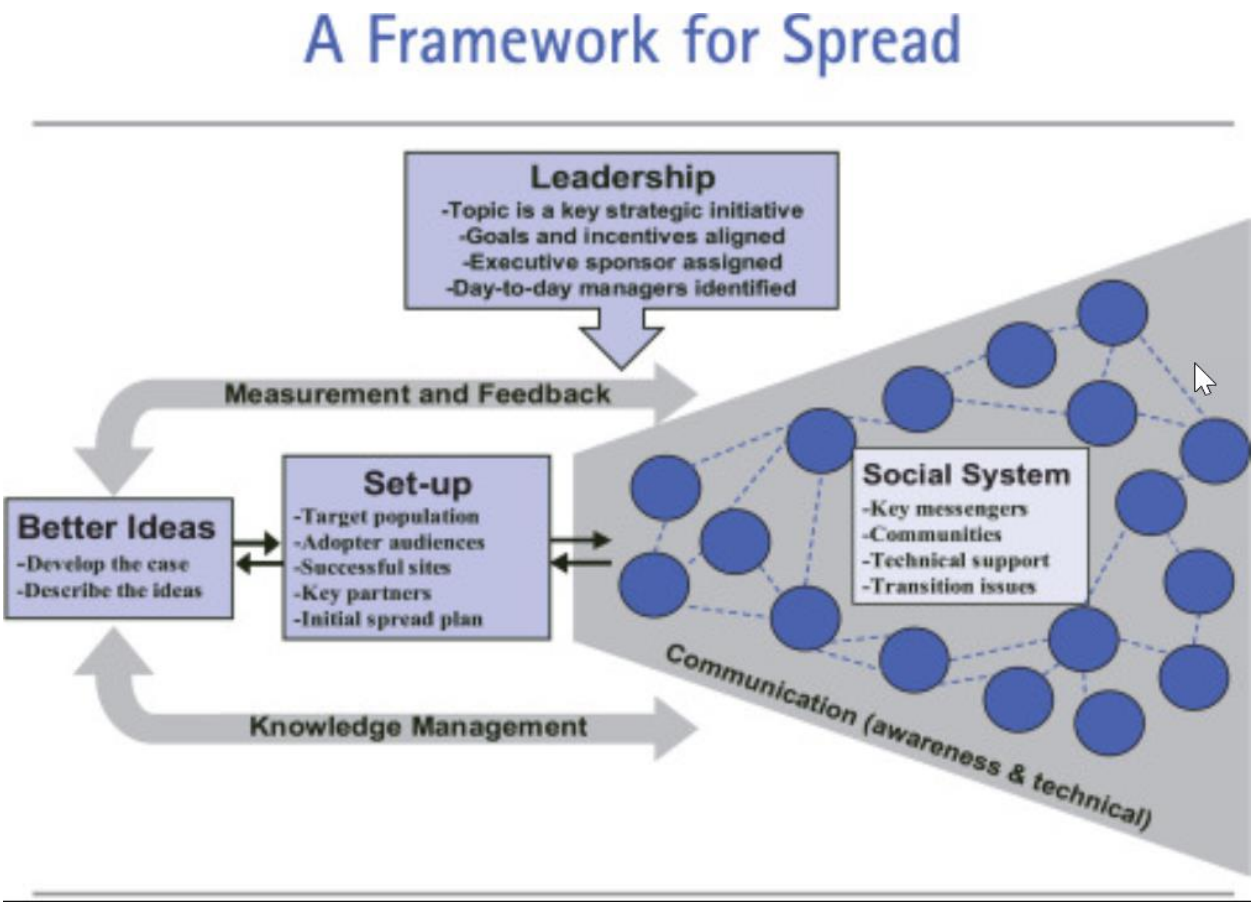
Appendix C

Hospital A HAPI Rates Post Pilot



Appendix D

The IHI Framework for Spread



Nolan et al., 2005

Appendix E

Table of Evidence

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
1	Pittman, 2019	Single, quantitative study	165 adult patients from critical care and progressive care settings in acute care hospitals.	60% (98) of the participants had avoidable HAPI's, 41% (67) were unavoidable. If preventative measures are not implemented appropriately, or documented, HAPI's are deemed avoidable.	Development of instrument to identify patients with an avoidable or unavoidable HAPI, based on preventative measures implemented from the Braden subscales. Instruments reveal prescribed number of interventions needed per subscale to prevent avoidable HAPI.	Retrospective design, based on electronic health record documentation, no confirmation of findings through observation.	IIIA
2	Lin et al., 2019	Qualitative, integrative review	21 peer reviewed papers – 12 quality improvement projects and nine research papers from eight studies.	There is benefit in multi-component pressure injury prevention programs.	N/A	Unable to validate which preventable measures worked better, risk of bias was not assessed in the articles reviewed, and low level of	IIIA/B

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
						research evidence reviewed.	
3	Lim et al., 2019	Quantitative, case-control	199 medical records of Adult patients in an acute care hospital setting for at least 24 hours.	The activity subscale, followed by friction and shear, was most sensitive and specific in predicting pressure injuries; authors recommend subscale scores should be used by nurses to guide care planning.	Patients assessed for risk of PI were 24.2% (OR = 0.758) less likely to develop a PI vs those not assessed. Cut-off score of 2 for activity subscale yields a 0.68 sensitivity and 0.69 specificity value: friction and shear 0.61 and 0.73, respectively.	Retrospective review of medical records which may have precluded identification of other predictors. Authors did not assess the consistency in nurse's risk assessments using Braden.	IIIA
4	Alderden et al., 2018	Quantitative, single study	6,377 surgical ICU patients from an academic medical center with Level 1 trauma services.	Intermediate scores in Braden total score and all subscales, except friction and shear, had the highest likelihood of PI development vs. the high-risk scores. Braden total score of High Risk (10-12)	N/A	Retrospective review of closed medical records. No information on what preventative measures were used or how many interventions	IIIB

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
				showed higher incidence of PI than a Braden score within Severe Risk (<=9).		are needed per subscale score.	
5	Cox, 2012	Qualitative, literature review	Review of nine peer-reviewed and published studies of adult critical care patients that included Braden score and subscale scores.	In two out of four studies, sensory subscale found to be most predictive. Braden scale has a lower specificity and positive predictive value, possibly over-predicting and leading to over-utilization of resources. Two of four studies found the mobility and moisture subscales to be predictive, two of nine found they were not. All four subscale studies did not find predictive value in the activity subscale.	N/A	Not a research study, more a synthesis of the literature available. Some studies used the admitting Braden score, and some used a spot-in-time score; cross-sectional review would be best.	VA

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
6	Gadd & Morris, 2014	Qualitative, single study	Convenience sample of 20 patients with confirmed HAPI's from a 200-bed acute care facility in the mid-west.	Of patients who had Braden scores not at-risk, 19% of them had a subscale score at risk. Preventative measures not tailored to subscale risk 46-97% of the time.	N/A	Retrospective closed medical record review. Reliance on documentation to determine if intervention was done. Small sample size, not randomly selected.	IIIB
7	Padula & Delarmente, 2018	Qualitative, single study	Hospitalized patients	Estimated cost of treating HAPI's from stages 1-4 considering interventions required and length of stay. Cost of treating stage 3, 4, and unstageable are disproportionately higher, showing cost benefit of preventative measures to prevent any stage and progression from stage 1 or 2.	N/A	Simulated likelihood of progression, cost parameters obtained from older literature, data on variation in costs to treat stage 3 and 4 limited, and expert opinion used to guide HAPI treatment equating to length of stay.	IIIB

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
8	Mordiffi et al., 2018	Qualitative, case-control	100 cases 1:1 matched with controls in a 1100+ bed acute care tertiary hospital in Singapore.	The mobility subscale was found to be 48% sensitive, 85% specific, 76.2% PPV, and 62% NPV. The Braden scale, at a cut-off score of 17, was 56% sensitive, 73% specific, PPV was 67.5%, and NPV was 62.4%. The cut-off score of 2 in the mobility subscale, was the only independent variable of all subscales to be statistically significant in predicting PI with an OR of 5.714 (95% CI 2.62, 15.676; p = 0.001).	N/A	Retrospective review of closed medical records in a single-site acute care tertiary hospital – results are not generalizable. Could not determine admission to ICU was based on pressure injury.	IIA
9	Nolan et al., 2005	Non-research, quality improvement	Outpatients of the Veterans Health Administration,	Use of the IHI Framework for Spread achieved initial improvements and	Leadership behaviors supported by coaching. Audio/visual tools	Lack of focus on specific activities that could speed up spread time.	VB

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
			more than 1800 clinics.	spread organization wide – sustaining gains over a three-year period. Checklists were created to facilitate each category of the framework to better guide project leaders.	to improve communication and learning.	Large organization, the improvement work, in the way it was done, is not generalizable.	
10	Morgenthaler et al., 2012	Non-research, quality improvement	Two Mayo Clinic Hospitals in Minnesota, 1951 beds.	Pilot projects completed in medicine and surgery services successfully; plan to spread to 79 other services using IHI Framework for Spread. Spread took seven months, gains sustained through the following eight months. Using the spread model helped to anticipate needs and barriers.	Audio/visual tools developed and disseminated to improve communication and education. Data to reinforce baseline, and improvements made.	Strained IT resources and gaps in science specific to the improvement plan.	VA

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
11	Gramlich et al., 2020	Single study, qualitative	44 leaders interviewed (13 physician leaders, 19 leading clinicians and hospital administrators, 11 provincial leaders) from a health system in Canada.	Interview of leaders to identify needs/barriers to sustainability in spreading and sustaining improvement work. Highlights what leaders are expected to do to initiate and implement, spread, scale, and sustain improvement.	Themes identified, quotes from the interviewees, and tables provide for a chronological recommendation to move work forward.	Interviews included more champions and coordinators and less leaders from the frontline level, which may skew data.	IIIA/B
12	Ament et al., 2017	Single qualitative study	21 interviews with 26 individuals – 18 related to the ERAS case and 8 related to the SSP case: both from a hospital setting	Two different implementation cases were evaluated for best practices on spread and sustainability. The interviews were held 3-6 years after the successful implementation of both projects. Survey results validate factors that align with IHI Framework for spread also lead to effective sustainability.	Survey and survey results.	The framework used in the article is designed for implementation research rather than sustainability, though has much cross over. Integral individuals involved in the initial work may have been missed in the survey. Snowball sampling may have led to selection bias.	III A/B

Appendix F

Gap Analysis

Future State	Current State	Gap	Action Plan
Preventative measures for Hospital acquired pressure injuries (HAPI) are implemented based on Braden subscale.	Preventative measures for HAPI are implemented based on Braden total score.	Nurses have been trained to implement all preventative measures based solely on the Braden total score.	Teach nurses and patient care technicians the why behind moving to subscale use for guiding preventative measures, share evidence. Share results of the pilot completed in the Intensive Care Unit with associated outcomes. Teach to the Braden Interventions by Subscale Protocol.
Evaluate each HAPI on whether it is avoidable or unavoidable.	Only HAPI's that are identified in the ICU are evaluated on whether the HAPI was avoidable.	Evaluation process has not yet been spread.	Wound Care Assistant Nurse Manager to take on evaluation for all HAPI's across the medical center.
Monitor rate of interventions implemented based on Braden subscale for quality assurance.	No monitoring in place for interventions implemented based on Braden subscale.	No method to understand how well each unit adopts the new protocol.	Develop process measures to monitor adherence to new protocol. Create audit tool for staff to use when evaluating adherence.
Quality improvement work is spread via a standardized and structured process across the medical center.	Quality improvement work is not formally spread. Any spread is achieved through informal methods and lacks monitoring and feedback.	No formalized process exists within the medical center to spread and sustain improvement work.	Educate leaders on the IHI Framework for Spread. Perform a post-training survey to evaluate effectiveness of training.

Future State	Current State	Gap	Action Plan
Provide training on Institute for Healthcare Improvement Framework for Spread to project volunteers.	No current training, offered by the medical center, exists.	Many hospital leaders are not familiar with using a framework to spread quality improvement work and how to sustain gains.	Develop survey to evaluate baseline understanding of how to spread/scale and sustain quality improvement work. Develop training based on survey results. Complete post-survey at end of project to assess improvement in knowledge base.
Oversight committee to monitor improvements made within the medical center to support sustainability.	No formal process to monitor for sustainability.	Without focus on sustainability, gains will likely be lost.	Review of evidence supporting various methods for sustainability. Review post-project survey results with senior leaders for adoption of best practices around sustainability.

Appendix G

Gantt Chart

Reducing Avoidable Hospital-Acquired Pressure Injuries	2020												2021											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pilot																								
Develop Interventions by Subscale protocol																								
Build team to support pilot																								
Train ICU Nurses on protocol																								
Develop process and outcome measures to monitor																								
Obtain baseline process measure data																								
Implement Interventions by Subscale pilot																								
Monthly checkpoints: measurement and feedback																								
Close pilot																								
Analyze pilot data: measurement and feedback																								
Present pilot to Senior Leaders; obtain support for spread																								

Reducing Avoidable Hospital-Acquired Pressure Injuries	2020												2021											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Spread Planning																								
Literature review for spread planning																								
Create pre- and post-project survey																								
Develop project budget																								
Submit final IRB application																								

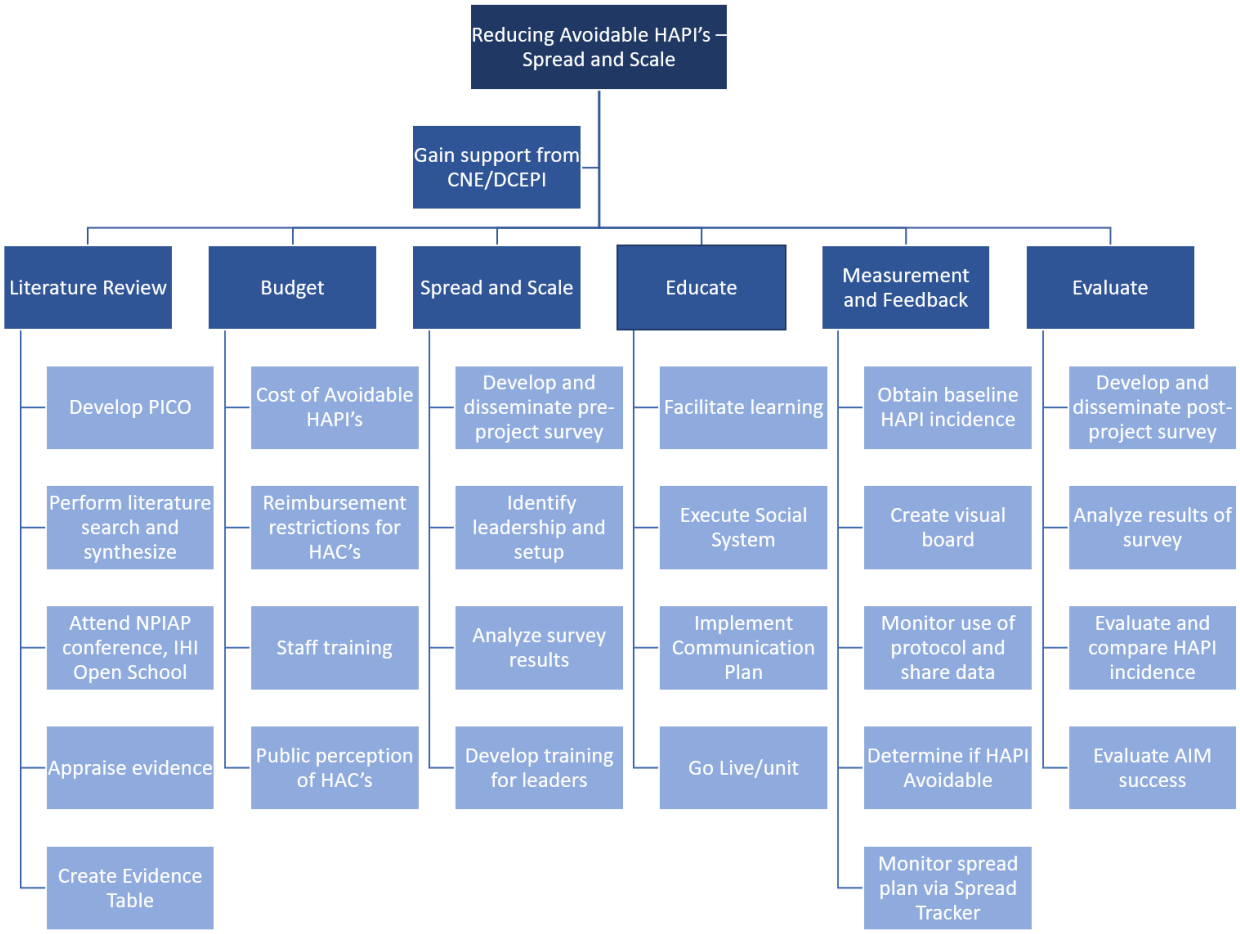
Reducing Avoidable Hospital-Acquired Pressure Injuries	2020												2021											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Spread and Education																								
Disseminate pre-project survey																								
Analyze pre-project survey results																								
Construct training based on survey results																								
Deliver education on the IHI Framework for Spread to leaders																								
Spread pilot to:																								
2 South																								
3 South																								
4 South																								
3 East																								
3 West																								
4 East																								
4 West																								
Measurement and feedback - each unit monthly																								
Disseminate post-project survey																								

Reducing Avoidable Hospital-Acquired Pressure Injuries	2020												2021											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Evaluation and Close																								
Analyze post-project survey results																								
Evaluate project AIM's for successful completion																								
Celebrate wins with stakeholders and staff																								
Plan development of Sustainability Oversight Council																								

Color Key
Pilot
Spread Planning
Spread and Scale
Evaluation and Close

Appendix H

Work Breakdown Structure



Appendix I

Responsibility/Communication Plan

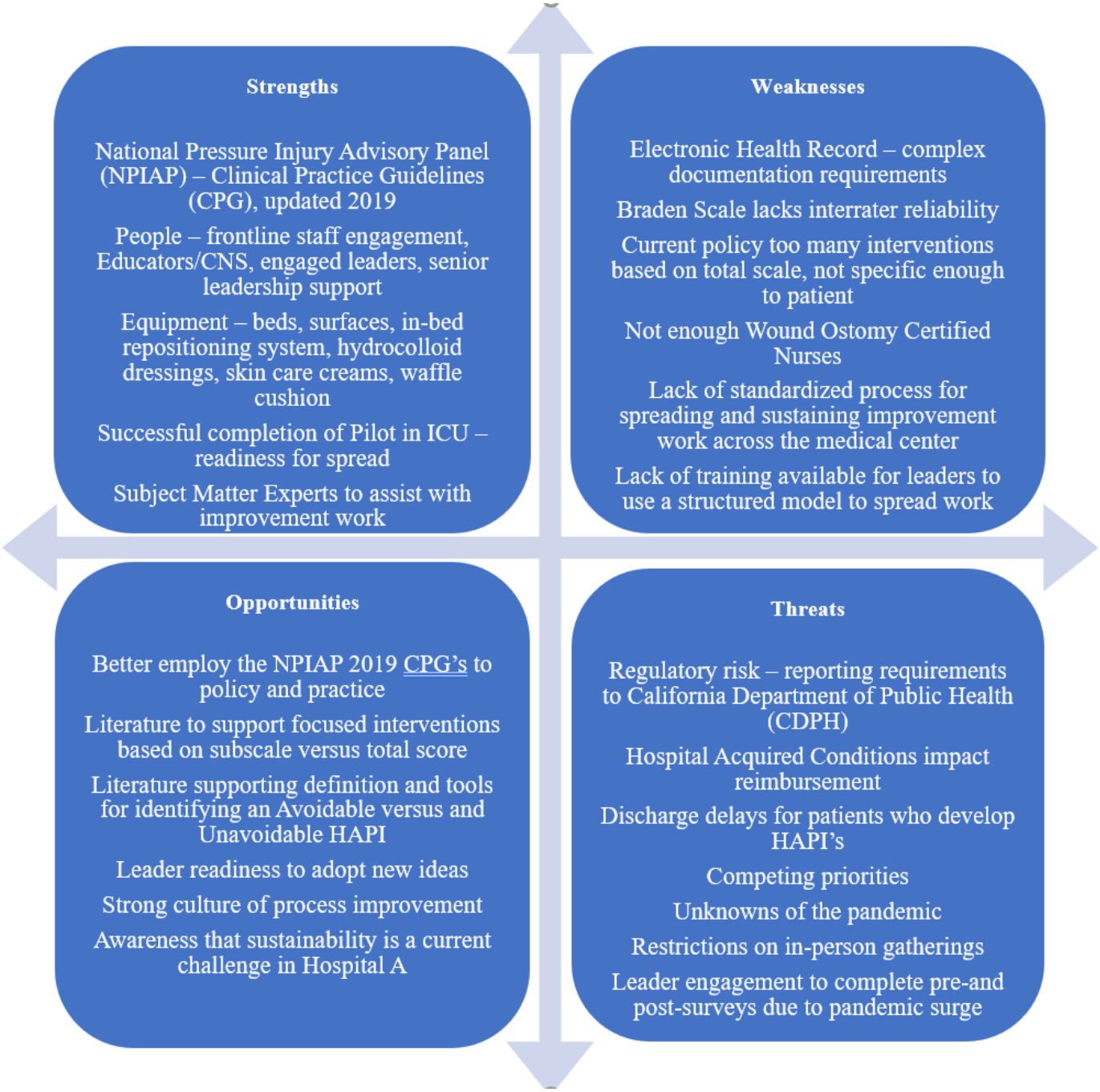
Communication Plan				
Project Name: Reducing Avoidable HAPI's			**Beginning Date:** January 2020	
Project Manager: Rachel Wyatt, Interim CNE			**Completion Date:** September 2021	
Project Objectives: Reduce Avoidable HAPI's, spread and scale Interventions by Subscale Protocol using IHI's Framework for Spread, and improve the level of knowledge among hospital leaders on how to spread and scale quality improvement work to sustain gains.				
Stakeholders: Hospital staff, patients, senior leaders, physicians, and hospital leaders				
Plan				
Timeline	**Team Member Responsible**	**Target Audience**	**Tool(s) for Delivery**	**Message Points**
Jan. 2020	CASD, ICU Manager	ICU Staff	PPT and Flyers	Why use subscales to drive interventions Interventions by Subscale Protocol
Feb. 2020	CASD, ICU Manager, Data Analyst	ICU Staff	Graphic displays Visual management board	Measurement and feedback
Mar. 2020	CASD, ICU Manager, Data Analyst	ICU Staff	Graphic displays Visual management board	Measurement and feedback
Apr. 2020	CASD, ICU Manager, Data Analyst	ICU Staff	Graphic displays Visual management board	Measurement and feedback
May 2020	CASD, ICU Manager, Data Analyst	ICU Staff	Graphic displays Visual management board	Measurement and feedback

Timeline	Team Member Responsible	Target Audience	Tool(s) for Delivery	Message Points
June 2020	CASD, Data Analyst	ICU Staff, Senior Leaders	Graphic displays, Visual management board, and PPT	Measurement and feedback Closure of pilot with review of successes
Aug 2020	CASD, ICU Manager	ICU Staff	Graphic displays	Goals of sustainability
Sept. 2020	CASD	Med-Surg/Tele Managers and other Stakeholders	Verbal, email	Plan for spread of ICU pilot – Interventions by Subscale – to begin January 2021
Nov. 2020	Interim CNE, CASD	Stakeholders	Verbal, email	Designation of Day-to-day leader of project (CASD) Spread plan and tracker Go live – Jan. 2021
Jan. 2021	Interim CNE, CASD	Stakeholders	Verbal, email	First unit Go-Live Dissemination of pre-project survey and purpose
Feb. 2021, monthly through Nov. 2021, and as needed	Interim CNE, CASD	Stakeholders	Graphic displays Visual management board	Measurement and feedback on progress of spread, protocol utilization, HAPI incidence (including Avoidable or Unavoidable)
Feb. 2021	Interim CNE	Hospital leaders	Email	Thank you for completing survey, next step is to analyze results and develop training – plan for April and May for training to be offered

Timeline	Team Member Responsible	Target Audience	Tool(s) for Delivery	Message Points
Apr. 2021	Interim CNE	Hospital leaders	Email	Provide several training dates from April to May, via virtual platform
Aug. 2021	Interim CNE	Hospital leaders	Email	Dissemination post-project survey and purpose
Sept. 2021	Interim CNE	Hospital leaders	Email	Thank you and outcome of post-project surveys
Oct. 2021	Interim CNE	Stakeholders	Email	Evaluation of project success Potential development of a sustainability oversight committee

Appendix J

SWOT Analysis



Appendix K

Budget – 5-Year Pro Forma Income Statement

		Year 1	Year 2	Year 3	Year 4	Year 5
Expenses	**Training**					
	Staff RN	$31,786.30	$32,580.96	$33,375.62	$34,170.27	$34,964.93
	Staff RN – Per Diem	$3,706.80	$3,799.47	$3,892.14	$3,984.81	$4,077.48
	PCT	$1,225	$1,255.63	$1,287.02	$1,319.19	$1,347.50
	ANM	$1,822.94	$1,822.94	$1,822.94	$1,822.94	$1,822.94
	NM	$340.48	$340.48	$340.48	$340.48	$340.48
	Cost of HAPI	**Baseline**	**64% reduction**	**90% reduction**	**92% reduction**	**95% reduction**
	Stage 1	$2,679.00	$893.00	$0.00	$0.00	$0.00
	Stage 2	$17,800.00	$7,120.00	$3,560.00	$3,560.00	$7,120.00
	Stage 3/4	$32,945.00	$11,980.00	$5,990.00	$2,995.00	$0.00
	Stage 3/4 Enhanced	$29,340.00	$6,520.00	$0.00	$0.00	$0.00
	Total Expenses	$121,645.52	$66,312.48	$50,268.20	$48,192.69	$49,673.33
Cost Avoidance	**HAPI (Cost Avoidance)**	$0	$56,251	$73,214	$76,209	$79,204
Net Income		($121,645.52)	($10,061.48)	$22,945.80	$28,016.31	$29,530.67

Appendix L

Cash Burn Projections

HAPI Count (with 133% increase each year)	2020	2021	2022	2023	2024
Stage 1	3	7	16	37	86
Stage 2	5	12	28	65	151
Stage 3/4	11	26	61	142	331
Stage 3/4 (Unstageable)	9	21	49	114	266
Total All Stage HAPIs	28	66	154	358	834

Cash Burn Projections						
Cost of HAPI	**Cost/Stage**	**Baseline - Year 1**	**Year 2 - 133% increase**	**Year 3 - 133% increase**	**Year 4 - 133% increase**	**Year 5 - 133% increase**
Stage 1	$893	$2,679.00	$6,251.00	$14,288.00	$33,041.00	$76,798.00
Stage 2	$3,560	$17,800.00	$42,720.00	$99,680.00	$231,400.00	$537,560.00
Stage 3/4	$2,995	$32,945.00	$77,870.00	$182,695.00	$425,290.00	$991,345.00
Stage 3/4 Enhanced	$3,260	$29,340.00	$68,460.00	$159,740.00	$371,640.00	$867,160.00
Total Costs		$82,764.00	$195,301.00	$456,403.00	$1,061,371.00	$2,472,863.00

Appendix M

Pre and Post Survey

UNIVERSITY OF SAN FRANCISCO

CHANGE THE WORLD FROM HERE

The purpose of this survey is to assess your baseline understanding of the use of a standardized framework to spread improvement work. Your identity will remain anonymous and your responses will be aggregated with others to develop training based on survey results. This survey should take about 10 minutes to complete. This survey is not research. Thank you in advance.

- ○ I agree.
- ○ No I do not agree. Please close survey.

My highest level of education is:

- ○ Associates Degree, any
- ○ Bachelors Degree, any
- ○ Masters Degree, any
- ○ Doctoral Degree, any

I have been in a formal leadership position (i.e., Supervisor, Manager, Director) for:

- ○ less than 5 years
- ○ 5-10 years
- ○ 10-15 years
- ○ more than 15 years

I have participated in quality improvement work (to improve the way a patient receives care).

- ○ Yes
- ○ No

I have led a team in quality improvement work within the last two years.

- ○ Yes
- ○ No

A small test of change is considered:

- ○ Implementing a new Electronic Health Record in one unit of a hospital
- ○ Implementing a new nutritional assessment in the hospital
- ○ Implementing a new tool for handoff with two staff members
- ○ Implementing a new Electronic Health Record in the Emergency Department

Before starting improvement work, one should first:

- ○ Validate the work aligns with the overall strategic plan of the organization
- ○ Ensure that your Supervisor approves the plan
- ○ Gather stakeholder support
- ○ Take a long vacation

The formal name of someone in the role of an Executive Leader in improvement work is:

- Sponsor
- Manager
- Leader
- Scribe

Who would be best to oversee improvement work on a Surgical Nursing Unit?

- Project Manager
- Unit Manager
- Project Sponsor
- Chief of Surgery

It is important that all stakeholders agree with the project plan before implementing.

- True
- False

A project is ready for spread if:

- Results are successful
- The solution aligns with organizational goals and priorities
- Resources are available to achieve the change
- All of the above

A project was successfully implemented in the supply department and has been approved to be spread to other departments. Is it necessary to monitor success in the secondary departments?

- ○ Yes
- ○ No

Put the following steps of the spread of improvement work in the correct order:

Complete sustainability plan
Complete a spread proposal
Kick-off spread work
Complete pilot
Validate success of spread
Monitor spread work
Question if the project is ready for spread
Debrief the spread outcome

The "Social System" in performance improvement efforts refers to:

- ○ Your closest friends and peers
- ○ Stakeholders for the project
- ○ Senior Leaders
- ○ Individuals in the target population

The following methods of communication are appropriate for the implementation of project work except:

- ○ Flyers
- ○ Email
- ○ Newsletters
- ○ Face-to face communication
- ○ The above are all appropriate forms of communication

Three weeks into the formal spread of the project you realize that the project goals are not being met. You should:

- ○ Abandon the project
- ○ Stop the project and start over
- ○ Stop the project in pick a new target population
- ○ Evaluate why goals are not being met

Feedback should only be sought at the end of the project:

- ○ Yes
- ○ No

What provides a supportive environment for implementing and spreading improvement work?

When adapting to a new change, most people fall into which of the two categories:

- [ ] Early adopters
- [ ] Early groups
- [ ] Early majority
- [ ] Early birds

A driver diagram:

- ○ Displays contributing factors to achieving a goal
- ○ Is a hierarchical list of the stakeholders involved in the project
- ○ Lists potential root causes of a problem
- ○ Outlines the opportunities when implementing a new project

A good way to monitor improvements during the project is with a:

- ○ Fishbone
- ○ Pareto Chart
- ○ Control chart
- ○ Pie Chart

Which of the following is the appropriate order of activities as described by Kurt Lewin's Change Theory:

- ○ Freeze, Unfreeze, Refreeze
- ○ Unfreeze, Refreeze, Sustain
- ○ Unfreeze, Change, Refreeze

According to sociologist Everett Rogers, ideas that spread naturally are:

- ○ Successful
- ○ Sustainable
- ○ Trialable
- ○ Replicable

Appendix N

Pittman Approval Letter

From: Joyce Pittman
To: Rachel Wyatt
Cc:
Subject: [redacted]
Date: Thursday, October 10, 2019 9:36:40 AM
Attachments: PUPI.PIPI Instrument.pdf
Braden Inventory.pdf
Braden Inventory Worksheet Instructions.doc

Caution: This email came from outside Kaiser Permanente. Do not open attachments or click on links if you do not recognize the sender.

Rachel,
Thank you for your official request to use the PIPI and accompanying tools. I am attaching the revised version (new terminology) and the Braden Worksheet with instructions.
If you have any questions don't hesitate to reach out.

When starting your review, complete the Braden worksheet first as this helps you complete the PIPI.

We were very interested to hear of KP and JH collaboration with The Joinct Commission. We would be interested in learning more if you have a contact person at TJC we could reach out to.

Joy(ce)

Joyce Pittman PhD, RN, ANP-BC, FNP-BC, CWOCN, FAAN
Associate Professor, College of Nursing
University of South Alabama
Health Sciences
5721 USA Drive North, Room 3057
Mobile, AL 36688
O: 251-445-9456
joycepittman@southalabama.edu

Appendix O

Braden Inventory Worksheet and PIPI

BRADEN INVENTORY WORKSHEET **HAPU Acquisition Date: _____**

2.0 Braden Scale

Days Prior to HAPU	Date	Sensory Perception		Moisture		Activity		Mobility		Nutrition		Friction and Shear		Total Daily Braden Score	
		DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT
-1PUDAY															
-2PUDAY															
-3PUDAY															

Review documentation. Based on the lowest score for each Braden category, check all types of interventions found in documentation.

2.1 Sensory Perception Interventions	-1PU DAY	-2PU DAY	-3PU DAY
Elevate Heels off Surface			
Reposition Frequently			
Pressure Redistribution			
Boney Prominence Protection			
Total			

2.2 Moisture Management Interventions	-1PU DAY	-2PU DAY	-3PU DAY
Breathable Pads			
Diapers			
Barrier Creams			
Scheduled Voiding			
Urinary Device			
IO Cath			
Fecal Device			
Extra Linen Change			
Total			

2.3 Activity Interventions	-1PU DAY	-2PU DAY	-3PU DAY
Elevate Heels off Surface			
Reposition Frequently			
Pressure Redistribution			
Boney Prominence Protection			
Mobility Promotion(PT,OT,ROM)			
Total			

2.4 Mobility Interventions	-1PU DAY	-2PU DAY	-3PU DAY
Elevate Heels off Surface			
Reposition Frequently			
Pressure Redistribution			
Mobility Promotion (PT,OT, ROM)			
Rotoprone, Rotorest			
Exception documented			
Total			

2.5 Nutrition Interventions	-1PU DAY	-2PU DAY	-3PU DAY
Enteral Nutrition			
Parental Nutrition			
P.O. Diet			
Supplements			
Contraindications Documented			
Dietary Consult			
Total			

2.6 Friction Shear Interventions	-1PU DAY	-2PU DAY	-3PU DAY
Elevate Heels off Surface			
Reposition Frequently			
Pressure Redistribution			
Mobility Promotion (PT,OT,ROM)			
Drawsheet /Lift Sheet			
HOB ≤30 degrees			
Boney Prominence Protection			
Other			
Total			

Pressure Ulcer/Injury Prevention Inventory

Patient ID: _____ Admission Date: ___/___/___ **HAPI Acquisition Date:** ___/___/___

HAPI Location: **1**=Sacrum/Coccyx **2**=Ischium **3**=Hip **4**=Heel **5**=Occipital **6**=Ear **7**=Other _____

HAPI Laterality: 1= Right 2= Left 3= Midline **HAPI Stage:** 1= DTPI 2= 2 3= 3 4= 4 5= Unstageable 6= Mucosal Membrane

Audit Date: _____ Auditor: _____

Review medical record
Assign the appropriate score for each item:
1= NO 2= YES

1. Clinical Condition Evaluation	**SCORE** ▼
History and Physical completed upon admission	
Braden Scale completed upon admission	
Braden Scale completed every shift for 3 days prior to HAPI acquisition date	
Skin assessment (Nursing) completed upon admission	

Review medical record 3 days prior to the documented development of the HAPI
Assign the appropriate score for each item:
1= NO, not appropriate 2= YES, appropriate

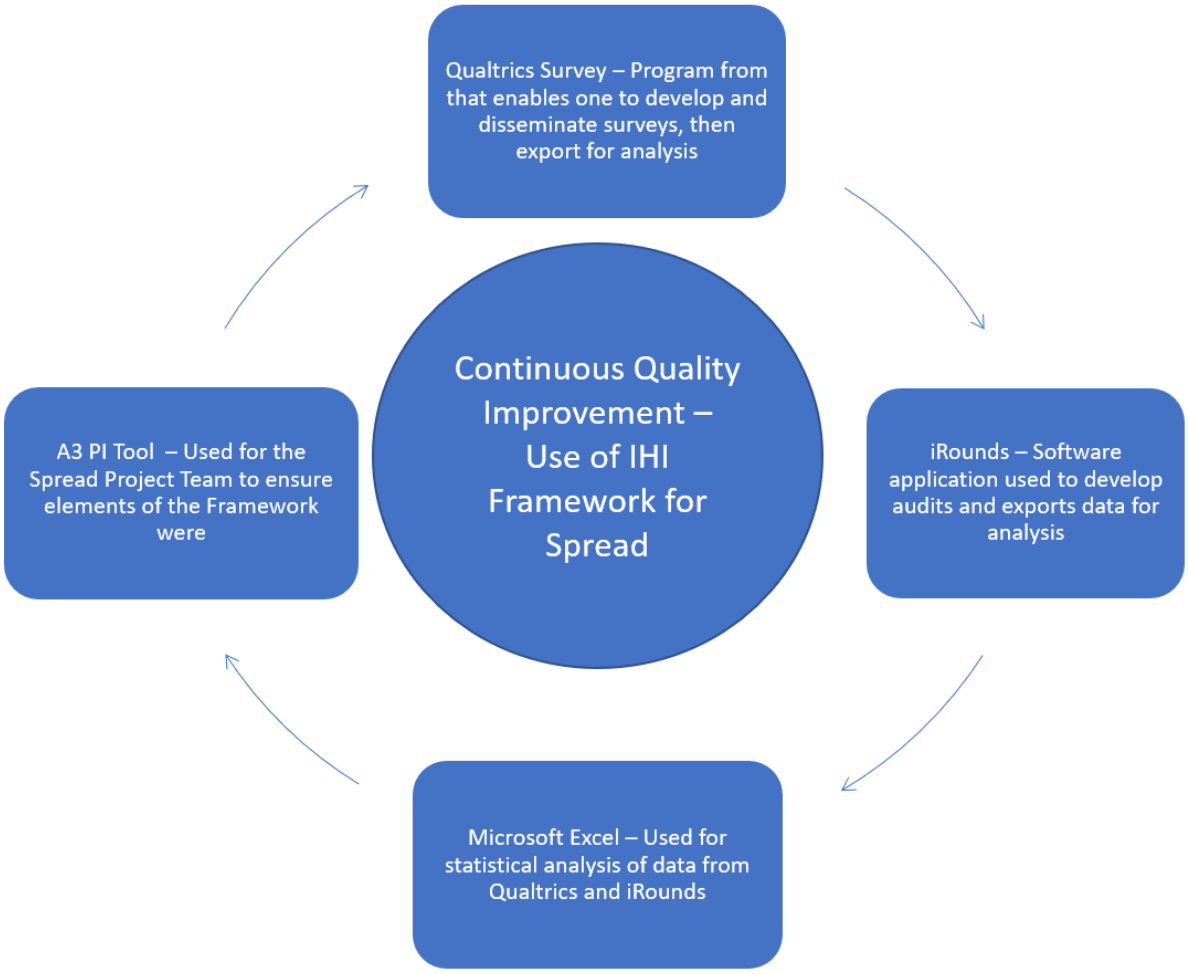
2. Defined and Implemented Intervention(s) consistent with Patient's Needs					
	HAPI DAY 0 Date____	**1 day prior to HAPI Date___**	**2 days prior to HAPI Date___**	**3 days prior to HAPI Date___**	
2.1 Sensory Perception Interventions Appropriate?					
2.2 Moisture Interventions Appropriate?					
2.3 Activity Interventions Appropriate?					
2.4 Mobility Interventions Appropriate					
2.5 Nutritional Interventions Appropriate					
2.6 Friction & Shear Interventions Appropriate					
3. Monitored/ Evaluated Impact of Interventions					
Skin Assessment completed every shift					
4. Revised Interventions as Appropriate					

Summary/ Conclusion

5. Pressure injury Avoidable	

Appendix P

CQI Method and Data Collection Tools



Appendix Q

Qualitative Word Cloud

Appendix R

Statistical Analysis of Pre- and Post-Surveys

t-Test: Two-Sample Assuming Equal Variances		
	Variable 1	*Variable 2*
Mean	0.636904762	0.625
Variance	0.020947802	0.047309028
Observations	14	9
Pooled Variance	0.030990174	
Hypothesized Mean Difference	0	
df	21	
t Stat	0.158281465	
P(T<=t) one-tail	0.437873605	
t Critical one-tail	1.720742903	
P(T<=t) two-tail	0.875747211	
t Critical two-tail	2.079613845	

Appendix S

Interventions by Braden Subscale A3

INTERVENTION BY BRADEN SUBSCALE STATUS REPORT – South Tower

As of:	August 4, 2021	Project Sponsor	Rachel Wyatt	Operational Leaders	Sanaz Martin, Tracy Esposo, Christina Martin	IA/PM	Rosie Kim

Status Categories

On Track	On pace to achieve objectives
At-Risk	Off-track but corrective actions are in place
Off Track	Off-track and no corrective actions have been taken
Complete	Completed

Project Aim	Reduce the number of MS/Tele HAPI (all stage) by 30% from 11 (Jan-Dec 20) to 8 by 12/31/2021
Area of Focus	Intervention by subscale, adoption and sustainability of implementation and documentation based on Braden subscale
Recent Activities	• Form workgroup • Develop spread plan • Update Quick Reference Guide • Recruit measureventionists, review Quick Reference Guide • Audit once per week per shift • Inviting MV to join meeting • baseline data collection 2/17-2/27 • ANM/Staff lead huddle: Staff Education plan 2/28/14 • Laminated and post Quick Reference Guide in patient room by bedside and by nursing station • Develop timeline for North Tower rollout • iRound weekly audit • Post data in Breakroom, add to monthly south tower newsletter • Focused huddle message on Nutrition on South Tower 4/4-4/24, second huddle 4/25-5/1 • Staff education on HC documentation through huddle and 1:1 with MV, create binder with documentation reference materials • Communicate to all MVs to count IV fluid for 2 interventions. • South Tower MVs to join North Tower MV meeting.

Future Activities	• Sustainability Plan:
	  • Maintain 80% of Sub Scales metrics with accumulative compliance >= 90%, scale back audit to once every two weeks, then one a month starting
	  • Deep dive on Nutrition compliance, opportunity/barrier
	  • Education for PCTs
	  • Education on documentation
	• PAUSE and Postpone due to surge. Recognition and Celebration: Skinny Dips, individually packaged treats: individually packaged carrots/apples, peanut butter, hummus: 8/21 and 8/28 (Lead: Stephanie/Tania, packaging support: Joanne/Heather/Irendeep/Marissa/Tisa/Sam), 75 per unit, dropping off packages in ANM's office, each unit distribute to their own department

Key Deliverables & Milestones

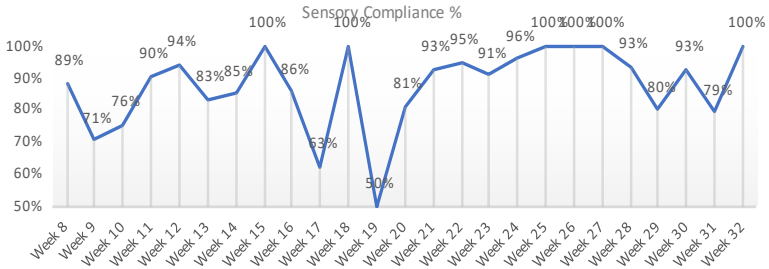
Key Deliverable / Milestone	Target End Date	Status
Baseline 2/17-2/27	3/6/2021	Complete
Staff education huddle 2/28-3/14	3/6/2021	Complete
Post laminated Quick Reference Guide : inside the room by the computer and by nursing station	3/12/2021	Complete
Sustainability Plan	6/30/2021	On Track

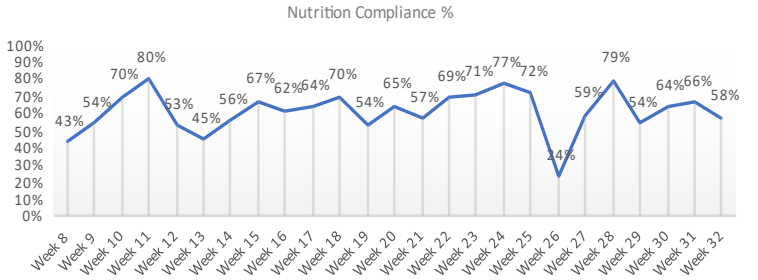
Primary KPI	Quality & Safety	Project Status	On Track	Project Source	Local
Outcome Metric	# of HAPI (all stage)	Metric Target	8	Current Metric	2

Desired Trend: ⇩

Sub Scale	Baseline Total Audits	Baseline Yes	Baseline Compliance 2/17-2/26	Post Baseline Accumulative Compliance as of 8/4/2021
SENSORY SUB SCALE	82	64	78%	88% ⇔
MOISTURE SUB SCALE	97	75	91%	94% ⇔
MOBILITY SUB SCALE	111	91	82%	95% ⇔
ACTIVITY SUB SCALE	8	7	88%	94% ⇔
NUTRITION SUB SCALE	116	58	50%	65% (64%) ⇑
FRICTION/SHEAR SUB SCALE	104	83	80%	96% ⇔

Week 8 & 9 are baseline data collection period





SOUTH SACRAMENTO

INTERVENTION BY BRADEN SUBSCALE STATUS REPORT – North Tower

As of:	August 4, 2021	Project Sponsor	Rachel Wyatt	Operational Leaders	Sanaz Martin, Kathy Reed, Catie Nickels	IA/PM	Rosie Kim

Status Categories

On Track	On pace to achieve objectives
At-Risk	Off-track but corrective actions are in place
Off Track	Off-track and no corrective actions have been taken
Complete	Completed

Project Aim	Reduce the number of MS/Tele HAPI (all stage) by 30% from 11 (Jan 20 – Dec 20) to 8 by 12/31/2021
Area of Focus	Intervention by subscale, adoption and sustainability of implementation and documentation based on Braden subscale
Recent Activities	• Form workgroup • Recruit measureventionists, review Quick Reference Guide • Audit once per week per shift • Inviting MV to join meeting • iRound weekly audit, recruiting additional MVs • Extend Baseline data collection to 5/1 (4/12- 5/1) • North Tower staff education: 5/1 – 5/8 • Staff education done via huddles for 1 week and will capture both weekend shifts: 5/1 NOC-5/8 NOC • Staff education on HC documentation – poster board • 4N shared best practices on # of MVs doing audits, teaching Braden subscale during staff meeting, focus on documentation. • 3N shard best practices, 1:1 education with poster board, staff meeting has been very helpful. • Eliminate hospice and palliative care patients. • Communicate to all MVs to count IV fluid for 2 interventions. • South Tower MVs to join North Tower MV meeting.
Future Activities	• Create binder with documentation reference materials • Align 4N MV observation practice with the rest of the units • Focused huddle message on HC documentation starting 6/9 • Staff education using Quick Reference Guide on Skills Day • Circle of Influence workgroup on education plan • PAUSE and Postpone due to surge: Recognition and Celebration: Skinny Dips, individual pre packaged treats: individual pre packaged, peanut butter, hummus: 8/21 and 8/28 (Lead: Stephanie/Tania (4N), packaging support: Joanne(NT)/Heather(ST)/Irendeep/Marisa/Paa (NT)/Sam), 75 per unit, dropping off packages in ANM's office, each unit distribute to their own department.

Key Deliverables & Milestones

Key Deliverable / Milestone	Target End Date	Status
Baseline 4/12 – 5/1	5/1/2021	Complete
Staff education huddle 5/1 – 5/8	5/8/2021	Complete
Sustainability Plan	Pending	

Primary KPI	Quality & Safety	**Project Status**	On Track	**Project Source**	Local
Outcome Metric	# of HAPI (all stage)	**Metric Target**	8	**Current Metric**	0

Desired Trend ↓

Sub Scale	Baseline Total Audits	Baseline Yes	Baseline Compliance 4/12-5/1	Post Baseline Accumulative Compliance as of 8/4
SENSORY SUB SCALE	70	52	74%	85% (85%) ⟷
MOISTURE SUB SCALE	87	72	83%	87% (88%) ↓
MOBILITY Sub Scale	218	186	85%	94% (94%) ⟷
ACTIVITY Sub Scale	246	212	86%	94% (93%) ↑
NUTRITION SUB SCALE	260	167	64%	77% (76%) ↑
FRICTION/SHEAR SUB SCALE	85	65	76%	93% (93%) ⟷

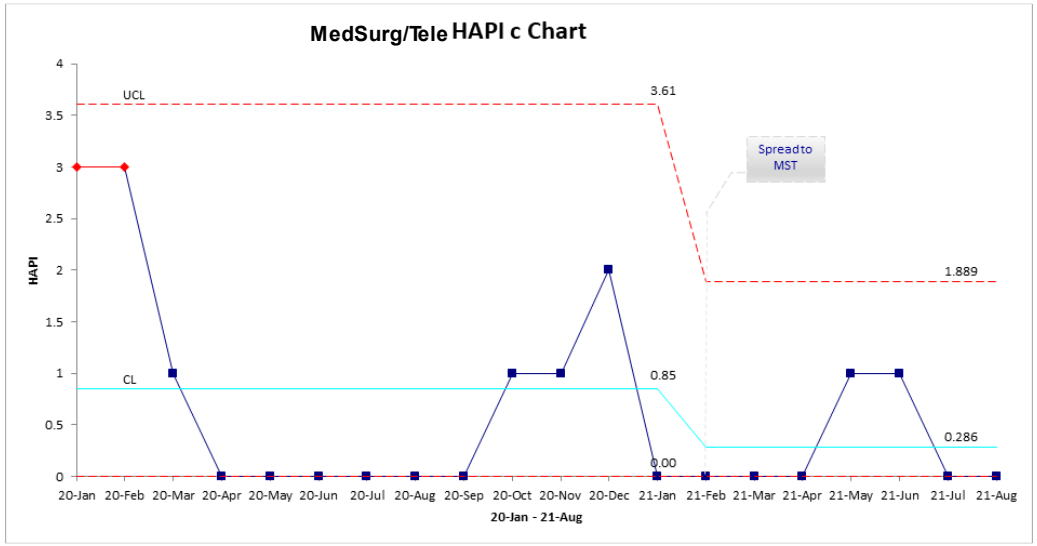
Week 16 – Week 18 (4/12 – 5/1) are baseline data collection period

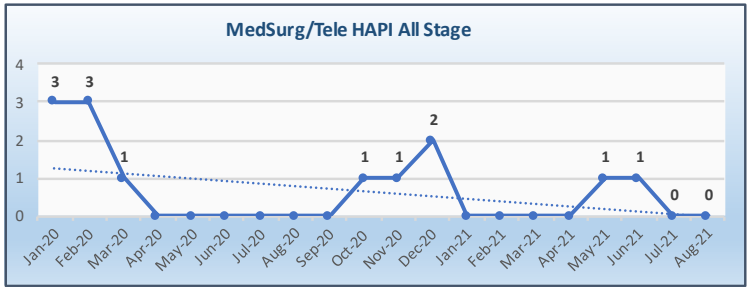
	Sub Scale	Baseline Total Audits	Baseline Yes	Baseline Compliance 4/12-5/1	Post Baseline Accumulative Compliance as of 8/4/2021
3N	SENSORY SUB SCALE	44	33	75%	86% (87%) ↓
	MOISTURE SUB SCALE	45	38	84%	94% (95%) ↓
	MOBILITY Sub Scale	144	121	84%	96% (96%) ⟷
	ACTIVITY Sub Scale	154	133	86%	96% (96%) ⟷
	NUTRITION SUB SCALE	163	98	60%	81% (79%) ↑
	FRICTION/SHEAR SUB SCALE	47	30	64%	96% (98%) ↓

	Sub Scale	Baseline Total Audits	Baseline Yes	Baseline Compliance 4/12-5/1	Post Baseline Accumulative Compliance as of 8/4/2021
4N	SENSORY SUB SCALE	26	19	73%	82% (80%) ↑
	MOISTURE SUB SCALE	42	34	81%	79% (75%) ↑
	MOBILITY Sub Scale	74	65	88%	89% (89%) ↑
	ACTIVITY Sub Scale	92	79	86%	89% (86%) ↑
	NUTRITION SUB SCALE	97	69	71%	70% (66%) ↑
	FRICTION/SHEAR SUB SCALE	38	35	92%	86% (82%) ↑

KAISER PERMANENTE SOUTH SACRAMENTO

Status Categories		
	On Track	On pace to achieve objectives
	At-Risk	Off-track but corrective actions are in place
	Off Track	Off-track and no corrective actions have been taken
	Complete	Completed





Attendees: Sanaz, Paa Thao, Stephanie Bracanovic

Appendix T

IRB Research Determination Letter

KAISER PERMANENTE®

Date: February 17, 2021
Subject: RDO KPNC 20 - 147
Title: Reducing hospital-acquired pressure injuries (HAPIs)

Dear Dr. Lima:

The Research Determination Committee for the Kaiser Permanente Northern California region has reviewed the documents submitted for the above referenced project. The project does not meet the regulatory definition of research involving human subjects as noted here:

Not Research

The activity does not meet the regulatory definition of research per 45 CFR 46.102(d): Research means a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge.

This determination is based on the information provided. If the scope or nature of the project changes in a manner that could impact this review, please resubmit for a new determination. The word "research" should not appear in any posters or publications resulting from this project. Further, if publications, presentations or posters are generated from this project the following wording must be used to reference to the project research determination outcome:

"The Research Determination Committee for the Kaiser Permanente Northern California region has determined the project does not meet the regulatory definition of research involving human subjects per 45 CFR 46.102(d)"

You are expected, however, to implement your study or project in a manner congruent with accepted professional standards and ethical guidelines as described in the Belmont Report (http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.html).

Additionally, you are responsible for keeping a copy of this determination letter in your project files as it may be necessary to demonstrate that your project was properly reviewed.

Provide this approval letter to the Physician in Charge (PIC), your Area Manager, and Chief of Service, to determine whether additional approvals are needed.

Sincerely,

The Research Determination Committee
KPNC-RDO@kp.org

Appendix U

Statement of Non-Research Determination Form

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DNP Statement of Non-Research Determination Form

Student Name: Rachel Wyatt

Title of Project: Reducing avoidable hospital-acquired pressure injuries (HAPIs).

Brief Description of Project:

Hospital-acquired pressure injuries are the only hospital-acquired condition (HAC), recognized by the Agency for Healthcare Research and Quality, as declining in performance (AHRQ, 2019). Approximately 2.5 million people develop a pressure injury during hospitalization, with an estimated 60,000 of those who will die from complications related to HAPI's (Padula & Delarmente, 2019). The cost per HAPI ranges from $500 to $70,000, and at a national healthcare cost, from $3.3 billion to $11 billion (Padula & Delarmente, 2019). The literature shows that more research is needed in better identifying the risk of HAPI in the critically ill population, differentiating avoidable from unavoidable, and tailoring specific interventions based on the patient's particular risk to reduce cost and risk of over-treating patients.

In a community hospital in Northern California, the incidence of HAPI has increased by over 400% year-over-year between 2016-2018. Inconsistencies in practice, documentation, data collection, and data analysis were some of the identified opportunities. Based on the exponential HAPI increase, a pilot was implemented in the Intensive Care Unit to reduce avoidable HAPI's.

In a study of 165 patients from critical or progressive care units that developed a

HAPI, 41% were deemed to be unavoidable (Pittman et al., 2019). Of the 41%, the ICU lengths of stay were longer, the incidence of bowel management devices in place was higher, and those who previously had a PI were more likely to have an unavoidable HAPI (Pittman et al., 2019). Using Pittman's research, a pilot was developed allocating a specific number of interventions to be implemented based on the Braden subscale score. The rate of HAPI's in the ICU, stage two and greater, decreased from a baseline of 2.812/1,000 patient days to 0.572/1,000 patient days. The pilot ran from November 2019 to May 2020. The next step is to spread the pilot to the Medical-Surgical/Telemetry units in the hospital.

Using the Institute for Healthcare Improvement's (IHI) Spread model and Kurt Lewin's Change model, the pilot completed in the ICU will be spread to the Medical-Surgical/Telemetry units by September 1, 2021.

A) Aim Statement: By September 1, 2021 develop, implement, and evaluate a redesigned HAPI Prevention Protocol.

Objectives include:

- Reduce HAPI's by 30% in the medical-surgical/telemetry units.
- Increase confidence among Registered Nurses and Patient Care Technicians on what, and when, to implement preventative measures for HAPI's by 20%.
- Improve caregiver knowledge of specific risk factors and interventions to include in shift handoff by 30%.

B) Description of Intervention: Most HAPI prevention protocols implement preventative measures for HAPI's based on the cumulative Braden scale score. Patients may have a cumulative Braden score over 18, though the patient has a risk in one of the

six subscales of the Braden scale. Braden subscales have been found to be individually predictive of PI development (Lim et al., 2019). In a retrospective chart review of 20 patients with confirmed HAPI's in a mid-western acute care facility, 19% of patients were found not at risk, per Braden cut-off score of 18, though had a subscale score at risk, and 81% of patients had at least one day at risk (Gadd & Morris, 2014). It was also found that interventions were not tailored to specific subscale risk 46-97% of the time (Gadd & Morris, 2014). Tailoring interventions to subscale could allow for the most appropriate preventative measures to be implemented versus implementing a long list of interventions with no specific target.

C) How will this intervention change practice?

Nurses apply interventions based on the Braden total score, that has a standard cutoff of 18. Per policy, there are several interventions that are then implemented for a total score of less than 18. These interventions are non-specific to the patient's risk. When evaluating the Braden total scare to plan interventions, it is possible to overlook a risk the patient may have in a subscale score, as the total score could be 18 or above. Nurses will take a closer look at each subscale and apply a specific number of interventions based on the subscale risk. The goal is to decrease the random implementation of a high volume of interventions and focus on targeted interventions to prevent HAPI's.

D) Outcome measurements:

- Reduce avoidable HAPI's by 30% in the medical-surgical/telemetry units.
- Increase confidence among Registered Nurses and Patient Care Technicians on

what, and when, to implement preventative measures for HAPI's by 20%.

- Improve caregiver knowledge of specific risk factors and interventions to include in shift handoff by 30%.

References

Agency for Healthcare Research and Quality. (2019). Declines in Hospital-Acquired Conditions. https://www.ahrq.gov/sites/default/files/wysiwyg/data/infographics/hac_rates_2019.pdf

Gadd, M. & Morris, M. (2014). Use of the Braden Scale for Pressure Ulcer Risk Assessment in a Community Hospital Setting: The role of total score and individual subscale scores in triggering preventative interventions. *Journal of Wound, Ostomy and Continence Nursing, 41*(6), 535-538. https://doi.org/10.1097/WON.0000000000000066

Lim, E., Mordiffi, Z., Chew, H., & Lopez, V. (2019). Using the Braden subscales to assess risk of pressure injuries in adult patients: A retrospective case-control study. *International Wound Journal, 3*, 665-673.

Padula, W. & Delarmente, B. (2019). The national cost of hospital-acquired pressure injuries in the United States. *International Wound Journal, 16*(3), 634-640. https://doi.org/10.1111/iwj.13071

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Pittman, J., Beeson, T., Dillon, J., Yang, Z., & Cuddigan, J. (2019). Hospital-acquired pressure injuries in critical and progressive care: avoidable versus unavoidable. *American Journal of Critical Care, 28(5),* 338-350. https://doi.org/10.4037/ajcc2019264

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: (http://answers.hhs.gov/ohrp/categories/1569)

☑ This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

☐ This project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

Instructions: Answer YES or NO to each of the following statements:

Project Title: Reduce avoidable hospital-acquired pressure injuries through implementation of interventions based on Braden subscale scores.	**YES**	**NO**
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	**X**	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. ALL participants will receive standard of care.	**X**	
The project is **NOT** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **NOT** follow a protocol that overrides clinical decision-making.	**X**	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment, or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new untested standards.	**X**	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an	**X**	

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intervention that is beyond current science and experience.		
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	**X**	
The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	**X**	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	**X**	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."*	**X**	

ANSWER KEY: If the answer to **ALL** these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to ANY of these questions is **NO**, you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

STUDENT NAME (Please print): Rachel Wyatt

Signature of Student:

R. Wyatt **DATE** 7/31/2020

SUPERVISING FACULTY MEMBER (CHAIR) NAME (Please print):

Signature of Supervising Faculty Member (Chair):

DATE

SUPERVISING FACULTY MEMBER (CHAIR) NAME (Please print):

Jill Mahoney

Signature of Supervising Faculty Member (Chair):

Jill Mahoney **DATE** 10/2/20

Appendix V

Letter of Support

KAISER PERMANENTE®
6600 Bruceville Rd
Sacramento, Ca 95823

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May 20, 2020

DNP Project Letter of Support from Agency

This is a letter of support for Rachel Wyatt to implement her DNP Comprehensive Project, Implementation of Braden-Subscale Specific Interventions, at Kaiser Permanente South Sacramento Medical Center. We give her permission to use the name of our agency in her DNP Comprehensive Project Paper and in future presentations and publications.

Sincerely,

Stacy L Alves, RN, MS
Director of Clinical Education, Practice and Informatics
Kaiser Permanente South Sacramento Medical Center
Stacy.L.Alves@kp.org
(916) 688-2492