HAPI Beds: A Quality Improvement Project to Reduce Hospital-Acquired Pressure Injuries

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A Quality Improvement Project to Reduce Hospital-Acquired Pressure Injuries

HAPI Beds:

A Quality Improvement Project to Reduce Hospital-Acquired Pressure Injuries

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N653: Internship

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A Quality Improvement Project to Reduce Hospital-Acquired Pressure Injuries

Abstract

Hospital acquired pressure injuries (HAPIs) remain a detrimental health problem that plagues hospital institutions and patients with a significant increase in morbidity and mortality. The development of HAPIs takes a tremendous toll on the patient, their family, as well as the healthcare system. Research has shown that there are multiple approaches in the prevention and treatment of HAPIs and one of the prominent methods includes choosing the appropriate bed surface tailored for the patient’s condition. This evidenced-based practice intervention was initiated with extensive literature review to contribute to the development of a new pressure injury surface selection algorithm for the adult Medical-Surgical Telemetry Stroke unit at KF hospital. The new algorithm is supported by the stakeholders to ensure compliance and support for a smooth transition and implementation. Individuals involved in the development of this new algorithm include the quality and risk team, wound nurse, bedside nurses, wound champions, and nurse leaders. Furthermore, audits, interviews, and HAPI interviews were conducted during this project. The pre-implication results showed a significant number of nurses with an apparent knowledge gap in prevention and treatment of HAPIs when ordering the specialized beds. However, through the implementation of the new surface algorithm and support from the stakeholders, the post survey data and analysis are projected to show an increase in nurse knowledge and competency at 3 months after implementation. Overall, the evidence-based bed selection algorithm was developed for the adult Medical-Surgical Telemetry Stroke Unit to reduce the knowledge gap among the nurses and reduce the incidence of HAPIs.

Keywords: Hospital-acquired pressure injury (HAPI), bed algorithm, knowledge gaps, stakeholders, prevention, treatment.
Introduction

Hospital acquired pressure injuries (HAPIs) have been a continual detrimental issue that plague patients, families, and healthcare institutions. According to the Joint Commission Center, an estimated 2.5 million patients within the U.S acute care facilities were diagnosed with a hospital acquired pressure injury and 60,000 of the patients have died due to complications. When a patient develops a pressure injury, they are susceptible to an increased rate of morbidity and mortality. In addition, pressure ulcers may drastically affect their quality of life as they are subjected to extensive treatments, longer length of stay in the hospital, as well as emotional and financial burdens. Hospital institutions are also affected by HAPIs by diverting funds and utilizing expenses for treating the pressure injuries. For example, “An estimated 3 million US inpatients are affected by HAPUs of all stages each year at an estimated aggregate annual cost of $11 billion.” (Crawford et al., 2014) In other words, HAPIs are costly expenses to both the patients and healthcare institutions.

HAPIs or pressure ulcers are defined as “localized injury to the skin and/or underlying tissue during an inpatient hospital stay.” (Rondinelli et al., 2018) There are multiple factors that contribute to the development of pressure injuries that include localized pressure that are not continually relieved, immobility, advanced age, diabetes, cognitive impairment, incontinence, severity of the illness, etc. The general process in the prevention and treatment of pressure injuries entail utilizing tools such as the Braden Score that measures the patient’s risk for developing pressure injuries. Specifically, the Braden Score measures the “patient’s perceived level of sensory perception, moisture, activity, mobility, nutrition, and friction and shear…” (Wassel et al., 2020) In addition to the Braden Score, other common methods intended to
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decrease pressure injuries include routine repositioning of the patient, use of suspension devices,
support surfaces and effective collaboration within the multidisciplinary fields. However, at
hospital KF, there is an apparent knowledge gap among the nurses in the selection of proper
support surfaces for preventing and treating HAPIs correlating to a substantial incidence of
HAPIs.

Problem description

At hospital KF, an acute care hospital within the San Francisco Bay Area, there is a
prevalent gap of knowledge within the nursing staff correlating to the prevention and treatment
of hospital acquired pressure injuries in the Adult Medical Surgical Telemetry Stroke Unit. A
microsystem assessment was performed to gain insight on the specific unit and a HAPI survey
was implemented to obtain baseline data. (Appendix I) The results showed that only 40% of the
nurses knew about the proper surface bed selection algorithm. Furthermore, 8 HAPIs have
occurred within the 24 bed Medical-Surgical Telemetry Stroke Unit out of 18 in the year-to-date
total amount of HAPIs in 2021. This shows that almost 50% of HAPI cases are presented within
this unit and thus a quality improvement focused on decreasing HAPI through increasing bed
selection knowledge or competency is highlighted within this microsystem.

Available knowledge/Literature Review

In the process of developing this quality improvement project it is imperative to start off
by defining the PICOT question that guides this action plan. Through the collaboration with the
stakeholders such as the wound nurse and the quality and risk team at Hospital KF, we have
gathered pertinent data to develop the PICOT question: In the adult Medical-Surgical Telemetry
Stroke Unit patients, does implementation of a new streamlined prevention and treatment bed
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algorithm as compared to the previous bed algorithm, increase awareness, and competency among the nurses within 6 months?

Among the common methods in the prevention and treatment of pressure injuries such as the Braden Scale and repositioning, one of the other effective methods includes utilizing specialized beds for their functionality in distributing and relieving pressure. In an observational prospective cohort study that analyzed 254 participants within a 30-bed intensive care unit, compared special mattresses like pressure redistributing foam mattresses (PRFM) to Non pressure redistributing foam mattresses (NPRFM). “Compared to the NPFM, the PRFM was associated with an 88% reduced likelihood of developing pressure injuries.” (Bai et al., 2020) Essentially, this study showed that there is a positive correlation in decreasing the incidence of pressure injuries with specialized beds. In another meta-analysis study that used randomized controlled trials (RCTs) and quasi-randomized trials showed that pressure relieving support surfaces reduced the incidence of pressure ulcers compared to the regular hospital beds. The study collectively included 59 trials that emphasized that “foam alternatives to standard hospital foam mattresses reduce the incidence of pressure ulcers in people at risk (RR 0.40 95% CI 0.21 to 0.74).” (McInnes et al., 2011) In other words, there is significant data that supports the use of pressure relieving surfaces in the prevention and treatment of pressure. Both studies emphasized that special surfaces and pressure relieving beds indicated a strong correlation to decreasing the incidence of pressure injuries.

There are multiple sources and evidence that support the use of special surfaces and pressure relieving beds in comparison to non-pressure relieving beds. However, the nurse or healthcare provider must order the correct bed that is tailored to the patient’s specific condition and assessment to ensure effectiveness. A prominent issue that arises when selecting the beds
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includes the nurses’ gap of knowledge on choosing the proper bed or general knowledge about the pressure ulcer prevention and treatment. A meta-analysis and systematic review that examined six cross-sectional studies to evaluate the nurse’s knowledge of HAPI, revealed that the “overall knowledge of nurses’ on pressure ulcer prevention was 46.24 % (95 % CI: 26.63–65.85).” (Gedamu et al., 2021) This study revealed that overall knowledge of nurses was below the acceptable level based on the Pressure Ulcer Knowledge Assessment Tool (PUKAT) that outlines the acceptable PUKAT level. An acceptable level is a “score of 16 and higher (out of 26) indicates acceptable level of knowledge and proficiency on PI (60% of the total score)” (Dalvand et al., 2018) Thus, when the score is less than 60%, it indicates that nurses’ level of knowledge on pressure injury prevention or treatment is insufficient and can lead to an increased incidence of HAPIs.

There are two solutions to resolve the gap of knowledge among the nurses and healthcare providers in the prevention and treatment of HAPIs. One of the solutions is to utilize and develop a well formulated bed algorithm that provides guidance for the bed surface selection. It is an effective tool to be implemented based on the availability of beds in the hospital. The bed surface algorithm serves as “a standardized formulary describing the support surfaces that are available in a specific care setting is critical for minimizing staff confusion, managing costs, and improving access to appropriate and safe products.” (McNichol et al., 2020) It is an invaluable resource that assists the nurses in critical decision making when ordering a bed surface based for a patient at risk or already has a pressure injury. The other solution is to develop a strong multidisciplinary team who will evaluate the incident of HAPIs and look within the system for errors that contribute to the development of HAPI. “Due to the gaps in knowledge and assessment tools, a multidisciplinary PIP team to provide overarching insight and direction to institutional
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policy is paramount to the success of a PIP program.” (Miller et al., 2019) Specifically, stakeholders such as the wound champions that operate within the microsystem can evaluate the effectiveness of the bed surface algorithm and make changes to ensure success of the tool.

Rationale

A change theory that can assist in guiding this action plan and ease the transition or change with the implementation of a new bed surface algorithm includes the Lewin’s Change Theory. Given the condition of the current microsystem where the nurses are accustomed to previous methodology, the Lewin’s Change Theory of Unfreezing, transitioning, and Refreezing is an appropriate approach to implementing change within the microsystem.

When utilizing Lewin's Change Theory, the process starts with the unfreezing stage that functions to evoke a sense of urgency for change and identify the issue within the microsystem. It “entails a change agent such as a nurse leader recognizing a problem, identifying the need for change, and mobilizing others to see the need for change.” (Shirey, 2013) Specifically, this stage involves increasing awareness on the prominent issues of the previous bed algorithm such as its complexity and process to obtain the algorithm. Furthermore, this stage also emphasized on creating a sense of urgency for change among the nurses and stakeholders.

Once urgency has been created, the next phase includes transitioning or changing the process. At this stage, detailed planning with a specific course of action is utilized to evoke the change. For example, the new bed surface algorithm will be implemented on the floor with wound champions and other stakeholders educating and assisting in the transition. This stage was designed with the purpose of removing the previous methodology to the current up to date evidence-based practice approach to specialized bed order and new algorithm. Lastly, the final
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stage is the refreezing that functions to solidify the changes to “produces a new equilibrium, which is then recognized as the new norm or higher level of performance expectation.” (Shirey, 2013) During this stage, stakeholders continue to play an essential role in ensuring that the newly implemented practice and algorithms are the new norms while also preventing regression toward the previous process.

**Specific Project Aim**

The purpose of this quality improvement project is to implement a new bed selection algorithm with an aim to increase bed selection competency within the Adult Medical-Surgical Telemetry Stroke Unit by 50% within 6 months to accurately prevent and treat hospital acquired pressure injuries.

**Context**

Prior to the implementation of interventions, an assessment of the microsystem was performed to gain an understanding of how the microsystem functions. Once the microsystem data is gathered and analyzed, it is utilized in addition with evidence-based practice literature review to ensure that the implemented interventions will be effective. Specifically, the data obtained will be used to develop a new bed surface algorithm to be implemented within the microsystem.

**Microsystem Assessment (5Ps)**

One of the initial tools utilized in assessing the microsystem as Hospital KF, is the 5 P’s Microsystem Assessment. This tool focuses on the purpose, patients, professionals, processes, and patterns within the microsystem and was considered in the development of this quality improvement project (Appendix A). Through collaboration with the stakeholders and survey
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results, the purpose of this action plan was defined as bridging the knowledge gap among the nurse to available resources to provide quality care by implementing a new HAPI prevention and treatment bed surface algorithm within the Medical Surgical Telemetry Stroke unit. The patient population within this microsystem pertains to Adult Medical Surgical Telemetry Stroke inpatients within the San Francisco Bay Area setting. Data collected from the prevalence of HAPI in 2020 showed that 8 or 44% of the incidences of HAPI occurred in this microsystem out of the 18 in the year-to-date number of HAPI at Hospital KF. The professionals involved in this microsystem include a nurse manager, unit assistants, telemetry technicians, wound nurse, patient care technicians, resource nurses, physicians, bedside nurses, and quality and risk team. The process starts with 2 nurse skin assessments then it is once a shift skin assessment. If there was an abnormal finding, then the physician and wound nurse are notified. However, the RN may also refer to the bed surface selection algorithm for ordering a specialty bed. Patterns that were noted include missing skin assessments, charting and delay of wound nurse consultation, availability of staff, and difficulty using the bed selection algorithm. Currently there is only one wound nurse at this hospital and cannot attend to all the patients that require beds so the nurses must rely on the bed surface selection algorithm.

**Root Cause Analysis**

Another tool used after the 5 P’s is the root cause analysis (RCA) that provides crucial information and outlines the different factors that contribute to the development of HAPIs (Appendix B). This tool contains multiple aspects and components that correlate to the development of HAPIs and explore all viable options until exhausted. Components of the RCA include the people, environment, patient conditions, materials, and processes that are obtained through audits, questionnaires, and interviews among the staff.
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The people depicted in the RCA include Registered Nurses, Patient Care Technicians, Wound Care Nurse, and Nurse Managers. When examining the environment, factors to be considered include poor documentation, workload, staff shortages, poor communication, and deficit knowledge in HAPI prevention and treatment in bed surface selection. Some of the patient conditions noted include poor nutrition, present illness, immobility, and obesity. The material factors include inappropriate bed surface and equipment such as restraints and assistive devices. Lastly, processes or methods that contribute factors include the unavailability of the wound nurse, knowledge gap among the unit nurses for bed selection, and the complexity of the bed algorithm.

**SWOT Analysis**

An additional tool used at Hospital KF, is the SWOT analysis that examines the strengths, weaknesses, opportunities, and threats within the microsystem (Appendix C). The current strength within this microsystem includes the available resources on pressure injuries such as the wound nurse who provides guidance for the nurses and consultation for the patient. Specifically, the wound nurse is an educator in the prevention and treatment of pressure injuries as well as assisting in the ordering of specialty beds. In addition to the strengths, there are multiple opportunities for improvement with the implementation of the new bed surface selection algorithm that includes simplified and detailed information for the selection of the proper beds. This translates to an increase in quality of patient care and satisfaction while also decreasing incidence of HAPIs and the additional hospital costs.

The apparent weakness includes the availability of the wound nurse, the knowledge gap on use of the bed selection algorithm, and the complexity of it (Appendix G). Currently, Hospital KF has only one wound nurse who evaluates all the patients through a consult prior to ordering a
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special bed. When the wound nurse is not available, the other nurses assume responsibility for the ordering of the beds. However, survey results showed only 60% of the nurses have ordered bed (Appendix I). In addition to the weakness, the RCA also indicated several threats that include noncompliance from the staff in adopting the new process and algorithm that present an increased cost for patients as well as the healthcare institution.

**PDSA Cycle and Gantt Chart**

To implement a change and decrease the incidence of HAPIs within the Adult Medical-surgical Telemetry Stroke Unit, a Plan Do Study Act (PDSA) cycle tool was used in the process of this project. The PDSA cycle functions to outline steps, procedures, and analyze the outcome of imposed interventions within this microsystem (Appendix D). The time frame of this Quality Improvement project is projected to be within 8 months and is shown with the different stages in the Gantt Chart (Appendix E). However, this QI project may continue once sufficient data has been collected and analyzed with the implemented interventions to decrease HAPIs.

Starting with the Plan phase of the PDSA cycle that lasts from Weeks 1-7, this stage is utilized to develop baseline data and gather pertinent information within the microsystem. The first week entails interviews and audits among the staff including the Quality and Risk team, Patient Care Technicians (PCTs), nurses, wound nurse, and nurse managers to obtain a better understanding of areas that needed improvement. During weeks 2-4, it is crucial in assessing the current policies and practices in the prevention and treatment of HAPIs as well as look into the evidence-based practice literature review to support action plan intervention. Furthermore, other tools used in the planning phase include Microsystem assessment and the development of the HAPI questionnaire in week 5-7 (Appendix F).
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The Do phase encompasses the data collection from the plan phase and HAPI survey for the development of the new bed selection algorithm and the implementation of this algorithm. At this stage, Weeks 8-11 are used to focus on refining and developing a new bed selection algorithm that is tailored from the analysis of the previous algorithm and feedback provided from the HAPI questionnaire (Appendix H). Weeks 12-23 is focused on incorporating stakeholders and incorporating the newly formed algorithm within the specific microsystem. Weeks 24-27 will be focused on reassessing the nurse competency and adherence to the new algorithm with interviews, audits, and HAPI surveys (Appendix F).

The final stages are the Study stage and Act stage that includes week in weeks 28-32 that primarily focuses on the evaluation of the results from the Do phases and discusses the future proceedings. For the Study phases, time is dedicated to evaluating the effectiveness of the new algorithm and assess if there is an increase in nurse competency in bed selection and decrease in the incidence of HAPIs. Furthermore, the Act stage entails discussion of the intervention and results with the QI team as well as stakeholders to determine if another PDSA cycle is required and the future steps to refine the project.

Intervention

The proposed intervention to decrease the incidence of HAPIs and increasing nurse competency in the prevention and treatment of HAPIs includes the implementation of a new and simplified evidence based HAPI bed algorithm (Appendix H). Both the RCA and HAPI questionnaire revealed several issues associated with the previous algorithm that correlated to a gap of knowledge in the prevention and treatment of HAPIs. The newly developed HAPI bed selection algorithm was created through evidence-based research and collaboration with the quality and risk team to ensure compatibility with Hospital KF (Appendix H). In comparison to
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the newly developed algorithm, the previous bed algorithm was difficult to access, and the information was difficult to translate into practice (Appendix G). The new algorithm provides detailed information that is formatted to guide the nurse in making the critical decision based on the patient’s assessment. In addition, the new algorithm accurately depicts the available beds within hospital KF that allows the nurse to reduce time looking for the appropriate beds.

As previously mentioned, the inclusion of stakeholders such as wound champions play a crucial role to ensure the effectiveness in the implementation of a new bed surface algorithm. Wound champions and other stakeholders’ function to advocate and expand knowledge related to the new intervention. Furthermore, it is crucial to obtain and utilize the support provided by all the stakeholders to ensure competency and adherence to the implemented intervention.

**Study of the Intervention and measures**

Prior to the implementation of this quality improvement project, it was crucial to gather data and have an in-depth understanding of the pertaining microsystem. To obtain a better understanding of the Adult Medical-Surgical Telemetry Stroke unit at Hospital KF, an assessment tool known as the 5 P’s microsystem assessment was utilized along with other tools and measures such as the RCA, audits, interviews and the HAPI survey. In addition to the collection of baseline data, literature review was performed with an emphasis on evidence-based practice for the intended intervention. Furthermore, the data obtained through microsystem analysis and literature review guides this project in development of the new bed surface selection algorithm within this microsystem.

In addition to the collection of baseline data through interviews, audits, and a HAPI survey. A PDSA cycle was utilized in adjunction with the previously mentioned measures. For
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example, the audits, interviews, and HAPI were used during the Planning phase of the PDSA cycle, and it will also be used during the Study phase of the PDSA cycle. The purpose is to examine the effectiveness of the intervention through comparison of the two sets of data at different stages. The HAPI survey is a crucial measure to examine as it presented significant data on the gap of knowledge and competency on bed surface selection. Specifically, the survey showed that only 40% of nurses were aware of the bed selection algorithm with only 60% of the nurses that have ordered beds (Appendix I). This baseline data is to be examined with the newly collected data in the study phase of the PDSA to indicate if there was significant improvement with the implementation of the new bed selection algorithm.

Furthermore, audits were conducted in the prior year by Hospital KF’s Quality and Risk team to determine the urgency or need for a change within this microsystem. In the year 2021, it was determined that 18 HAPIs occurred at hospital KF, with 8 HAPIs presented within the specific microsystem. This evidently also showed a need for change and the audits within the study phase of the PDSA cycle will determine the effectiveness of the change in decreasing HAPIs in the Medical-Surgical Telemetry Stroke Unit.

Results

A HAPI survey was dispersed among the unit nurses in the Adult Medical-Surgical Telemetry Stroke Unit prior to the implantation of the Quality Improvement project. The questionnaire was provided to a total of 10 nurses with questions focused on the knowledge of bed algorithms, bed orders, obstacles in bed ordering and other issues affecting the prevention and treatment of HAPIs (Appendix F). As previously mentioned earlier, only 40% of the unit nurses within the microsystem are aware of the Pressure Injury Prevention Policy or algorithm with 90% of the nurses stating it is under their scope of practice to order the specialty beds.
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However, only 60% of the nurses have ordered beds within the past six months with 66.7% ordering beds roughly 1-2 times and 33.3% that have ordered beds 3-4 times. The results show that there is a gap of knowledge about the existence of the Pressure Injury Prevention Policy that correlates to a low number of nurses ordering specialized beds.

In addition, the HAPI survey also provided an opportunity to gather input from the nurses on the common obstacles as well as their recommendation in preventing and treating hospital acquired hospital injuries. The common obstacle trends noted from the survey depicted staffing competency and staffing availability being the major obstacles. Uncoincidentally, the most apparent recommendation is to have more staff available to assist in the prevention and treatment of HAPIs.

Post implementation results are currently unavailable due to the time constraints, but we speculate that another round of HAPI surveys will be conducted to assess changes and improvements. Specifically, we expect an increase in the nurse’s knowledge for the prevention and treatment of HAPIs with appropriate bed selection with the new streamline bed algorithm. The projected increase in awareness of the bed algorithm is to be above 90% that is influenced by the support of the stakeholders such as the wound champions. Furthermore, we also speculate a decrease in the incidence of HAPIs within this microsystem by at least 10%.

Summary

After deep analysis of the microsystem with the use of various tools and measures, we were able to define the issue relating to the significant number of HAPIs presented in the Adult Medical-Surgical Telemetry Stroke Unit. The data indicated that there was a gap of knowledge among the nursing staff on effective prevention and treatment of HAPIs when choosing and
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ordering the proper bed surfaces and types. Furthermore, the baseline data collected helped to define the PICOT question in relation with evidence-based practice literature to develop the intervention of a new bed selection algorithm that is to be implemented on this unit.

Currently, the current state of this project is in the Do stage of the PDSA cycle, and the new algorithm is in the final stages of being implemented on this unit. Through the collaboration with the stakeholders that includes the wound nurse, QI team, wound champions and nurse managers, the algorithm was refined and examined multiple times to determine its effectiveness, practicality, and accessibility. Having the stakeholder’s involvement and support of this project plays a crucial role to maximize the success rate in implementing and standardizing the new algorithm. Specifically, they can advocate and provide education to the staff who are in different stages in adopting the new practice such as the substantial late majority. The relevance of this intervention and new algorithm falls in line with the aim to provide a new resource to decrease the knowledge gap among the nursing staff and increase their knowledge in prevention and treatment of HAPIs by 50% within 6 months.

Conclusions

HAPIs continue to be a substantial issue that contributes to an increase in morbidity and mortality of patients. However, healthcare providers can play an important role to decrease HAPIs by maintaining a high competency and knowledge of the prevention and treatment of HAPIs. The purpose of the newly developed new selection algorithm is to increase competency and decrease the knowledge gap among the nurses within the Adult Medical-Surgical Telemetry Stroke Unit. This algorithm is supported by evidence-based practice and stakeholders to ensure effective transition and adoption of the refined resource. Once sufficient data has been collected post implementation and examination then transferability can be discussed and determined.
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Our recommendation for this project is to continue assessments and implications of the algorithm within Hospital KF. The algorithm may need further adjustment depending on the types of beds availability and possible changes in policies for the prevention and treatment of HAPIs. However, changes on the algorithm can easily be made and sustaining of new implementation can be made through engagement of stakeholders. Furthermore, additional research on the effectiveness of standardized bed selection algorithms is necessary to increase and support the use of bed selection algorithms.
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Section VII Appendices

Appendix A: 5 P’s Microsystem Analysis

5 P’s Microsystem Analysis

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Bridging the knowledge gap through resources to provide high quality care to the patients with HAPI prevention and treatment in Medical-Surgical Telemetry Stroke Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient</td>
<td>High risk patients in Medical-Surgical Telemetry Stroke Unit: Braden Scale &lt;18, moisture, immobility, presence of medical devices, malnourished, diabetes</td>
</tr>
<tr>
<td>Professional</td>
<td>Multidisciplinary Team: Patient Care Technicians (PCTs), Unit Assistants, Telemetry Technicians, Registered Nurses (RN), Wound Care Nurse, QI Team, Nurse Manager, Physicians</td>
</tr>
<tr>
<td>Process</td>
<td>2 RNs skin assessment on admission, discharge and once a shift. Wound nurse consultations. Reporting to provider and wound nurse for abnormal findings. RN referring to surface selection algorithm</td>
</tr>
<tr>
<td>Pattern</td>
<td>Delay availability of wound nurse. Inaccurate or missing skin assessment. Unavailable staff for repositioning every 2 hours. Auditing on charting</td>
</tr>
</tbody>
</table>

The 5 P’s microsystem assessment was used to obtain an in-depth look and understand of the microsystem. The assessment examines the purpose, patient, professional, process, and patterns in the microsystem.
Appendix B: Root Cause Analysis

Fishbone Diagram: Root Cause Analysis

The fishbone diagram root cause analysis depicts the different factors that contribute to the development of HAPIs. The components include the people, methods, patient conditions, environment, and material factors.
## Appendix C: SWOT Analysis

### SWOT Analysis

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Wound care nurse availability on the unit</td>
<td>• Availability of Wound nurse</td>
</tr>
<tr>
<td>• Unit staff readiness to learn the measures for prevention and treatment of HAPI</td>
<td>• Knowledge gap within the unit staff members on the use of algorithm</td>
</tr>
<tr>
<td>• Quality and Risk team’s support in the development of Prevention and treatment algorithm</td>
<td>• Complexity of the current algorithm</td>
</tr>
<tr>
<td>• Available resources HAPI Prevention and Treatment</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improve patient quality of care</td>
<td>• Noncompliant staff to the preventative measures</td>
</tr>
<tr>
<td>• Streamline and simplified algorithm</td>
<td>• Increases cost for patients and healthcare system</td>
</tr>
<tr>
<td>• Increased patient comfort and satisfaction</td>
<td>• Decreased patient satisfaction</td>
</tr>
<tr>
<td>• Reduce incidence of HAPI and hospital costs</td>
<td></td>
</tr>
</tbody>
</table>

The SWOT analysis is another method of assessment of the microsystem with emphasis on the strengths, weaknesses, opportunities for improvement and threats to the microsystem.
Appendix D: PDSA Cycle

The PDSA cycle depicts the Plan, Do, Study, and Act stages. Currently, this project is within the Do stage where the intervention is to be implemented. Once the Do stage is complete, the study and Act stage will present the outcome of the intervention.
Appendix E: Gantt Chart

The Gantt chart presents a visual presentation of the timeline for this project. The first week will be focused on audits, interviews, and microsystem assessment. Weeks 2-4 will be focused on literature review and review of current policies. Weeks 5-7 is for the development and distribution of the HAPI algorithm. Weeks 8-11 will be focused on the development of a new bed surface algorithm. Weeks 12-23 is the time frame where the bed algorithm will be implemented with the involvement of the stakeholders. Weeks 24-27 is for evaluations through audits, interviews and HAPI survey again. Weeks 28-32 is for analyzing the data and determining future outcomes and interventions.

Appendix F: HAPI Questionnaire

HAPI QUESTIONNAIRE
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This survey serves as a method to gather information from the nurses perspective and understanding about Hospital Acquired Pressure Injuries. All answers provided will be anonymous and provide critical data for opportunities of improvement. Thank you for participation!

1. Are you aware of the bed selection algorithm located in the Pressure Injury Prevention Policy?
   __ Yes
   __ No

2. Do you feel it's within your scope of practice to request a specialty bed for a patient?
   __ Yes
   __ No

3. Have you requested the UA to order a specialty bed for a patient with a HAPI/CAPI or at high risk for HAPI in the last six months?
   __ Yes
   __ No

4. If yes, then how many times have you placed an order?
   __ 1 to 2 times
   __ 3 to 4 times
   __ More than 5 times

5. If you answered no to the previous question, what are obstacles preventing you from placing a bed order?
   _________________________________________________________________

6. What are some obstacles you face when it comes to preventing/treating Hospital Acquired Pressure Injuries?
   _________________________________________________________________

7. Do you have any additional comments or recommendations in preventing/treating Hospital Acquired Pressure Injuries?
   _________________________________________________________________

Responses from this questionnaire provides baseline information and depict the issues and barriers within the microsystem for the prevention and treatment of HAPIs.
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Appendix G: Previous Algorithm

### Treatment Support SURFACE SELECTION ALGORITHM

<table>
<thead>
<tr>
<th>PRESSURE INJURY SEVERITY FACTORS</th>
<th>Very High Severity</th>
<th>High Severity</th>
<th>Moderate Severity</th>
<th>Low Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERY HIGH</td>
<td>Less than or equal to 9</td>
<td>10-12</td>
<td>13-14</td>
<td>15-18</td>
</tr>
<tr>
<td>HIGH</td>
<td>DVT, Stage 3 or 4, Unstable, Multiples</td>
<td>DVT, Stage 3 or 4, Unstable, Multiples</td>
<td>DVT, Stage 2-5, Unstable, Multiples</td>
<td>DVT, Stage 1-2, Unstable, Multiples</td>
</tr>
<tr>
<td>MODERATE</td>
<td>Constantly Moist</td>
<td>Very Moist</td>
<td>Occasionally Moist</td>
<td>Rarely Moist</td>
</tr>
<tr>
<td>LOW</td>
<td>Completely Immobile</td>
<td>Very Limited</td>
<td>Slightly Limited</td>
<td>No Limitations</td>
</tr>
<tr>
<td></td>
<td>0.1 Side Available</td>
<td>2 Sides Available</td>
<td>2 Sides Available</td>
<td>8 Sides Available</td>
</tr>
</tbody>
</table>

Previous bed surface selection algorithm at Hospital KF. It is complex and inaccurate to the available beds.
Appendix H: New Algorithm

KFH Surface Selection Algorithm for **High Risk HAPI Patients**

<table>
<thead>
<tr>
<th>Risk Assessment:</th>
<th>Very High</th>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braden Score:</td>
<td>Less than or equal to 9</td>
<td>10-12</td>
<td>13-14</td>
<td>15-18</td>
</tr>
<tr>
<td>Moisture:</td>
<td>Constantly Moist</td>
<td>Very Moist</td>
<td>Occasionally Moist</td>
<td>Rarely Moist</td>
</tr>
<tr>
<td>Mobility:</td>
<td>Completely Immobile</td>
<td>Very Limited</td>
<td>Slightly Limited</td>
<td>No Limitations</td>
</tr>
</tbody>
</table>

**Med-Surg (MST)**
- Unit Supply: STRYKER: Isoflex w/Air Pump
  - Set Air Pump to Isoflex Mode
  - Low Air Loss Mattress

**ICU**
- Unit Supply: Hill-Rom Progressa Bed
  - Low Air Loss Mattress

Surface Selection for **Bariatric Patients**

<table>
<thead>
<tr>
<th>Bariatric</th>
<th>1st choice: Rental Hill-Rom complete Bariatric (1000 lbs)</th>
<th>2nd Choice (if 1st choice not available): Rental Hill-Rom Total Care Bariatric (500 lbs)</th>
</tr>
</thead>
</table>

- If patient has 1 or more risk factor outlined above, please use appropriate bed selection per the algorithm.
- Unit assistant will order Rental Bed based on nurse recommendation. Bed should arrive within 4 hours.
- Use waffle air seat cushion when high risk patient sitting in chair (2 hours maximum in chair at a time).
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**KFH Surface Selection Algorithm for Pressure Injury Treatment**

<table>
<thead>
<tr>
<th>Pressure Injury Severity</th>
<th>Very High Severity</th>
<th>High Severity</th>
<th>Moderate Severity</th>
<th>Low Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braden Score:</td>
<td>Less than or equal to 9</td>
<td>10-12</td>
<td>13-14</td>
<td>15-18</td>
</tr>
<tr>
<td>Wound Type:</td>
<td>DTI, Stage 3-4, Unstageable, Multiple</td>
<td>DTI, Stage 3-4, Unstageable, Multiple</td>
<td>DTI, Stage 2-3, Unstageable, Multiple</td>
<td>Stages 1 – 2</td>
</tr>
<tr>
<td>Moisture:</td>
<td>Constantly Moist</td>
<td>Very Moist</td>
<td>Occasionally Moist</td>
<td>Rarely Moist</td>
</tr>
<tr>
<td>Mobility:</td>
<td>Completely Immobile</td>
<td>Very Limited</td>
<td>Slightly Limited</td>
<td>No Limitations</td>
</tr>
<tr>
<td>Turning Surfaces:</td>
<td>0-1 Side Available</td>
<td>2 Sides Available</td>
<td>2 Sides Available</td>
<td>3 Sides Available</td>
</tr>
</tbody>
</table>

### Med-Surg (MST)

- **Rental**
  - **Hill-Rom: ENVELLA: Air Fluidized Therapy (Preferred)** 350 lbs.
  - **ENVISION Mattress 400 lbs.**
  - **Air Fluidized Bed**
  - **Low Air Loss Mattress**

- **Unit Supply**
  - **STRYKER: Isoflex w/Air Pump**
  - **Set Air Pump to Isoflex Mode**
  - **Low Air Loss Mattress**
  - **Pressure Redistribution Mattress**

### ICU

- **Rental**
  - **Hill-Rom: ENVELLA: Air Fluidized Therapy (Preferred)** 350 lbs.
  - **ENVIRON Progressa Bed**
  - **Air Fluidized Bed**
  - **Low Air Loss Mattress**

- **Unit Supply**
  - **Hill-Rom Progressa Bed**
  - **Low Air Loss Mattress**

- **Unit Supply**
  - **Hill-Rom Progressa Bed**
  - **Low Air Loss Mattress**

- **Unit Supply**
  - **Hill-Rom Progressa Bed**
  - **Low Air Loss Mattress**

- **If patient has 1 or more risk factor outlined above, please use appropriate bed selection per the algorithm.**
- **Unit assistant will order Rental Bed based on nurse recommendation. Bed should arrive within 4 hours.**
- **Use waffle air seat cushion when high risk patient sitting in chair (2 hours maximum in chair at a time).**

Newly developed bed surface selection algorithm that is tailored for hospital KF microsystem. Information is more apparent with accurate beds types available.
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Appendix I: Survey Results

Are you aware of the bed selection algorithm located in the Pressure Injury Prevention Policy?
10 responses

- Yes: 60%
- No: 40%

Do you feel it's within your scope of practice to request a specialty bed for a patient?
10 responses

- Yes: 90%
- No: 10%
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Have you requested the UA to order a specialty bed for a patient with a HAPI/CAPI or at high risk for HAPI in the last six months?
10 responses

- 40% Yes
- 60% No

If Yes, then how many times have you placed an order?
6 responses

- 33.3% 1 to 2 times
- 66.7% 3 to 4 times
- More than 5 times
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Survey results that emphasized the gap of knowledge among the nurses. In addition, provides information on barriers and recommendation on the prevention and treatment of HAPI. Note that staffing availability and compliance as the common obstacles.