K-CARDS AND CARE BUNDLES: USING VISUAL CUES AND EVIDENCE-BASED PRACTICE TO DECREASE HOSPITAL-ACQUIRED PRESSURE INJURIES

by

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ABSTRACT

SHERRY MORGAN THOMAS. K-Cards and Care Bundles: Using Visual Cues and Evidence-Based Practice to Decrease Hospital-Acquired Pressure Injuries
(Under the direction of DR. KELLY POWERS)

Hospital-acquired pressure injuries (HAPIs) are nursing-sensitive indicators that can lead to extended hospital stays, infection, and even death. Healthcare organizations are not reimbursed for the care HAPIs require, and it is estimated that HAPI costs in the United States could exceed $26.8 billion annually. A quality improvement project utilizing Kamishibai Cards (K-Cards) with interventions to prevent HAPIs was implemented to determine if implementing K-Cards would decrease HAPI frequency counts. The project occurred on two adult nursing units at one hospital with two non-intervention units for comparison. The project unit nurses were provided education, and K-Cards listing HAPI prevention interventions were placed outside each patient room to serve as a visual cue. HAPI frequency counts were collected and compared during the 12 weeks before and after the K-Cards were implemented. One project unit, medical/surgical/progressive, experienced a 66% reduction in HAPI frequency counts [n = 6 (pre), 2 (post)], while their comparison unit experienced a 200% increase [n = 0 (pre), 2 (post)]. The other project unit, a medical/surgical/intensive care unit, experienced a 15% reduction in HAPI frequency counts [n = 13 (pre), 11 (post)], while their comparison unit experienced no change [n = 2 (pre), 2 (post)]. These results indicate that K-Cards are a promising HAPI reduction strategy for further exploration. Further projects with modified HAPI prevention interventions listed on the K-Cards, longer implementation timeframes, and different project and comparison units may be beneficial to more accurately gauge K-Cards' impact on preventing HAPIs.

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DEDICATION

This work is dedicated to my wonderful and supportive husband, Larry Thomas, and our headstrong and talented daughters, Abigail and Kensley. Larry, you have always given me the freedom, encouragement, and support to accomplish every goal I have ever set for myself. You have cheered me on during the good times and carried me through the tough times. I would not be where I am today without your unwavering dedication. Girls – I hope I have shown you that you can achieve any goal or dream you want as long as you push yourself and work hard. You girls have driven much of my success to give you a better life and set a positive example. I believe you girls can achieve anything you set your mind to, and I will always support you 100%. Larry, Abby, and Kensley, you three are my whole world, I love you more than words can say, and I hope I have made each of you proud.

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LIST OF ABBREVIATIONS

AHRQ	Agency for Healthcare Research and Quality
ANA	American Nurses Association
CAUTI	catheter-associated urinary tract infection
CLABSI	central line-associated bloodstream infection
CMS	Centers for Medicare and Medicaid Services
COVID-19	Coronavirus Disease of 2019
CWON	Certified Wound and Ostomy Nurse
DTPI	Deep Tissue Pressure Injury
HAC	hospital-acquired conditions
HAPI	hospital-acquired pressure injury
IPU Progressive	Medical/Surgical Progressive Care Unit
K-Card	Kamishibai Card
MSICU	Medical/Surgical Intensive Care Unit
NDNQI	National Database of Nursing Quality Indicators
NSI	nursing-sensitive indicator
PRN	as needed
QI	quality improvement
SWAT	Skin and Wound Action Team

CHAPTER 1: INTRODUCTION

Hospital-Acquired Pressure Injuries (HAPIs) have significant negative impacts on both patients and healthcare facilities. HAPIs are costly to treat, prolong patients' length of stay, require additional healthcare resources, cause unnecessary pain and suffering, and can even lead to death (AHRQ, 2011a; Wassel et al., 2020). A tragically famous example of a pressure injury resulting in death is that of Christopher Reeve, star of the Superman movie franchise, who passed away in 2004 from "sepsis caused by an infected pressure injury on his sacrum" (Bisbee, 2020, p. 81) after developing quadriparesis following a horseback riding accident in 1995. In the years since Mr. Reeve's death, HAPIs have gained a tremendous amount of negative attention in healthcare.

Although there is literature that argues that some pressure injuries are unavoidable, especially in critical care settings (Cox & Schallom, 2017; Pittman et al., 2019; Schmitt et al., 2017), the National Quality Forum (NQF) highlighted the serious nature of HAPIs by deeming any Stage 3, Stage 4, or Unstageable HAPI as a Never Event (NQF, 2011). According to the Centers for Medicare and Medicaid Services (CMS), Never Events are "serious and costly errors in the provision of health care services that should never happen" (CMS, 2006, para. 1). The CMS lists wrong-site surgery and wrong-type blood transfusions as other examples of Never Events, and also goes on to state that Never Events "cause serious injury or death to beneficiaries, and result in increased costs to the Medicare program to treat the consequences of the error" (CMS, 2006, para. 1).

From an accountability perspective, HAPIs reflect negatively upon the nursing care patients receive while in a healthcare facility. As early as 1860, Florence Nightingale wrote, "if

he has a bedsore, it is generally the fault not of the disease, but of the nursing" (Nightingale, 1860, para. 5).

HAPIs continue to be labeled as nursing-sensitive indicators (NSIs), or quality indicators that measure outcomes attributable to nursing care (Montalvo, 2007; Press Ganey Associates, 2021b). Other NSIs include patient falls, central line-associated bloodstream infections (CLABSIs), and catheter-associated urinary tract infections (CAUTIs). Many healthcare facilities submit their NSI data to the National Database of Nursing Quality Indicators (NDNQI), developed by the American Nurses Association (ANA) in 1998. Press Ganey, a company known for assisting organizations with performance improvement initiatives for over 30 years, acquired the NDNQI from the ANA in 2014, with the goal of continuing to advance patient outcomes and improve nursing metrics (Berry, 2014). Upon paying a fee, healthcare facilities participating in the NDNQI program can benchmark their NSI data against other facilities with similar variables, such as bed size or teaching status (Montalvo, 2007; Press Ganey Associates, 2021b). It is beneficial for facilities to perform this type of external benchmarking with the NDNQI for reasons such as: providing an awareness of how one facility's nursing outcomes compare to other facilities, allowing facilities to identify specific areas needing improvement, and serving as a data source for programs such as Magnet (Well and Empowered, 2021). Since hospital reimbursement is tied to quality metrics and outcomes, the overall goal is to outperform the NDNQI mean for each nursing indicator (Well and Empowered, 2021). The mean is a rolling number that changes each quarter. NDNQI data can run up to two quarters behind, and printable reports present data from the last eight quarters.

HAPIs can be economically devastating to acute care facilities. In 2011, data from the AHRQ stated that approximately 2.5 million patients per year developed HAPIs in the United

States (AHRQ, 2011a). Further, total HAPI costs were estimated to be between $9.1 and $11.6 billion annually, while costs to treat individual HAPIs were between $20,900 and $151,700 (AHRQ, 2011a). HAPI lawsuits were widespread, listed as the second most common lawsuit filed in 2011, with the first being wrongful death (AHRQ, 2011a). The AHRQ also revealed that HAPIs were directly related to about 60,000 patient deaths each year (AHRQ, 2011a). More recent cost estimates have proven to be even more astronomical. Padula and Delarmente (2019) "created a Markov simulation to estimate costs for staged pressure injuries acquired during hospitalization from the hospital perspective" (p. 634). They estimated that HAPI costs in the United States could exceed $26.8 billion annually (Padula & Delarmente, 2019). In 2008, the CMS revealed they would no longer reimburse facilities for hospital-acquired conditions (HACs) that were not present upon admission. HAPIs were one of the HACs identified as being non-reimbursable (CMS, n.d.). Considering the tremendous physical and economic outcomes associated with HAPIs, healthcare facilities have a duty and responsibility to implement comprehensive measures to prevent HAPIs from occurring.

1.1 Problem Statement

Two units at the project lead's place of employment within a large urban healthcare system in the southeastern United States, the Medical/Surgical Intensive Care Unit (MSICU) and the Medical/Surgical Progressive Care Unit (IPU Progressive), experienced an increased number of HAPIs in 2021, with HAPI rates higher than their respective NDNQI goals, or mean comparisons with other facilities with similar variables such as bed size or teaching status (Press Ganey Associates, 2021c). Press Ganey Associates (2021a) defines a HAPI rate as "the number of patients with pressure injuries at a specific point in time that were acquired within the facility" (p. 3). The rate is calculated by dividing the total number of patients by the number of patients

with HAPIs at a specific point in time, then multiplying by 100. Reducing HAPIs was also a system-level nursing goal for this large healthcare system in 2022. With elevated HAPI rates and system-level directives to reduce them, there was clearly a need to identify, implement, and evaluate HAPI prevention interventions in these units.

This healthcare system utilizes the Braden Scale to identify adult patients at risk for developing HAPIs. The Braden Scale is a pressure injury risk assessment tool with documented reliability and validity that stratifies pressure injury risk into six subscales: sensory perception, moisture, activity, mobility, friction and shear, and nutritional status (Bergstrom et al., 1987). HAPI risk assessments using the Braden Scale are conducted upon admission to any adult inpatient unit within the healthcare system and during each subsequent shift. To complete the assessment, the nurse assigns a score in each of the six subscales, and a total score is automatically calculated, ranging from 6 to 23 (AHRQ, 2011b, Section 3D). The lower the total score, the higher the patient's risk of developing a HAPI. A score of 18 or less generally indicates an overall at-risk status (AHRQ, 2011b, Section 3D). Based on the total score and the risk areas identified via the subscales, the nurse is responsible for implementing HAPI prevention interventions, otherwise known as "care bundles," to mitigate the patient's specific areas of risk. Care bundles are sets of "three to five evidence-based practices – interventions supported by research – that when used together cause significant improvement in patient outcomes" (McCarron, 2011, p. 30). However, a list of prevention practices was not readily accessible to the bedside nurses at the project site. There was no easy way for nurses to visualize or be reminded of HAPI prevention care bundle components, as they were present in electronic policy and procedure manuals outside the nurses' usual electronic documentation locations, making them a challenge to find. Certified Wound and Ostomy Nurses (CWONs) are available for consultation

and assistance; however, there are only two full-time CWONs and one as-needed (PRN) CWON for the entire facility, which consists of over 450 licensed beds.

1.2 Project Purpose

The primary purpose of this quality improvement (QI) project was to increase compliance with implementing HAPI prevention care bundles by using Kamishibai Cards (K-Cards) as visual cues, with the goal of decreasing HAPI frequency counts on two project units. A secondary aim was to obtain feedback about the K-Card project from the participating nurses to assist in refining the process for long-term sustainment and implementation in other units within the facility. Additionally, variables such as patient age, gender, length of stay, COVID-19 (Coronavirus Disease of 2019) status, intubation status, use of vasopressors, and other relevant measures were tracked to help identify trends for future projects and assist in identifying patients needing a more specific HAPI prevention focus.

K-Cards are Lean visual management tools that originated with Buddhist monks drawing pictures to tell stories (Niederstadt, 2010). They serve as visual cues, allowing end-users to quickly identify standard work, or tasks required in carrying out daily processes. Healthcare facilities have adopted K-Cards to aid in process standardization and heightened compliance with care bundles. The cards are two-sided and follow a standardized format related to size, color, and layout (Niederstadt, 2010). For this project, the cards were formatted with a green stripe across the top of one side and a red stripe across the top of the opposite side. Standard work tasks related to HAPI prevention interventions were listed on both sides. The card remained on the green side if all applicable interventions were in place. If an applicable intervention was not in place, the intervention not in place was marked with a dry erase marker, the card was turned to the red side until all applicable items were implemented, then it was returned to the green side.

The colored stripes aimed to allow the nurses to quickly identify whether all applicable HAPI prevention components were in place or if further follow-up was needed.

1.3 Clinical Question (PICO)

The PICO question that guided this project was: In adult patients on the MSICU and IPU Progressive hospital units (P), does implementing K-Cards (I) enhance pressure injury prevention bundle compliance and improve unit HAPI frequency counts (O) compared to current HAPI prevention practices (C)?

1.4 Project Aims and Objectives

This QI project utilized a pre-and post-intervention design to evaluate for changes in HAPI frequency counts on two project units and two comparison units. Nursing compliance with implementing and documenting evidence-based HAPI prevention practices was monitored with weekly audits and compared using percentages. Descriptive statistics were used to analyze patient variables including age, gender, length of stay, COVID-19 status, intubation status, use of prone positioning (turning patients onto their stomachs to improve air movement and lung expansion), use of vasopressors, HAPI stage, and body location of the HAPI. A post-intervention survey was also used to examine nurses' perceptions of the intervention. Survey results were analyzed using descriptive statistics (mean and range) and content analysis.

The primary data source for the weekly HAPI frequency counts pre- and post-implementation was weekly reports generated from the CWONs' documentation. An additional data source that provided frequency counts was the results of the facility's quarterly NDNQI Pressure Injury Prevalence Studies, a process that was in existence prior to implementing the K-Card project. Prevalence studies are conducted quarterly at the project facility by the Skin and Wound Action Team (SWAT) members, who are unit-based nurse champions that receive

special training from the facility's CWONs on skin, wounds, pressure injuries, and ostomies. On the day a prevalence study is conducted, the SWAT nurses complete head-to-toe skin assessments on all patients on all eligible units unless the patient meets one of four exclusion criteria: "patient off unit, patient refused, unsafe for patient condition/contraindicated, or patient actively dying" (Press Ganey Associates, 2021a, p. 17, "Reasons for Exclusion" section). A CWON is notified of any pressure injuries found and validates the nurse's findings at the patient's bedside. A chart review determines if the pressure injury was present on admission (documented within 24 hours of admission) or hospital-acquired. HAPI rates at the unit- and facility-levels are calculated once the findings are validated and chart reviews are completed, as those numbers serve as the numerator and denominator for the HAPI rate calculations.

Patient variables such as age, gender, length of stay, COVID-19 status, intubation status, use of prone positioning, use of vasopressors, HAPI stage, and body location of the HAPI, were abstracted for comparison and trending on all patients who developed a HAPI on either a project or comparison unit during the pre- and post-intervention timeframes.

To measure compliance with K-Card utilization and implementation of HAPI prevention interventions on the project units, individuals identified by the nurse managers, including a charge nurse and a SWAT member, were trained to perform weekly random audits of K-Card compliance by the project lead the week before the project started. For comparison, the same audits were performed on the comparison units to evaluate and compare compliance with implementing interventions to prevent HAPIs with and without the K-Cards available as visual cues or reminders for the nurses. The two comparison units, CVIMC and CVICU have the same nurse manager, who elected to receive the audit training from the project lead and perform the weekly audits. The training was face-to-face and included an overview of the K-Card process,

audit tools, auditing process, timeline, and how to submit completed audit forms. Upon completing the training, each auditor signed a roster, which was maintained by the project lead. The audits included visual inspections of the patients and equipment in their rooms along with concurrent chart audits to ensure applicable HAPI prevention interventions were implemented and documented appropriately.

Once the project was complete, a link to an electronic post-implementation survey was emailed to all nurses working on the project units during implementation to request feedback about the process. A content analysis of the open-ended responses was conducted. Themes were identified and summaries of the responses were abstracted. The survey results were shared with unit leadership and other key stakeholders at the facility, such as the HAPI Taskforce, the Quality Improvement Department, Nursing Assistant Vice Presidents, and the Chief Nurse Executive.

CHAPTER 2: LITERATURE REVIEW

A literature review was conducted between August 2021 and March 2022 using the Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and the Cochrane Library databases. Google Scholar was also utilized to conduct a more extensive search on K-Cards. Search terms utilized included *Kamishibai, care bundle, visual management, visual cue, medical surgical, critical care, hospital-acquired, HAPI, pressure ulcer, or pressure injury*. English language, peer-reviewed journals, human subjects, and publication dates of 2016 to 2022 were the search limiters, and articles focusing on settings other than acute care, such as long-term care or home health, were excluded.

2.1 Systematic Reviews Focused on Care Bundles and Patient Outcomes

The search produced two systematic reviews regarding the effectiveness of care bundles on patient outcomes in general (Lavallee et al., 2017) and on decreasing HAPIs in older adults in critical care (Floyd et al., 2021). The review conducted by Lavallee et al. (2017) yielded mixed results regarding the impact of care bundles as tools for decreasing negative patient outcomes. They concluded that "very low-quality evidence from controlled before-after studies suggests that care bundles may reduce the risk of negative outcomes when compared with usual care. By contrast, the better-quality evidence from six randomized trials is more uncertain" (p. 1). The authors felt the broad scope of their review (negative patient outcomes) could have impacted their findings and that a more limited search scope could have yielded different results. The systematic review conducted by Floyd et al. (2021) specifically focused on HAPIs and included nine studies. They concluded that most HAPI reduction projects are QI in nature, and that available evidence suggests that early identification of HAPI risk and care bundle implementation can help prevent HAPIs in older, critically ill adults (Floyd et al., 2021).

2.2 Research Focused on Care Bundles and HAPI Prevention

Two single QI projects where facilities successfully decreased their HAPI rates were found during the literature review (Amon et al., 2019; Rivera et al., 2020). Rivera et al. (2020) implemented a HAPI prevention bundle in a critical care unit that had recorded nine pressure injuries during the 14-month baseline data collection phase (HAPI index of 3.4, with index meaning [pressure injuries/patient care days] x1000). Their HAPI index decreased to 0.48 by the end of their 10-month post-intervention phase. Amon et al. (2019) avoided HAPIs for 1,000 days on their medical-surgical-telemetry unit by implementing a HAPI prevention bundle. This bundle consisted of six primary tactics: "improved risk assessment, individualized pressure injury risk factor reduction, specialized prophylactic skin products and support surfaces, early mobility, staff education, and unit skin champions" (pp. 18-19). Results of these two QI projects suggest that care bundle implementation can be effective in HAPI prevention efforts.

2.3 Research Focused on K-Cards

Two articles about using K-Cards as interventions to improve HAPIs were found during the literature review. One project successfully prevented deep tissue pressure injuries in a pediatric population (Fuller et al., 2021). The other project, implemented on an adult thoracic and cardiovascular surgery unit, successfully decreased HAPI rates after implementing K-Cards (Salinas et al., 2021).

The literature review mainly produced QI projects utilizing K-Cards to improve unit processes within pediatric patient populations. Most of the projects focused on urinary catheter utilization days, CAUTI rates, central line utilization days, CLABSI rates, and bundle component compliance, and all either sustained or successfully decreased their numbers (Frith et al., 2019; Kamity et al., 2021; Ormsby et al., 2020; Shea et al., 2019; Stewart, 2021). One facility

implemented "Caring Cards" (Gould et al., 2018), a less punitive-sounding form of K-Cards, on a neurological unit and experienced a dramatic decrease in their patient fall rates.

Most of the evidence found during the comprehensive literature review supported the use of care bundles and K-Cards to improve NSIs. Since most of the projects focused on pediatric populations and CAUTIs and CLABSIs, this project aimed to fill the identified gap by utilizing K-Cards for HAPI prevention in adult patients.

2.4 Conceptual Framework

Frameworks and conceptual models are essential in scholarly projects as they provide structured guidance for enhanced success. Lewin's Change Management Model was the identified theoretical framework that was used to guide this project. The model involves three steps: unfreezing, moving/transitioning, and refreezing (Lewin, 1947; Shirey, 2013). Planning, preparation, and creating buy-in are part of the unfreezing stage. In this project, unfreezing occurred by sharing each unit's 2021 HAPI data with the respective teams to convey the problem magnitude, create buy-in, and provide education regarding the K-Card process. The intervention was implemented in the moving/transitioning stage, which is when data was collected. Using the project results, the refreezing stage occurs after the project is completed, as it involves updating the process based upon participant feedback, embedding the change into standard work, and spreading it to additional areas. Lewin's framework was appropriate for this QI project as it involved halting the previous practice, changing to a new practice, attempting to enculturate the new practice into the unit routine, and addressed sustainability and spread.

CHAPTER 3: METHODS

The primary aim of this QI project was to implement K-Cards with HAPI prevention care bundle components to serve as visual cues and reminders to assist nurses in implementing evidence-based HAPI prevention practices.

3.1 Project Design and Aims

This project utilized a pre-and post-intervention design with comparison units to evaluate for changes in HAPI frequency counts. Nursing compliance with implementing and documenting evidence-based HAPI prevention practices were monitored with weekly audits and compared using percentages. Descriptive statistics were used to analyze patient variables such as age, gender, length of stay, COVID-19 status, intubation status, use of prone positioning, use of vasopressors, HAPI stage, and body location of the HAPI. A post-intervention survey was used to accomplish an additional aim of examining nurses' perceptions of the intervention.

3.2 Sample

Convenience sampling was used, as all patients admitted to the project units during the implementation timeframe were eligible for inclusion. The project units and comparison units only admit adult patients aged 18 and over, so the project focused only on the adult population. Prisoners were excluded from the project, as were patients with pressure injuries that were present upon admission to the hospital unless they also developed a HAPI while admitted to one of the project or comparison units.

Typical patients on MSICU include high acuity medical/surgical patients who are intubated, on critical medication drips, and frequently receive vital interventions such as ventilator support and continuous hemodialysis. The Cardiovascular Intensive Care Unit (CVICU) was selected as MSICU's comparison unit because their patients receive similar

interventions to those on MSICU, but patients typically have cardiac-specific etiologies instead of general medical/surgical ones.

IPU Progressive patients are often either step-down patients from MSICU or high-acuity patients from medical/surgical floors who need more frequent monitoring, such as patients on high-flow oxygen, in diabetic ketoacidosis (DKA), and other medical/surgical diagnoses. The Cardiovascular Intermediate Care unit (CVIMC) was selected as IPU Progressive's comparison unit because it is the hospital's other intermediate care unit, serving as a step-down unit for patients transferring out of CVICU and caring for patients with heart failure, vascular surgeries, post-heart catheterization, and pacemaker insertions.

All Registered Nurses (RNs) and Licensed Practical Nurses (LPNs) working on MSICU and IPU Progressive during the intervention timeframes were included in the project. After experiencing a staffing crisis during the height of the COVID-19 pandemic, both units were comprised of many new graduate nurses with only one to two years of experience, and travel nurses working at the facility for a short period of time. The IPU Progressive unit also employs LPNs who work alongside the RNs and within their scope of practice. The comparison units experienced similar staffing issues and employed many new graduate nurses and travel nurses.

Convenience sampling was also used in regard to the post-intervention nurse feedback survey. A flyer with a QR Code and link to the electronic survey was emailed to all nurses who worked on the two project units during project implementation. Copies of the flyer were printed and posted on the units. The survey remained open for two weeks after the project ended. Completion was voluntary. An email reminder about completing the survey was sent by the project lead at the end of the first week. Face-to-face reminders were provided by the unit managers, charge nurses, and educators during pre-shift huddles (brief meetings at each change

of shift where the nurse manager or charge nurse discusses any announcements, education, or other important information with the on-coming staff). Additional reminders were included in the units' weekly update newsletters, which are developed and disseminated by the nurse educators.

3.3 Setting

The setting of this project was a 457-bed acute care tertiary hospital, which is part of a large urban healthcare system in the southeastern United States. Two units were identified for inclusion in the intervention based on their high rate of HAPIs in 2021: MSICU, a 35-bed medical/surgical intensive care unit, and IPU Progressive, a 28-bed medical/surgical progressive care unit. Comparison units were also selected, and included CVICU, a 14-bed cardiovascular intensive care unit, and CVIMC, a 16-bed cardiovascular intermediate care unit.

3.4 Intervention

K-Cards with HAPI prevention bundle components were designed by the project lead (Appendix A and Appendix B) with input from the hospital's CWONs and with information from the Wound, Ostomy and Continence Nursing (WOCN) Society's HAPI prevention guidelines (Ratliff et al., 2017). Prior to the start of the intervention, the K-Cards were printed in color on front and back, laminated, and a hole was punched in the top center of each one. On Wednesday, September 7, 2022, the first day of project implementation, the project lead hung a unit-specific K-Card on a removable hook outside of each patient's door on the MSICU and IPU Progressive units. K-Cards were not placed on the comparison units. The project lasted for 12 weeks, concluding on Tuesday, November 29, 2022.

An education module that included information about each unit's specific HAPI rates, the importance of HAPI prevention, and the K-Card process was provided to all RNs and LPNs,

including travel nurses, on the project units between August 23, 2022 and September 6, 2022, prior to the start of the project. The education was created by the project lead and included a narrated online module published in Microsoft Stream with a link to a post-test in Microsoft Forms. A brief video demonstration of the actual K-Card process was filmed and embedded in the online module. The training was mandatory for nurses on the project units to complete and they were required to score at least 80% on the post-test to pass. They could review the module and take the test as many times as needed. The project lead emailed an initial flyer to the RNs and LPNs on both project units notifying them of the required module (Appendix C). The module was accessible via QR Code and by an active link on the flyer. The nurse managers and charge nurses also provided in-person reminders regarding completing the module during pre-shift huddles. The nurses' completion status and pass/fail status were monitored by the project lead via completion reports that were run every few days and sent to the nurse managers, AVPs, educators, and Clinical Nurse Specialists of the project units.

On the day the K-Card project began, a total of 51 eligible nurses had completed the online module and post-test. IPU Progressive had a 69% completion rate (22 out of 32 nurses completed the module) and a 95% pass rate (21 out of the 22 nurses who took the module passed it). MSICU had a 23% completion rate on the day the project began (29 out of 124 nurses completed the module) and a 93% pass rate (27 out of the 29 nurses who took the module passed it). With such low completion rates prior to the start of the K-Card project, the IPU Progressive nurse manager and the project lead provided brief face-to-face in-services during week one. The project lead and unit educator also provided brief face-to-face in-services on MSICU while performing frequent rounding during week one of the project. No roster was signed to indicate completion of this face-to-face training, nor did these nurses complete a post-test. The education

module was never closed and remained accessible to the project unit nurses even after the project went live.

The intervention involved the nurses reviewing the HAPI prevention bundle components listed on the K-Cards during each bedside start-of-shift report. If all applicable patient-specific components were in compliance, they placed the K-Card with the green side (compliant side) facing out. If applicable patient-specific items were not in compliance, they turned the card to the red side and marked the deficiencies with a provided dry erase marker. Once the outstanding items were completed, the nurse erased the markings and turned the card around so that the green side faced out. These processes supported peer-to-peer accountability and served as visual cues to remind the nurses of outstanding interventions needing attention if the K-Card was on the red side. The project lead visited the project units multiple times during weeks one and two, then at least every two weeks to check-in with the staff about the process, ensure the K-Cards were still present, and replace any missing K-Cards.

3.5 Data Collection Procedures

The primary outcome data for this project was the frequency counts of HAPIs acquired on the two project units and two comparison units pre- and post K-Card implementation. The primary source for this data was a weekly report generated from the CWONs' documentation, which was in place prior to implementing the K-Card project. This report is fully automated; it runs each Monday morning and is delivered to an email group that includes key skin and wound program stakeholders. The project lead examined the report each Monday to identify any patients with a documented pressure injury, and then conducted a chart review on each patient with a pressure injury on a project or comparison unit. Variables such as age, gender, length of stay, COVID-19 status, intubation status, use of prone positioning, use of vasopressors, HAPI stage,

and body location of the HAPI were abstracted from the chart during the review. Tracking and trending these variables was completed to help better understand the root causes or contributing factors of the facility's HAPIs and identify where future advanced HAPI interventions should focus. An Excel workbook with separate worksheets for each project and comparison unit and their pre-and post-intervention data was created by the project lead (Appendix D). During the pre- and post-implementation time periods, any patient on a project or comparison unit who developed a HAPI via the weekly report was added to the appropriate unit's data-tracking spreadsheet after being assigned a code for de-identification. Pre-intervention data was collected for the 12 weeks prior to project implementation (June 20 – September 5, 2022), and post-implementation data was collected for 12 weeks after the project units begin using the K-Cards on September 7, 2022 (September 12 – November 28, 2022).

An additional data source to obtain HAPI frequency counts was the results of the facility's quarterly Pressure Injury Prevalence Studies. This process was also in existence prior to implementing the K-Card project. In addition to the frequency counts obtained during the July 2022 and October 2022 studies, which were conducted during the 12-week pre- and post-implementation timeframes, the project lead also analyzed the calculated rates from the project and comparison units during two pre-implementation prevalence studies and two post-implementation prevalence studies to determine if any relationships existed. The pre-implementation studies were conducted in April and July 2022, and post-intervention studies were conducted in October 2022 and February 2023, even though the K-Cards were removed from the project units on December 1, 2022. The project facility tracks prevalence study unit and facility-level rates via a table on a Microsoft Word document. The CWON updates the data and shares it with key stakeholders within seven days after each prevalence study is conducted. The

project lead ensured there was no duplication of patients between the prevalence study data and weekly frequency count data. Patients already identified as having a HAPI through weekly frequency counts were excluded from the final frequency counts retrieved from the prevalence studies.

Compliance with implementing appropriate HAPI prevention bundle components was measured via weekly audits during the post-intervention timeframe. Auditors trained by the project lead, including a nurse manager, two SWAT nurses, and a clinical supervisor, performed five random audits per unit per week utilizing Auditor K-Cards (Appendix E). The auditors validated whether all patient-specific bundle components were in place as applicable and logged their findings on a pen-and-paper audit tool provided by the project lead (Appendix F and Appendix G). Any deficiencies were to be addressed with the primary nurse in real-time. The completed audit tools were submitted to the project lead weekly, who entered the data into an Excel spreadsheet for compliance tracking (Appendix H). Though they did not implement the K-Card project, bundle compliance data was also collected on the comparison units to evaluate and compare compliance with HAPI prevention interventions on units with and without a visual cue. There was no pre-implementation data for comparison, as this information was not tracked at the facility prior to implementing the K-Card project. However, all compliance rates, including patient-level, intervention-level, overall weekly compliance, and overall cumulative compliance, were calculated via percentages and compared to assess for any trends with implementing HAPI prevention interventions.

Upon project completion, a link to an electronic survey (Appendix I) was emailed to the RNs and LPNs on the project units to obtain feedback on the K-Card process. The name of the unit in which the nurse worked was the only identifier collected, to compare feedback between

the two project units. The survey was created by the project lead and contained six questions – one asked the respondents to identify their primary work unit (IPU Progressive or MSICU), four utilized a five-point Likert Scale, and one was open-ended. The Likert Scale questions made statements about the K-Cards and the K-Card process, such as "K-Cards helped increase my knowledge about HAPI prevention practices/care bundles" and "The K-Card process was beneficial and should be spread to other units." The response options ranged from 1 = Strongly Disagree to 5 = Strongly Agree. The open-ended question asked for any additional feedback about K-Cards, care bundles, visual cues, or the overall K-Card process.

3.6 Data Analysis

Upon conclusion of the 12-week project, the pre-and post-intervention data were compared and displayed in graphs and tables. Frequency counts and percentages were the most utilized measures and were calculated at the unit level versus patient level. Descriptive statistics, such as mean, range, frequency counts, and percentages were used to evaluate and formulate trends with the patient variable data, such as age, gender, location of HAPI on the body, HAPI stage, and other captured measures. This data was visually represented via a table. Bundle component compliance data obtained from the weekly audits were analyzed using percentages and visually represented with bar graphs. Next, a special combination graph compared bundle component compliance data, displayed in bar graphs, with HAPI frequency counts overlayed in line graphs. The pre-and post-intervention frequency counts were displayed with run charts and tables, and the weekly compliance audit results were represented with bar charts. Descriptive statistics including the mean and range were used to analyze the responses to the four Likert Scale questions on the post-intervention feedback survey and were visually represented via a

table. A content analysis of the open-ended responses to the survey was conducted to identify themes that emerged from the nurses' responses.

3.7 Ethical Considerations

The project lead submitted the project plan for Institutional Review Board (IRB) approval through the project facility's IRB in June 2022, after the Doctor of Nursing Practice (DNP) Program Director at the University of North Carolina at Charlotte provided a project approval letter to the facility's IRB. The project lead received notification of IRB approval from the project facility on June 23, 2022 (Appendix L). An IRB approval application was then submitted to the University of North Carolina at Charlotte IRB and was approved on July 5, 2022 (Appendix M). The project did not begin until IRB approval was granted from both entities.

All patient data related to this project was kept secured and confidential. It was important to include patient identifiers in the data collection process to prevent duplications, which could have falsely increased a project or comparison unit's HAPI numbers. The reports and data collection tools were stored on a password-protected computer and within a user-specific computer drive. The folder where the documents were saved was not accessible to anyone except the project lead and the project facility's Information and Analytics Services (IAS) department. The names of patients who developed HAPIs were added to a log on an Excel spreadsheet, where the project lead assigned each patient a code in order to de-identify them. The assigned code was entered on a data collection spreadsheet, which is also where the additional patient variables abstracted from the chart reviews were logged. No patient-identifying information was included in the reports upon project completion. Nurse confidentiality was also maintained regarding the weekly audits and completion of the post-intervention voluntary survey. The auditors were not asked to document the names of any nurses when performing their weekly

audits, and the survey only contained a question on the survey asking the respondents to identify which unit they worked on for comparison purposes.

CHAPTER 4: PROJECT RESULTS

The aim of this multi-step QI project was to decrease HAPI frequency counts on two project units by implementing K-Cards formatted with HAPI prevention interventions. This project took place in the fall of 2022. K-Cards were implemented and utilized by RNs and LPNs on two identified project units from September 7, 2022 - November 29, 2022. HAPI frequency counts were monitored on the project and comparison units during the project and for 12 weeks prior, and HAPI bundle compliance audits were completed on the project and comparison units during the project timeframe. The post-implementation quarterly NDNQI Pressure Injury Prevalence Study, another source of HAPI frequency count data, was conducted on October 20, 2022. The results of a second post-implementation prevalence study on February 16, 2023 were also used to assist in trending HAPI rates over a longer period of time. Demographic variables were collected on all patients who developed a HAPI on a project or comparison unit during the 12-week pre-implementation and 12-week post-implementation timeframes. A post-implementation staff feedback survey was available for the nurses on the project units to complete from December 1, 2022 - December 14, 2022.

4.1 Patient Sample Information

This project utilized convenience sampling, as all adult patients admitted to the MSICU and IPU Progressive Units during the 12-week implementation timeframe were eligible for inclusion in the K-Card project. Prisoners were excluded from the project, as was any patient with a pressure injury that was present on admission, unless they developed a new HAPI while admitted to a project unit during implementation. All adult patients present on the two project units on the dates of the quarterly NDNQI Pressure Injury Prevalence Studies held during the pre-and post-implementation timeframes were eligible for inclusion unless they met one of the

four exclusion criteria previously discussed per the NDNQI. The same data were also collected on two similar comparison units, though the K-Cards were not implemented on these units.

Patient variables were collected on each patient that developed a HAPI during the pre- and post-implementation phases of the K-Card project. The goal of this information was to track and trend data for the facility to focus on in future HAPI reduction efforts.

IPU Progressive (project unit) had six patients who developed HAPIs during the 12-week pre-implementation phase. Of these six patients, the mean age was 71 years, the majority were male (67%, n=4), and the mean length of stay was 25 days. There was an outlier, as one patient had a 92-day length of stay. Most of the patients (67%, n=4) were not COVID-19 positive and had not been intubated (83%, n=5) or received vasopressors (83%, n=5). No patient was placed in the prone position. Half of the HAPIs were Stage 2 (50%, n=3), with Stage 1 (33%, n=2) and deep tissue pressure injuries (DTPIs) (17%, n=1) comprising the other half. The location of IPU Progressive's pre-implementation HAPIs were mostly the heels (33%, n=2) and the sacrum/coccyx (33%, n=2), with the back (17%, n=1) and ears from oxygen tubing (17%, n=1) making up the rest. CVIMC (comparison unit) had no HAPIs during the pre-implementation timeframe.

IPU Progressive (project unit) had two patients develop HAPIs during the post-implementation timeframe. The mean age was 60 years, both were female, and the mean length of stay was 40 days. Neither were COVID-19 positive, half had been intubated (50%, n=1), none had been placed in the prone position, and half had received vasopressors (50%, n=1). HAPI stages post-implementation were limited to Stage 3 (50%, n=1) and DTPI (50%, n=1), and the location was limited to the heels only (100%, n=2). CVIMC (comparison unit) had two patients develop HAPIs during the post-implementation timeframe. The mean age was 74 years, both

were male, and the mean length of stay was 13 days. Neither were COVID-19 positive, had been intubated, been placed in the prone position, or received vasopressors. HAPI stages post-implementation were limited to Stage 2 (50%, n=1) and Unstageable (50%, n=1), and the location was limited to the sacrum/coccyx only (100%, n=2). See Table 1 for IPU Progressive and CVIMC's HAPI patient variables pre- and post-implementation.

Table 1

IPU Progressive and CVIMC HAPI Patient Variables

	Pre-Data		Post-Data	
Variable	**IPU Progressive (Project Unit)** *(n = 6)*	**CVIMC (Comparison Unit)** *(n = 0)*	**IPU Progressive (Project Unit)** *(n = 2)*	**CVIMC (Comparison Unit)** *(n = 2)*
Age (in years)	71* (mean), 57-78 (range)	No HAPIs during 12-week pre-implementation timeframe	60 (mean), 49-71 (range)	74 (mean), 64-83 (range)
Gender	67% male		100% female	100% male
Length of Stay (in days)	25** (mean), 7-92 (range)		40 (mean), 27-52 (range)	13 (mean), 7-19 (range)
Covid +	67% no		100% no	100% no
Intubated	83% no		50% yes, 50% no	100% no
Placed in Prone Position	100% no		100% no	100% no
Received Vasopressors	83% no		50% yes, 50% no	100% no
HAPI Stage	50% Stage 2, 33% Stage 1, 17% DTPI		50% Stage 3, 50% DTPI	50% Stage 2, 50% US
HAPI Location	33% Heels, 33% Sacrum/Coccyx, 17% Back, 17% Ears (MDR)		100% Heels	100% Sacrum/Coccyx

*all numbers rounded to nearest whole number

** = outlier (92 days)

DTPI = Deep Tissue Pressure Injury, MDR = medical-device related, US = Unstageable

MSICU (project unit) had 13 patients develop HAPIs during the pre-implementation phase. The mean age was 59 years, 62% were female (n=8), the mean length of stay was 11 days, none were COVID-19 positive, all had been intubated (100%, n=13) and received vasopressors (100%, n=13), and 92% (n=11) had not been placed in the prone position. The most frequent HAPI stages were DTPI (31%, n=4) and mucosal membrane injuries (31%, n=4), followed by Stage 2 (23%, n=3). Stage 3 (n=1) and Stage 1 (n=1) comprised 8% of the 13 HAPIs. The most prominent location of the HAPIs was the sacrum/coccyx at 39% (n=5), followed by the genitals from medical device-related injuries at 15% (n=2). The rest of MSICU's pre-implementation

HAPIs were comprised of one HAPI each (8%) on the back, nose, cheek, tongue, lip, and occiput. CVICU (comparison unit) had two patients with HAPIs in the pre-implementation time period. The mean age was 57 years, one male and one female, mean length of stay was six days, none were COVID-19 positive, all were intubated and had received vasopressors, and none were placed in the prone position. One HAPI was a Stage 4 and the other was a DTPI, with one injury located on the sacrum/coccyx and the other located on the elbows.

Post-implementation, MSICU (project unit) had 11 patients who developed HAPIs. The mean age was 54 years, 55% were male (n=6), and the average length of stay was 18 days. None were COVID-19 positive or placed in the prone position, and more than half were intubated (64%, n=7) and received vasopressors (73%, n=8). Stage 2s were the most common (36%, n=4) HAPI stage post-implementation, followed by Unstageable (27%, n=3) and Mucosal Membrane (27%, n=3), then Stage 1 (9%, n=1). Most of the injuries were located on the sacrum/coccyx post-implementation (36%, n=4), followed by the lip (18%, n=2), neck (18%, n=2), and occiput (18%, n=2). The heels were the least common location (9%, n=1). Several HAPIs were related to medical devices (45%, n=5). CVICU (comparison unit) had two HAPIs post-implementation. The mean age was 69 years with 24-day length of stays. Both were male, neither were COVID-19 positive or placed in the prone position, and both were intubated and received vasopressors. One HAPI was a Stage 2 and the other was a Mucosal Membrane injury. One was on the sacrum/coccyx, and the other was on the lip from a medical device. See Table 2 for MSICU and CVICU's HAPI patient variables pre- and post-implementation.

Table 2

MSICU and CVICU HAPI Patient Variables

	Pre-Data		Post-Data	
Variable	**Med/Surg ICU (Project Unit)** *(n = 13)*	**CVICU (Comparison Unit)** *(n = 2)*	**Med/Surg ICU (Project Unit)** *(n = 11)*	**CVICU (Comparison Unit)** *(n = 2)*
Age (in years)	59* (mean), 31-79 (range)	57 (mean), 53-60 (range)	54 (mean), 32-65 (range)	69
Gender	62% female	50% male, 50% female	55% male	100% male
Length of Stay (in days)	11 (mean), 2-28 (range)	6 (mean), 4-8 (range)	18 (mean), 2-54 (range)	24
Covid +	100% no	100% no	100% no	100% no
Intubated	100% yes	100% yes	64% yes	100% yes
Placed in Prone Position	92% no	100% no	100% no	100% no
Received Vasopressors	100% yes	100% yes	73% yes	100% yes
HAPI Stage	31% DTPI, 31% MM, 23% Stage 2, 8% Stage 3, 8% Stage 1	50% Stage 4, 50% DTPI	36% Stage 2, 27% US, 27% MM, 9% Stage 1	50% Stage 2, 50% MM
HAPI Location	39% Sacrum/Coccyx, 15% Genitals (MDR), 8% Back (MDR), 8% Nose (MDR), 8% Cheek (MDR), 8% Tongue (MDR), 8% Lip (MDR), 8% Occiput	50% Sacrum/Coccyx, 50% Elbows	36% Sacrum/Coccyx, 18% Lip (MDR), 18% Neck (MDR), 18% Occiput (1 of 2 MDR), 9% Heels	50% Sacrum/Coccyx, 50% Lip (MDR)

*all numbers rounded to nearest whole number

DTPI = Deep Tissue Pressure Injury, MM = Mucosal Membrane, MDR = medical-device related, US = Unstageable

4.2 HAPI Frequency Counts

The primary goal of this project was to compare HAPI frequency counts before and after K-Card implementation between the project units and their designated comparison units. Baseline HAPI frequency count data was calculated for 12 weeks prior to K-Card implementation (weeks of June 20, 2022 through September 5, 2022), and post-implementation data was collected for 12 weeks after the K-Cards went live on September 7, 2022.

The IPU Progressive Unit (project unit) experienced a 66% reduction in HAPIs after K-Card implementation [n = 6 (pre), 2 (post)]. CVIMC (comparison unit) experienced a 200% increase in HAPI frequency counts [n = 0 (pre), 2 (post)]. See Table 3 for a summary of IPU Progressive and CVIMC's weekly HAPI counts pre- and post-project implementation.

Table 3

IPU Progressive and CVIMC's Weekly HAPI Frequency Counts

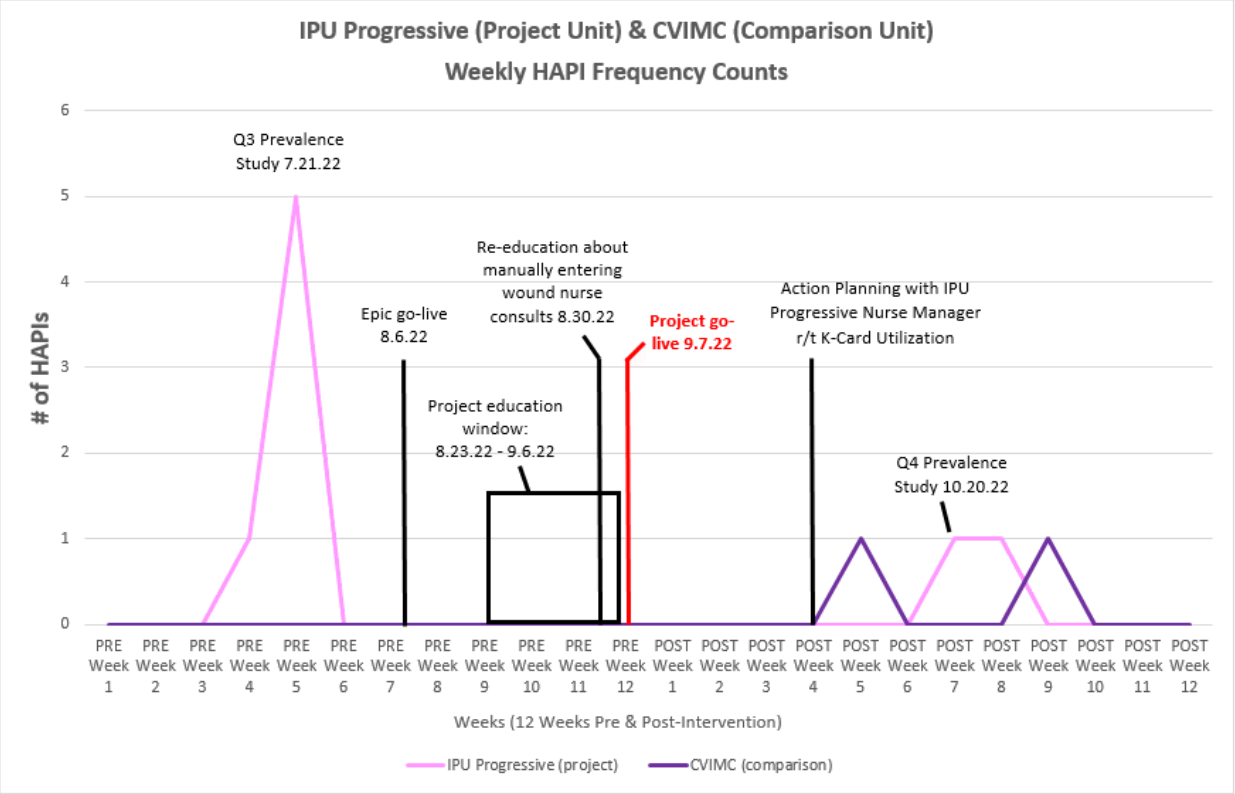
	Pre-Implementation: Weekly Number of HAPIs												K-Card Implementation	Post-Implementation: Weekly Number of HAPIs											
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
IPU	0	0	0	1	0	5	0	0	0	0	0	0		0	0	0	0	0	0	1	1	0	0	0	0
CVIMC	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	1	0	0	0	1	0	0	0

IPU (project unit), CVIMC (comparison unit)

See Figure 1 for a HAPI frequency count run chart comparing IPU Progressive and CVIMC's HAPI frequency counts pre- and post-implementation.

Figure 1

IPU Progressive and CVIMC Weekly HAPI Frequency Counts



The MSICU experienced a 15% reduction in HAPI frequency counts after K-Card implementation [n = 13 (pre), 11 (post)]. CVICU, MSICU's comparison unit, experienced no change in their HAPI frequency counts during the post-implementation period [n = 2 (pre), 2 (post)]. See Table 4 for a summary of MSICU and CVICU's weekly HAPI counts pre- and post-project implementation.

Table 4

MSICU and CVICU Weekly HAPI Frequency Counts

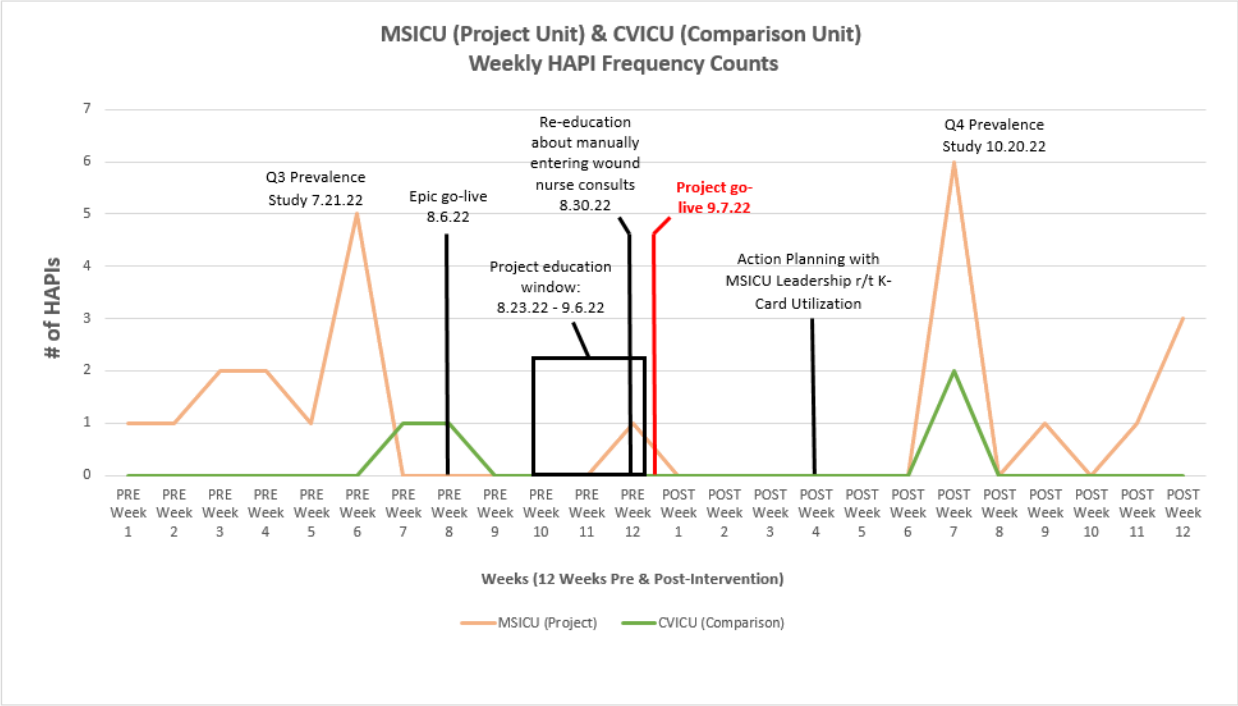
	Pre-Implementation: Weekly Number of HAPIs													**Post-Implementation: Weekly Number of HAPIs**										
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	K-Card Implementation	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
MSICU	1	1	2	2	1	5	0	0	0	0	0	1		0	0	0	0	0	0	6	0	1	0	1	3
CVICU	0	0	0	0	0	0	1	1	0	0	0	0		0	0	0	0	0	0	2	0	0	0	0	0

*MSICU (project unit), CVICU (comparison unit)

See Figure 2 for a HAPI frequency count run chart comparing MSICU and CVICU's HAPI frequency counts pre- and post-implementation.

Figure 2

MSICU and CVICU Weekly HAPI Frequency Counts



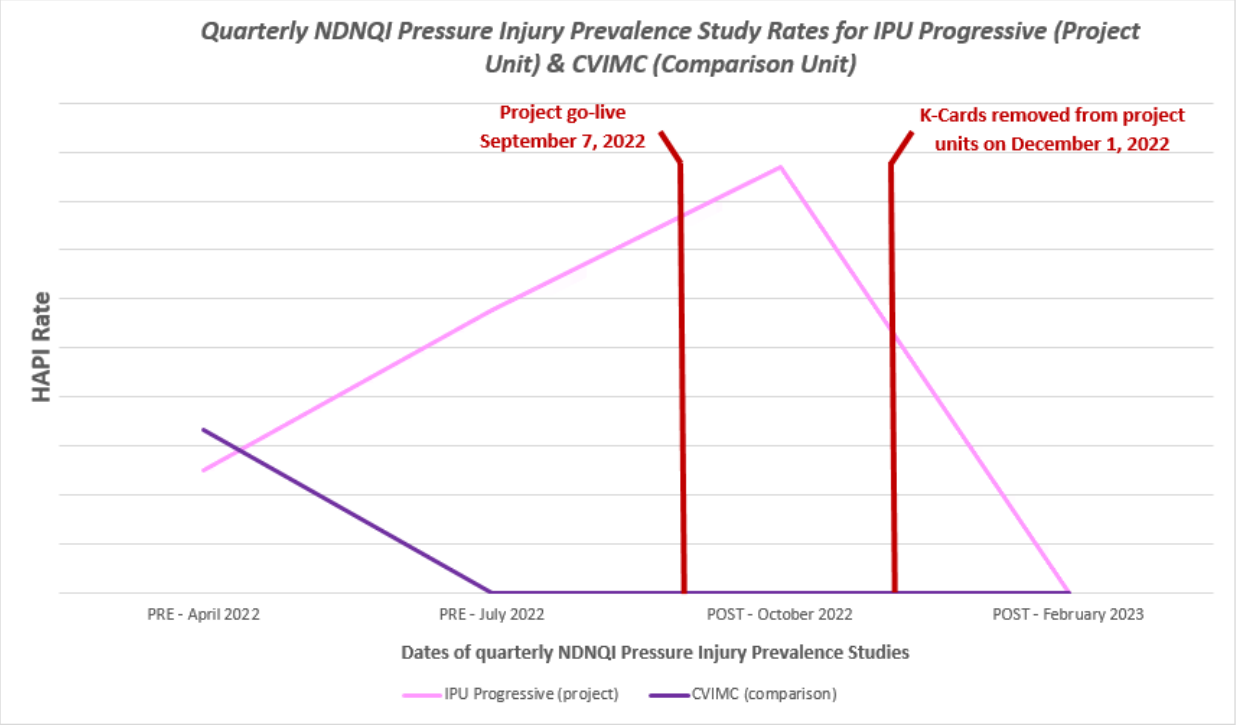
Patients with HAPIs identified during the July 2022 and October 2022 Pressure Injury Prevalence Studies were included in the HAPI frequency counts, as these studies were conducted during the pre-and post-implementation timeframes. The project lead analyzed the results of the two pre-implementation and the two post-implementation studies to identify any trends or relationships between the weekly frequency counts and the rates calculated from the prevalence studies. Exact values (rates) from the prevalence studies cannot be written for publication due to restrictions of Press Ganey (C. Potter, personal communication, July 1, 2022).

At the end of 2021, IPU Progressive's rate was well over the NDNQI mean (goal) and was still above goal as of third quarter 2022. The IPU Progressive rate was lowest during the first

2022 prevalence study (April 2022), then increased during the subsequent prevalence study (July 2022, pre-data), and increased further during the first post-implementation prevalence study (October 2022). However, IPU Progressive's rate decreased to zero in the first post-project prevalence study conducted in February 2023, over two months after the K-Cards removed from the project units on December 1, 2022. CVIMC's rate was highest during the first 2022 study (April 2022, pre-data) and fell to zero in July 2022, October 2022, and February 2023. Frequency counts during the April 2022 and February 2023 prevalence studies were not included in the final frequency counts, as these studies occurred before and after the pre-and post-implementation data collection timeframes. See Figure 3 for a run chart comparing IPU Progressive and CVIMC's HAPI rates during the NDNQI Pressure Injury Prevalence Studies. It is important to note that prevalence studies are conducted in one day each time, providing a snapshot of HAPI rates on a unit.

Figure 3

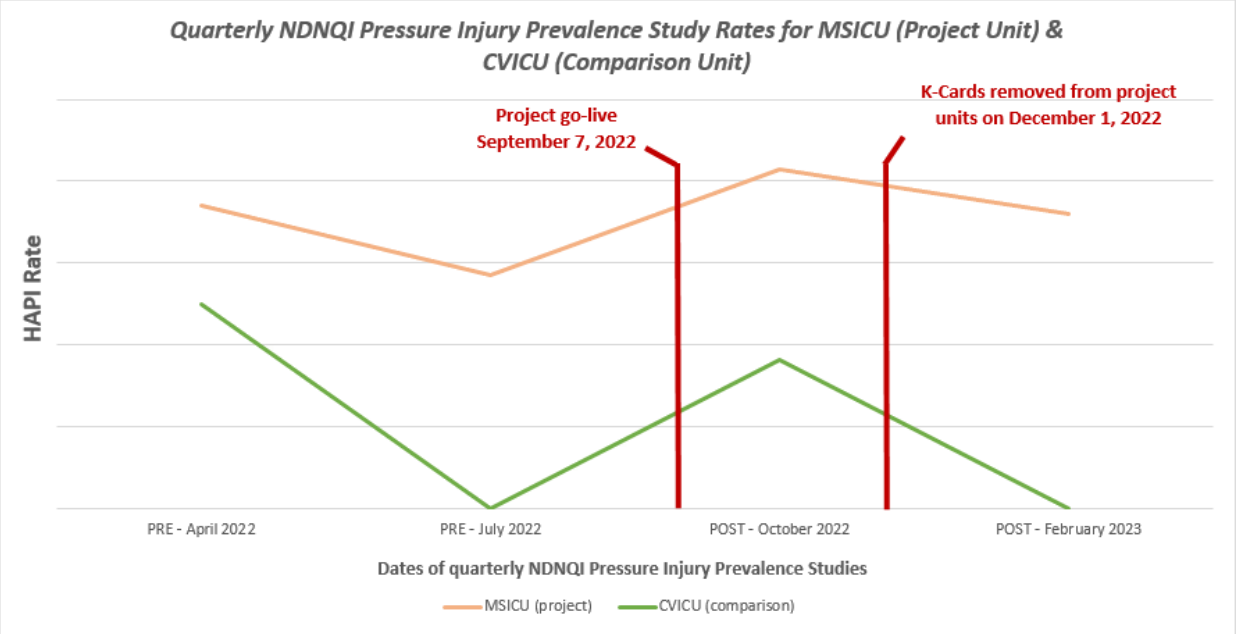
IPU Progressive and CVIMC HAPI Rates during Quarterly Prevalence Studies



MSICU's prevalence study rates were also well above the NDNQI mean at the end of 2021. Interestingly, both MSICU's and CVICU's HAPI rates decreased in July 2022 compared to April 2022, but then both units increased again in October 2022 and decreased again in February 2023. The K-Cards were also removed from MSICU on December 1, 2022. Of the four prevalence studies, MSICU's rate was highest in October 2022, during the K-Card project, whereas CVICU's rate was highest in April 2022. Frequency counts during the April 2022 and February 2023 prevalence studies were not included in the final frequency counts for this project, as these studies occurred before and after the pre-and post-implementation data collection timeframes. It is again important to note that prevalence studies are conducted in one day each time, providing a snapshot of HAPI rates on a unit. See Figure 4 for a run chart comparing MSICU and CVICU's HAPI rates during the Pressure Injury Prevalence Studies.

Figure 4

MSICU and CVICU HAPI Rates during Quarterly Prevalence Studies



4.3 Results of Compliance Audits

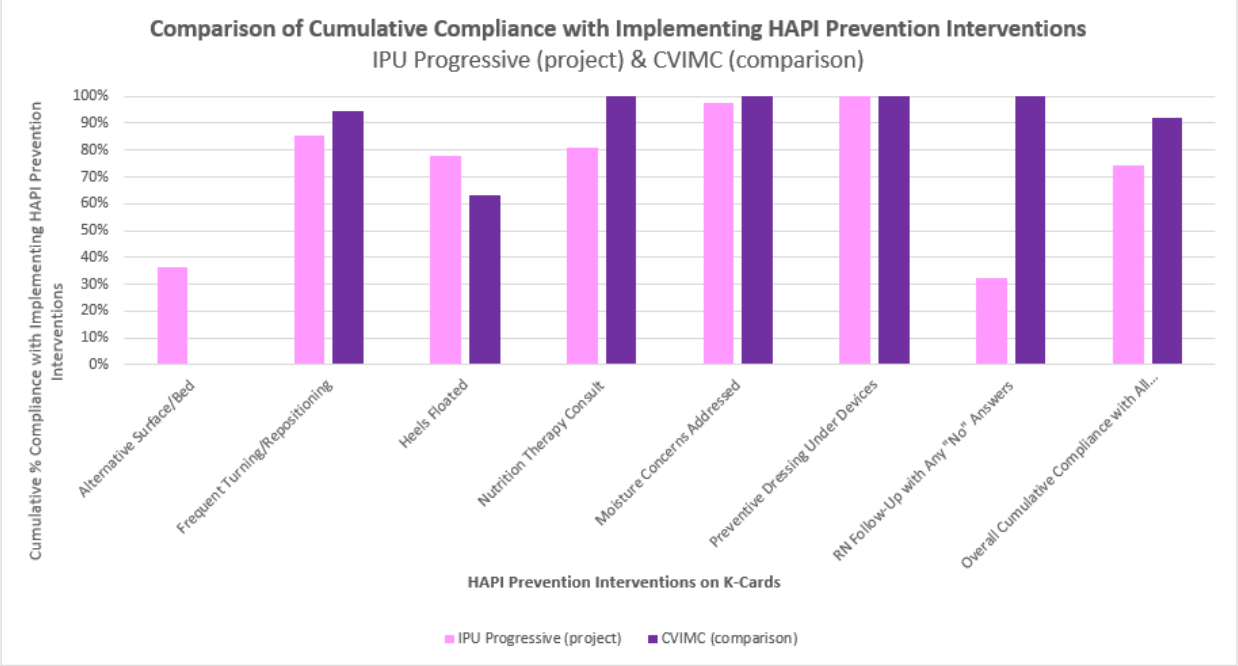
To assess the nurses' compliance with utilizing the K-Cards and implementing patient-appropriate HAPI prevention interventions, auditors trained by the project lead completed five random audits per unit per week during the 12-week implementation timeframe. The audits were completed on a pen-and-paper tool, then submitted to the project lead for monitoring and tracking. These audits were completed on both the project units and the comparison units. No pre-data is available for comparison, as this data was not captured before the K-Card project implementation. The data was tracked each week, but cumulative results for each unit have been visually represented via bar graphs.

When comparing IPU Progressive (project unit) and CVIMC (comparison unit), CVIMC had better compliance (92.2%) with implementing HAPI interventions than IPU Progressive (74.1%) even though they did not use K-Cards. IPU Progressive did better at floating heels than

CVIMC, although the two HAPIs that IPU Progressive developed during post-implementation both involved the heels. CVIMC submitted erroneous data for the alternative surface/bed data point, as the auditor did not realize that the hospital beds on CVIMC come equipped with surfaces and features that promote HAPI reduction. They should have been at 100% compliance for this metric. Interestingly, the auditor on IPU Progressive only followed up with the nurses about patients with "No" answers 32% of the time, whereas CVIMC's auditor followed up 100% of the time. This could be one reason IPU Progressive's compliance data was not as high as CVIMC's. It is also interesting to note that while CVIMC had increased compliance with implementing most of the HAPI interventions, they did not use K-Cards and developed more HAPIs (2) during the post-implementation timeframe. See Figure 5 for a bar chart comparing IPU Progressive and CVIMC's compliance with HAPI prevention interventions.

Figure 5

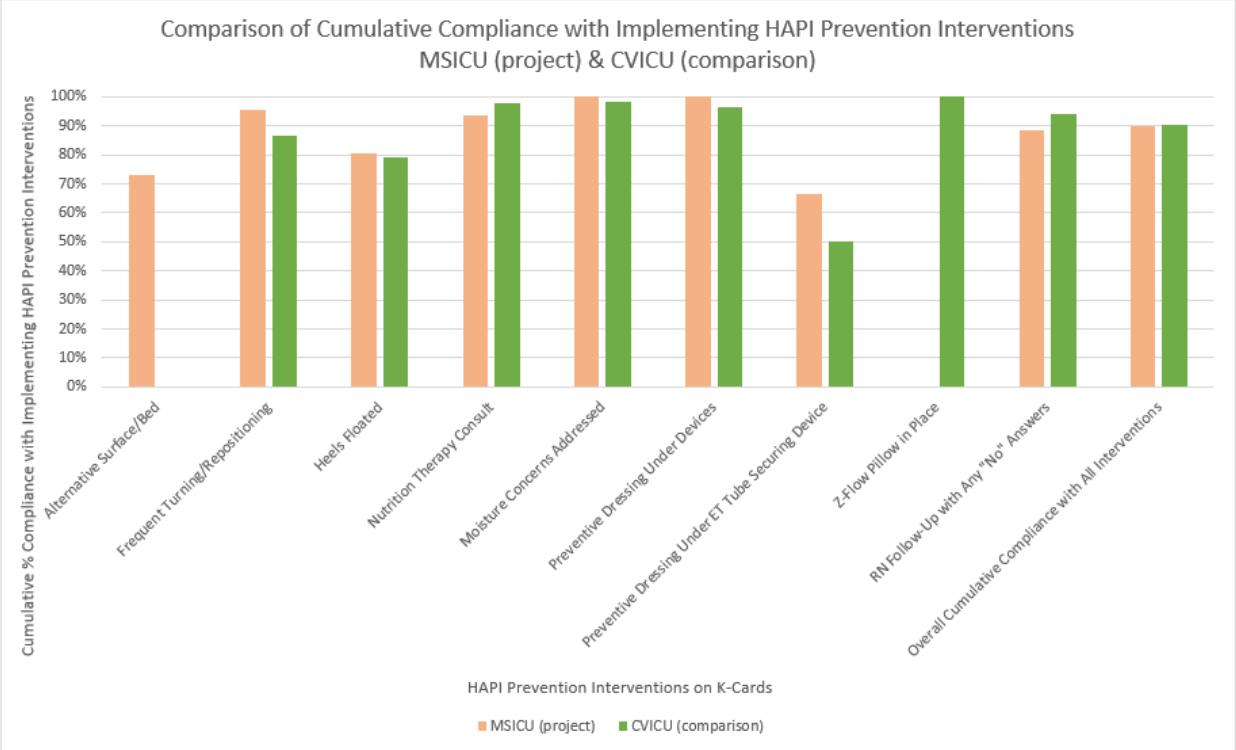
Comparison of IPU Progressive and CVIMC HAPI Intervention Compliance



Overall compliance was 89.8% on MSICU (project unit) and 90.4% on CVICU (comparison unit). When comparing MSICU and CVICU's compliance with the specific interventions, MSICU outperformed CVICU in five of ten categories, tied CVICU in one category, and did worse than CVICU in two categories (obtaining a nutrition therapy consult and following up with nurses having "No" answers). MSICU did not have any patients who were placed in the prone position, so using a Z-Flow pillow did not apply to them. The alternative surface/bed data is not accurate, as there was some confusion amongst the auditors regarding what counted as an alternative surface/bed. See Figure 6 for a bar chart comparing MSICU and CVICU's compliance with HAPI prevention interventions.

Figure 6

Comparison of MSICU and CVICU HAPI Intervention Compliance



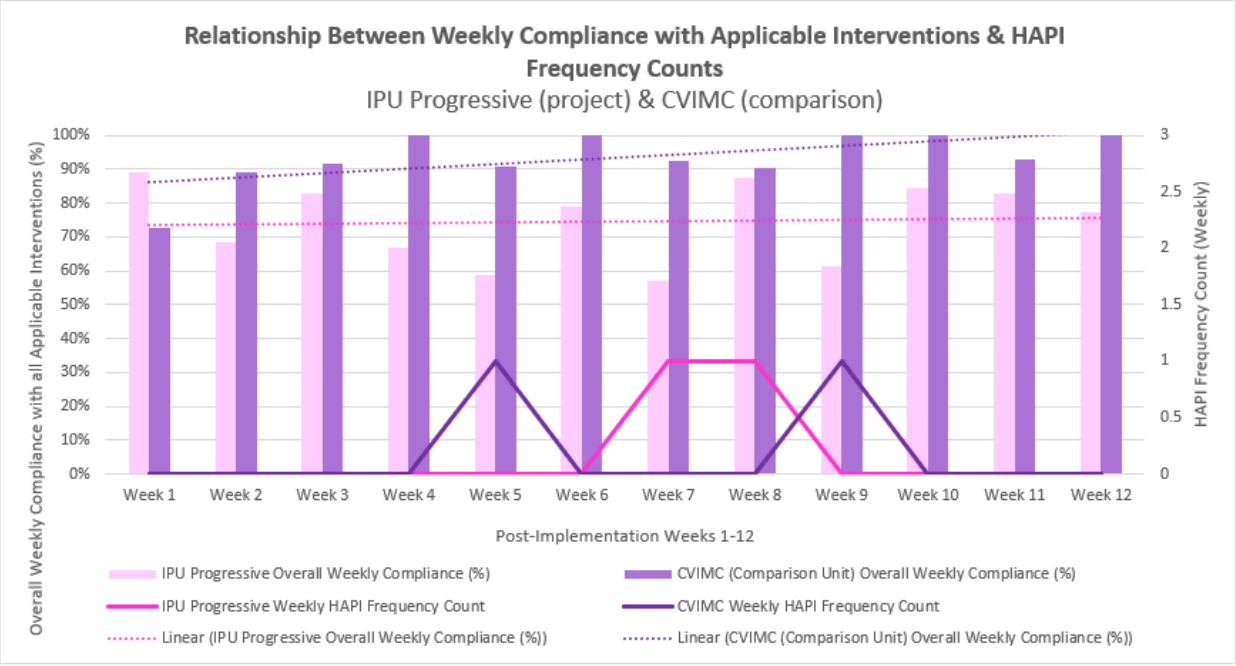
The project lead then created a special combination graph to visualize weekly overall HAPI intervention compliance compared with the weekly frequency counts during the 12-week

K-Card implementation timeframe. A trendline was added for each unit to determine if each unit improved or worsened in HAPI intervention compliance from week to week.

IPU Progressive (project unit) remained stable in compliance from week to week, per the trend line on the graph. IPU Progressive also developed two HAPIs after three weeks of progressively worsening compliance, followed by just one week of improved compliance. CVIMC improved in their intervention compliance from week to week as per the trendline, and their HAPIs also developed after a period of decreased HAPI intervention compliance. See Figure 7 for a chart displaying the relationship between weekly HAPI intervention compliance and HAPI frequency counts on IPU Progressive and CVIMC.

Figure 7

Relationship Between Weekly HAPI Intervention Compliance and HAPI Frequency Counts on IPU Progressive and CVIMC

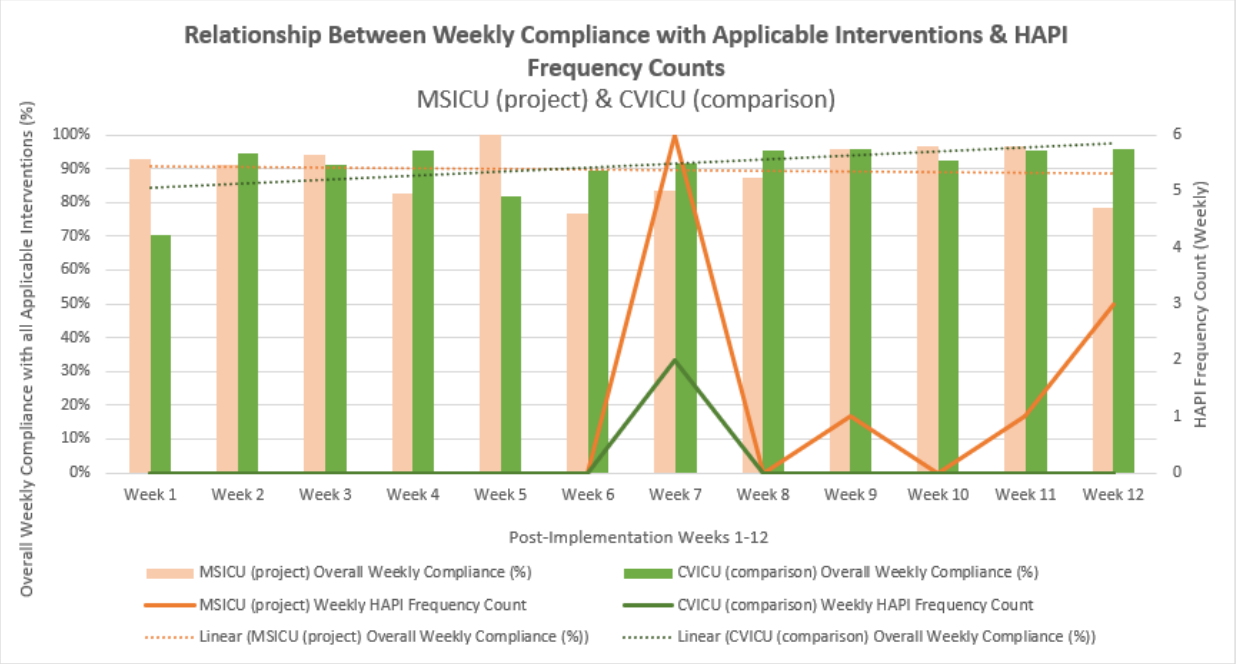


Per the trend line on the MSICU and CVICU's combination graph, MSICU (project unit) decreased slightly in their overall HAPI intervention compliance from week to week, whereas

CVICU (comparison unit) increased compliance. MSICU identified most of their HAPIs during week seven, the week of the October 2022 NDNQI Pressure Injury Prevalence Study. There were a few weeks of poor compliance before week seven, but no trend was established. See Figure 8 for a chart displaying the relationship between weekly HAPI intervention compliance and HAPI frequency counts on MSICU and CVICU.

Figure 8

Relationship Between Weekly HAPI Intervention Compliance and HAPI Frequency Counts on MSICU and CVICU



4.4 Staff Feedback Survey

All RNs and LPNs employed on the two project units during the 12-week implementation timeframe were included in the education and K-Card project. They were also eligible to complete the post-implementation staff feedback survey. In addition to regularly employed nurses, travel nurses were also included in the project and post-implementation survey.

A brief six-question staff feedback survey was offered for two weeks after the K-Card project ended (Appendix I). The survey was electronic, voluntary, and did not collect personal or identifying data except for the unit the respondent worked on for comparison purposes. The survey was open from December 1, 2022 until December 14, 2022. A flyer was sent via email along with the project information sheet to the RNs and LPNs on MSICU and IPU Progressive on December 1, 2022. Copies of the flyer (Appendix J) and IRB-required project information sheet, which served as a consent form for the project lead to use the responses in the project analysis (Appendix K), were also posted on the units. A QR Code and an active link were available on the flyer for convenient access to the survey to help promote responsiveness. The project lead sent a reminder email after the first week ended. The unit manager, educator, and charge nurses reminded the nurses to complete the survey during staff huddles at shift change. The unit educator also placed reminders in the unit's weekly update newsletter. A total of 16 nurses took the survey, nine from MSICU (7% response rate, N=124) and seven from IPU Progressive (22% response rate, N=32).

The first survey question asked the respondents to identify whether they worked on IPU Progressive or MSICU. Questions two through five asked specific questions about the K-Card process using a five-point Likert Scale with answers ranging from 1 = Strongly Disagree to 5 = Strongly Agree. Mean scores on these four items demonstrated that the nurses who completed the survey had neutral perceptions of K-Cards and the project, with mean scores ranging from 2.4 to 2.8. The last Likert Scale question, which asked if the K-Card process was beneficial and should be spread to other units, had a slightly lower mean and higher standard deviation than the other three questions. There were more Strongly Disagree responses to this question than any of

the other questions. See Table 5 for a summary of Likert Scale responses to the post-intervention feedback survey.

Table 5

Summary of Likert Scale Responses to Post-Intervention Feedback Survey

Responses About the K-Card Project	Mean, Standard Deviation, and Range
K-Cards increased knowledge about HAPI prevention practices/care bundles	*M* = 2.8, *SD* = 1.5 1-5 (range)
K-Cards as visual cues helped to prioritize HAPI prevention	*M* = 2.7, *SD* = 1.5 1-5 (range)
Process was easy to follow and did not significantly increase workload	*M* = 2.7, *SD* = 1.5 1-5 (range)
K-Card process was beneficial and should be spread to other units	*M* = 2.4, *SD* = 1.6 1-5 (range)

The final question was open-ended and asked respondents to provide any additional feedback about the project they would like to share. Question six was optional, but seven nurses (44% of the respondents) did provide additional comments. Four of the seven nurses who left comments were from MSICU (57% of the comments left), and the other three were from IPU Progressive (43% of the comments left). A content analysis was performed, and two overarching themes were identified: barriers to use and recommendations for improvement. See Table 6 for the results of the content analysis performed on the comments provided in the post-intervention staff feedback survey.

Table 6

Content Analysis of Post-Intervention Staff Feedback Survey Comments

Barriers to Use	Recommendations for Improvement
• ICU nurses already know HAPI prevention interventions, not helpful in critical care • Most of the staff did not pay attention to the K-Cards • Too much additional work for a busy unit • The steps did not fit in with the nurses' workflow	• Computerized checklists would be helpful • Make the K-Cards larger • Frequent check-ins by project lead desired • Frontline nurse review of process is important

CHAPTER 5: SIGNIFICANCE AND IMPLICATIONS

Because HAPIs negatively reflect upon nursing care, can lead to increased patient suffering, and are costly for healthcare facilities, the aim of this QI project was to examine whether K-Cards with nursing-specific HAPI prevention interventions could help decrease HAPI frequency counts on two adult inpatient units with increased HAPI rates in 2021.

5.1 Discussion and Interpretation of Results

Analysis of the final project results revealed a decrease in HAPI frequency counts on MSICU and IPU Progressive at the end of the post-implementation timeframe (15% and 66% reductions, respectively). The two comparison units, CVICU and CVIMC, experienced an increase in HAPI frequency counts or no change (0% and 200% increases, respectively). It is important to note that both project units (IPU Progressive and MSICU) experienced decreases in their HAPI frequency counts, and both comparison units (CVIMC and CVICU) experienced an increase or no change in their HAPI frequency counts, despite the project units being twice the size of the comparison units (IPU Progressive has 28 beds compared to CVIMC with 16 beds, and MSICU has 35 beds compared to CVICU with 14 beds). In addition to bed size differences, the project-comparison unit pairs also differed with respect to patient population characteristics such as disease process, length of stay, use of invasive tubes, medication infusions, and procedures allowed. These differences may have contributed to higher baseline HAPI rates on the project units. It is encouraging that HAPI frequency counts declined on both project units post-implementation. Another potential related factor was that the nurse compliance auditor on IPU Progressive did not follow up with the nurses with any “No” responses in their audits. This could indicate a heightened emphasis on HAPI prevention communication efforts in the comparison units. While the project results demonstrated HAPI reductions with the use of K-

Cards, the K-Cards cannot be identified as the definitive reason for these reductions, as HAPI prevention work was an ongoing focus on all of the project and comparison units.

The project findings aligned with the results of the project lead's initial literature review. Only two articles were located during the review where K-Cards were used to decrease HAPIs. In one article, the authors successfully decreased HAPIs (specifically deep tissue pressure injuries) during a project focused on a pediatric population (Fuller et al., 2021). Salinas et al. (2021) successfully decreased HAPI rates in an adult thoracic and cardiovascular surgery unit after implementing K-Cards populated with best practices in HAPI prevention. This current project helps to address the limited literature on K-Cards for HAPI prevention, and project findings indicate that more evaluation of K-Cards for adult HAPIs is needed.

Two articles in the literature review indicated that care bundles were effective at preventing HAPIs (Amon et al., 2019; Rivera et al., 2020). These results align with the positive outcomes of this K-Card project, as the K-Cards served as visual cues and reminders to the nurses about HAPI prevention interventions. Additionally, several K-Card projects found in the literature revealed success with using K-Cards to prevent other NSIs, such as CAUTIs and CLABSIs (Frith et al., 2019; Gould et al., 2018; Kamity et al., 2021; Ormsby et al., 2020; Salinas et al., 2021; Shea et al., 2019; Stewart, 2021). Pieces of the K-Card project aligned with evidence found in the literature, including K-Cards, care bundles, and reducing NSIs. Considering the results of the K-Card project and the identified gaps in the nursing literature, K-Cards appear to be a promising HAPI reduction strategy warranting further exploration.

Several articles found during the literature review addressed bundle compliance monitoring. A few articles described setting goals for and monitoring bundle compliance, yet did not report bundle compliance rates (Rivera et al., 2020; Salinas et al., 2021). They only reported

outcome measures, such as HAPI rates (Rivera et al., 2020; Salinas et al., 2021). Authors in other projects monitored and reported NSI prevention bundle component compliance, and results in all articles showed improvement in compliance with implementing bundle components (Frith et al., 2019; Kamity et al., 2021; Ormsby et al., 2020; Stewart, 2021). While the weekly compliance audits in this project did not reveal a noticeable incremental improvement in bundle component compliance on the project units or the comparison units, trend lines added to the graphs by the project lead indicate trends in improvement on CVIMC and CVICU, the two comparison units, where HAPI frequency counts increased or did not change (respectively) from pre-implementation to post-implementation. These results could indicate inconsistencies or inaccuracies in the completion and/or results of the compliance audits. Another explanation could be related to whether the unit compliance auditors followed up with the nurses when any deficiencies were noted. The overall follow-up compliance was higher on the two comparison units, CVIMC and CVICU, and lower on the two project units, IPU Progressive and MSICU (respectively). This could indicate that reinforcing HAPI prevention interventions with the nurses from week to week led to slight improvements in compliance.

The interesting results of the NDNQI Pressure Injury Prevalence Studies, used as an additional HAPI frequency count data source for the K-Card project, also warrant further exploration. The results and trends of the quarterly studies (each study is a one-day assessment) did not align with or match the frequency counts that were collected ongoing. While IPU Progressive's (project unit) frequency counts decreased during the project implementation, their prevalence study rate increased from the July 2022 to October 2022 studies, then decreased slightly in the February 2023 study, after the K-Cards were removed from the project units on December 1, 2022. Conversely, CVIMC (IPU Progressive's comparison unit) experienced a

200% increase in their HAPI frequency counts, yet their prevalence study rate decreased from the July 2022 to October 2022 studies and remained at zero during the February 2023 prevalence study, and this unit did not implement K-Cards. MSICU (project unit) and CVICU (comparison unit) both experienced an increase in their prevalence study rates between the July 2022 and October 2022 studies, and then both experienced a decrease in the February 2023 prevalence study. However, MSICU's frequency counts decreased, and CVICU's stayed the same during the K-Card project. While the frequency counts are truly raw number frequencies, the prevalence study rates are calculated results based upon numerators and denominators derived from the number of HAPIs found on the day of the study versus the number of patients assessed. The mismatch between HAPI frequency counts and prevalence study rates indicates that it may be beneficial to compare frequency counts and prevalence study rates over a longer timeframe to determine how the two metrics are associated and perhaps to ascertain which measurement is most beneficial for conducting and evaluating HAPI reduction interventions. The mismatch also supports continuing nursing education on HAPIs as the nurses who assess patients for the prevalence studies receive special training and were able to detect HAPIs that were not previously reported in daily nursing care (i.e., the non-prevalence study source of frequency count data.

Various patient-level variables were abstracted on all patients who developed a HAPI while on a project or comparison unit during the pre-and post-implementation timeframes to help identify trends and determine where to focus additional HAPI prevention interventions. The variables were decided upon during the initial project planning stages, which fell during the midst of the COVID-19 pandemic and corresponding surges. For this project, the following variables were abstracted and trended: patient age (in years), gender, length of stay (in days),

whether the patient had COVID-19, was intubated, placed in the prone position, or on vasopressors, and the stage and body location of the HAPI.

The patients developing HAPIs on IPU Progressive (project unit) and CVIMC (comparison unit) were older than MSICU (project unit) patients with longer lengths of stay. This speaks to the severity of illness found in patients on MSICU and CVICU and how the trajectory of illness and body systems working together impact the skin. The literature seems to support this finding, as patients who are in critical care areas are at increased risk for developing HAPIs for a variety of reasons, including receiving mechanical ventilation and vasopressor medications (Cox et al., 2022), limited mobility, and impaired perfusion (Alderden et al., 2017). There was a definite decrease in the number of patients with COVID-19 who had been placed in the prone position, which aligns with the timeframe in which the project took place. By the time the K-Cards were implemented, the project facility was no longer experiencing a COVID-19 surge, and very few COVID-19-positive patients were admitted to the hospital.

The body locations of HAPIs appeared to be more streamlined in the post-implementation timeframe. IPU Progressive (project unit) went from having HAPIs in four different body locations pre-implementation (heels, sacrum/coccyx, back, and ears), to only one body location (heels) post-implementation. This finding is supported by IPU Progressive's overall compliance with floating heels during the 12-week post-implementation timeframe which was only 77.8%. MSICU (project unit) also went from experiencing HAPIs in eight body locations pre-implementation to two body locations post-implementation; however, the MSICU and CVICU (comparison unit) experienced a trend in the later weeks of post-implementation that had not been experienced previously. During weeks 7-12 of the post-implementation timeframe, patients in MSICU and CVICU began developing HAPIs related to endotracheal tubes and their

securement devices. Bundle compliance data obtained in the weekly audits support the trend with HAPIs under endotracheal tube securement devices, as MSICU's overall compliance with this intervention was only 66.7%, and CVICU's overall compliance was only 50%. No data was available for comparison related to repositioning endotracheal tubes to relieve pressure, as this intervention was not addressed on MSICU's or CVICU's K-Cards. It is noted that respiratory therapists care for endotracheal tubes at the project facility, but they were not included in the K-Card project planning or implementation. This indicates that interprofessional training and K-Card revisions are warranted.

In analyzing each of the patient variables collected, it seems that IPU Progressive should focus on patients with long lengths of stay, and MSICU should focus HAPI prevention measures on all patients, especially those with medical devices and endotracheal or tracheostomy tubes. Further exploration of other patient-related variables, such as weight, comorbidities, cardiac arrest status, and patient disposition may be beneficial. It may also be valuable to assess whether healthcare providers consider the HAPIs to be avoidable or unavoidable. Current literature suggests that some HAPIs are unavoidable, especially in the critical care setting (Cox & Schallom, 2017; Pittman et al., 2019; Schmitt et al., 2017). Comparing applicable variables on patients who develop HAPIs in the project facility with variables associated with unavoidable pressure injuries in the literature and combining those results with our HAPI prevention intervention data could help add to or refute the current evidence suggesting HAPIs may be unavoidable.

In reflecting upon the results of the staff feedback survey, the K-Card project was overall not well-received by the nurses on the project units. One reason may be the timing of the project. The project was implemented on September 7, 2022, and a required education module was

available during the two weeks prior. The facility had converted to a new electronic health record on August 6, 2022, just before the project began. This conversion required a tremendous amount of training and education and was a source of frustration among the staff. Additionally, the two project units had an unusually high number of travel nurses during and immediately after the COVID-19 pandemic. Difficulties during COVID-19 caused full-time nurses at the project facility to leave the hospital for non-patient-facing positions, or to become travel nurses due to the escalated pay rates. Unfortunately, some left nursing altogether due to burnout and post-traumatic stress disorder associated with the pandemic. The facility was forced to fill the vacant positions with travel nurses to continue to meet patient care needs and staffing ratios. Leadership at the project facility frequently hears complaints from the nursing staff that they are being asked to do too much and that tasks are added to their workload, but none are taken away. This may have contributed to the lack of buy-in to the overall project from the nurses and the low response rates to the follow-up survey, as only 16 nurses from both project units took the follow-up survey. The low survey response rate could be related to survey fatigue, as one study found that nurses were asked to complete more surveys during the pandemic, leading to low response rates and weaker data quality (de Koning et al., 2021). Due to the low response rates, survey findings should be interpreted with caution. While project continuance should consider the survey results, further assessment of nursing staff perceptions and recommendations is needed.

In retrospect and based on some of the feedback provided in the survey, the project lead would attempt to improve the K-Card process in coordination with the staff nurses using the Plan-Do-Study-Act (PDSA) model for improvement (IHI, n.d.). Attending unit-based staff meetings or shared governance council meetings to obtain feedback on the process and suggestions for improvement may improve the likelihood that the nurses would more readily

receive and embrace the process. It would be beneficial to review the themes and suggestions for improvement the nurses provided in the post-implementation survey. For example, one theme indicated that critical care nurses already know the HAPI prevention interventions, yet they had the highest number of HAPIs, and their overall compliance was low in some areas such as with the endotracheal tube securement devices (66.7% and 50% compliance). However, increased HAPI rates in critical care are evident in the literature due to the severity of illness and other risk factors (Pittman et al., 2019; Richardson et al., 2017; The Joint Commission, 2022). This information helps support the notion that some HAPIs may genuinely be unavoidable. Another strategy that may help improve compliance with the nurses is identifying knowledge gaps versus system failures. Knowledge gaps require education interventions to improve, whereas system failures require process revisions. It is difficult to ascertain whether the issues with K-Card compliance were due to knowledge gaps or system failures. However, the assistant vice president of MSICU and CVICU shared with the project lead that, while the project was not well-received by the nurses overall, she noticed an increased awareness of HAPIs and the importance of preventing them on the units. The MSICU unit went on to create a “wound cart” so that HAPI prevention and wound care items would be more accessible to the nurses. This further supports the clinical significance of the project and indicates that the nursing staff may be more receptive to HAPI-prevention K-Cards if the PDSA cycle is applied, starting with gaining buy-in.

5.2 Limitations and Recommendations

The project lead identified several limitations with the K-Card project. One limitation was the short implementation timeframe. Similar projects in the literature typically lasted for one year or more (Amon et al., 2019; Fuller et al., 2021; Kamity et al., 2021; Ormsby et al., 2020; Salinas et al., 2021). This project operated within the confines of the school program’s timeline

and was based on IRB approval. Twelve weeks pre-and post-implementation may not have been enough time to reach all the nurses, achieve buy-in, change practice, enculturate the new process, and improve upon the process. However, the data results fulfill the Plan-Do-Study portions of PDSA, and Act will be supported by utilizing the survey, compliance, and frequency count findings. Further projects would benefit from longer implementation timeframes.

Competing priorities at the project facility was another limitation as the hospital implemented a new electronic health record (EHR) on August 6, 2022. All nurses had been required to complete multiple hours of in-person and online training classes to prepare for the new EHR during June 2022 and July 2022. The K-Card education module was disseminated to the nurses on the project units on August 23, 2022, two weeks after the EHR transition, and the K-Card project went live two weeks later, on September 7, 2022. The new EHR was a significant change for the facility that required a great deal of time and effort from the nurses. Additionally, the nurses were still adapting to the new documentation system at the same time they were asked to implement a new process (the K-Cards). Should the project be repeated, crafting a timeline that avoids any major changes already impacting the bedside nurses taking place in the project would be favorable.

Staffing challenges during COVID-19 led to an increased number of travel or temporary nurses working on both project units. Anecdotally, per the project lead's ten years of experience as a clinical nurse educator, travel nurses understand, and sometimes prefer, their transient status on a nursing unit, as it allows them to not get involved in unit happenings and initiatives. Knowing they will only be working on a particular unit for a short time can create a challenge for gaining project buy-in from travel nurses and in getting them to comply with unit or facility requirements. There are units at the project facility that employ a lower number of travel nurses.

Recommendations for further projects would include implementing the K-Cards on units with more stable full-time staff and fewer travel nurses to help alleviate any lack of buy-in and compliance that can be affiliated with temporary staff.

The project lead occupied a facility-level position during the K-Card project and was not embedded in either of the project units during implementation. The limited amount of time the project lead had to observe the nurses completing the process, remind nurses about the process, perform follow-ups, offer encouragement, and help hold patients accountable may have contributed to the lack of buy-in from the project unit nurses. The compliance auditors, the IPU Progressive nurse manager, and the MSICU unit educator and nurse manager assisted the project lead in reminding the staff about completing the education module and utilizing the K-Cards. Recommendations for future projects include recruiting non-managerial staff nurses to assist with championing the project. Additionally, it may help for the project lead to develop closer relationships with the staff on the identified project units by attending more start-of-shift huddles, staff meetings, and unit-based shared governance meetings before beginning the project. Including the staff in as much of the planning process as possible could help the nurses embrace the project more.

The random weekly compliance audits were not conducted by the project lead, but by four trained auditors who were embedded in the units. This could have caused interrater reliability issues and impacted the audit results. Additionally, the auditor on IPU Progressive (project unit) did minimal follow-up with the nurses who were not compliant with implementing HAPI prevention interventions on the K-Cards (32.14% follow-up compliance). This could have prohibited the IPU Progressive nurses from learning more about the project, clearing up any questions or misconceptions, or developing a sense of accountability in participating in the

project. The project lead did not conduct any quality assurance tests on the audit results. Future recommendations include the project lead performing the compliance audits personally or conducting periodic quality assurance tests on the audit results.

Another limitation that led to a sudden increase in HAPIs in MSICU (project unit) and CVICU (comparison unit) during the last few weeks of the project implementation involved a trend in medical device-related HAPIs due to pressure from endotracheal tubes and their securement devices. The HAPI prevention interventions listed on the K-Cards did not specifically address repositioning endotracheal tubes, and additionally, respiratory therapists manage and reposition endotracheal tubes at the project facility. However, respiratory therapists were not included in the K-Card project. Future recommendations would include revising the K-Cards to be more inclusive of HAPI prevention interventions, including information about repositioning endotracheal tubes, and involving all applicable key stakeholders in the K-Card revisions and planning process. In project planning discussions, it would be advantageous to include respiratory therapy and any other interprofessional partners that contribute to HAPI prevention efforts, such as physical therapists to assist with mobility concerns or clinical dieticians to assist with nutrition concerns. Certified nursing assistants, who perform many HAPI prevention tasks, such as turning and repositioning patients, helping with feeding, and keeping skin clean and dry with bathing and incontinence care, should also be included in the project planning. They, too, were not educated on this K-Card project or audited for compliance with the HAPI prevention interventions that fall into their scope of practice.

One final limitation to address is the lack of available literature that addresses utilizing K-Cards to prevent HAPIs in adult populations. Much of the evidence surrounding K-Cards involves pediatric populations and prevention of other NSIs such as CLABSI and CAUTI. It may

benefit the facility to implement K-Cards in the adult population with a CLABSI or CAUTI focus instead of HAPIs. CLABSI and CAUTI prevention efforts are typically more focused – the patients are easier to identify by the presence of a urinary catheter or central line, care and maintenance procedures are standardized for all patients, and clear inclusion and exclusion criteria exist. HAPI prevention is more subjective and is based on risk factor identification. Starting with successful use of CLABSI or CAUTI K-Cards with adult patients could prepare nurses to then better implement K-Cards for the more complicated process of HAPI prevention. See Table 7 for a summary of the identified project limitations and recommendations.

Table 7

Summary of the Identified Project Limitations and Recommendations

Limitations	Recommendations
Short implementation timeframe (12 weeks)	Longer implementation timeframe with future projects
Competing priorities at the project site	Develop a timeline sensitive to major changes impacting bedside staff at the project site
Staffing challenges and increased travel nurses on the project units	Select project units with more stable staffing and fewer numbers of travel nurses
Project lead held a facility-level position and was not embedded on either of the project units	Recruit non-managerial staff to be project champions and develop closer relationships with staff on project units
Weekly compliance audits were completed by unit auditors and the project lead did not conduct quality assurance audits	Project lead to perform random audits or conduct periodic quality assurance testing to ensure accuracy of results
Trend in medical device-related HAPIs due to pressure from endotracheal tubes and their securement devices on MSICU and CVICU	Revise HAPI prevention interventions on K-Cards and include all key stakeholders (i.e. respiratory therapists and nursing assistants) in project planning activities
Lack of available literature that addresses utilizing K-Cards to prevent HAPIs in adult populations	Attempt K-Card implementation in adult patients with other NSIs (ex. CAUTI or CLABSI)

5.3 Summary

It has been established that HAPIs cause significant adverse impacts to patients and hospitals and should be prevented whenever possible. K-Cards and care bundles are evidence-based and effective in decreasing or preventing NSIs, but planning and implementing nursing-focused projects in the post-pandemic climate takes patience and collaboration. All key stakeholders who contribute to HAPI prevention practices and the nurses working on identified project units must be included in planning the project to contribute to its success. This project showed potential for utilizing K-Cards to decrease HAPIs, which was a noted gap in the literature, and provided direction and focus for future HAPI reduction interventions.

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APPENDIX A: MSICU K-CARDS

Hospital-Acquired Pressure Injury (HAPI) Prevention

K-Card: MSICU

During Bedside Shift Report, ensure:

- ❑ Patient is on an alternative surface/bed, if applicable
- ❑ Frequent turning/repositioning for patients who cannot turn/reposition themselves. Document.
- ❑ Float heels completely off bed with pillows under calves if patient cannot turn/reposition self. Document.
- ❑ Nutrition Therapy consulted if patient not eating/drinking
- ❑ Address moisture if patient is incontinent of urine or stool (ex. external catheter, FlexiSeal, moisture barrier cream, absorbent under pad, etc.). Document.
- ❑ Patients with ANY medical devices, especially oxygen masks:
  - Preventive foam dressing is placed under device
  - Rotate/reposition device frequently, if able
  - Assess underneath device(s) with each head-to-toe skin assessment, if able
- ❑ Patients being proned:
  - Preventive foam dressings on face under ET tube securement device, shoulders, chest, knees
  - Reposition patient q2 hours
  - Utilize Z-Flow Pillow

- All items in compliance = PASS
  - Keep K-Card turned to GREEN side
  - *Thank you for keeping our patients SAFE and HAPI free!*
- 1 or more items missing/not done = DOES NOT PASS
  - Turn card to RED side
  - Follow directions in RED at bottom

Hospital-Acquired Pressure Injury (HAPI) Prevention

K-Card: MSICU

During Bedside Shift Report, ensure:

- ❑ Patient is on an alternative surface/bed, if applicable
- ❑ Frequent turning/repositioning for patients who cannot turn/reposition themselves. Document.
- ❑ Float heels completely off bed with pillows under calves if patient cannot turn/reposition self. Document
- ❑ Nutrition Therapy consulted if patient not eating/drinking
- ❑ Address moisture if patient is incontinent of urine or stool (ex. external catheter, FlexiSeal, moisture barrier cream, absorbent under pad, etc.). Document.
- ❑ Patients with ANY medical devices, especially oxygen masks:
  - Preventive foam dressing is placed under device
  - Rotate/reposition device frequently, if able
  - Assess underneath device(s) with each head-to-toe skin assessment, if able
- ❑ Patients being proned:
  - Preventive foam dressings on face under ET tube securement device, shoulders, chest, knees
  - Reposition patient q2 hours
  - Utilize Z-Flow Pillow

- Mark items needing follow-up with dry erase marker
- Keep card turned to RED
- Address non-compliant items ASAP
- Turn card back to GREEN once non-compliant items are addressed

APPENDIX B: IPU PROGRESSIVE K-CARDS

Hospital-Acquired Pressure Injury (HAPI) Prevention

K-Card: IPU Progressive Care

During Bedside Shift Report, ensure:

- ❑ Patient is on an alternative surface/bed, if applicable
- ❑ Frequent turning/repositioning for patients who cannot turn/reposition themselves. Document.
- ❑ Float heels completely off bed with pillows under calves if patient cannot turn/reposition self. Document.
- ❑ Nutrition Therapy Consulted if patient not eating/drinking
- ❑ Address moisture if patient is incontinent of urine or stool (ex. external catheter, FlexiSeal, moisture barrier cream, absorbent under pad, etc.). Document.
- ❑ Patients with ANY medical devices, especially oxygen masks:
  - Preventive foam dressing is placed under device
  - Rotate/reposition device frequently, if able
  - Assess underneath device(s) with each head-to-toe skin assessment, if able

- All items in compliance = PASS
  - Keep K-Card turned to GREEN side
  - *Thank you for keeping our patients SAFE and HAPI free!*

- 1 or more items missing/not done = DOES NOT PASS
  - Turn card to RED side
  - Follow directions in RED at bottom

Hospital-Acquired Pressure Injury (HAPI) Prevention

K-Card: IPU Progressive Care

During Bedside Shift Report, ensure:

- ❑ Patient is on an alternative surface/bed, if applicable
- ❑ Frequent turning/repositioning for patients who cannot turn/reposition themselves. Document.
- ❑ Float heels completely off bed with pillows under calves if patient cannot turn/reposition self. Document.
- ❑ Nutrition Therapy Consulted if patient not eating/drinking
- ❑ Address moisture if patient is incontinent of urine or stool (ex. external catheter, FlexiSeal, moisture barrier cream, absorbent under pad, etc.). Document.
- ❑ Patients with ANY medical devices, especially oxygen masks:
  - Preventive foam dressing is placed under device
  - Rotate/reposition device frequently, if able
  - Assess underneath device(s) with each head-to-toe skin assessment, if able

- Mark items needing follow-up with dry erase marker
- Keep card turned to RED
- Address non-compliant items ASAP
- Turn card back to GREEN once non-compliant items are addressed

APPENDIX C: K-CARD EDUCATION MODULE FLYER

ATTENTION ALL RNs & LPNs ON MSICU & IPU!

You have a short education module to complete!

Contact Sherry Thomas with questions:

Email: sherry.m.thomas@atriumhealth.org

Phone: 704-403-3165 or send a message via Rover

WHAT?

K-Card Project Education Module

WHEN?

Begins Tuesday, 8/23 &

DUE Tuesday 9/6

HOW?

Video with Post-Test

(approx. 12 minutes to complete)

WHY?

To prepare to implement a 12-week Doctor of Nursing Practice (DNP) project focusing on HAPI prevention

TO ACCESS THE EDUCATION MODULE, CLICK HERE OR SCAN THE QR CODE BELOW:

APPENDIX D: EXAMPLE OF PRE-AND POST-IMPLEMENTATION DATA COLLECTION SPREADSHEETS

IPU / Progressive Care PRE-Intervention HAPI Data Collection Spreadsheet										
De-Identified Patient #:	Age	Gender	Room #	Length of Stay (admit to time HAPI identified)	COVID +?	Intubated?	Proned?	Pressors?	HAPI Stage	Location of HAPI

APPENDIX E: MSICU AND IPU PROGRESSIVE AUDITOR K-CARDS

Hospital-Acquired Pressure Injury (HAPI) Prevention

K-Card: MSICU

AUDITOR CARD

Verify in the EMR / Observe Patient:

- ❑ Patient on alternative surface/bed, if applicable
- ❑ Frequent turning/repositioning has been documented (Q2 hours if proned)
- ❑ Heels floated completely off bed with pillows under calves if patient cannot turn/reposition self
- ❑ Nutrition Therapy has been consulted if patient not eating/drinking
- ❑ Moisture concerns related to incontinence have been addressed if applicable (ex. external catheter, FlexiSeal, absorbent under pad, and/or moisture barrier cream documented)

Observe Patient with Any Medical Devices, especially oxygen masks:

- ❑ Preventive foam dressings are underneath all medical devices

Observe on Patient Being Proned:

- ❑ Preventive foam dressing on face under ET tube securement device
- ❑ Z-Flow Pillow in place

- All items in compliance = PASS
  - Provide in-the-moment praise for keeping the patient safe
  - Document results on Audit Form
- 1 or more items missing/not done = DOES NOT PASS
  - Turn card outside door to RED side
  - Mark items needing follow-up with dry erase marker
  - Discuss non-compliant items with RN
  - Document results on Audit Form

Hospital-Acquired Pressure Injury (HAPI) Prevention

K-Card: IPU Progressive Care

AUDITOR CARD

Verify in the EMR / Observe on Patient:

- ❑ Patient is on an alternative surface/bed, if applicable
- ❑ Frequent turning/repositioning has been documented if patient cannot turn/reposition self
- ❑ Heels floated completely off bed with pillows under calves if patient cannot turn/reposition self
- ❑ Nutrition Therapy has been consulted if patient not eating/drinking
- ❑ Moisture concerns related to incontinence have been addressed if applicable (ex. external catheter, FlexiSeal, absorbent under pad, and/or moisture barrier cream documented)

Observe Patient with Any Medical Devices, especially oxygen masks:

- ❑ Preventive foam dressings are underneath all devices

- All items in compliance = PASS
  - Provide in-the-moment praise for keeping the patient safe
  - Document results on Audit Form
- 1 or more items missing/not done = DOES NOT PASS
  - Turn card outside door to RED side
  - Mark items needing follow-up with dry erase marker
  - Discuss non-compliant items with Primary RN
  - Document results on Audit Form

APPENDIX F: MSICU K-CARD AUDITING TOOL

HAPI Prevention K-Card Audit Tool – MSICU

Directions: *Complete five (5) random audits on different patients on MSICU (ICU 2 and/or ICU 3) per week using the MSICU Auditor K-Card between* ***9/6/2022*** *and* ***11/30/2022****. Document results on this form. Submit completed form to Sherry M. Thomas.*

Auditor's Name: _____ **Week Beginning:** _____

Audit #1: Date: _____

- Patient on alternative surface/bed ❑ Yes ❑ No ❑ N/A
- Frequent turning/repositioning has been documented (q2 hrs. if proned) ❑ Yes ❑No ❑ N/A (turns self)
- Heels floated completely off bed with pillows under calves ❑ Yes ❑ No ❑ N/A (turns self)
- Nutrition Therapy has been consulted if patient not eating/drinking ❑ Yes ❑ No ❑ N/A (eating/drinking)
- Moisture concerns have been addressed, as applicable ❑ Yes ❑ No ❑ N/A (continent)
- Preventive foam dressing underneath all medical devices ❑ Yes ❑ No ❑ N/A (no medical devices)
- Preventive foam dressing under ET Tube securement device on proned patient ❑ Yes ❑ No ❑ N/A (not proned)
- Z-Flow Pillow in place on proned patient ❑ Yes ❑ No ❑ N/A (not proned)
- If any No answers, was follow-up provided with primary RN in real time? ❑ Yes ❑ No ❑ N/A (no no's)

Audit #2: Date: _____

- Patient on alternative surface/bed ❑ Yes ❑ No ❑ N/A
- Frequent turning/repositioning has been documented (q2 hrs. if proned) ❑ Yes ❑No ❑ N/A (turns self)
- Heels floated completely off bed with pillows under calves ❑ Yes ❑ No ❑ N/A (turns self)
- Nutrition Therapy has been consulted if patient not eating/drinking ❑ Yes ❑ No ❑ N/A (eating/drinking)
- Moisture concerns have been addressed, as applicable ❑ Yes ❑ No ❑ N/A (continent)
- Preventive foam dressing underneath all medical devices ❑ Yes ❑ No ❑ N/A (no medical devices)
- Preventive foam dressing under ET Tube securement device on proned patient ❑ Yes ❑ No ❑ N/A (not proned)
- Z-Flow Pillow in place on proned patient ❑ Yes ❑ No ❑ N/A (not proned)
- If any No answers, was follow-up provided with primary RN in real time? ❑ Yes ❑ No ❑ N/A (no no's)

HAPI Prevention K-Card Audit Tool – MSICU

Audit #3: Date: _____

- Patient on alternative surface/bed ❑ Yes ❑ No ❑ N/A
- Frequent turning/repositioning has been documented (q2 hrs. if proned) ❑ Yes ❑No ❑ N/A (turns self)
- Heels floated completely off bed with pillows under calves ❑ Yes ❑ No ❑ N/A (turns self)
- Nutrition Therapy has been consulted if patient not eating/drinking ❑ Yes ❑ No ❑ N/A (eating/drinking)
- Moisture concerns have been addressed, as applicable ❑ Yes ❑ No ❑ N/A (continent)
- Preventive foam dressing underneath all medical devices ❑ Yes ❑ No ❑ N/A (no medical devices)
- Preventive foam dressing under ET Tube securement device on proned patient ❑ Yes ❑ No ❑ N/A (not proned)
- Z-Flow Pillow in place on proned patient ❑ Yes ❑ No ❑ N/A (not proned)
- If any No answers, was follow-up provided with primary RN in real time? ❑ Yes ❑ No ❑ N/A (no no's)

Audit #4: Date: _____

- Patient on alternative surface/bed ❑ Yes ❑ No ❑ N/A
- Frequent turning/repositioning has been documented (q2 hrs. if proned) ❑ Yes ❑No ❑ N/A (turns self)
- Heels floated completely off bed with pillows under calves ❑ Yes ❑ No ❑ N/A (turns self)
- Nutrition Therapy has been consulted if patient not eating/drinking ❑ Yes ❑ No ❑ N/A (eating/drinking)
- Moisture concerns have been addressed, as applicable ❑ Yes ❑ No ❑ N/A (continent)
- Preventive foam dressing underneath all medical devices ❑ Yes ❑ No ❑ N/A (no medical devices)
- Preventive foam dressing under ET Tube securement device on proned patient ❑ Yes ❑ No ❑ N/A (not proned)
- Z-Flow Pillow in place on proned patient ❑ Yes ❑ No ❑ N/A (not proned)
- If any No answers, was follow-up provided with primary RN in real time? ❑ Yes ❑ No ❑ N/A (no no's)

Audit #5: Date: _____

- Patient on alternative surface/bed ❑ Yes ❑ No ❑ N/A
- Frequent turning/repositioning has been documented (q2 hrs. if proned) ❑ Yes ❑No ❑ N/A (turns self)
- Heels floated completely off bed with pillows under calves ❑ Yes ❑ No ❑ N/A (turns self)
- Nutrition Therapy has been consulted if patient not eating/drinking ❑ Yes ❑ No ❑ N/A (eating/drinking)
- Moisture concerns have been addressed, as applicable ❑ Yes ❑ No ❑ N/A (continent)
- Preventive foam dressing underneath all medical devices ❑ Yes ❑ No ❑ N/A (no medical devices)
- Preventive foam dressing under ET Tube securement device on proned patient ❑ Yes ❑ No ❑ N/A (not proned)
- Z-Flow Pillow in place on proned patient ❑ Yes ❑ No ❑ N/A (not proned)
- If any No answers, was follow-up provided with primary RN in real time? ❑ Yes ❑ No ❑ N/A (no no's)

APPENDIX G: IPU PROGRESSIVE K-CARD AUDITING TOOL

HAPI Prevention K-Card Audit Tool – IPU Progressive Care

Directions: *Complete five (5) random audits on different patients on IPU Progressive Care per week using the IPU Progressive Care Auditor K-Card between* ***9/6/2022*** *and* ***11/30/2022****. Document results on this form. Submit completed form to Sherry M. Thomas.*

Auditor's Name: _____ **Week Beginning:** _____

Audit #1 Date: _____

- Patient on alternative surface/bed ❑ Yes ❑ No ❑ N/A
- Frequent turning/repositioning has been documented ❑ Yes ❑ No ❑ N/A (turns self)
- Heels floated completely off bed with pillows under calves ❑ Yes ❑ No ❑ N/A (turns self)
- Nutrition Therapy has been consulted if patient not eating/drinking ❑ Yes ❑ No ❑ N/A (eating/drinking)
- Moisture concerns have been addressed, as applicable ❑ Yes ❑ No ❑ N/A (continent)
- Preventive foam dressing underneath all medical devices ❑ Yes ❑ No ❑ N/A (no medical devices)
- If any No answers, was follow-up provided with primary RN in real time? ❑ Yes ❑ No ❑ N/A (no no's)

Audit #2 Date: _____

- Patient on alternative surface/bed ❑ Yes ❑ No ❑ N/A
- Frequent turning/repositioning has been documented ❑ Yes ❑No ❑ N/A (turns self)
- Heels floated completely off bed with pillows under calves ❑ Yes ❑ No ❑ N/A (turns self)
- Nutrition Therapy has been consulted if patient not eating/drinking ❑ Yes ❑ No ❑ N/A (eating/drinking)
- Moisture concerns have been addressed, as applicable ❑ Yes ❑ No ❑ N/A (continent)
- Preventive foam dressing underneath all medical devices ❑ Yes ❑ No ❑ N/A (no medical devices)
- If any No answers, was follow-up provided with primary RN in real time? ❑ Yes ❑ No ❑ N/A (no no's)

HAPI Prevention K-Card Audit Tool – IPU Progressive Care

Audit #3: Date: _____

- Patient on alternative surface/bed ❑ Yes ❑ No ❑ N/A
- Frequent turning/repositioning has been documented ❑ Yes ❑No ❑ N/A (turns self)
- Heels floated completely off bed with pillows under calves ❑ Yes ❑ No ❑ N/A (turns self)
- Nutrition Therapy has been consulted if patient not eating/drinking ❑ Yes ❑ No ❑ N/A (eating/drinking)
- Moisture concerns have been addressed, as applicable ❑ Yes ❑ No ❑ N/A (continent)
- Preventive foam dressing underneath all medical devices ❑ Yes ❑ No ❑ N/A (no medical devices)
- If any No answers, was follow-up provided with primary RN in real time? ❑ Yes ❑ No ❑ N/A (no no's)

Audit #4: Date: _____

- Patient on alternative surface/bed ❑ Yes ❑ No ❑ N/A
- Frequent turning/repositioning has been documented ❑ Yes ❑No ❑ N/A (turns self)
- Heels floated completely off bed with pillows under calves ❑ Yes ❑ No ❑ N/A (turns self)
- Nutrition Therapy has been consulted if patient not eating/drinking ❑ Yes ❑ No ❑ N/A (eating/drinking)
- Moisture concerns have been addressed, as applicable ❑ Yes ❑ No ❑ N/A (continent)
- Preventive foam dressing underneath all medical devices ❑ Yes ❑ No ❑ N/A (no medical devices)
- If any No answers, was follow-up provided with primary RN in real time? ❑ Yes ❑ No ❑ N/A (no no's)

Audit #5: Date: _____

- Patient on alternative surface/bed ❑ Yes ❑ No ❑ N/A
- Frequent turning/repositioning has been documented ❑ Yes ❑No ❑ N/A (turns self)
- Heels floated completely off bed with pillows under calves ❑ Yes ❑ No ❑ N/A (turns self)
- Nutrition Therapy has been consulted if patient not eating/drinking ❑ Yes ❑ No ❑ N/A (eating/drinking)
- Moisture concerns have been addressed, as applicable ❑ Yes ❑ No ❑ N/A (continent)
- Preventive foam dressing underneath all medical devices ❑ Yes ❑ No ❑ N/A (no medical devices)
- If any No answers, was follow-up provided with primary RN in real time? ❑ Yes ❑ No ❑ N/A (no no's)

APPENDIX H: EXAMPLE OF BUNDLE COMPONENT COMPLIANCE DATA COLLECTION SPREADSHEET

IPU Progressive Care Bundle Component Compliance Data Collection Spreadsheet							
Audit Date:	Patient on alternative surface/bed, if applicable	Frequent turning/repositioning documented	Heels floaded completely off bed with pillows under calves	Nutrition Therapy consulted if patient not eating/drinking	Moisture concerns addressed?	Preventive foam dressing underneath all medical devices	If any No answers, was follow-up provided with primary RN in real time?

APPENDIX I: POST-INTERVENTION PARTICIPANT FEEDBACK SURVEY

K-Cards Process Survey for MSICU and IPU/Progressive Nurses

1. What unit do you work on?

- ◯ MSICU
- ◯ IPU/Progressive

2. K-Cards helped to increase my knowledge about hospital-acquired pressure injury (HAPI) prevention practices / care bundles.

- ◯ 5 = Strongly Agree
- ◯ 4 = Agree
- ◯ 3 = Neutral
- ◯ 2 = Disagree
- ◯ 1 = Strongly Disagree

3. K-Cards serving as visual cues helped to ensure HAPI prevention was a priority during my daily work.

- ◯ 5 = Strongly Agree
- ◯ 4 = Agree
- ◯ 3 = Neutral
- ◯ 2 = Disagree
- ◯ 1 = Strongly Disagree

4. The K-Card process was easy to follow and did not significantly increase my workload.

- ◯ 5 = Strongly Agree
- ◯ 4 = Agree
- ◯ 3 = Neutral
- ◯ 2 = Disagree
- ◯ 1 = Strongly Disagree

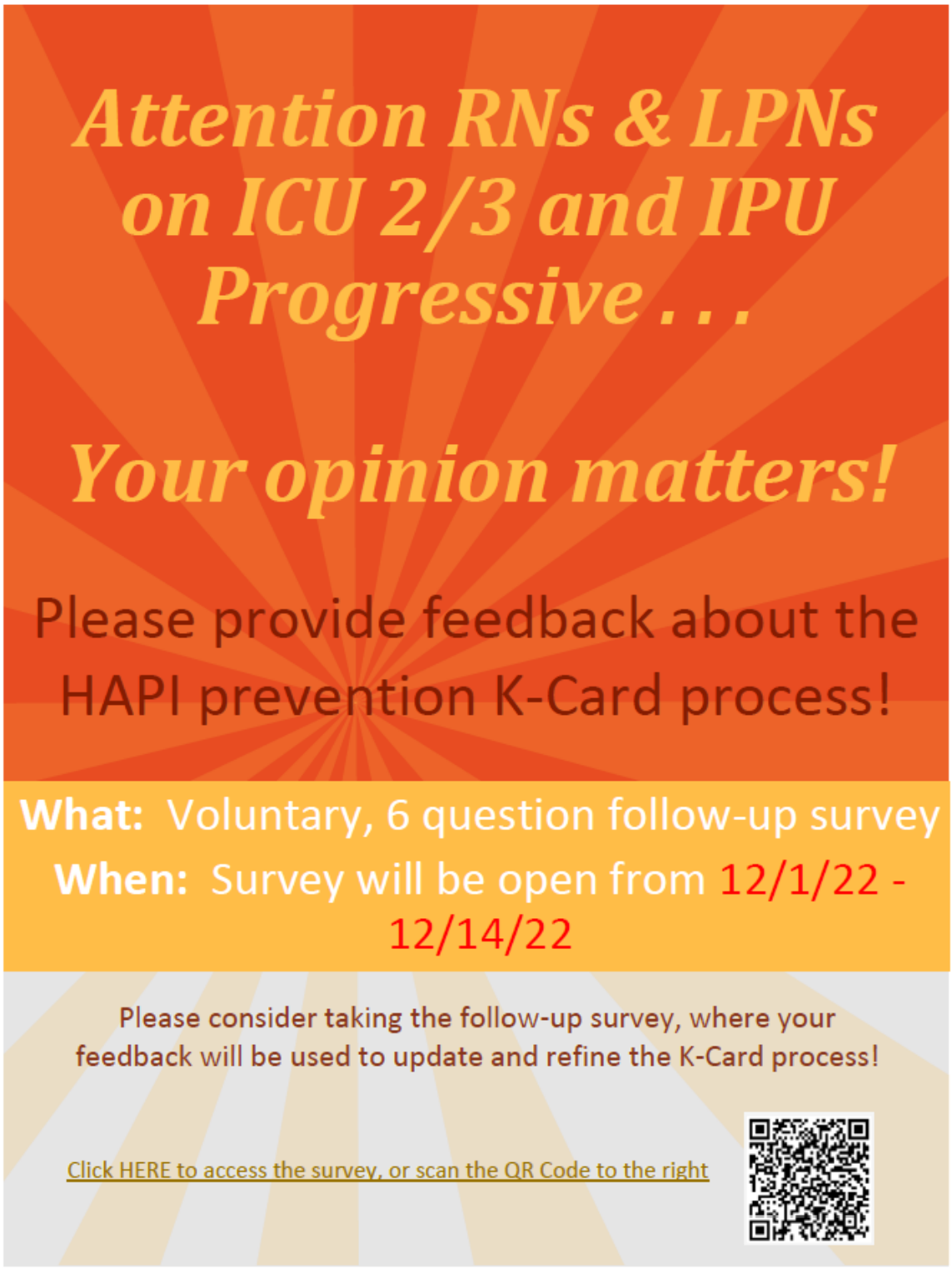
5. The K-Card process was beneficial and should be spread to other units at AH Cabarrus.

- ◯ 5 = Strongly Agree
- ◯ 4 = Agree
- ◯ 3 = Neutral
- ◯ 2 = Disagree
- ◯ 1 = Strongly Disagree

6. Do you have other feedback about K-Cards, Care Bundles, Visual Cues, or the overall process that you would like to share?

Enter your answer

APPENDIX J: POST-INTERVENTION PARTICIPANT FEEDBACK SURVEY FLYER



APPENDIX K: POST-INTERVENTION PARTICIPANT FEEDBACK SURVEY INFORMATION SHEET

Wake Forest School of Medicine

Clinical Education Services Department

K-CARDS AND CARE BUNDLES: USING VISUAL CUES AND EVIDENCE-BASED PRACTICE TO DECREASE HOSPITAL-ACQUIRED PRESSURE INJURIES (HAPIS)

Informed Consent Form to Participate in Research

Dr. Shannon B. Morton, DNP, APRN, NEA-BC, ACNS-BC Principal Investigator
Sherry M. Thomas, MSN, RN, NPD-BC, CNL DNP Student, Study Team

SUMMARY

You are invited to participate in a research study. The purpose of this research is to obtain feedback about the following Doctor of Nursing Practice (DNP) Project being conducted on ICU 2/3 and IPU Progressive Care: utilizing Kamishibai Cards (K-Cards) as visual cues and reminders of HAPI prevention interventions to potentially decrease the number of HAPIs on the project units. You are invited to be in this study because you are an RN or LPN on ICU 2/3 or IPU Progressive Care. Your participation in this research will involve completing an anonymous, electronic, 6-question survey once the project is complete, which will take approximately 5 – 10 minutes.

Participation in this study will involve disclosing whether you work on ICU 2/3 or IPU Progressive Care. All research studies involve some risks. A risk to this study that you should be aware of is that the investigators will know which unit you work on but will not know your name. You may not benefit from participation in this study.

Your participation in this study is voluntary. You do not have to participate in this study if you do not want to. You will not lose any services, benefits, or rights you would normally have if you choose not to participate.

The remainder of this form contains a more complete description of this study. Please read this description carefully. You can ask any questions if you need help deciding whether to join the study. The person in charge of this study is Dr. Shannon B. Morton, Principal Investigator. If you have questions, suggestions, or concerns regarding this study or you want to withdraw from the study his/her contact information is: Shannon.morton@atriumhealth.org

If you have any questions, suggestions or concerns about your rights as a volunteer in this research, contact the Institutional Review Board at 336-716-4542 or the Research Subject Advocate at Wake Forest at 336-716-8372.

Wake Forest
School of Medicine

How Many People Will Take Part in the Study?
This will depend on how many RNs and LPNs on ICU 2/3 and IPU Progressive Care choose to complete the electronic survey.

What Are the Risks of the Study?
The risk of harm or discomfort that may happen as a result of taking part in this research study is not expected to be more than in daily life or from routine physical or psychological examinations or tests. You should discuss the risk of being in this study with the study staff.

There is a slight risk of a breach of confidentiality. We will do our best to protect your confidential information. Efforts, such as coding research records, keeping research records secure and allowing only authorized people to have access to research records, will be made to keep your information safe.

Are There Benefits to Taking Part in the Study?
You are not expected to receive any direct benefit from taking part in this research study. We hope the information learned from this study will benefit other people in the future.

What Are the Costs?
There are no anticipated costs; however, all study costs, related directly to the study, will be paid for by the study.

Will Your Research Records be Confidential?
The results of this research study may be presented at scientific or medical meetings or published in scientific journals. Your identity and/or protected health information will not be disclosed unless it is authorized by you, required by law, or necessary to protect the safety of yourself or others. There is always some risk that even de-identified information might be re-identified.

Participant information may be provided to Federal and other regulatory agencies as required. The Food and Drug Administration (FDA), for example, may inspect research records and learn your identity if this study falls within its jurisdiction.

Will You Be Paid for Participating?
You will receive no payment or other compensation for taking part in this study.

What About My Health Information?
In this research study, any new information we collect from you is considered Protected Health Information. The information we will collect for this research study includes: your opinion about the K-Card process and suggestions for improvement.

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WHAT ARE MY RIGHTS AS A RESEARCH STUDY PARTICIPANT?

You may choose not to take part or you may leave the study at any time. If you decide to stop participating in the study we encourage you to talk to the investigators or study staff. The investigators also have the right to stop your participation in the study at any time. Information about you may be removed from the study data and could be used for future research or shared with other researchers without additional consent from you.

By continuing, I agree to take part in this study. I authorize the use and disclosure of my health information as described in this consent and authorization form. I have had a chance to ask questions about being in this study and have those questions answered. By taking part in the study, I am not releasing or agreeing to release the investigator, the sponsor, the institution or its agents from liability for negligence.

APPENDIX L: ATRIUM HEALTH/WAKE FOREST IRB APPROVAL MEMO

WAKE FOREST UNIVERSITY
HEALTH SCIENCES

Office of Research
INSTITUTIONAL REVIEW BOARD

MEMORANDUM

Association for the Accreditation of Human Research Protection Programs, Inc. — Full Accreditation

To: Shannon Morton
Atrium/ Carolinas Healthcare System

From: Brian Moore, Chair
Institutional Review Board

Date: 6/23/2022

Subject: Exempt Protocol: IRB00084796
K-Cards and Care Bundles: Using Visual Cues and Evidence-Based Practice to Decrease Hospital-Acquired Pressure Injuries

No protected health information will be used or disclosed in this research proposal; therefore the requirement for individual Authorization does not apply.

This research meets the criteria for a waiver of HIPAA authorization according to 45 CFR 164.512.

Exemption Category 4 - Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. null (Category null).

Note that only the Wake Forest University School of Medicine IRB can make the determination for its investigators that a research study is exempt. Investigators do not have the authority to make an independent determination that research involving human subjects is exempt. Each project requires a separate review and approval or exemption. The Board must be informed of any changes to this project, so that the Board can determine whether it continues to meet the requirements for exemption.

The Wake Forest School of Medicine IRB is duly constituted, has written procedures for initial and continuing review of clinical trials; prepares written minutes of convened meetings, and retains records pertaining to the review and approval process; all in compliance with requirements of FDA regulations 21 CFR Parts 50 and 56, HHS regulations 45 CFR 46, and International Conference on Harmonisation (ICH) E6, Good Clinical Practice (GCP), as applicable. WFSM IRB is registered with OHRP/FDA; our IRB registration numbers are IRB00000212, IRB00002432, IRB00002433, IRB00002434, IRB00008492, IRB00008493, IRB00008494, and IRB00008495.
WFSM IRB has been continually fully accredited by the Association for the Accreditation of Human Research Protection Programs (AAHRPP) since 2011.

Medical Center Boulevard, Winston-Salem, NC 27157-1023 (336) 716-4542 / fax (336) 716-4480

APPENDIX M: UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE IRB APPROVAL MEMO

CHARLOTTE
RESEARCH AND ECONOMIC DEVELOPMENT

To:	Sherry Thomas University of North Carolina at Charlotte
From:	Office of Research Protections and Integrity
Approval Date:	05-Jul-2022
RE:	Notice of Approval of Exemption
Exemption Category:	2~4
Study #:	IRB-22-1286
Study Title:	K-Cards and Care Bundles: Using Visual Cues and Evidence-Based Practice to Decrease Hospital-Acquired Pressure Injuries

This submission has been reviewed by the Office of Research Protections and Integrity (ORPI) and was determined to meet the Exempt category cited above under 45 CFR 46.104(d). This determination has no expiration or end date and is not subject to an annual continuing review. However, you are required to obtain IRB approval for all changes to any aspect of this study before they can be implemented and to comply with the Investigator Responsibilities detailed below.

Important Information:

1. Face masks are optional on UNC Charlotte's campus. This includes classrooms and other academic spaces. Researchers conducting HSR activities in other locations must continue to adhere to local and state requirements in the setting where the research is conducted.
2. Face masks are still required in healthcare settings. Researchers conducting HSR activities in these settings must continue to adhere to face coving requirements.
3. Organizations, institutions, agencies, businesses, etc. may have further site-specific requirements such as continuing to have a mask requirement, limiting access, and/or physical distancing. Researchers must adhere to all requirements mandated by the study site.

Your approved consent forms (if applicable) and other documents are available online at Submission Page.

Investigator's Responsibilities:

1. Amendments **must** be submitted for review and the amendment approved before implementing the amendment. This includes changes to study procedures, study materials, personnel, etc. Note: Modifications may require review by the Full IRB. Be aware of the IRB Committee meeting submission deadlines.

2. Data security procedures must follow procedures as approved in the protocol and in accordance with OneIT Guidelines for Data Handling.
3. Promptly notify the IRB (uncc-irb@uncc.edu) of any adverse events or unanticipated risks to participants or others.
4. Five years (5) following this approval/determination, you must complete the Admin-Check In form via Niner Research to provide a study status update.
5. Be aware that this study is included in the Office of Research Protections and Integrity (ORPI) Post-Approval Monitoring program and may be selected for post-review monitoring at some point in the future.
6. Reply to the ORPI post-review monitoring and administrative check-ins that will be conducted periodically to update ORPI as to the status of the study.
7. Complete the Closure eform via Niner Research once the study is complete.

Please be aware that approval may still be required from other relevant authorities or "gatekeepers" (e.g., school principals, facility directors, custodians of records).