Organizational Wound Policy Improvement and Expansion

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Dedication

I dedicate this paper and all the hard work put into it to my children, grandchildren, mother, friends and co-workers. I appreciate all the support, sacrifice and encouragement throughout this journey, without all of you I would not have accomplished this goal. Lastly, this is in memory of my daddy, Thomas Welker.

Abstract

Hospital acquired pressure injuries are a costly and significant health care issue that can have major implications for patients and health care organizations. Accurate and timely wound assessment and documentation is an essential for patient safety, quality care, and outcome improvement. Wound and skin documentation has become a concern for a 114-bed hospital in eastern North Carolina. The goal of this quality improvement project was to improve patient wound care, patient wound outcomes and staff education related to improved wound care and wound assessment. Interventions chosen to achieve the established goal were: implementation of nurses properly photographing wounds to be imported into the electronic medical record (EMR), initiation of visual cues at the patient doorways to indicate which patients have wounds and which day re-measurement is due, initiation of reminder cue cards on nursing work stations on wheels with step-by-step information related to wound care, adding a column to the patient list that indicates which patients have wounds and implementation of EMR reminders on day seven and at discharge to re-measure and document on wound status. The results revealed that wound and skin documentation compliance from January to April 2023 increased from 52% to 91%, from pre-implementation data collected April to May 2022. The results of this project reveal that the interventions can increase wound and skin documentation compliance thus yielding improved quality of life for our patients.

Keywords: wounds, skin, interventions, hospital acquired pressure injury, digital imaging

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Section I. Introduction

Accurate and timely wound assessment and documentation is an essential aspect of patient safety, quality care, and outcome improvement for all patients. Assuring a consistent patient centered approach is essential, particularly when exploring change. It is a major role of leadership to provide the parameters, support and guidance for this to happen reliably and according to the needs of the organization and evidence-based recommendations.

Background

The site for this project is a 114-bed hospital in eastern North Carolina. This hospital is part of a large, primarily rural, healthcare system. The hospital, established in 1948, is a non-profit organization that provides a wide range of health services to nearly 40,000 people across four counties and strives for strong community support. The services include, but are not limited to, behavioral health, cancer services, emergency services, neurology, orthopedics, pain management, and women's services. The patient population is diverse, healthcare illiterate and underserved.

Patients admitted to the hospital must have an initial skin assessment as part of their admission nursing assessment. Any patient admitted to the hospital with a pressure injury (PI), wound, or who undergoes surgical intervention is required, by policy, to have a proper assessment and documentation of each wound to facilitate planning and implement appropriate care. Implementation of the correct interventions and communication from shift to shift, across the continuum, will help facilitate wound healing and reduce the risk these patients have for extended hospitalizations as well as issues post-hospitalization.

In 2009 the Centers for Medicare and Medicaid Services (CMS) began a concerted effort to aid hospitals in reducing the incidence of PI by adding them to their list of "Never Events"

(Silveria, 2009). This made hospital acquired PIs receive reduced reimbursement as CMS felt that this is a condition that is easily prevented by utilizing standard and multidisciplinary care guidelines (Silveria, 2009). The potential legal liability to the organization and the negative impact on financial reimbursement are two issues that are of importance to all levels of nursing Leadership.

In order to provide effective patient care records and positive patient outcomes, a user-friendly tool must be readily available for utilization. The wound policy must also be transformed to demonstrate the high quality of care expected, evidence of team member's involvement with the patient, and communication among healthcare professionals. Inadequate patient care records or non-effective communication tools may have an adverse impact on the quality of care provided and clinical decision-making. Documentation must include valid and reliable information in enough detail that demonstrates appropriate care has been delivered, utilizing best practices (Do et al., 2021).

Organizational Needs Statement

The project site currently has a system-wide wound policy and though it is evaluated annually, there remains opportunity to incorporate concepts that are a better fit for some of the system's sites. The importance of following the prescribed policy to maximize patient safety and outcomes is clearly an area of needed improvement. It is important for team members to understand and ensure they are following the prescribed policy for patient safety, including skin health, policy compliance and effective communication. Hospitals have realized there are potential financial burdens associated should they incur a hospital acquired pressure injury (HAPI) or fail to provide adequate wound care to promote healing (Padula & Delarmente, 2019). Heerschap et al. (2019), reported that a single incidence of a HAPI can cost a hospital $500 to

over $70,000. Identification and documentation of wounds present on admission continues to be of particular interest to the organization in light of CMS requirements (Silveria, 2009). Therefore, the importance of proper documentation as it relates to organizational risk and liability is an area that needs to be stressed.

There are no state or national benchmarks, such as the National Database of Nursing Quality Indicators (NDNQI), related to wound treatment. Healthy People 2030 has a focus to improve health by assisting individuals with obtaining timely, high quality health care including treatment for chronic illnesses, such as wounds (Office of Disease Prevention and Health Promotion [ODPHD], 2022). The project site has a goal of no more than one HAPI per fiscal year (S. Brinkley, personal communication, July 5, 2022).

The World Health Organization has recognized wound management as a worldwide public health problem that is managed best by interprofessional teams and communication. Employing an interprofessional approach to wound management has been proven to increase healing and decrease recurrence of wounds (Heerschap et al., 2019). Through annual training, and goal setting, daily interprofessional rounds and quality audits, team members are expected to be knowledgeable of the organizational expectations related to the wound care they provide. When team members, including nurses, are knowledgeable of proper wound care they are able to educate patients and their families allowing them to better understand how to care for themselves or the patient outside of the hospital. Building a positive relationship with the patient and family is important to encourage them to feel empowered with an informed choice regarding their treatment. When a patient is demotivated, does not feel empowered, is not literate in wound care, is not offered a choice of treatment, or does not understand the extent of the financial burden that

they may be facing, it is highly likely that the patient will not follow the given instructions to care for their wound (Palmer, 2022).

Problem Statement

A chart review of 100 charts at the project site from June 1, 2022, to July 31, 2022 revealed opportunities for improvement for staff to follow existing policy related to care and documentation of wounds and surgical incisions. Chart review revealed a documentation compliance rate of 36% with six key elements according to policy. The elements audited were: measurement of wound on admission or identification; flowsheet activation; plan of care; patient education; dressing orders; dressing assessed every shift; and consultation ordered. System policy required measurement of wounds at seven days post initial assessment, which follows best practice guidelines adopted from Mosby's and Elsevier's Nursing Skills. Wound location, size, and depth in addition to presence of drainage and tissue type should be documented (Bowers & Franco, 2020). Compliance with measuring at initial assessment was at 44% (n = 44) and assessing the dressing appearance daily was 16% (n = 16). This hospital's average length of stay was 5.1 days; therefore, only 40% (n = 40) of the charts audited were still hospitalized on day seven. Of the 40% (n = 40) that were still admitted on day seven only 1% (n = 1) with wounds were re-measured. Policy specifically dictates guidelines related to measurement, education, assessment and documentation of dressing sites. These opportunities indicate that there was an inefficient process with wound assessment and care from the time the patient was admitted until discharged, which may lead to complications in care, delay in wound healing and financial burdens for the organization.

Purpose Statement

The purpose of this project was to improve patient wound care, patient wound outcomes and staff education related to improved wound care and wound assessment. Having a system-wide policy that is appropriate for all entities which includes processes that are based on best practice and efficiency is first and foremost. A strong policy can assist the organization with having accurate data to demonstrate wound healing, presence on admission and other parameters, yielding improved quality of life for our patients.

Section II. Evidence

Wounds affect millions of individuals globally, for this reason research on wounds and improving wound healing is plentiful. There are a plethora of literature reviews available regarding wounds and wound care although there is not a wealth of literature available on interventions that can be utilized to improve documentation outcomes. The purpose of this literature review was to synthesize the current knowledge on wound care, and evidence-based interventions to increase nursing documentation of wounds.

Literature Review

The Laupus library, located on the East Carolina University (ECU) campus, was the site utilized for all literature reviews. Cumulative Index to Nursing and Allied Health Literature (CINHAL) and PubMed databases were used for the literature search, additionally a forward search of selected articles in Scopus was completed. Search terms included wounds, visual cues, digital media, best practice alerts and HAPI. Phrases utilized included “pressure injury documentation”, “improving wound documentation”, “wound care” and “documenting of wounds”. Only literature written in English from 2017-2022 were considered. Inclusion criteria noted patients in the inpatient setting. Any articles that describing outpatient settings were

excluded. The CINHAL search yielded a result of 127 articles, of which 16 were saved for review. The PubMed search yielded a result of 89 articles, of which 12 were saved for review. All levels of literature evidence were searched. Literature selected supported: wound identification, measuring, staging, dressing, documenting, and the utilization of tools to facilitate compliance a total of seven articles were selected and included in the literature review (see Appendix A).

Current State of Knowledge

The management and documentation of wounds has proven to be a constant challenge to team members over the years. Many patients suffer from chronic wounds and multiple comorbidities making treatment and management difficult. In addition, complex wounds can lead to extended lengths of stay and readmissions. These difficulties have led to many studies being conducted with the goal of improving patient outcomes. The Joint Commission (TJC) and the Centers for Medicare and Medicaid Services (CMS) have generated rules and regulations that govern the documentation that organizations are required to have in place (Hess, 2019).

There is a significant amount of literature that supports the premise that healthcare facilities should be focused on patients who are admitted to the hospital with PIs and wounds. Furthermore, literature supports that interventions should be in place, each patient having had an assessment and documentation on admission of each wound, in order to facilitate planning and implementation of appropriate care during each patient's hospital stay (Aqusti et al., 2022; Au et al., 2019; Bowers & Franco, 2020; Chavez et al., 2019). Despite the plethora of literature supporting wound interventions, there is not a significant amount of research to support how to improve wound documentation in the acute care setting.

Current Approaches to Solving Population Problem

There are multiple interventions utilized individually for wound care improvement. Combining or packing interventions together in a structured manner for implementation can be referred to as bundling. Implementing several interventions together, as a bundle, can have a positive impact on an organization's ability to demonstrate that they provide outstanding wound care that surpasses standard expectations.

Photographic Documentation. Photographing wounds has been a proven method to increase healing and patient outcomes. Jordan et al. (2021) offered that photographic documentation of wounds can improve the verification of wound staging, by demonstrating physical appearance, as well as the overall quality of documentation and avoid loss of revenue. Jordan et al. conducted a study by reviewing 372 cases, of which 27 cases were affected by photographic documentation. Photographic documentation was utilized for clarification of operative procedures (n = 5), primary diagnosis (n = 10), secondary diagnosis (n = 3), and length of hospitalization (n = 9). The facility gained an estimated $65,328 dollars in revenue annually after implementation of photographic documentation.

Au et al. (2019) performed a study at a skilled facility with 128 beds and patients with various wounds. At the time of admission each patient received a skin swarm, a comprehensive skin review, to identify any wounds. If there were any wounds identified, informed consent was obtained in order to take an image of the wound. Each patient was given weekly skin examinations, including the patients earlier identified without wounds. The patients with existing wounds received a more thorough assessment. The digital photographs of the wounds in the electronic medical record (EMR) improved understanding and communication between the care team. Photographs were able to show wound staging in a way in which descriptors were unable to capture. This facilitated improvements in conversations regarding the treatment and

management of wound care. The photographs also allowed the care team to track the progress of each wound, providing objective visual information. The percentage of patients with PIs decreased dramatically after implementation of digital photographs. The long-term patients with wounds decreased from 11.15 annually to 5.33 and the short-term patients decreased from 1.16 annually to none. Photographs also improved the precision of wound classification, which in turn had the benefit of appropriate treatment regimens. Difficult to manage wounds greatly benefited from the ability to easily share and access wound photographs onsite as well as remotely.

Visual Cues. Clack et al. (2019) conducted front-end analysis utilizing interviews and observations to identify challenges related to the current isolation precaution signage and establish a plan to design new signage. The interviews and observations were followed by implementing the Plan, Do, Study, Act (PDSA) methodology. The team determined that placement of the visual cues and the design of the signage was deemed to be inadequate. When the team was prompted about where visual cues should be located, the participants agreed that some cues should be located inside the patient room. It was agreed upon that visual cues would be placed: at the entrance to the patient room, the foot of the patient bed, and next to patient charts. The overall look of the visual cues took on a different look. Symbols and the color scheme were redeveloped with the intention of becoming standardized throughout the organization. Distinguishing symbols were utilized to differentiate isolation categories. The new signage offered positive outcomes and the implementation process was found to be useful and well accepted by the users. Although this study was not focused on wound signage the same principle can be applied.

Stoeckle et al. (2019) conducted a literature review to identify and implement evidence-based best practices for fall prevention. A multifactorial fall prevention program was

implemented including high-fall-risk patient identification signs, visual cues. Usage of the fall risk signs occurred up to 43% of the time. Implementation of the signs did increase awareness and communication between ancillary disciplines. Visual cues, such as signage, was a low cost effort that had high staff adherence, although the setting for this project was an overcrowded emergency department. The results of the project did not yield a reduction in falls, perhaps a different setting should be considered.

Electronic Reminders. Sheth et al. (2021) describes the benefits of utilizing best practice alerts (BPAs) during a quality improvement project to improve pneumococcal vaccination rates and documentation of vaccines received, refused and deferral reasons. The project site was a rheumatology clinic and the target population was rheumatoid arthritis patients. The BPAs were developed based on guidelines provided from the Centers for Disease Control and Prevention (CDC). The BPA was designed to automatically trigger during the patient's initial assessment. Sheth et al. points out that the functionality of the BPA was multifaceted, it demonstrated improvement in the pneumococcal vaccine being offered to patients, it reminded team members to offer the vaccine to each patient, the documentation also improved, and team members were required to enter an action. The BPA had the capability to be turned off for six months when vaccination was prescribed or deferral reasons were appropriately documented, and for a year if the patient refused vaccination. If the BPA was ignored, it continued to reappear on the subsequent visit. This study emphasizes the effective implementation of BPAs to improve vaccination rates, which can be generalized and sustained for many aspects of preventative care. Overall pneumococcal vaccination did improve 49% and the documentation aspects improved by 40% over the two phases of implementation.

Valvona et al. (2020) conducted a retrospective analysis of data for 11 BPAs, with the outcome measure being the percent that corresponds with recommended actions. The BPA presentation type was significant. The odds are 7.7 times greater that a recommended action would be taken by a provider with an active BPA presentation type after adjusting for whether an action was required. One of the BPAs from which data was collected included "Patient has Pressure Injury on Admission". By accepting the BPA the diagnosis is added to the patient's problem list, then an unsigned order for a consult from the Wound/Ostomy nursing team can be created. Another available option is to go to the patient's problem list and select a more appropriate option from a complete set of wound diagnoses. Interestingly, alerts that contained over 300 characters in the headers had compliance rates below 21%. Therefore, to simplify team member options it is suggested that BPA designs minimize the follow-up boxes and action choices, have multiple acknowledgment reasons, and not include an activity link.

Evidence to Support the Intervention

Photographs of wounds are used primarily as a visual confirmation of the wound noted in the EMR (Tamang et al., 2022). Evidence supports photographs have major advantages for the patient. The National Wound Care Strategy Program recommends that digital images become a part of standard practice (Jordan et al., 2021). Documentation of wounds can include PIs, tumors, infection, surgical wounds and open fractures. Staff in the emergency room, operating room, intensive care unit and on medical/surgical units can utilize digital devices, such as I-pads, that including a photo-app to easily transfer images into the medical record (Jordan et al., 2021). Photographs in the EMR do not require that the physician come into contact with the wound; therefore, the dressing would not have to be removed as often, facilitating healing and decreasing infection. Having photographs over time aid in showing the status and the prognosis of healing

(Li et al., 2018). Ensuring success for patients and team members, assuring all elements are covered in policy and that the policy is followed upon implementation will be imperative.

Visual cues, such as signage, can serve as reminders and indicators to assist team members in completing task. Reminders will assist team members' unconscious acts of omission by prompting them to recall information that they already know by presenting information in a different and more accessible format. Visual cues on paper are relatively inexpensive interventions that have been found to be effective, particularly when utilized in combination with other interventions (Pantoja et al., 2019). Visual aids outside the patient doors to indicate which patients have wounds will remind team members they need to address interventions with the wounds. Additionally, checklist attached to each workstation with wound interventions listed will guide care and improve documentation.

Utilizing on-screen computer reminders in the EMR, such as BPAs and additional data columns have been effective in increasing nursing compliance with elements of care. The EMR can be set up to have alerts appear when patients have certain diagnosis, these alerts can be pre-set as reminders to perform task (Augusti et al., 2022). With all of the task that nurses have to carry out reminders are beneficial in ensuring all elements of care are met. An important function of on-screen reminders is the improvement of the quality of documentation and metrics (Lehto et al., 2021). Specific interventions, in the form of order sets, can be automatically triggered when certain documentation is entered. Systematic assessment of the performance gaps of on-screen reminders is important to enhance the clinical impact and manage potential alert fatigue (Bunkers et al., 2019). While reminders can be a vital part of an improvement in care and documentation it is important not to overload team members to an extent that they develop BPA alert fatigue.

Evidence-Based Practice Framework

There are many different approaches utilized to improve processes, correct behaviors or decrease waste in workflow. PDSA is the methodology utilized for this project. PDSA is a practical approach as it can be utilized to make changes in steps or where revisions may be needed. The process is to develop a plan of change or a goal (Plan), carry out the test of change by implementing the interventions (Do), make observations of the change by collecting results to be analyzed (Study), and lastly make needed changes or adjustments in the plan if needed (Act) (Institute for Healthcare Improvement [IHI], 2017). PDSA is a quality improvement methodology that is part of Lean Six Sigma originated from work completed at Toyota in manufacturing. This cycle can be repeated over and over to continually make improvements.

The Reach Effectiveness Adoption Implementation Maintenance (RE-AIM) was initially developed, by Russ Glasgow, Shawn Boles and Tom Vogt in the late 1990s, for the consistent reporting of health research results (Kikuchi et al., 2021). In addition, this framework can also be used to evaluate the impact of an intervention on individual and organizational levels using the following five factors: reach, effectiveness, adoption, implementation, and maintenance. King et al., (2010) explains that RE-AIM has been utilized to evaluate policy interventions which address an extensive range of health conditions in addition to health behaviors. An advantage of implementing the RE-AIM framework is that it connects main ideas that will be utilized in planning with evaluating projects.

Ethical Consideration & Protection of Human Subjects

This project was an implementation of a quality improvement initiative, for patients with wounds; therefore, the ECU Institutional Review Board (IRB) process was required. Approval was obtained from the project site and site leaders as the project was deemed a Quality

Improvement project (see Appendix B). The Quality Self-Certification Tool was submitted to East Carolina University on August 26, 2022. Approval was obtained on November 2, 2022, ECU deemed the project as a Quality Improvement and/or Program Evaluation (see Appendix C). In preparation for the project, the project leader completed the Collaborative Institutional Training Initiative (CITI; n.d.) modules.

Interventions involved the implementation and usage of: digital media of wounds into the EHR, visual cues, and electronic reminders. Patient eligibility was based on the presence of a wound. All patients were treated fairly and equally. Confidentiality and Health Insurance Portability and Accountability Act (HIPPA) laws were followed. Patient privacy was protected and patient identifiers were confidential at all times. The medical unit was chosen as the site to pilot the wound bundle as they have recently combined with the surgical unit and now have an average daily census of thirty patients and six nurses. The average nurse to patient ratio is one to five. Of the five patients for which the one nurse is providing care, it is common to have two or more with multiple wounds.

Section III. Project Design

Project Site

The site selected for this project was the medical unit of a community hospital. The hospital, initially established in 1948, is part of a large health care system. The project site is a 114-bed not for profit facility. The facility is located in a rural area of northeastern North Carolina (NC) and provides services to over 40,000 individuals over a span of four counties. The facility offers community members general medical, surgical, behavioral health and specialty services including outpatient, cancer care, pain management and emergency services.

Description of the Setting

The setting of the project was the medical unit within an acute care hospital. The unit consist of 30 private beds located within three long hallways, joined by one nurse's station backed up by a medication station. The unit also contains a room with an automated dispensing supply cabinet (Pyxis), nutrition room and a break room for team members. The unit operates 24/7 with consistent staffing. Annual days of care average 10,750 with an average day census of 29.

Description of the Population

The population of interest for this project are registered nurses (RNs) on the medical unit. The medical unit is comprised of 29 full time nurses, 17 full time nursing assistants and five full time monitor technicians. A typical shift consists of six nurses, three nursing assistants and one monitor technician who work 12-hour shifts. One of the six nurses also serves as a charge nurse, along with having responsibility for the nursing care of five patients. The target population consisted of, male and female, nurses that provide care for patients with wounds.

Project Team

Establishment of an interprofessional wound committee within the facility is the first step to achieving other interventions to improve wound documentation (Chavez et al., 2019). The wound and skin team consisted of a Project Team Leader (PTL), a Site Champion, who is a Director of Patient Care Services, a Quality Nurse Specialist, two medical/surgical nurses, a nursing assistant II, a wound center nurse, an education nurse and faculty mentor. The PTL was responsible for meeting with project faculty, site champion, and the project site for regular updates regarding the progress. The Quality Nurse Specialist served as support, assisting with data collection, policy review and facilitating team meetings. The two medical/surgical RNs and the nursing assistant II were vital as they work in the area that has the greatest need of

improvement, the pilot area. The medical/surgical RNs and the nursing assistant II served as a sounding board between the wound and skin team and the frontline team members. The medical/surgical RNs and the nursing assistant II were able to take ideas and templates back to their co-workers and get feedback to bring back to the wound and skin team prior to moving to the next step. The wound center RN is considered an expert related to skin and wounds. The wound center RN was able to provide feedback on how they took photographs and measurements to incorporate into the EMR. Having an education nurse on the team was important to assist with educational needs related to implementation and review of policies. The committee assisted with addressing policies, implementation of change, and review of interventions. The wound committee established for this project has the ability and tools to continue to grow and onboard additional members after the project work is complete.

Project Goals and Outcome Measures

The primary goal of this project was to improve patient wound care, patient wound outcomes and staff education related to improved wound care and wound assessment. Research supports that each patient should have a skin assessment and documentation should be made on admission of each wound in order to facilitate planning and implementation of appropriate care during each patient's hospital stay (Aqusti et al., 2022; Au et al., 2019; Bowers & Franco, 2020; Chavez et al., 2019). Team members should easily be able to meet the needs of their patients

Each patient that arrives to the medical unit, according to policy, is to have a skin swarm completed by two RNs. Any irregularities noted are to be documented in the patient's EMR flowsheet. Any wounds discovered are indicated by documentation on the flowsheet along with measurements by the RN. By entering wound specifics in the flowsheet, an automatic BPA is triggered to notify the nurse of additional patient care requirements. The BPA includes:

assessment and documentation requirements every shift; positioning instructions, measurement frequency; dressing orders; and specific guides for discharge plans. Additionally, education is to be provided to the patient and documented; a nursing diagnosis of “Impaired Skin Integrity” is added to the patient’s care plan so that each of the individual components can be addressed.

A photograph of the wound, including a measuring device, were taken by nurses with an electronic device. The photograph was imported directly into the patient’s EMR wound flowsheet. By having imaging readily available in the flowsheet team members and providers can see the progression of wound healing. Detailed wound care visual cue cards were adhered to each nursing work station. By implementing visual reminders that are adhered to each work station the steps are right in front of RNs as they are providing care. Each RN placed a visual cue at the patient’s door, if the patient had a wound present, to serve as a daily reminder to assess and re-measure on the seventh day of hospitalization.

Description of the Methods and Measurement

Outcome measures are data metrics that show the impact of the intervention and if the expected outcome was achieved as anticipated. The percentage of variance from baseline was utilized to determine post project implementation improvement. Table 1 outlines the expected outcomes and measurements used for each project objective.

Table 1

Objectives, Expected Outcomes, and Measurements

Number	***Objective***	***Expected Outcome***	***Measurement***
1	Team will have improved wound documentation	Post intervention documentation will be at 90%	Pre-post difference in documentation
2	Visual cues will be placed at patient doorways	Visual cues will be present at 90% of applicable patient doorways	Percent of visual cues utilized
3	Visual cues will be place on RN WOWs	Visual cues will be present on 90% of RN WOWs	Percent of visual cues utilized
4	Photograph of wound will be imported in EMR	90% of applicable EMR charts will have photograph of wound	Percent of photographs imported into the EHR
5	Wound BPA will be accepted in EMR	90% of wound BPAs will be accepted	Percent of BPAs accepted
6	Team will utilize Presence of Wound column on flowsheet	Presence of Wound column on flowsheet	Percent of team members that utilize Presence of Wound column

Note. Aggregated data was utilized for outcome and measurement data.

Discussion of the Data Collection Process

Chart audits were performed pre- and post-intervention to determine if the interventions were effective in improving patient wound care, patient wound outcomes and staff education related to improved wound care, wound assessment and wound documentation. Pre-intervention audits were performed on the medical unit in addition to the intensive care and women's unit. The PTL collected all of the data manually from the EMR and through observations utilizing a

pre and post intervention data collection tool (see Appendix D). An educational roster was utilized during team member education to determine the percentage of staff that attended an educational session. Data was transcribed into an Excel spreadsheet for ease of sorting and analyzing. Pre-intervention data was collected from June 1, 2022, to July 31, 2022 and was compared to post-intervention data. Post-intervention data was collected January 1, 2023 through the end of April 2023. All data was trended for analysis, evaluation and comparison.

Data collection took place daily or weekly depending on the data collected. Column and line graphs were utilized to display data on informational boards for team members on the medical unit. The wound and skin team met bi-weekly to review progress and trends.

Implementation Plan

Prior to implementation education and training was provided to nurses on the medical unit (see Appendix E - F). The PTL along with assistance from nurse educators and Clinical Informaticist provided educational in-services for nursing team members on the medical unit. The educational in-services took place on the medical unit and lasted on average 30 minutes. After all educational in-services were completed, educational information was posted on the medical unit to serve as a reminder and reference tool for RNs.

Implementation of this project occurred January – April 2023. The pre-implementation phase of this project which included a literature search and review was completed to assist with developing evidence-based interventions that would be implemented. The wound and skin team collaborated to discuss which interventions would be best for this project setting. Current state and proposed future state (see Appendix G) were discussed and a gap analysis (see Appendix H) was performed to identify strengths, weaknesses, opportunities and threats (SWOT). Strengths identified: support from leadership, participation from wound team members, local wound care

center, identified patient care need. Weakness identified: decreased participation from unit nurses, compliance from unit nurses, increase patient to nurse ratio. Opportunities identified: hand-off from shift to shift, time management, maximize technology resources. Threats identified: sustainability of new interventions, culture change in practice, nursing shortage. The interventions that were chosen for implementation to improve or correct flow were developed from evidence-based interventions. Those interventions included: implementation of nurses properly photographing wounds to be imported into the EMR (Jordan et al.; 2021; Li et al., 2018; Tamang et al., 2022); initiation of visual cues at the patient doorways to indicate which patients have wounds and which day re-measurement is due (Pantoja et al., 2019); initiation of reminder cue cards on RN WOWs with step-by-step information related to wound care (Augusti et al., 2022; Bunkers et al., 2019; Lehto et al., 2021); adding a column to the patient list that indicates which patients have wounds and implementation of EMR reminders on day seven and at discharge to re-measure and document on wound status (Augusti et al., 2022; Bunkers et al., 2019; Lehto et al., 2021).

RNs utilized the camera integrated on the android rover device to capture images of wounds. The RN was able to link the image directly into the patient's wound flowsheet in the EMR. Once in the EMR all images linked to each wound could be viewed. From the flowsheet there was an option to view thumbnail images so that progression of the wound can been seen. Users have access to wound details such as measurements and last dressing change from the EMR flowsheet.

Laminated cards with an image of a band-aid and the days of the week were secured to the doorways of patients with wounds by magnets. RNs utilized dry erase markers to indicate the day of the week that the wound is due to be re-measured. The visual cues assisted the nurse with

staying on schedule for re-measurement as well as notifying team members which patients had wounds.

Informative cue cards were placed on each nursing WOW. The visual included vital information for RNs to adhere to that supported them in their wound care success. The cue cards reminded RNs: when to measure wounds and obtain images, assess the dressing appearance, to provide education to the patient and family, activate needed element in the care plan, in addition to other important steps that will improve wound outcomes.

By adding a column to each team members patient list the RNs were able to easily identify which patients had wounds. Easily identifying the patient's that had wounds assist with ensuring all interventions were provided. The added column served as a visual reminder to the RN, as they were able to see what type of wound the patient has listed in the column each time they refer to their patient list.

EMR reminders in the form of BPAs fire at day seven and with discharge orders to re-measure and document wound status. The BPA appeared on the screen and the RN has the ability to address and re-measure the wound then or they can delay the task for one hour and will be reminded. By clicking on accept RNs are taken directly to the flowsheet where they can enter their measurements and upload their image.

Timeline

This project began in May 2022, beginning with collaboration with the site champion to determine organizational needs and reviewing potential areas that could benefit from a project. Organizational support for the project was obtained in June 2022. In July 2022, literature review and project design began. During this time, the project design was established in collaboration with the project team, faculty, and stakeholders. Request to conduct the project was subsequently

submitted to the IRB for approval. Education activities were conducted after the IRB approval. Pre-implementation compliance data was obtained during the months of June - July 2022. Project implementation started in January 2023 and continued through April 2023. The project results, findings, interpretation, and implications were reviewed and analyzed from January 2023 to May 2023. The project completion, approval, dissemination of results and findings, and presentation were completed in June and July of 2023. A project timeline was completed (see Appendix I).

Section IV. Results and Findings

The purpose of this project was to improve patient wound care, wound outcomes and staff education related to improved wound care and wound assessment. The PDSA and RE-AIM methods were utilized to make positive changes related to wound care and documentation. This project took place over a four-month time period. Chart audits were performed on the majority of patients admitted to the medical unit with wounds. Audits were performed in real time, therefore patients that were admitted and discharged when the PTL was not present were excluded.

Results

Pre-implementation wound elements collected were: measured on admission/discovery, identified on flowsheet, staging, dressing appearance every shift, dressing orders, and measured every seven days. The pre-implementation composite score was 52% (N = 100). The team realized there was significant opportunity to improve wound care delivered to qualified patients. Post-implementation wound elements collected in addition to those collected pre-implementation were: image obtained at admission and image obtained every seven days. The post-implementation composite score was 91% (N= 91), which was a 39% increase compared to pre-implementation. Table 2 outlines detailed results on each intervention monthly, pre- and post-implementation.

Table 2

Project Measures Compliance Data

	Pre-implementation % 2022		Post-implementation % 2023			
	June	July	January	February	March	April
Measured on Admission/ Discovery	46%	36%	100%	95%	100%	89%
Identified on Flowsheet	87%	95%	100%	100%	100%	100%
Staged	73%	86%	100%	100%	100%	82%
Dsg Appearance Q Shift	17%	23%	44%	75%	52%	42%
Dsg Orders	29%	41%	100%	100%	100%	100%
Measured at Week One with Imaging	NA	NA	100%	90%	82%	80%
Imaging on Admission/ Discovery	NA	NA	93%	95%	95%	74%
Composite per month	51%	56%	92%	95%	85%	89%

Note. This table illustrates monthly compliance under each measure and monthly compliance composite score.

Discussion of Major Findings

During the investigation phase of this project, it was determined that patients admitted with wounds and skin issues were a significant concern at the project site. It had also been noted that the number of patients being admitted with wounds had increased over the preceding year. Following an extensive literature review, interventions chosen for project initiation were: visual cues, digital imaging and digital reminders. The goal of the project was to initiate a wound and skin team guided by evidence-based interventions to improve accurate and timely wound assessment and documentation.

The major findings in this project indicated that the implementation of visual cues, digital imaging and digital reminders effectively improved accurate and timely wound assessment and documentation. The results revealed that wound documentation during the pre-implementation phase, June - July 2022, to the implementation phase of January - April 2023 increased 39%. An increase in documentation compliance supports the literature evidence that visual cues, digital imaging and digital reminders increase wound documentation (Aqusti et al., 2022; Au et al., 2019; Bowers & Franco, 2020; Chavez et al., 2019).

Section V. Interpretation and Implications

Costs and Resource Management

Prior to implementing a quality improvement project, it is crucial to determine if the benefits will outweigh the project's cost. The cost incurred for this project related primarily to the cost of labor. The project implementation was piloted on the medical unit. Regular meetings took place, planning, information dissemination, and follow-up were all needed to ensure a successful pilot project. The project team leader had a total of 210 hours utilized for the implementation of this project, which included preparation of materials for meetings and go live of the project,

meetings with the wound and skin team members, chart reviews for data abstraction, and team member education. There were no additional costs related to implementation because the interventions were put into place and carried out during a regular staffing schedule and budgeted hours. There were no initial startup, capital, or operational costs incurred as the pilot unit already had the electronic devices and the Clinical Quality Department provided the resources for all meetings. This was a low cost implementation project that provided high-quality benefits to team members and patients which additionally provides aid in reducing financial burdens related to HAPIs. See Appendix J for the breakdown of the project expenses.

Implications of the Findings

The project's implications on patients care, nursing practice, healthcare and the project goals were evaluated during and after the implementation period. Evaluation provided the skin and wound team an opportunity to examine any gaps or needed changes in the process that can be further explored. By evaluating the pre-implementation performance, areas that needed improvement or change which were difficult to obtain stakeholder buy-in, were identified. The project findings provided data which was analyzed, trends were identified and compliance rates reported. The team members and the patients, on the pilot unit, are the greatest benefactors of this evidence-based project.

Implications for Patients

This quality improvement project improved patient care, wound assessment and medical record documentation. By standardizing the practice of team members measuring wounds and obtaining digital imaging upon admission, every seven days and on discharge we were able to provide continuity of care and establish a timeline of wound healing. Increasing the timeliness

and accuracy of wound documentation we have been able to positively impact patients' quantity and quality of life.

Implications for Nursing Practice

Through this project, nurses and other team members received education related to evidence-based care on wounds as specified under the initiative. The education provided focused on the relationship between the interventions team members provided to patients and the evidence-based care that promotes positive outcomes for patients with wounds. Through an improved understanding of the relationship between wounds and wound healing, nurses can enhance the nurse-to-patient relationship through educated interactions with patients, resulting in increased patient engagement. This project revealed an increase in attention to wounds and documentation. Positive results yielded from this project promotes the need for more inpatient units to implement visual cues, EMR reminders and digital imaging.

Impact for Healthcare System(s)

This project has positively impacted the wound care delivered on the pilot unit and has the potential to make a huge impact on the care delivered by the healthcare system. System level leaders supported this project and are eager to see it rolled out system wide. The wound and skin policy will need to be revised. Revisions will need to include the educational components and interventions utilized with this project so team members across the system will be knowledgeable. By adopting project measures, units can improve wound care flow and communication and develop standardization throughout the healthcare system.

Sustainability

The sustainability of this project will require continued leadership support and accountability from clinical leaders and senior leadership. The project is being continued at the

project site and there is a plan to expand the project components to other units at the project site as well as at a system level. The project site continued with the wound and skin team and maintained regular meetings. Team members on the pilot unit verbalized their support of the wound interventions and continuation of the project components. Audits are being be performed by unit leaders to ensure continued compliance is maintained.

Dissemination Plan

The dissemination plan included presenting project results to the project site's leadership and wound and skin team. The quality improvement project's manuscript was submitted to the university's online repository "The ScholarShip" on July 16, 2023. The poster was presented to the faculty and DNP students at East Carolina University College of Nursing on July 11, 2023. The results were presented and discussed during the project site's May and June's 2023 Pressure Injury Prevention (PIP) committee meeting. Abstract submissions to several scholarly journals and poster presentation events at organizational, state and national conferences have been considered.

Section VI. Conclusion

Limitations and Facilitators

The project site experienced staffing shortages during this project's implementation phase, which resulted in varied participation particularly from night shift team members. Additionally, the surgical unit closed, resulting in the reallocation of both patients and team members to the medical unit. Due to the staffing shortages and combining units, nursing team members would often have very high patient ratios, making it increasingly difficult to complete all tasks in a timely manner. Leadership had a strong support for the project which made implementation possible.

Recommendations for Others

For other units choosing to implement a wound and skin project bundling interventions together for implementation is recommended (Pantoja et al., 2019). Education should be provided to nurses to ensure proper measuring when photographing wounds which will be imported into the EMR (Jordan et al., 2021; Li et al., 2018; Tamang et al., 2022). Utilizing visual cues to indicate which patients have wounds and which day re-measurement is due sets the expectation (Pantoja et al., 2019). Leadership presence and support is paramount to any successful project (Heerschap et al., 2019; Palmer, 2022).

Recommendations Further Study

The project site has the capability to activate a function within the EMR that would allow photographs to be imported directly into the patient's flowsheet. This functionality would have to be activated for the entire system. Something of this magnitude would involve education and training in addition to possibly purchasing additional electronic devices. The benefits of this function could be substantial for patients, team members and physicians. By having the wound images imported directly into the flowsheet the user can view the wounds in a progression across the screen. This is a topic that has being presented to the system wide PIP committee in hopes that there will be follow through on the plan to implement all interventions for the entire system.

There are huge gaps and opportunities related to surgical wounds and incisions. The PIP committee has created a subcommittee that is working towards clarification related to where measurements should be taken and by whom. In addition, this committee is examining the question of whether a new LDA be activated or if the current LDA needs to be edited when a patient goes to surgery. Surgical sites are currently not being measured and closure methods are

not being recorded in the flowsheet along with dressing change details. Future state would include record of surgical site images, measurements and closure method.

Final Thoughts

This project aimed to improve patient wound care and wound outcomes and staff education related to wound care and assessment. The site for this project was a 114-bed hospital in eastern North Carolina. This hospital is part of a large, primarily rural, healthcare system. The proposed evidence-based project aimed to initiate visual cues, digital imaging and digital reminders to aid in wound care, assessment and documentation. The results revealed that implementing these interventions on the pilot unit at the project site increased wound assessment and documentation by 39%. Providing the appropriate tools to positively increase wound assessment and documentation has a positive effect on patient outcomes, nursing practice, and the healthcare organizations.

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Appendix A

Literature Review

Authors	Year Pub	Article Title	Theory	Journal	Purpose and take home message	Design/Analysis/Level of Evidence	IV DV or Themes concepts and categories	Sample Size	Sample method	Subject Chara c.	Comments/critique of the article/methods GAPS
Au, Y. Holbrook, M. Skoons, A. Painter, J., McBurney, J., Cassata, A., & Wang, S.C.	2019	Improving the quality of pressure ulcer management in a skilled nursing facility	Theory of safety	*International Wound Journal*	study highlights the power of effective management combined with real time data analytics, as enabled by digital wound care management, to make significant improvements in health care delivery.	Quality Assurance, Performance Improvement, Root Cause Analysis Level V	Effective management & digital management	NA	Audits from long and short stay cohorts	128 bed nursing home facility. Residents with Pressure Ulcers.	Authors identified the need for greater visibility on wound metrics and learned of the skin and wound solution. Additionally, policy and procedural changes were enacted in order to correctly implement its usage.
Clack, L., Stühlinger, M., Meier, M., Wolfensberger, A., & Sax, H.	2019	User centered participatory design of visual cues for isolation precautions.	Theory of self efficacy	*Antimicrobial Resistance & Infection Control*	aimed to develop an isolation precaution signage system that provides visual cues, serves as a cognitive aid at the point of care, and removes ambiguity regarding which precautions are necessary when caring for isolated patients.	User centered, front-end analysis through interviews and observations Level III	Visual cues & cognitive aid	NA	Observations and interviews	900 bed tertiary care hospital. Healthcare providers (nurses, physicians, allied care, assistants, etc)	User centred participatory design was a useful approach that holds potential for further improving design in healthcare settings.
Jordan, M. C., Jovic, S., Gilbert, F., Kunz, A., Erd, M., Strobl U., Jakubietz, R. G., Jakubietz, M. G., Meffert, R. H., & Fuchs, K. F.	2021	Smartphone based photographic wound documentation improves the quality of medical accounting in orthopaedic and plastic surgery.	Theory of self efficacy	*Der Unfallchirurg*	Smartphone based systematic photographic documentation can improve the confirmation of proceeds relevant diagnoses and procedures as well as the duration.	Level I Retrospective analysation	Photographic documentation & wound care	327 cases reviewed, 27 affected by photograph	Analyzed charts with photographs in a retrospective manner	Level 1 trauma center	Smartphone based photographic documentation can improve the overall quality of patient files and thus avoid loss of revenue. The implementation of digital devices with corresponding software is an important component of the digital structural change in hospitals.
Sheth, H. S., Grimes, V. D., Rudge, D., Ayers, B., Moreland, L. W., Fischer, G. S., & Aggarwal, R.	2021	Improving pneumococcal vaccination rates in rheumatology patients by using best practice alerts in the electronic health records.	Theory of self determination	*The Journal of Rheumatology*	To improve pneumococcal vaccination (PV) rates among rheumatology clinic patients on immunosuppressive therapy in the outpatient settings, utilizing BPAs.	Level V Quality Improvement Project	BPAs improving therapy	26,717 eligible high risk patients with rheumatic disease	Medical Record report review	patients on immunosuppressive modications regardless of diagnosis were targeted to receive PPSV23 and the pneumococcal conjugate vaccine	Authors reported they did not investigate infections, postvaccine symptoms, or other systemic complications. There were minor issues reported with implementing BPA in different clinics, such as delays in going live, lack of vaccine availability, and turnover of office staff, requiring additional training sessions for new staff a major barrier for any EMR alert based intervention is alert fatigue and providers ignoring alerts with their busy schedules.
Stoecklin, A., Jeiler, J. I., Havey, R., & Acbrsold, C.	2019	Catching quality before it falls: preventing falls and injuries in the adult emergency department.	Theory of self determination	*Journal of Emergency Nursing*	To identify and implement evidence based interventions to prevent patient falls and injuries in the emergency department by implementing visual cues/signage.	Level V Quality Improvement Project	Visual cues & improve patient care		Retrospective chart review and root cause analysis	Emergency Department patients at a 87 bed, Level 1 Trauma Hospital	the current fall risk assessment is that it is not inclusive of patients at high risk for fall related injuries.
Valvona, S. N., Rayo, M. F., Abdel Rasoul, M., Locke, L. L., Rizer, M. K., Moffatt Bruce, S. D., & Patterson, E. S.	2020	Comparative effectiveness of best practice alerts with active and passive presentations: A retrospective study.	Theory of self efficacy	*Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care*	Computerized reminders improved adherence to recommended processes of care, when users were required to enter a response into the reminder, there was a trend towards larger improvements.	Level I Retrospective analysation	Computerized reminders	560,306 alerts were reviewed	Retrospective queries were ran against EHR database	Large academic medical center	Authors note the study was conducted using retrospective data from several years ago. Findings are limited to the use of alerts in hospital settings. There were challenges in calculating the compliance rates.

Appendix B

Organizational Approval Letter

[redacted]

June 28, 2022

To East Carolina University College of Nursing:

We at [redacted] have reviewed Stacy Simmons's DNP Project Proposal ***"Organizational Wound Policy Improvement and Expansion"*** Ms Stacy Simmons has organizational support and approval to conduct their Doctor of Nursing Practice student project within our institution(s). Our organization's liaison, or project champion, for the project is [redacted]

We understand that the timeframe for this project is from the date of this letter through May 1, 2023. Implementation at the project site will occur January 1, 2023 through April 30, 2023, unless otherwise negotiated. We understand that for Ms Stacy Simmons to achieve completion of the DNP program, dissemination of the project is required by the University and will include a public presentation related to the project and submission to the ECU digital repository, The ScholarShip. In addition, we understand that ECU College of Nursing encourages students completing exemplary scholarship to develop a manuscript for publication, but that is not a requirement. Our organization understands and agrees that the student will not use our organization's name in the formal project paper or any subsequent posters, presentations, or publications.

Our organization has deemed this project as a ***program or process development project***. Our organization is aware that this project will be processed first through our organizational approval process and then through the ECU College of Nursing process, which may include a formal review through University and Medical Center Institutional Review Board of East Carolina University (UMCIRB), if needed. Our organization ***does*** have an Institutional Review Board (IRB). We are aware that in the absence of an organizational IRB, the project will be submitted through the ECU College of Nursing review process which may include UMCIRB review if needed.

Thank you,

[redacted]

Appendix C

Institutional Review Board Approval

Submitted on 8/26/2022

Based on your responses, the project appears to constitute QI and/or Program Evaluation and IRB review is not required because, in accordance with federal regulations, your project does not constitute research as defined under 45 CFR 46.102(d). If the project results are disseminated, they should be characterized as QI and/or Program Evaluation findings. Finally, if the project changes in any way that might affect the intent or design, please complete this self-certification again to ensure that IRB review is still not required. Click the button below to view a printable version of this form to save with your files, as it serves as documentation that IRB review is not required for this project. 11/2/2022

Appendix D

Pre and Post Intervention Audit Tool

Pre-Intervention Wound Audit Tool

Date of Audit	Date of Admission	MRN	HAR	Measured on Admission/Discovery	Measured at 1 Week	Stage	Staged ?	First Unit	Room	Flowsheet	POC	Ed.	DSG Orders	DSG Appear Q Shift	Consult	Notes

Post-Intervention Wound Audit Tool

Date of Audit	Date of Admission	MRN	HAR	Measured on Admission/Discovery	Measured at 1 Week	Stage	Staged ?	First Unit	Room	Flowsheet	DSG Orders	DSG Appear Q Shift	Photo	Consult	Notes

Appendix E

Education and Training Information

Pressure Injury Protocol BPA

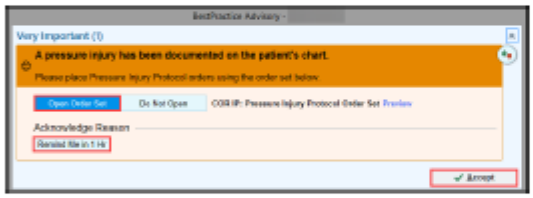
The six pressure injury protocols have now been combined into one protocol. When an active Pressure Injury Lines, Drains, and Airways (LDA) is activated or a person is admitted with an existing Pressure Injury LDA, a Best Practice Advisory (BPA) will appear notifying the user that a pressure injury has been documented on the patient's chart.

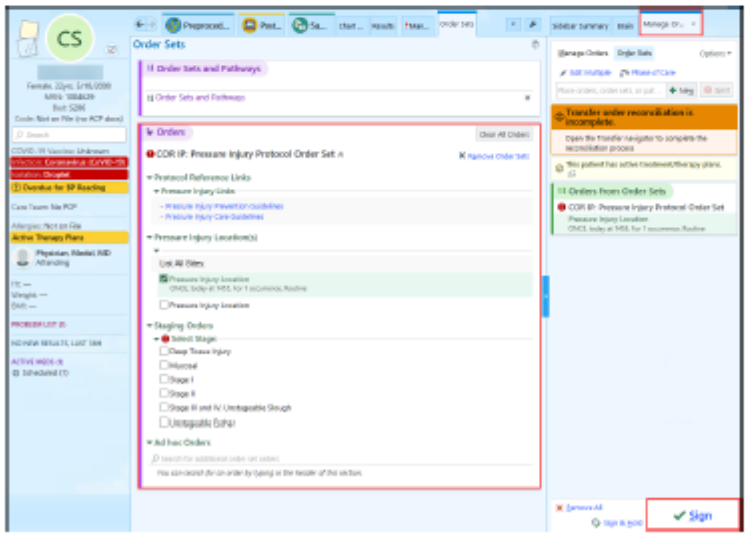
Try It Out

Pressure Injury Protocol and BPA

From the BPA, the user can access the *COR IP: Pressure Injury Protocol Order Set* and implement orders based on the stage of the Hospital Acquired Pressure Injury (HAPI).

- The BPA appears in the *Managed Orders* activity tab and *Admission* navigator.
  - When the BPA appears, and defaults to **[Open Order Set]**, click **[Accept]** then under *Staging Orders, Select Stage:* select the stage of the pressure injury to activate the order and click **[Sign]**.
  - There is an option to click **[Remind Me in 1 Hr]** if the user is unable to sign the orders at that time.





NOTE: Location of the HAPI will need to be documented for the Wound Ostomy Nurse Consult.

EHR Application: Inpatient
Version: 1.0

Appendix F

Flyer

Wound & Skin Bundle Pilot - MEDICAL

POLICY CHANGE

Initial documentation of an incision, pressure ulcer, or wound occurs when first identified: including measurements (length x width x depth) taken with measuring device, recorded on identification, repeated weekly, and at discharge.

PHOTOGRAPHS

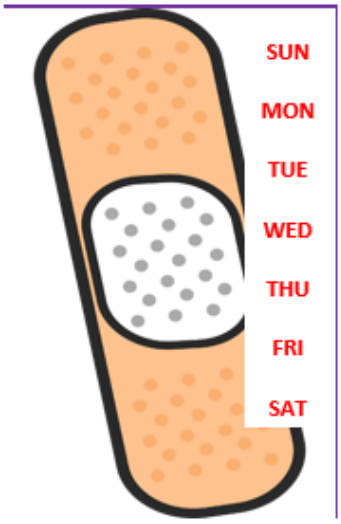
Nurses will take a photograph of wounds using an electronic device. Images will be sent directly to the patient's electronic health record via the secure App. All photos should include a measuring device with the date, patient's initials, HAR number and location of the wound. Photographs will be obtained on identification, repeated weekly, and at discharge.

ELECTRONIC HEALTH REMINDERS

When an active pressure injury line (LDA) is activated a best practice advisory (BPA) will appear notifying the user that a pressure injury or wound has been documented on the patient's chart. The BPA will allow the user to select the wound stage which will then populate dressing orders. The BPA will also populate a reminder on day 7 and at discharge to re-measure the wound.

VISUAL CUES

Two signs will be utilized to assist with improving wound care and documentation. One is a laminated image of a band aide with the days of the week vertically. The sign will be place on the patient's doorway. A dry erase marker will be utilized to circle the day of the week that the wound is to be re-measured. The other sign is a step by step reminder of elements that are to be addressed and documented on. The signs will be placed on the WOWs. Adding the "Wound Presence" column to the patient list will assist with easily identifying which patients have wounds.



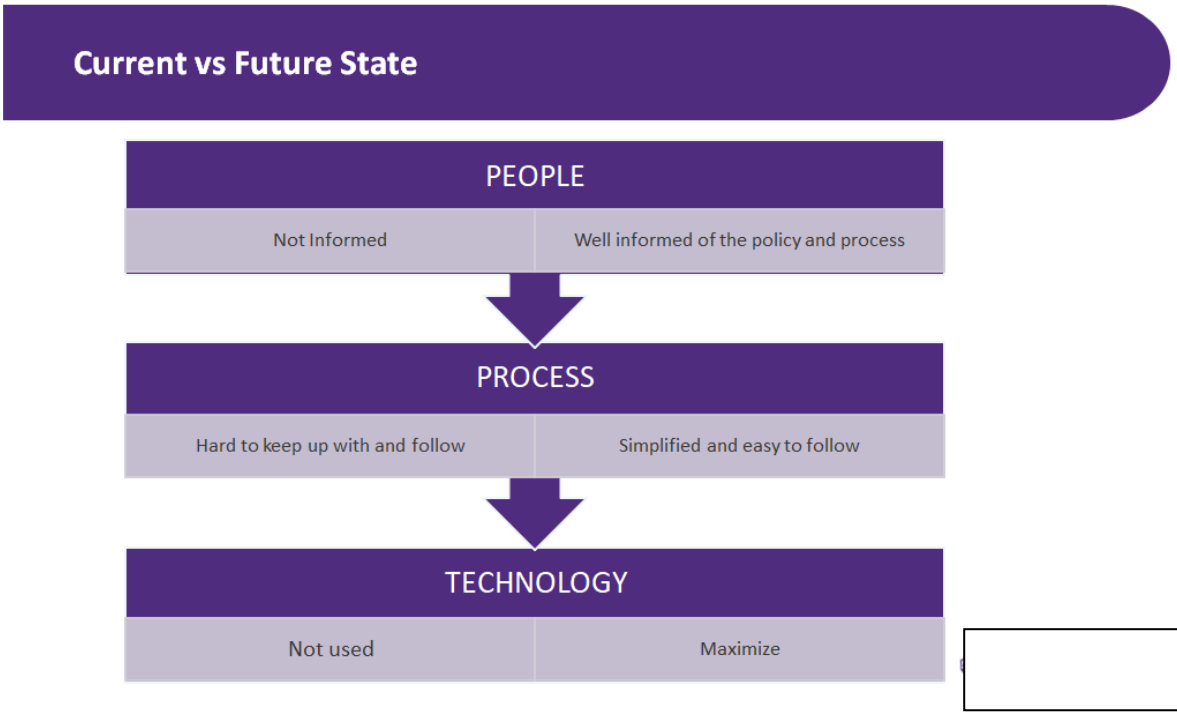
DID I DOCUMENT?

- ASSESSMENT OF WOUNDS: L x W x D UPON ADMISSION/DISCOVERY/7 DAYS/ DISCHARGE
- STAGE OF THE WOUND
- FOLEY SECURED TO OPPOSITE LEG EACH SHIFT
- PICTURE TAKEN ADMISSION/DISCOVERY/7 DAYS/ DISCHARGE
- DSG APPEARANCE
- EDUCATION WITH PATIENT/ FAMILY
- "RISK/ACTUAL SKIN INTEGRITY IMPAIRMENT": ADDED/ ADDRESSED IN CARE PLAN

Special Thanks to [redacted] Wound Team – Making it easier to provide the best care possible to our patients.

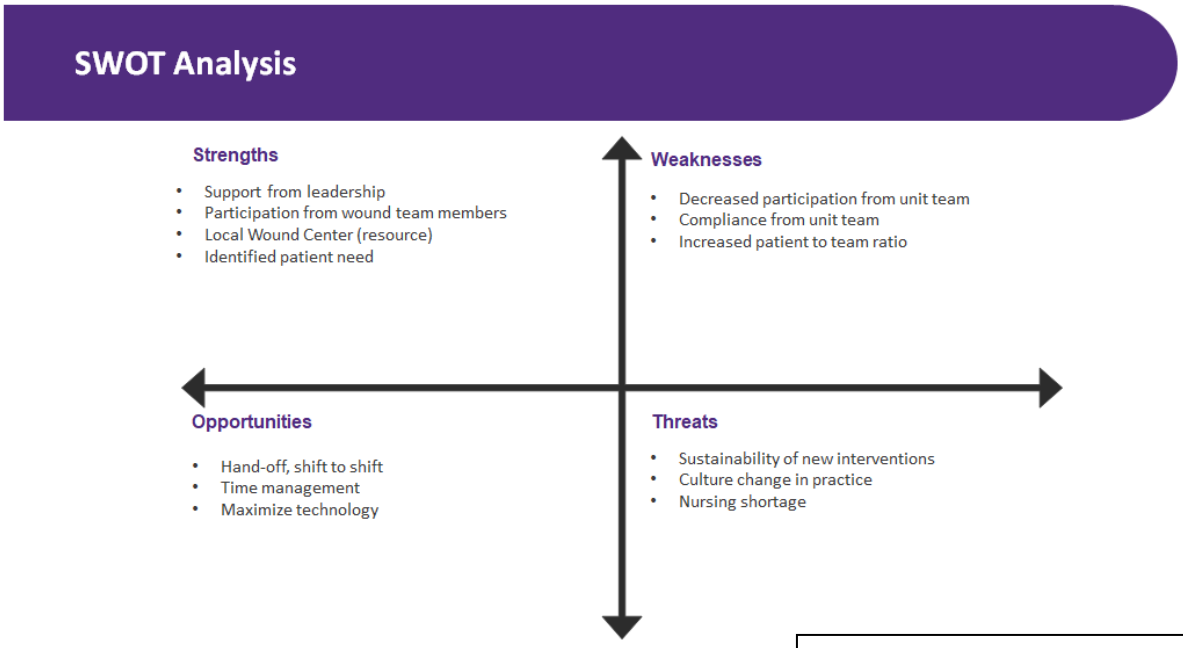
Appendix G

Current and Proposed Future State



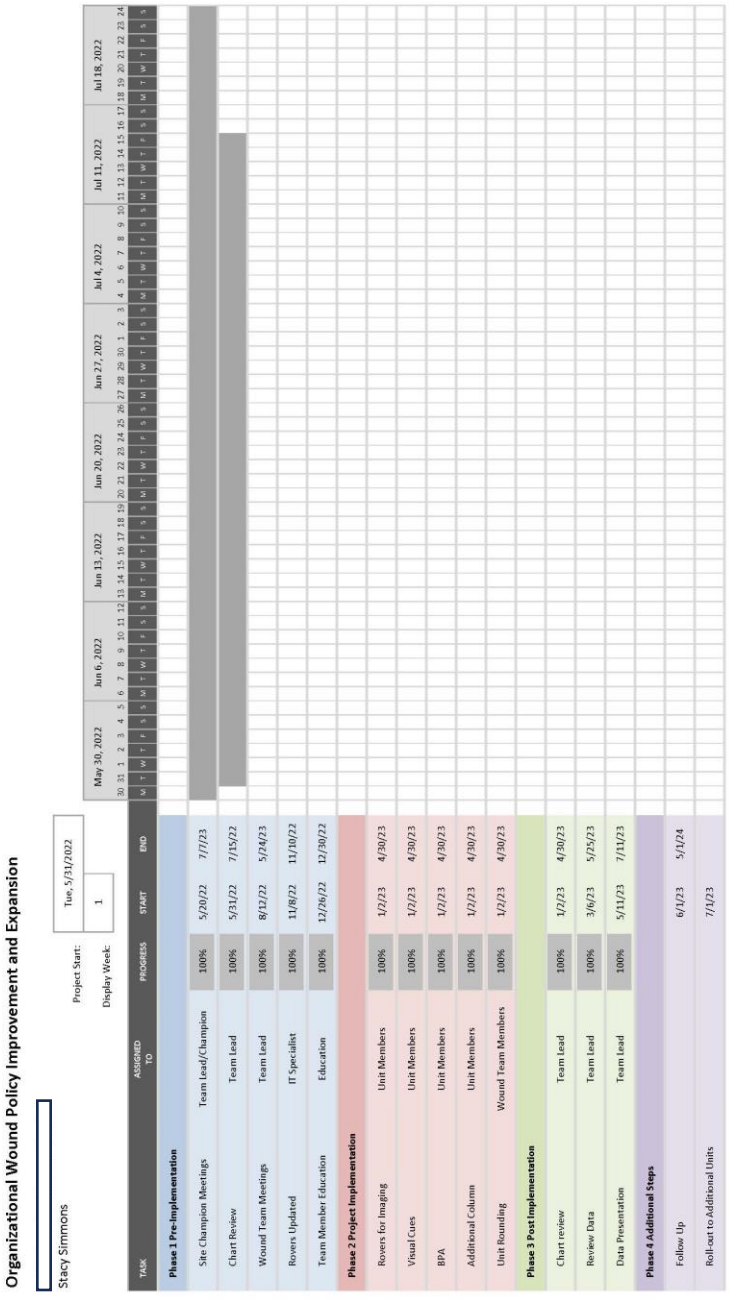
Appendix H

SWOT/Gap Analysis



Appendix I

Project Timeline



Appendix J

Budget for Project

Team Member	Hourly Salary	Number of hours	Total Cost
DNP Student (Quality Nurse Specialist III)	$47	210	$9,870
		210	$9,870

Note. This table illustrates the number of hours spent by the project team lead and the hourly salary. The table provides the total cost of the human resources used in implementing the project. There were no startup, capital, or operational cost associated with the project implementation.