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Aiming for Zero: Creating a Culture of Safety and Improving CAUTI Outcomes in the Microsystem

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Section I. Abstract

Problem: Catheter-associated urinary tract infection (CAUTI) remains the leading cause of hospital-acquired infection (HAI) despite being preventable. CAUTI increases the length of stay, morbidity, mortality, readmissions, and costs. There is also increasing antimicrobial resistance in pathogens causing CAUTI. Thus, reducing HAIs such as CAUTI should be a priority for every institution.

Context: The microsystem for this CAUTI quality improvement project is a 24-bed adult medical-telemetry unit in an acute care teaching hospital with excessive CAUTI. This project aims to improve the unit's CAUTI standardized infection ratio (SIR) from a baseline of 2.54 to 1.75 by October 2020. A SIR of 1.75 for the microsystem translates to zero CAUTI events per month during the project timeline.

Interventions: The quality improvement project has three themes of intervention. The first theme of interventions is the provision of CAUTI prevention education to frontline staff. The second theme of interventions is to reduce infection by the daily review of patients with an indwelling urethral catheter (IUC) and a requirement to notify the physician when the IUC is no longer indicated, or an alternative can be used. A visual tracking board for the prompt removal of IUC and a smart phrase in the electronic medical record (EMR) was created to standardized communication between nurses and physicians regarding urinary catheter necessity. The third theme of intervention is to reduce misdiagnosis due to colonization by using the organization's regional urine culture algorithm for sending urine cultures from patients with an IUC.

Measures: A family of measures for the project was developed. The outcome measures for the project are the CAUTI Standardized Infection Ratio (SIR) and number of CAUTI events per month during the project timeline.

Results: By the end of the project, the microsystem achieved zero monthly CAUTI events and a CAUTI SIR score of 1.73.

Conclusions: Implementing the interventions led to the achievement of zero CAUTI events, thus preventing harm to patients. The interventions are also incorporated in the daily processes of the microsystem and, therefore, sustainable.

Keywords: catheter associated urinary tract infection, daily review of urinary catheters, visual tracking board, urine culture algorithm

Section II. Introduction

Introduction

Catheter-associated urinary tract infection (CAUTI) is still the leading cause of hospital-acquired infection (HAI). In the United States, 40% of HAIs are caused by a urinary tract infection (UTI), and 75% are device-related (Margaret et al., 2015). Twelve to sixteen percent of adult hospital inpatients will have a urinary catheter at some time during admission (Lo et al., 2014). Among patients with an indwelling urinary catheter (IUC), bacteriuria occurs at a rate of three to ten percent per day of hospital catheterization, and 10 to 20% of these patients will develop a UTI (Saint, 2000). CAUTI can increase morbidity, mortality, cost, length of stay, and patient readmissions (Merchant et al., 2017). There is also increasing antimicrobial resistance in the pathogens causing CAUTI, making treatment more challenging (Merchant et al., 2017). CAUTI is considered preventable harm in hospitals, but in the acute care setting, a trend of unwarranted and prolonged catheter usage continues (CDC, 2015).

CAUTI prevention aligns with the organization's mission of providing high-quality and affordable healthcare services. It is the organization's priority to provide excellent care and prevent harm to each of its members. Additionally, harm events are publicly reported, and excessive CAUTI can damage the organization's reputation. Also, the Centers for Medicare & Medicaid Services (CMS) do not reimburse CAUTI events since it is considered are preventable harm. Furthermore, CAUTI is a nursing quality indicator, and preventing CAUTI at all costs shows excellence in nursing care.

Problem Description

Multiple strategies have been implemented to prevent CAUTI, but there continues to be an increased use and duration of catheterization (CDC, 2015). An unwarranted catheter does

more harm than good. Catheters not only increase the risk of infection, but they can also cause non-infectious complications such as trauma, strictures, discomfort, and limitations on mobility (Saint et al., 2018). The CDC (2015) estimates that 15 to 21% of catheterizations are unwarranted. Catheters should only be used for an appropriate indication and removed as soon as the need is no longer met (Margaret et al., 2015). Alternatives to indwelling catheters should also be investigated to minimize catheter usage to appropriate indications only. Reducing HAI from all sources should be a top priority for every institution—especially with the increasing emergence of antimicrobial-resistant pathogens.

The microsystem assessed for this quality improvement project is an adult medical telemetry inpatient unit. On review of internal data from the organization's quality department, the microsystem's historical trend shows an excessive number of CAUTI. Data for 2019 showed a total of three CAUTI attributed to the microsystem with a Standardized Infection Ratio (SIR) of 2.54. The national benchmark for CAUTI SIR is one, and the organizational goal is 0.75 SIR. The microsystem did not meet the regional organization target and did worst compared to national benchmark.

Available Knowledge

PICOT Question

The PICOT question used for the literature search and synthesis of evidence for the CAUTI quality improvement project asks: In the adult inpatient care setting (P: patient/population), how does implementation of nursing protocol (I: intervention), compared to current practice (C: comparison), decrease CAUTI (O: outcome) over a six-month period (T: time frame)?

Search Strategy

An electronic search was conducted in June 2019 using the Cumulative Index of Nursing and Allied Health (CINAHL) complete database and PubMed using the following search terms: *catheter-associated urinary tract infection*, *urinary catheter**, *nurse-driven protocol*, and *nurse**. The search was limited to human studies, English-language, meta-analysis, systematic reviews, clinical practice guidelines, and randomized control trials published from January 2009 to June 2019. The search yielded 39 articles from CINAHL and 1,200 articles from PubMed. The references from the articles retrieved were also searched for relevant studies on the prevention of CAUTI, and among these, three articles from an adult inpatient setting were selected for review.

Appraisal of Evidence

The John Hopkins Nursing Evidence-Based Practice (JHNEBP) research evidence appraisal tool (2017) was used to appraise the evidence for this review. (See Appendix A for evaluation table.)

Durant (2017) conducted a systematic review of nurse-driven protocols and the prevention of CAUTI. The review aimed to discover the effect of nurse-driven protocols on the clinical predictors and prevalence of CAUTI. Studies included in Durant's (2017) meta-synthesis were published after 2006 in the United States within the acute care setting, and they examined the impact of the nurse-driven protocols on outcomes such as IUC utilization rates, IUC days, and CAUTI rates compared to prior practice. Each study included in the review was appraised for the level of evidence and the risk of bias. Twenty-nine studies were included in the meta-synthesis. All were case-control studies with a pre and post approach. Twenty-eight out of the 29 studies reported a reduction in CAUTI. This systematic review showed that nurse-driven

protocols have a positive impact on the prevention of CAUTI. This study is rated as L III-B using the JHNEBP appraisal tool.

Bernard et al. (2012) conducted a systematic review of strategies implemented to decrease the duration of IUCs and potentially reduce the incidence of CAUTI. The authors only included studies from 2000 to 2010 in the acute care setting, addressing timely removal of an IUC with outcome measures being the incidence of CAUTI and duration of IUC. Nine studies were included for qualitative review. Five studies used a nurse-led intervention to trigger a review for continued use or discontinuation of the IUC. Three studies were on computerized intervention and one on a chart reminder system. All studies found a reduction in CAUTI incidence and length of catheterization, and no one specific intervention was superior to the other. This study is rated as L III-B using the JHNEBP appraisal tool.

The Infectious Diseases Society of America (IDSA) authored the 2009 International Clinical Practice Guideline to diagnose, prevent, and treat CAUTI in adults. The IDSA guidelines were formed through systematic weighting of the quality of evidence and recommendation grade. A panel of experts discussed initial findings, and final recommendations were determined by consensus. The practice guideline was reviewed and approved by all collaborating organizations before it was published and circulated. The guidelines are reviewed at an annual interval to determine if there is a need for revision based on current literature. To summarize the IDSA's (2009, 2019 update) recommendation, strategies that limit the use and duration of IUC to appropriate indication are the best way to reduce the incidence of CAUTI. This study is rated as L IV-A using the JHNEBP appraisal tool.

Synthesis

The Durant (2017) and Bernard et al. (2012) studies were both on nursing interventions that are simple, cost-effective, supports, and empowers nurses at the bedside to provide excellent care and prevent harm. Empowering nurses, by investing in their education and involvement in quality improvement projects such as timely IUC removal is essential and will drive better patient care outcomes. The studies of Durant (2017) and Bernard et al. (2012) were meta-synthesis of strategies to reduce the use and duration of IUC and prevent CAUTI. Both studies showed that strategies, such as nurse-driven protocol, nurse-led, and informatics-led interventions, are effective in lowering IUC days and have a positive impact on CAUTI reduction.

The level of evidence from the IDSA (2009) recommendation lead the author to prioritize interventions that would make the most significant impact, which is the daily review of IUC necessity and removal of the IUC as soon as no longer indicated, or an alternative can be used. The IDSA (2009) recommendation guides the decisions healthcare providers make at the bedside and helps educate patients and families to make well informed, evidence-based decisions about the care and procedures they receive.

All evidence reviewed affirmed that removing urinary catheters as soon as possible reduced CAUTI. Inserting an IUC should be considered after all of the other alternatives have been reviewed. Additionally, nursing and informatics led interventions positively impact CAUTI prevention.

Rationale

Three frameworks were chosen to translate the CAUTI prevention evidence into practice: the Comprehensive Unit-based Safety Program (CUSP) from the Agency for Healthcare

Research and Quality (AHRQ), the Model for Improvement from the Institute for Healthcare Improvement (IHI), and Jean Watson's Caring Science Theory. These frameworks were chosen because they are culture change models that emphasize that patient safety can be integrated as part of routine work; the three approaches are appropriate to reduce harm.

Description of Frameworks

A Conceptual Framework: Comprehensive Unit-based Safety Program (CUSP)

The CUSP is a culture change model to prevent infections and improve the quality and safety of healthcare delivered to patients. CUSP, developed by the AHRQ, has been successfully applied to improve the way physicians, nurses, and other team members work together. CUSP aims to reduce harm by creating a culture of patient safety at the hospital unit level. It builds the capacity to address safety issues by combining clinical best practices and the science of safety. The CUSP model accentuates the significance of having a diverse team, soliciting the opinion of direct care providers, working toward a common goal, finding issues the team can solve, and integrating solutions to these issues as part of the unit's routine work (AHRQ, 2015).

CUSP has a tool kit to help guide each step of the change process. The core CUSP toolkit is modular and modifiable to meet unit needs. The toolkit consists of three modules—implementation, sustainability, and resources—that a hospital unit can use to teach team members how to apply CUSP to prevent CAUTI (AHRQ, 2015).

A Conceptual Framework: Model for Improvement

The Model for Improvement from IHI (2011) provides a framework for improvement work that is structured around the aim, the interventions to achieve the aim, and the measure to know that the change was an improvement. Both outcome and process measures will be tracked with data to compare against the aim. The interventions or processes are carried out in daily

work and tested within a plan–do–study–act (PDSA) cycle. When a change is made, a small test is carried out at the onset, and feedback is obtained, allowing staff to refine and modify the change and plan for its next test.

The outcome measure for the CUSP and Model for Improvement conceptual frameworks are hospital-acquired CAUTI events and SIR. Both conceptual frameworks provide a strategic approach to creating sustainable change.

A Theoretical Framework: Jean Watson's Caring Science Theory

Dr. Jean Watson's Caring Science Theory is used to guide transformative models of caring and healing practices for hospitals, nurses, and patients alike. Jean Watson's theory can be considered a philosophical and ethical foundation for professional nursing. The Caring Science Theory has ten processes that guide caring practice into action. The approach is based on the core concept of a relational caring for self and others, heart-centered encounters with another person, and multiple ways of reflective, meditative approach (Watson, 2009).

The measure for Jean Watson's Caring Science Theory as it relates to CAUTI prevention is nurse communication in the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, the balancing measure for this project. The HCAHPS survey is a measure of patient experience in the hospital. The Communication with Nurses rating summarizes how well patients feel that their nurses explained things clearly, listened carefully, and treated them with courtesy and respect (CMS, 2020). Effective communication between nurses and patients can prevent harm such as CAUTI.

As a healthcare institution, it is essential that we look at strategies to prevent CAUTI so we can be safe and cost-effective to our members. How can our microsystem move forward to achieve excellence in nursing through CAUTI reduction? The CUSP framework and the IHI

Model for Improvement guide in the implementation of this change process. Further, Jean Watson's Caring Science Theory helps inculcate this change process into the hearts of care providers so we can sustain the culture change at the individual care provider level, and ultimately, achieve CAUTI prevention for patients.

Specific Project Aim

The specific aim of this quality improvement project is to improve the CAUTI SIR of the microsystem from its March 2020 baseline of 2.54 to 1.75 by October 2020. A SIR of 1.75 translates to zero CAUTI events during the project timeline. With all these goals considered, the CAUTI prevention program's success is quantifiable and measurable.

Section III. Methods

Context

A microsystem assessment was done in March 2020 to determine gaps within the current process for CAUTI prevention and improve within those areas. A 5P microsystem assessment tool was used to obtain an overall view of the healthcare facility unit. The microsystem assessment created an opportunity to look into and find chances to transform the unit positively. The 5Ps microsystem assessment components are purpose, patients, professionals, processes, and patterns. Based on the microsystem assessment, the review of the evidence, and the gap analysis, a project charter (see Appendix B) was created. A quality improvement project was proposed and implemented from May to October 2020 to address the microsystem's excessive CAUTIs. The quality improvement project was feasible since the microsystem is already equipped with a bladder scanner and alternatives to urinary catheters such as pure wick devices, condom catheters, and straight catheters. Moreover, the quality improvement project aligns with the facility's current policies and procedures for CAUTI.

Setting

The facility is an acute care teaching hospital in Northern California. The microsystem assessed for the quality improvement project is one of the adult medical-telemetry inpatient units. The microsystem has 24 private rooms, and an average daily patient census of 20 with seasonal variations.

Purpose

The microsystem’s purpose is to provide compassionate and excellent patient-centered healthcare to patients and their families. The microsystem also aims to reduce the risk of harm to

patients, maintain patient and employee safety, be efficient with available resources, and have a workplace culture in which teams feel appreciated and heard.

Patients

The microsystem patients are mostly adult medical telemetry patients, but there are also overflow surgical patients. The patients in the microsystem have a high level of acuity and multiple comorbidities. The unit is specialized in stroke and chronic ventilator patients and cares for patients transitioning out of the ICU. More than 80% of the patients are geriatric (65 years and older), and more than half of the patient population has a low mobility level.

Professionals

The microsystem has a unit nurse manager, five assistant nurse managers, a unit medical director, a shared administrative assistant, 56 registered nurses, 12 patient care technicians, and five unit assistants. The facility has physician hospitalists and multiple specialists available for consultation. The facility has diverse multidisciplinary teams that work together to achieve the shared goal of providing high-quality, affordable healthcare services to improve the health of members and communities served. Another team working in collaboration with the microsystem is the rehabilitation team, which includes physical therapy, occupational therapy, speech therapy, and physical medicine and rehabilitation. The facility also has respiratory, environmental, nutritional, pastoral services, and pharmacy departments. The facility further has a wound care nurse specialist, and a clinical nurse specialist educator shared with all adult medical, surgical, and telemetry units in the facility. The Infection Prevention department works collaboratively with the units to reduce HAI.

Patterns

The unit has regular pre-shift huddles that address microsystem metrics that matter, such as falls, CAUTI, central line-associated blood stream infection, hospital-acquired pneumonia, hospital-acquired pressure injuries, *Clostridium difficile* infections, employee safety, and HCAHPS scores. The unit also has regular monthly staff meetings, annual education for all employees, and stroke rounds on Mondays, Wednesdays, and Fridays. The facility holds daily safety briefings, staffing calls for each shift, daily high census calls, and a daily discharge call. Multidisciplinary rounding is done inconsistently, especially during the current COVID-19 pandemic, given the need for social distancing.

Processes

The current process for CAUTI prevention is for the nursing leadership team to do CAUTI audits, which focus on the care and maintenance of the patient's IUC. The nursing leadership team audits each CAUTI bundle component, including perineal cleansing, catheter care, keeping the urinary catheter bag below the bladder level and off the floor, maintaining an unobstructed urine flow, and applying a securement device to prevent tagging of the urinary catheter. Other processes in the unit used to promote safety and enhance communication among the healthcare team and with patients include bedside handoff report for nursing also known as Nurse Knowledge Exchange (NKE), Authentic Hourly Visitation (AHV) of patients, and Multi-Disciplinary Rounding (MDR).

SWOT Analysis

A SWOT analysis (see Appendix C) was conducted to analyze the project's risks, benefits, and feasibility. The strength of the project lies in the support from leadership, partnership with the physician team, and continued engagement from frontline staff. The project

is also in alignment with facility goals, policies, and procedures. Necessary equipment and supplies are already available in the unit for use. During the analysis, the main weakness identified is the lack of awareness of frontline staff on CAUTI prevention and alternatives to IUC. Communication between nurses and physicians is inconsistent regarding the necessity of the urinary catheters, and there is also an ingrained pattern of pan culturing febrile patients with an IUC.

Implementing a quality improvement project on CAUTI allowed the microsystem to provide quality patient care and apply evidence-based knowledge into practice. Other opportunities included within the proposed project are that better quality care translates to higher patient satisfaction, leading to increased plan membership and member retention. CAUTI is publicly reported on the CMS Hospital Compare website, and it is a quality indicator needed for Magnet Recognition. The threat to the project is the competing priorities that come with the COVID-19 pandemic. Thus, based on this SWOT analysis, it is clear that opportunities and strengths outweigh the potential weaknesses and threats that might impact the project's success.

Cost Benefit Analysis

Implementing the CAUTI prevention quality improvement project will decrease CAUTI in the microsystem, resulting in cost avoidance from patients' extended lengths of stay to treat CAUTI. Each CAUTI event adds 7.2 days in the length of stay per patient. While the program's cost for the microsystem is $10,600, the overall benefit of implementation will be the cost avoidance of $75,600 during the first year. With the project costs deducted, the net benefit is $65,440 for the organization during the first year of implementation (see Appendix D). There are also secondary benefits that are intangible, such as increased patient satisfaction, a better hospital

reputation, and public reporting of better-quality metrics. The overall benefit of decreased CAUTI incidences outweighs the cost of the program implementation.

Intervention

The CAUTI prevention quality improvement project had three main themes of intervention to decrease hospital-acquired CAUTI events. For the intervention's first theme, increasing CAUTI prevention awareness among frontline staff, education was provided to all nurses in the microsystem. CAUTI prevention education was given during shift huddles, staff meetings, annual reviews, and skills day. A unit-based team (UBT) for CAUTI prevention was created. Members of the UBT served as CAUTI champions and are a resource in the unit when there are questions about CAUTI prevention and project interventions. Engagement and feedback from frontline staff are vital to project success because they are the ones who are involved in the actual work.

The second theme of intervention is reducing infection, an emphasis was placed on prompt removal of IUC when no longer necessary and the use of alternatives. A visual tracking board (see Appendix E) for daily review and prompt removal of lines was created. The visual tracking board indicated which patient had an IUC, the indication, and the plan. The visual tracking board is used for handoff reports between nurse leaders regarding IUCs that need follow-up, and it is also used as a reference for daily huddles for frontline staff. To enhance communication between nurses and physicians, a smart phrase (see Appendix F) was created in Health Connect, the organization's electronic medical record (EMR), for discontinuation and alternatives to an IUC. The smart phrase is in a Situation, Background, Assessment, and Recommendation (SBAR) format with a drop-down menu for IUC indication and recommendation. The smart phrase is used in the Dear Doctor communication section of the EMR.

The third theme of intervention is to reduce misdiagnosis by reducing unnecessary urine cultures. The frontline staff received education on the use of the organization's regional urine culture algorithm (see Appendix G) and that a "urinalysis, foley with microscopy panel" should be ordered by physicians first before a "urine culture, foley" is decided. Urine cultures should be sent when the patient has significant pyuria, the patient is febrile with signs and symptoms of urinary tract infection, and there is no other identifiable infection source.

Study of the Intervention

Frontline staff received comprehensive CAUTI education at the annual skills day review on the components of care for CAUTI prevention and interventions for the CAUTI quality improvement project. At the end of the annual skills day, a post-test was given to validate staff knowledge regarding CAUTI prevention and interventions in place. All nurses were required to attend annual skills day, and attendance was tracked.

For the second theme of intervention, reducing infection, a visual tracking board was created. The visual tracking board indicated which patients had an IUC, the indication, and the plan. The visual tracking board is updated daily, and all IUC discontinued are crossed out at the end of the day. The evening shift nurse leader takes a picture of the board, and that picture is then sent to the unit's leadership team daily through internal email for process outcome documentation. The author tracked this as percent compliance per month for the daily review of IUC and the visual tracking board's completion.

The third intervention, aimed to reduce misdiagnosis of CAUTI, is based on AHRQ (2015) guidance entitled *Preventing CAUTI: Focus on culturing stewardship*. An algorithm from the organization's regional CAUTI prevention program was used for ordering urine cultures from patients with an IUC. Inappropriate cultures may lead to unnecessary antimicrobial use,

resulting in increased antimicrobial resistance, *Clostridium difficile* infection, and possible adverse drug reactions (CDC, 2019). Additionally, inappropriate urine cultures may increase CAUTI events according to the National Health Care Safety Network (NHSN) surveillance definition (see Appendix H) even when not clinically significant (AHRQ, 2015).

Data were collected on a daily, weekly, and monthly basis to maintain project momentum. The CEPI department provided the staff attendance roster for the annual skills day CAUTI education. Data for CAUTI SIR were obtained from the facility's Statit data subdivided into different units. The Infection Prevention department provided data for the number of CAUTI events per month and urine cultures done during the project timeline from patients with an IUC. The author tracked the visual tracking board data through the picture sent by internal email. The support of all multi-disciplinary stakeholders enabled the success of the CAUTI prevention project.

The CAUTI quality improvement project went through many plan–do–study–act (PDSA) cycles to improve the processes for CAUTI prevention. During the PDSA cycle, the study or evaluation step looked at the current data to determine whether the plan is working. Results were compared to those predicted and those of previous performances. This portion of the cycle also included what was learned and promoted discussion for what needs to change for the next PDSA cycle.

Measures

The outcome measure for this project was the number of hospital-acquired CAUTI events during the project timeline (May to October 2020) and the CAUTI SIR (see Appendix J), which is the ratio of the observed number of CAUTI events to the predicted number of CAUTI events. The SIR measurement strategy was chosen because the CDC's NHSN uses this measure to track

CAUTI surveillance nationally, and the microsystem's performance could be compared to the benchmark.

The project had two process measures: the daily review of IUC necessity with the completion of the visual display board and adherence to the urine culture algorithm. The data was measured as a percentage of visual tracking board compliance per month (see Appendix K). For the adherence to the urine culture algorithm, all urine cultures from a patient with an IUC sent during the project timeline were reviewed for correct usage of "urine culture, foley" order. A urinalysis should be sent before a urine culture is decided. The urinalysis for patients with an IUC should be ordered by physicians as "Urinalysis, foley with microscopy panel" and a separate order for "Urine Culture, Foley" when appropriate.

The quality improvement project's balancing measure is nurse communication in the HCAHPS survey. Data for this measure came from the quality department's Hospital Quality Dashboard and was reported monthly. Effective nurse communication reduces complication rates and improves patient safety (CMS, 2020).

Ethical Considerations

The project was reviewed by faculty and is determined to qualify as an Evidence-Based Change in Practice Project, rather than a Research Project. Institutional Review Board (IRB) review is not required, and the project met exemption criteria (see Appendix L). This quality improvement project aimed to avoid harm to patients through CAUTI prevention and improve the culture of safety and staff engagement in the microsystem; the CAUTI prevention project demonstrates both the principles of beneficence and non-maleficence for the patients. The CAUTI prevention work also finds resonance with the university's Jesuit core value of a culture of service that promotes the dignity of every person (USF, n.d.). Furthermore, the CAUTI

prevention work allowed the team to be of service to the community and provide care for the patient, promoting respect for their autonomy and at the same time advocating for their wellbeing, which is in accordance with the first provision of the American Nurse Association code of ethics (ANA, 2015).

Section IV. Results

The microsystem had no hospital-acquired CAUTI events during the project timeline. The last CAUTI in the microsystem occurred on December 16, 2019. The microsystem achieved its aim of decreasing its CAUTI SIR from a baseline of 2.54 to 1.75. The CAUTI SIR of the microsystem in October 2020 was 1.73 (see Appendix M).

The results of the process measures are as follows. At the end of the project timeline, 96% of the microsystem's nurses received CAUTI prevention education on annual skills day., and post-test results also validated knowledge of CAUTI prevention programs in the microsystem. The nurses reviewed 100% of IUCs daily per shift assessment documentation, and adherence to the visual tracking board process increased throughout the project timeline. At the end of October, adherence to the visual tracking board process was 95% (see Appendix N). All urine cultures from patients with an IUC within the project timeline were reviewed. Only four urine cultures were sent to the laboratory during the project timeline, and all were reviewed. The review showed 75% adherence to the correct use of the "urinalysis, foley with microscopy panel" order before a "urine culture, foley" is sent (see Appendix O).

Nurse communication in the HCAHPS score was the balancing measure for the project. The baseline average nurse communication HCAHPS score was 85.3%, while at the end of the project, the average nurse communication HCAHPS score was 89.25%. The median HCAHPS score during the project timeline is 88.3% (see Appendix P). The CAUTI prevention quality improvement project results were shared with staff during huddles and monthly staff meetings. The microsystem received recognition for zero CAUTI each month during the project timeline, and the team celebrated the unit's success.

Section V. Discussion

The interventions implemented to achieve the goal led to an improvement demonstrated by the outcome measure's achievement. Prevention of CAUTI can be attributed to daily nursing reviews of IUCs and the requirement to communicate to the physician if there is no appropriate IUC indication or an alternative is available. Additionally, using a smart phrase in the Health Connect, the EMR, improved the communication between nurses and physicians regarding IUC necessity and alternatives.

The use of the organization's regional urine culture algorithm, as well as the separation of urinalysis and urine culture orders, may have led to a decrease in inappropriate urine cultures, which may result in inadvertent complications, such as an increase in MDROs, *Clostridium difficile* infection, or an adverse drug reaction (AHRQ, 2015). Continued coaching and education are still needed for urine culture algorithm use.

In general, the quality improvement project has improved frontline staff members' awareness and knowledge about CAUTI prevention and the use of the urine culture algorithm. These are included in the CAUTI prevention education given to nursing staff. Senior leadership support, partnership with physicians, engagement of frontline nursing staff, and collaboration with Infection Prevention and CEPI departments all contributed to the success of the project.

Conclusions

In conclusion, the evidence reviewed agreed that removing the IUC as soon as it is no longer indicated, and after all other alternatives have been considered reduced CAUTI rates. Additionally, nursing protocols showcased a positive impact on CAUTI prevention. The CUSP and IHI Model for Improvement framework and Jean Watson's Caring Science Theory guided the implementation of evidence into practice. The frontline staff education, engagement, senior

leadership support, and collaboration with physicians, and the Infection Prevention and CEPI departments contributed to this CAUTI prevention project's success. The bundle of interventions, which included daily review of IUC necessity with a requirement to notify the physician when IUC is no longer indicated or an alternative can be used, implementation of a visual display board in the microsystem, staff education on CAUTI prevention, and avoiding unnecessary urine cultures all contributed to achieving the aim of zero CAUTI events during the project timeline and a CAUTI SIR of 1.73.

Sustainability

This project's sustainability can be facilitated through continued bedside coaching sessions of frontline staff and nurses and physician leaders who remain invested in the unit's success and improvement of patient outcomes. To accomplish this goal, the frontline staff's engagement and safety culture are vital in the microsystem. The project is incorporated into the unit's daily routine and processes, such as shift huddles, monthly staff meetings, annual reviews, NKE, and MDR. A standard work for the visual tracking board (see Appendix O) was also developed for sustainability. Furthermore, the quality improvement project is in alignment with current policies and procedures for CAUTI.

Moving forward, newly hired full-time, part-time, per diem, and traveler staff need to receive education on the CAUTI prevention protocol as part of the onboarding process. This process should include staff re-evaluation as part of periodic and annual performance appraisals.

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Section VII. Appendices

Appendix A. Evaluation Table

Evaluation Table: Evidence 1

Citation	Design/Method	Sample/Setting	Variables Studied and Their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
Durant, D. J. (2017). Nurse-driven protocols and the prevention of catheter-associated urinary tract infections: A systematic review. *American Journal of Infection Control*, *45* (12), 1331–1341.	Systematic Review with Meta-Synthesis **Purpose:** to discover the effect of nurse-driven protocols on the clinical predictors and prevalence of CAUTI **Method:** ▪ Evidence retrieved from electronic databases, searching by hand, and expert consultation from 2006–2017. ▪ Inclusion and exclusion criteria were outlined using the PICOT research question. ▪ Level of evidence was considered for each study before synthesizing the findings using Melnyk and Fineout-Overholt 7-level designation of evidence scale Studies were assessed for risk for bias using Joanna Briggs Institute's Critical Appraisal Checklist.	**Sample:** 29 case control studies published after 2006 examined the impact of nurse-driven protocol on clinical outcome such as IUC utilization rates, IUC days, and CAUTI rates 29 studies: 16 full-text articles, four conference posters, eight conference abstracts, and one Google Books excerpt. **Setting:** Acute care setting in the United States. **Population:** >50,000 adult patients	**Nurse-driven protocol** ▪ **A**ll studies had similar designs, using a decision-making algorithm for catheter insertion and removal based on medical necessity criteria. ▪ Some studies did not make it clear whether the nurse could remove the catheter without a specific physician order, or if they could only recommend a physician order to remove.	**IUC utilization rate:** number of IUC days divided by the number of patient day **IUC days:** the number of days a urinary catheter is placed **CAUTI rate:** the number of observed CAUTIs per 1,000 IUC days	**Qualitative synthesis** ▪ Heterogeneity of the outcomes and methods used made a statistical meta-analysis inappropriate ▪ Various based on individual evidence	Most studies reported reduction in prevalence of CAUTI with varying degrees of impact and statistical significance. However, formal quality assessment revealed high risk for bias. **Level of evidence:** All 29 records retrospectively compared two groups using existing data as the control, indicative of case control studies and level 4 evidence. No randomized controlled trials or studies with an external control group could be identified in the literature. **Critical appraisal:** Quality assessment revealed a high risk of bias in the methodologic design of the included studies; studies met an average of 4.9 out of 11 quality indicators, or 45%	**Strengths:** ▪ Systematic review ▪ Graded the level of evidence ▪ Critically appraised the evidence with an Integrity score ▪ Good sample size ▪ Appears to effectively reduce the clinical predictors and prevalence of CAUTI through improved assessment of medical necessity and timely catheter removal. ▪ Most studies reported reduction in prevalence of CAUTI. **Weaknesses:** ▪ Quality assessment revealed a high risk of bias **Conclusion:** NDPs appear to have a positive impact on clinical predictors and on the prevalence of CAUTI **Feasibility:** ▪ Reasonable to implement ▪ Same setting and population **L III, B**

Note. CAUTI: Catheter-Associated Urinary Tract Infection; IUC: Indwelling Urethral Catheter; NDP: Nurse-Driven Protocol.

Evaluation Table: Evidence 2

Citation	Design/Method	Sample/Setting	Variables Studied and Their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
Bernard, M. S., Hunter, K. F., & Moore, K. N. (2012). A review of strategies to decrease the duration of indwelling urethral catheters and potentially reduce the incidence of catheter-associated urinary tract infections. *Urologic Nursing*, *32*(1), 29.	Systematic Review with Meta Synthesis **Purpose:** Evaluate the current literature for research-based strategies to reduce the length of time of catheter placement and to review the effects of these strategies on the duration of catheterization and incidence of CAUTIs. **Method:** ▪ Authors searched 5 databases from 2000 to 2010 Of the 53 abstracts reviewed, 9 were relevant to the research questions.	**Sample:** 9 studies published between 2000 to 2010 in the acute care setting that addressed the timely removal of catheters and the outcome measure of CAUTI incidence and duration of IUC were reviewed. **Setting:** Acute care hospitals	Nurse-led and informatic-led intervention to trigger review of continued catheter use **Nurse-led intervention:** utilize nursing staff to assess, after a set period of time, whether an indwelling urinary catheter is still indicated for the patient. This leads to a decision to discontinue or continue the catheter through collaborative discussion with the physician or use of a standing order. **Informatics-led interventions:** Informatics-led interventions make use of technological information systems, including computerized, order-entry systems that automatically prompt healthcare practitioners to take action with a specified and defined intervention.	CAUTI Incidence IUC Days: the number of days a urinary catheter is in place CAUTI rate: number of observed CAUTIs per 1,000 IUC days	**Qualitative Synthesis** ▪ Heterogeneity of the outcomes and methods used made a statistical meta-analysis inappropriate Various based on individual evidence	▪ The available evidence supports nurse-led or informatic-led interventions for reducing the length of catheterizations and incidence of CAUTI. However, no specific intervention was clearly superior than the others Two out of the 9 studies did not demonstrate significant reduction in CAUTI	**Strengths:** ▪ These findings, although limited by the quality of the studies, demonstrate the potential of interventions based on the review of indications for catheterization ▪ Even if CAUTI was no different in any of the studies, the reduced nursing care time, the ability of the patient to be more mobile, and patient comfort would justify early removal **Weakness:** ▪ Small sample size ▪ High risk for bias (studies were not assessed for bias) ▪ High risk for Hawthorn's effect **Feasibility:** ▪ The frontline participation of registered nurses demonstrates their critical role in reducing complications from indwelling urinary catheters. ▪ Research into the barriers of translating knowledge about CAUTI into practice may be important in application of these interventions. **L III B**

Note. CAUTI: Catheter-Associated Urinary Tract Infection; IUC: Indwelling Urethral Catheter.

Evaluation Table: Evidence 3

Citation	Design/Method	Sample/Setting	Variables Studied and Their Definitions	Measurement and Data Analysis	Findings	Appraisal: Worth to Practice
Hooton, T. M., Bradley, S. F., Cardenas, D. D., Colgan, R., Geerlings, S. E., Rice, J. C., …, & Nicolle, L. E. (2010). Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America. *Clinical Infectious Diseases*, *50*(5), 625–663.	Clinical practice guidelines developed systematically through review of evidence and expert panel consensus **Purpose:** To provide recommendations for the diagnosis, prevention, and treatment of CAUTI in adults. **Panel composition:** The IDSA SPGC convened a multidisciplinary panel of experts in the management of CAUTI. **Literature review and analysis:** ▪ No date restriction ▪ Published in English ▪ Excluded: Studies with insufficient participants to support a valid statistical analysis; poorly described intervention, study design, or population; and enough bias to limit the trustworthiness of the study. **Method:** To evaluate evidence; systematic weighting of the quality of the evidence and the grade of recommendation. Initial findings were discussed by the panel, and final recommendations were determined by consensus.	Studies included had no date restriction and were published in English. Excluded from the review were studies with insufficient participants to support a valid statistical analysis, poorly described intervention, study design or population, and enough bias to limit the trustworthiness of the study **Population:** Adults	Diagnosis, prevention, and treatment of CAUTI CAUTI in patients with catheterization (whether indwelling urethral, indwelling suprapubic, or intermittent) is defined by the presence of symptoms or signs compatible with UTI with no other identified source along with 10^3 cfu/mL of one bacterial species in a single catheter urine specimen or in a midstream voided urine specimen from a patient whose urethral, supra- pubic, or condom catheter has been removed within the previous 48 hours (A-III).	Various based on study	▪ 47 recommendations for prevention, diagnosis, and treatment of CAUTI ▪ Strategies that limit the use and duration of IUC to appropriate indications is the best way to reduce the incidence of catheter-associated UTI ▪ Indwelling catheters should be removed as soon as they are no longer required to reduce the risk of CA-bacteriuria (A-I) and CAUTI (A-II). ▪ Institutions should consider nurse-based or electronic physician reminder systems to reduce inappropriate urinary catheterization (A-II) and CAUTI (A-II) ▪ Institutions should consider automatic stop-orders to reduce inappropriate urinary catheterization (B-I)	**Strengths:** ▪ Included all evidence without date restriction ▪ Each recommendation was systematically appraised for strength of recommendation and quality of evidence ▪ The guidelines are reviewed annually to determine if there is a need for revision based on current studies ▪ High quality of evidence **Feasibility:** ▪ Same population ▪ Low risk for harm events when implemented ▪ No cost data **L IV A**

Note. CAUTI: Catheter-Associated Urinary Tract Infection; IUC: Indwelling Urethral Catheter; IDSA: Infectious Diseases Society of America; SPGC: Standards and Practice Guidelines Committee

Appendix B. Project Charter

Setting

Medical Telemetry Unit in an acute care teaching hospital

Problem

Excessive CAUTI attributed to the microsystem. Not meeting regional organization target for catheter-associated urinary tract infection prevention.

Global Aim

The global aim of this project is to enhance the culture of safety and eliminate CAUTI in the microsystem by October 2020 through staff education on CAUTI prevention, daily review of urinary catheters, and the use of a urine culture algorithm for patients with an IUC.

Specific Aim

The specific aim of this quality improvement project is to improve the CAUTI standardized infection ratio (SIR) of the microsystem from a baseline of 2.54 SIR in March 2020 to a 1.75 SIR by October 2020.

Sponsors

Table 1

Sponsors and Preceptors

Role	Name	Title
Sponsor	Darina Kavanagh	Chief Nursing Executive
Preceptor	Denette Valencia, RN	Nurse Manager
Infection Prevention	Amal Johnson, RN, CIC	Infection Preventionist
Sponsor	Terrance Shaw, RN	Adult Services Director
Sponsor	Loveena Virk, MD	Chair- Inpatient Medical Director

Table 2

Microsystem Team

Name	Title
Philip Kim, MD	7North Medical Director
Catherine Joseph, RN	7North Nurse Manager
Anna Taylor, RN	Assistant Nurse Manager
Christina Packham, RN	Assistant Nurse Manager
Elita Hope Davis, RN	Assistant Nurse Manager
Shiela Escobar, RN, SCRN, PCCN	Assistant Nurse Manager
Tiffany Banks, RN, MBA, MSN	Assistant Nurse Manager
Chantal Bush, RN	Nurse Champion
Katherine Seidl, RN	Nurse Champion
Analissa Baylon-Pena, RN	Nurse Champion
Omatuni Parker	Nurse Champion
Andrea Ragland	Nurse Champion
Prisca Onwuemeka	Nurse Champion

Goals

To improve quality and safety of patients in the microsystem by decreasing CAUTI SIR rate from a baseline of 2.54 to 1.75 or below by October 2020.

1. Create a culture of safety.
2. Decrease CAUTI.
3. Increase staff awareness on CAUTI prevention strategies.
4. To reduce the unnecessary use of urinary catheters in the inpatient setting.

Table 3

Measures

Measure	Data Source	Target
Outcome		
Standardized Infection Ratio (SIR)	Infection prevention	1.75
CAUTI events per month	Infection prevention	zero
Process		
% Staff who received CAUTI prevention	Annual review attendance roster	80 %

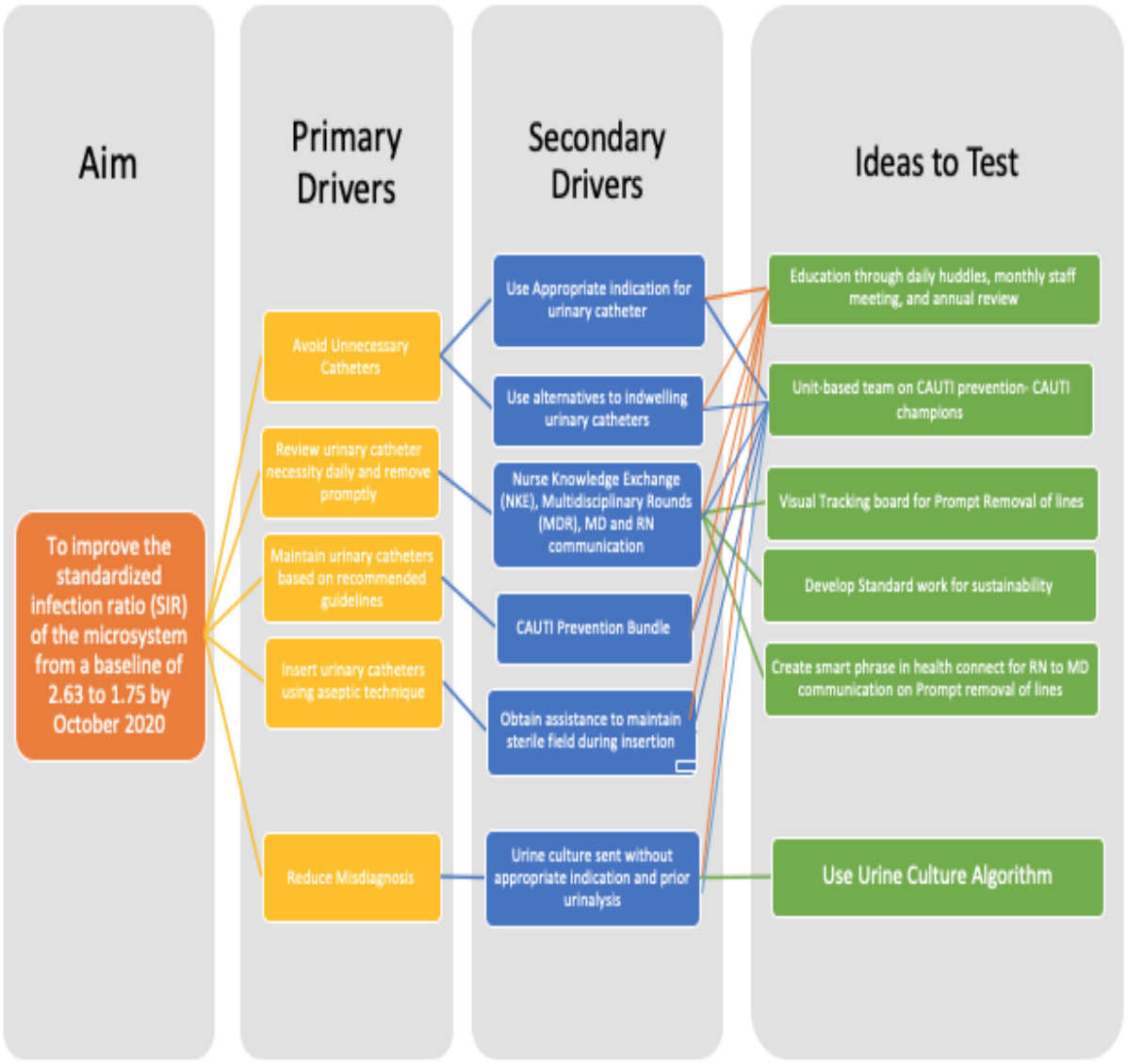
education on annual skills day		
% Daily review of IUC with completion of visual tracking board per month	Internal audit	80%
% Correct usage of urine culture, Foley order	Internal audit	80%
Balancing		
RN communication	HCAHPS score	80%

Table 4

Measurement Description

Measure	Measure Definition	Data Collection Source	Goal
CAUTI events	Number of CAUTI events per month	Infection prevention monthly audit	zero
Standardized Infection Ratio (SIR)	Observed CAUTI events / expected CAUTI events = SIR	Infection prevention monthly audit	1.75
% Daily review of IUC with completion of visual display board per month	Number of Daily reviews of IUC with completion of visual display board per month divided by the number of days per month × 100%	Internal audit	80%
% Correct usage of urine culture, Foley order	Number of correct uses of urine culture, Foley order divided by total number of urine cultures from a patient with an IUC x 100%	Internal audit	80%
RN communication	The Communication with Nurses star rating summarizes how well patients feel that their nurses explained things clearly, listened carefully to the patient, and treated the patient with courtesy and respect	HCAHPS survey from CMS	80%

Driver Diagram



Changes to Test (Rapid Cycle Testing)

1. Staff education, training, and huddles on CAUTI prevention strategies.

2. Catheter review included in the shift huddles, multidisciplinary rounds (MDR), and nurse knowledge exchange (NKE) every shift.

3. Implementing standardized and accurate documentation of CAUTI bundle in the EMR by nurses

4. Assistant nurse manager rounding with patient and RN and reviewing catheter necessity.

5. Visual display board indicating which patients have a urinary catheter, the indication, and the plan of care.

6. Developing a unit-based team on CAUTI prevention.

7. Implementing the organization's urine culture algorithm.

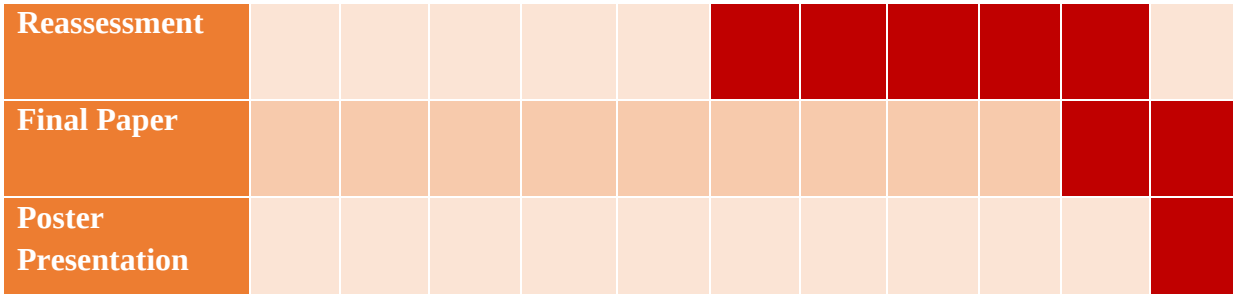
8. Real-time coaching for excellence.

9. Celebrate microsystem wins on CAUTI prevention

Table 5

Project Timeline (Gantt Chart)

Dates	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Define Project											
Aim											
Microsystem Assessment											
Finalize Charter											
Prepare for Implementation											
Create a Team											
Staff Education											
Huddles											
Test of Change											



CNL Competencies

1. Interpret patterns and trends in quantitative and qualitative data to evaluate outcomes of care within a microsystem and compare to other recognized benchmarks or outcomes (King et al., 2019).

2. CNL articulates delivery process, outcomes, and care trends using various media and other communication methods to the healthcare team and others (King et al., 2019).

3. CNL applies concepts of improvement science and systems theory (King et al., 2019).

4. Demonstrate working knowledge of the healthcare system and its components, including sites of care, delivery models, payment models, and the roles of healthcare professionals, patients, caregivers, and unlicensed professionals (King et al., 2019).

5. Assume a leadership role of an interprofessional healthcare team focusing on the delivery of patient-centered care and the evaluation of quality and cost-effectiveness across the healthcare continuum (King et al., 2019).

6. Use systems theory in the assessment, design, delivery, and evaluation of healthcare within complex organizations (King et al., 2019).

7. Evaluate the efficacy and utility of evidence-based care delivery approaches and their outcomes at the microsystem level (King et al., 2019).

8. Collaborate with healthcare professionals, including physicians, advanced practice nurses, nurse managers, and others, to plan, implement, and evaluate an improvement opportunity.

9. Participate in a shared leadership team to make recommendations for improvement at the micro-, meso-, or macrosystem level (King et al., 2019).

10. Use performance measures to assess and improve the delivery of evidence-based practices and promote outcomes that demonstrate delivery of higher-value care (King et al., 2019).

11. Perform a comprehensive microsystem assessment to provide the context for problem identification and action (King et al., 2019).

12. Use evidence to design and direct system improvements that address safety and quality (King et al., 2019).

13. Implement quality improvement strategies based on current evidence, analytics, and risk anticipation (King et al., 2019).

14. Promote a culture of continuous quality improvement within the system (King et al., 2019).

15. CNL, as an information manager, will analyze and identify metrics that matter within the microsystem to aid with the improvement project (King et al., 2019).

16. The CNL in an outcome manager's role is prepared to initiate and lead the quality improvement initiatives, design research, and carry out evidence-based interventions to promote patient safety, streamline the healthcare delivery process, and reduce errors (King et al., 2019).

Lessons Learned

1. Start early and thoroughly plan the project.

2. Collaboration, engagement, and buy-in are needed among management, interdisciplinary teams, and frontline nursing staff.

3. Support of sponsors, champions, and co-leads is much needed and appreciated.

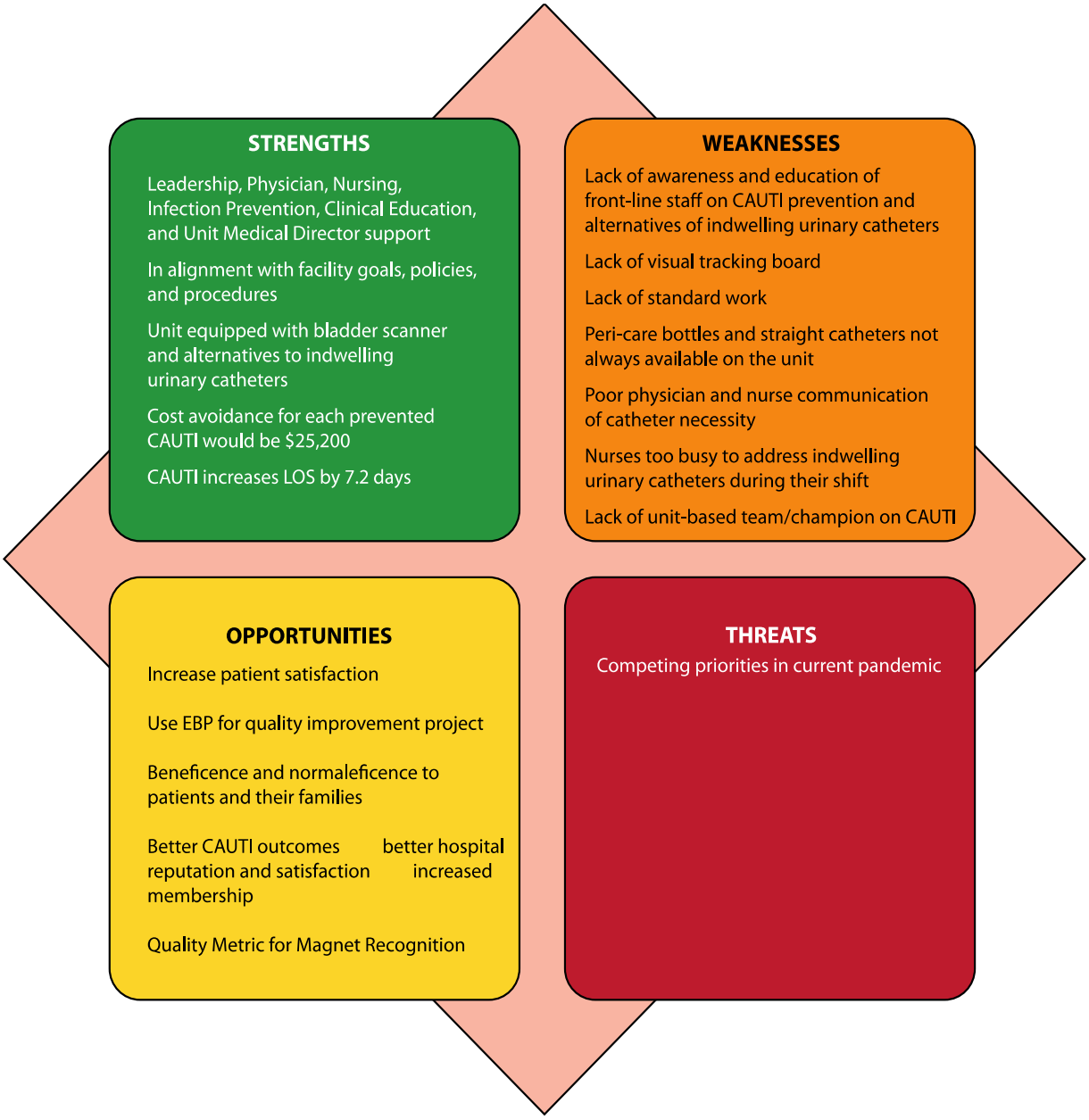
4. Infection prevention and quality department partnership are essential.

5. Adequate staffing is needed to ensure the completion of daily baths and other aspects of patient hygiene.

6. Adequate patient and family motivation and participation are essential.

7. Creating standard work facilitates the sustainability and smooth flow of the process.

Appendix C. SWOT Analysis



Appendix D. Cost–Benefit Analysis

Table 1

Project Cost

Items	Quantity	Cost per hour	Hours in a year	Annual cost
CAUTI Champions / Trainer Training	3 CAUTI champions	$90.00	8 hours per Champion × 3 Champions = 24 hours	$6,480.00
CAUTI Champion Trainer Annual Review Classes	8 classes	$90.00	4 hours per session	$2,880.00
Supplies and Prices	--	--	--	$200
Food	--	--	--	$600
Total Cost	--	--	--	$10,160.00

Table 2

Cost Avoidance/Benefit

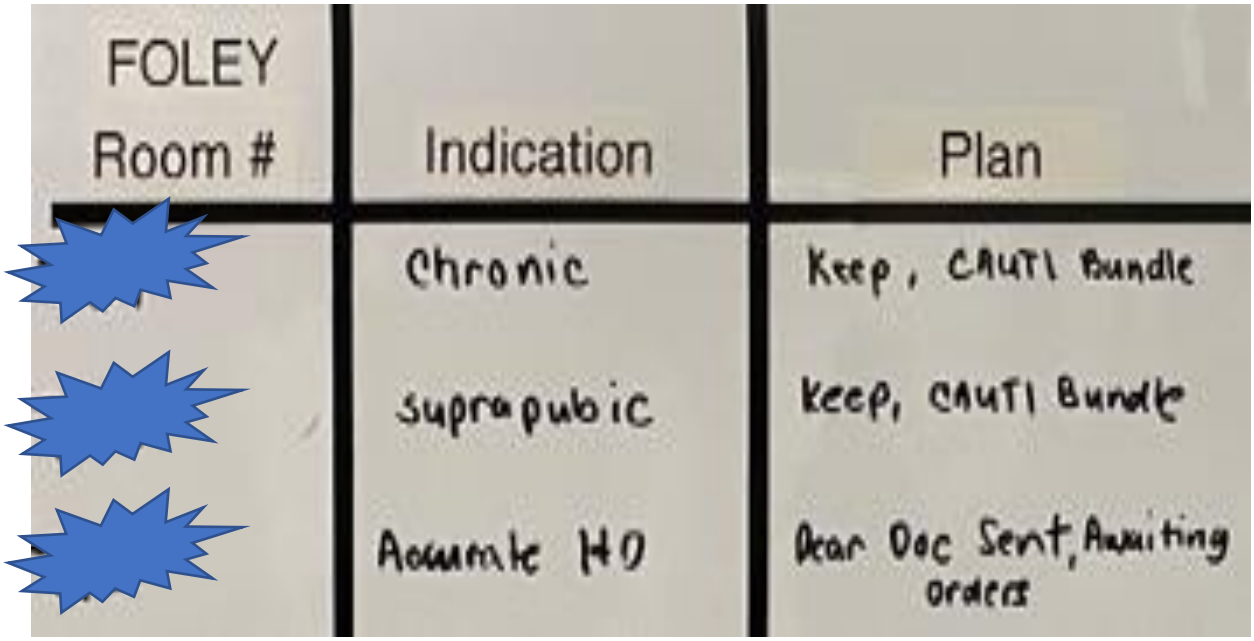
Items	Quantity	Cost for each extended LOS	Average # of days to treat CAUTI	Costs for each event	Total Annual Cost of CAUTI
CAUTI event	Three CAUTI events for 2019	$3,500.00	7.2 days	$3,500.00 × 7.2 days = $25,200.00	75,600.00

Table 3

Cost–Benefit Analysis

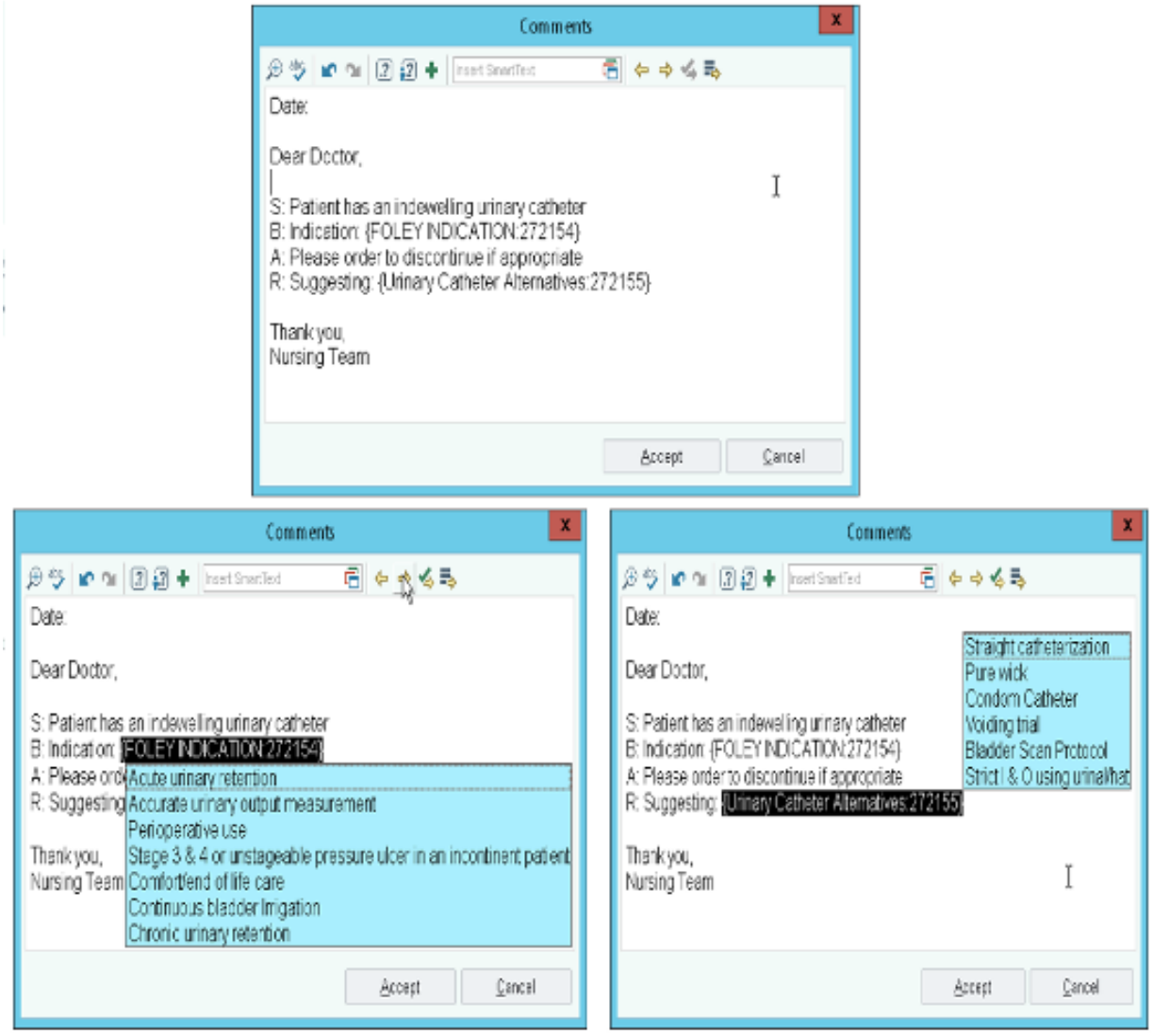
Item	Calculation	Interpretation
Cost	$10,160.00	Estimated total cost of quality improvement project
Benefit	$75,600.00	Cost avoidance for a total of three CAUTI
Net Benefit	$65,440.00	Estimated dollar amount of savings after cost are covered.
B/C ratio	$75,600.00/$10,160.00 = $7.44	For every one dollar spent by project there is a $7.44 benefit

Appendix E. Visual Tracking Board

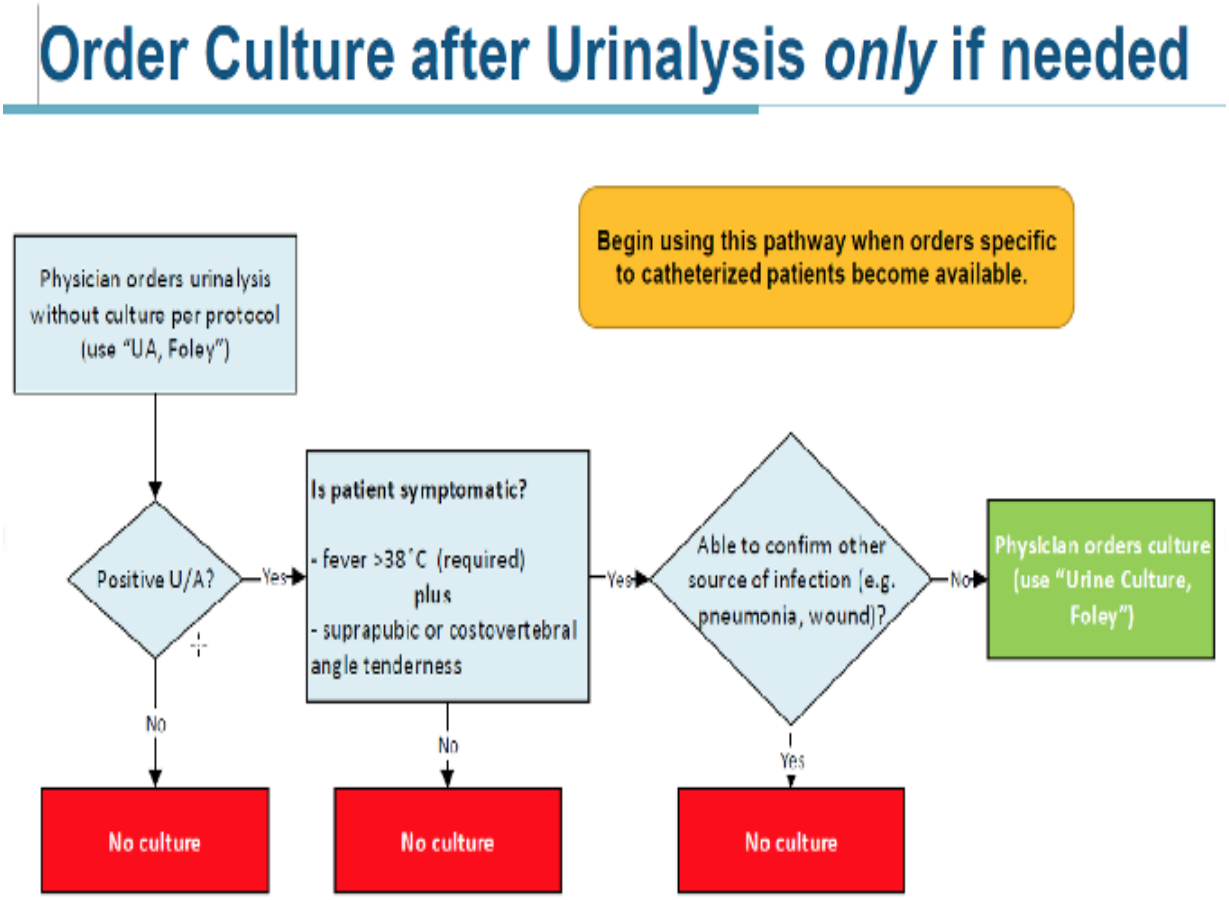


Appendix F. Smart Phrase

. EBYFoley



Appendix G. Urine Culture Algorithm



Appendix H. Definitions

Indwelling urinary catheter (IUC)

A drainage tube that is inserted into the urinary bladder through the urethra, is left in place, and is connected to a drainage bag (including leg bags). These devices are also called Foley catheters. Indwelling urinary catheters that are used for intermittent or continuous irrigation are also included in CAUTI surveillance. Condom or straight in-and-out catheters are not included, nor are nephrostomy tubes, ileoconduits, or suprapubic catheters unless an indwelling urinary catheter (IUC) is also present.

Catheter-associated urinary tract infection (CAUTI)

Patient must meet 1, 2, and 3 below:

1. Patient had an indwelling urinary catheter that had been in place for more than two consecutive days in an inpatient location on the date of event AND was either:

    • Present for any portion of the calendar day on the date of event (DOE), OR

    • Removed the day before the date of event.

2. Patient has at least one of the following signs or symptoms:

    • fever (>38.0°C): Reminder: To use fever in a patient >65 years of age, the IUC needs to be in place for more than two consecutive days in an inpatient location on date of event and is either still in place OR was removed the day before the DOE.

    • suprapubic tenderness *

    • costovertebral angle pain or tenderness *

    • urinary urgency ^

    • urinary frequency ^

    • dysuria ^

3. Patient has a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of ≥105 CFU/ml.

Based on NHSN (2020) definition.

Appendix I. Outcome Measures

Outcome Measure 1: CAUTI Standardized Infection Ratio (SIR)

Numerator:	Number of observed hospital-acquired CAUTI cases
Denominator:	Number of predicted hospital-acquired CAUTI
Calculation:	Divide numerator by denominator and report as ratio
Frequency:	Monthly
Sampling & Measurement:	All patients admitted to the unit.

Outcome Measure 2: Number of CAUTI events

Number:	Number of observed hospital-acquired CAUTI cases
Frequency:	Monthly
Sampling & Measurement:	All patients admitted to the unit.

Appendix J. Process Measures

Process Measure 1a: Daily review of urinary catheter necessity

Numerator:	Number of records of patients with indwelling urinary catheters and daily documentation of indication for continued catheter necessity Indication should include at a minimum: Perioperative use for selected surgical procedures Urine output monitoring in critically ill patients Management of acute urinary retention and urinary obstruction Assistance in pressure ulcer healing for incontinent patients Comfort during end-of-life care
Denominator:	Number of records of patients with indwelling urinary catheters reviewed
Calculation:	Divide numerator by denominator and report as percent
Frequency:	Monthly
Sampling & Measurement:	A random review of records of all patients on the unit with indwelling urinary catheters was done three days each week. The days and times varied. Documentation should be present daily; include the record in the numerator only if documentation is present for every day the catheter is/was in place: an all-or-none measure.

	Include patients in the denominator if there is no documentation or documented indication does not meet criteria. These are not included in the numerator and represent opportunities for improvement.

Process Measure 1b: Microsystem daily review of all patients with an IUC will be tracked by taking a picture of the IUC visual display board. The picture of the visual display board is emailed to the leadership team for process measure documentation.

Numerator:	Total number of times the visual tracking board was completed and a picture was emailed to the microsystem leadership team at the end of the day.
Denominator:	Total number of days in a month
Calculation:	Divide numerator by denominator and report as percent
Frequency:	Monthly
Sampling & Measurement:	Visual tracking board should be completed daily and picture emailed at the end of the day to leadership team. If visual tracking board was completed but picture was not sent this will not be included in the numerator; an all-or-none measure.

Process Measure 2: Appropriateness of urine culture from patients with an IUC.

Numerator:	Number of records of urine cultures from a patient with an IUC that followed the urine culture algorithm. The record review must fulfill all criteria: urinalysis Foley with microscopy panel showed significant pyuria (>50 WBC), before a urine culture Foley is ordered

Denominator:	Total number of records reviewed of urine cultures from a patient with an IUC
Calculation:	Divide numerator by denominator and report as percent
Frequency:	Duration of project timeline (May to September)
Sampling & Measurement:	All urine cultures from patients with an IUC for the performance year will be reviewed

Process Measure 3: Percentage of nursing staff in the microsystem who receive CAUTI prevention education at staff meeting and annual review.

Numerator:	Number of nurses that received CAUTI prevention education on annual skills day
Denominator:	Total number of nurses in the microsystem
Calculation:	Divide numerator by denominator and report as percent
Frequency:	Duration of project timeline (May to October))
Sampling & Measurement:	All nurses in the microsystem are required to attend

Appendix K. IRB Exemption for Non-Research Statement of Determination Form

CNL Project: Statement of Non-Research Determination Form

Student Name: Shiela Helga K. Escobar

Title of Project:

Aiming for Zero: Creating a Culture of Safety and Improving CAUTI Outcomes in the Microsystem

Brief Description of Project:

A) Aim Statement:

The specific aim is to improve the catheter-associated urinary tract infection (CAUTI) standardized infection ratio (SIR) of the microsystem from a baseline of 2.54 to 1.75 or below by October 2020. A CAUTI SIR of 1.75 translates to zero CAUTI events during the project timeline.

B) Description of Intervention:

1) Develop a Unit-Based Team (UBT) on CAUTI prevention.

2) Educate staff on the four components of care for CAUTI prevention and the CAUTI quality improvement project's interventions.

3) Develop an SBAR phrase in Health Connect for structured communication between nurses and physicians on prompt removal of lines and use of alternatives for indwelling urinary catheters (IUCs).

4) Create a visual tracking board in the unit on prompt removal of IUC.

5) Use the organization's urine culture algorithm for sending urine cultures from a patient with an IUC.

6) Celebrate success in CAUTI prevention.

C) How will this intervention change practice?

1) Creating a UBT on CAUTI prevention will create engagement and ownership of frontline staff and collaboration between all team members.

2) Education will help staff members understand the importance of preventing CAUTI as well as how this can affect patients and their families. Visual tools will help staff retain CAUTI education received and also serve as a guide and reminder of the components of CAUTI prevention.

3) The SBAR phrase in Health Connect, the organization's electronic medical record (EMR), will create clear, structured communication between nursing and physician for prompt urinary catheter removal and create an independent check between nurses and physicians on IUC necessity.

4) The visual tracking board serves as a quick visual reference tool for the work that needs to be accomplished for the day, such as which urinary catheters need to be reviewed and discontinued.

5) The use of the organization's urine culture algorithm prevents unnecessary urine cultures from being sent, leading to overdiagnosis of CAUTI and inappropriate

treatment.

6) Celebrating real successes further engages the staff around their effort on CAUTI prevention. It also reminds staff members that the work done on CAUTI prevention yields results.

D) Outcome measurements:

The CAUTI standardized infection ratio in the unit will be 1.75 or less by October 2020.

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

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

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

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

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

Project Title:	**YES**	**NO**

The aim of the project is to improve the process or delivery of care with established/accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	**X**	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. ALL participants will receive standard of care.	**X**	
The project is **NOT** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **NOT** follow a protocol that overrides clinical decision-making.	**X**	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new untested standards.	**X**	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience.	**X**	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	**X**	
The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	**X**	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/or patients.	**X**	

If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-Based Change of Practice Project at Kaiser Permanente, Oakland Medical Center hospital or agency and as such was not formally supervised by the Institutional Review Board."*	**X**	

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

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

STUDENT NAME (Please print):

_____

Signature of Student: Shiela Helga K. Escobar **DATE: June 17, 2020**

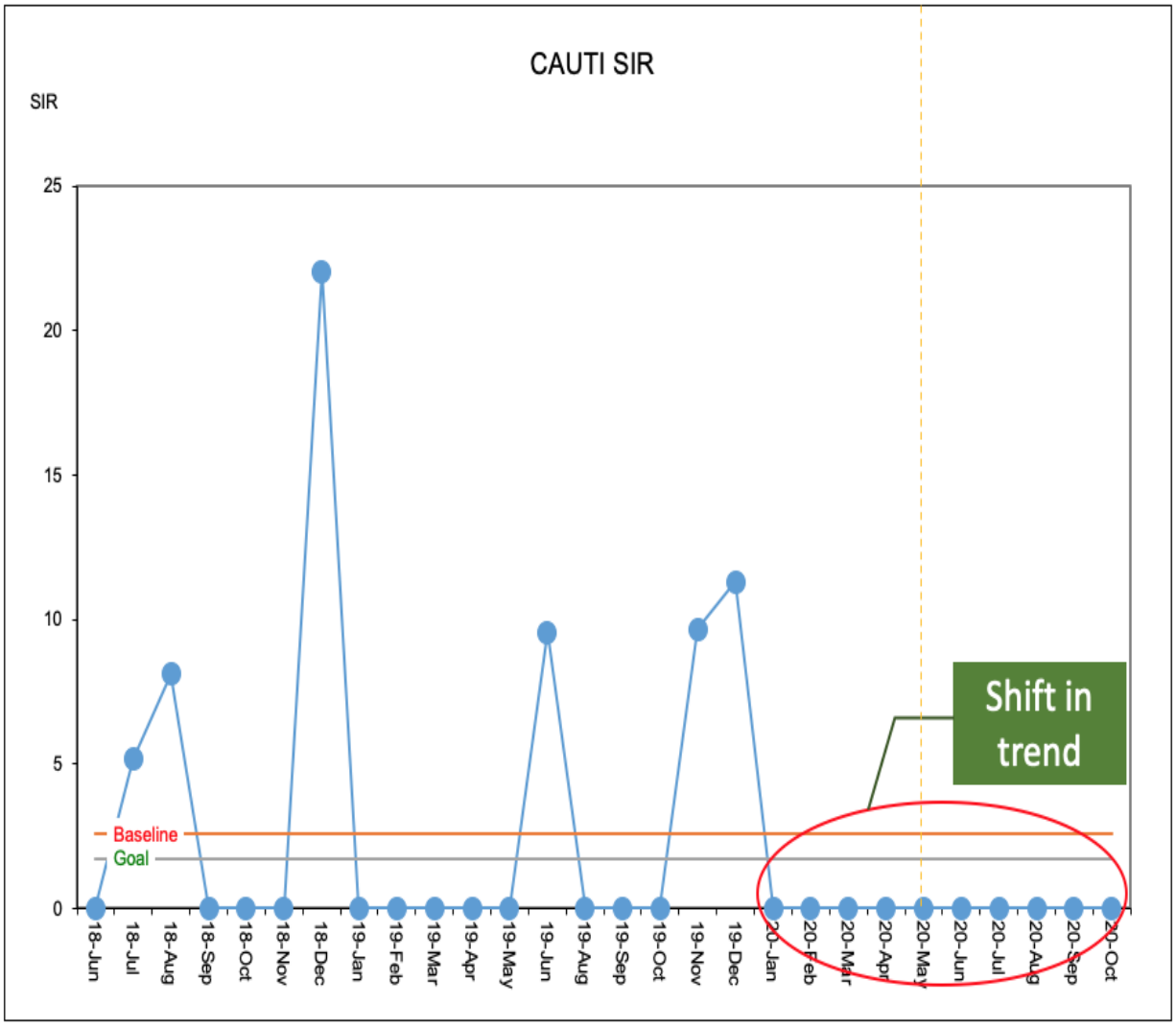
SUPERVISING FACULTY MEMBER NAME (Please print):

_____

Signature of Supervising Faculty Member:

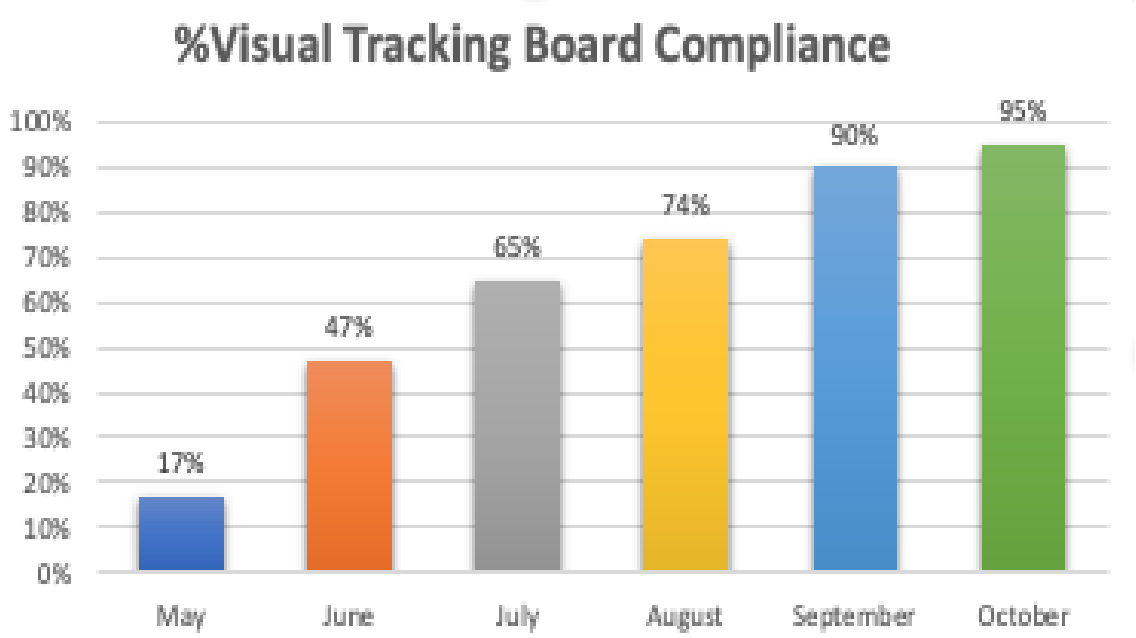
_____**DATE**_____

Appendix L. Outcome Measure Result

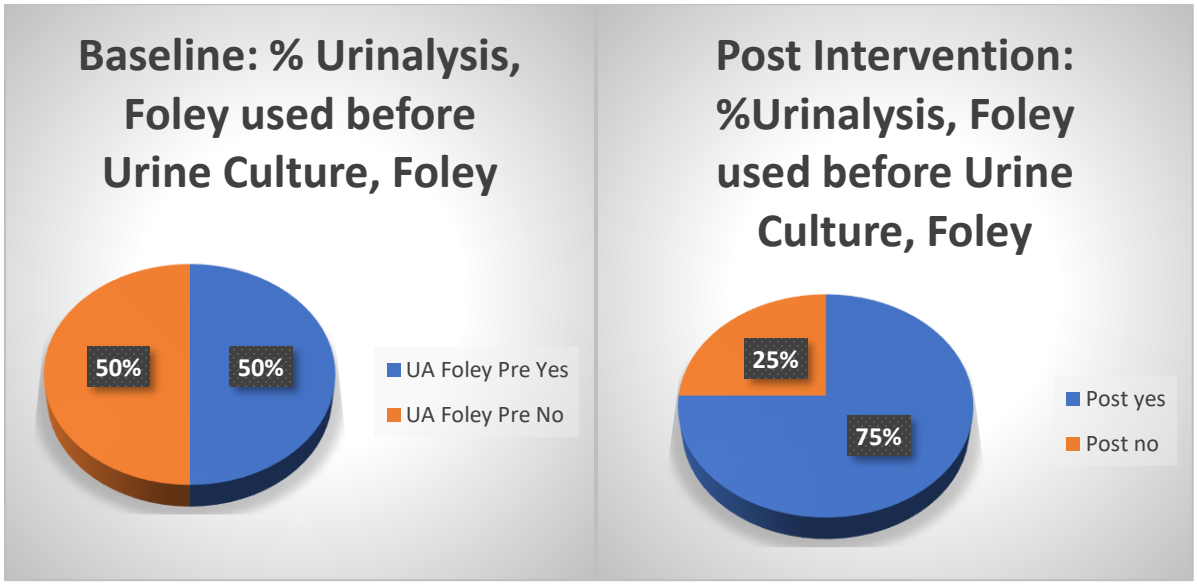


Appendix M. Process Measure Result

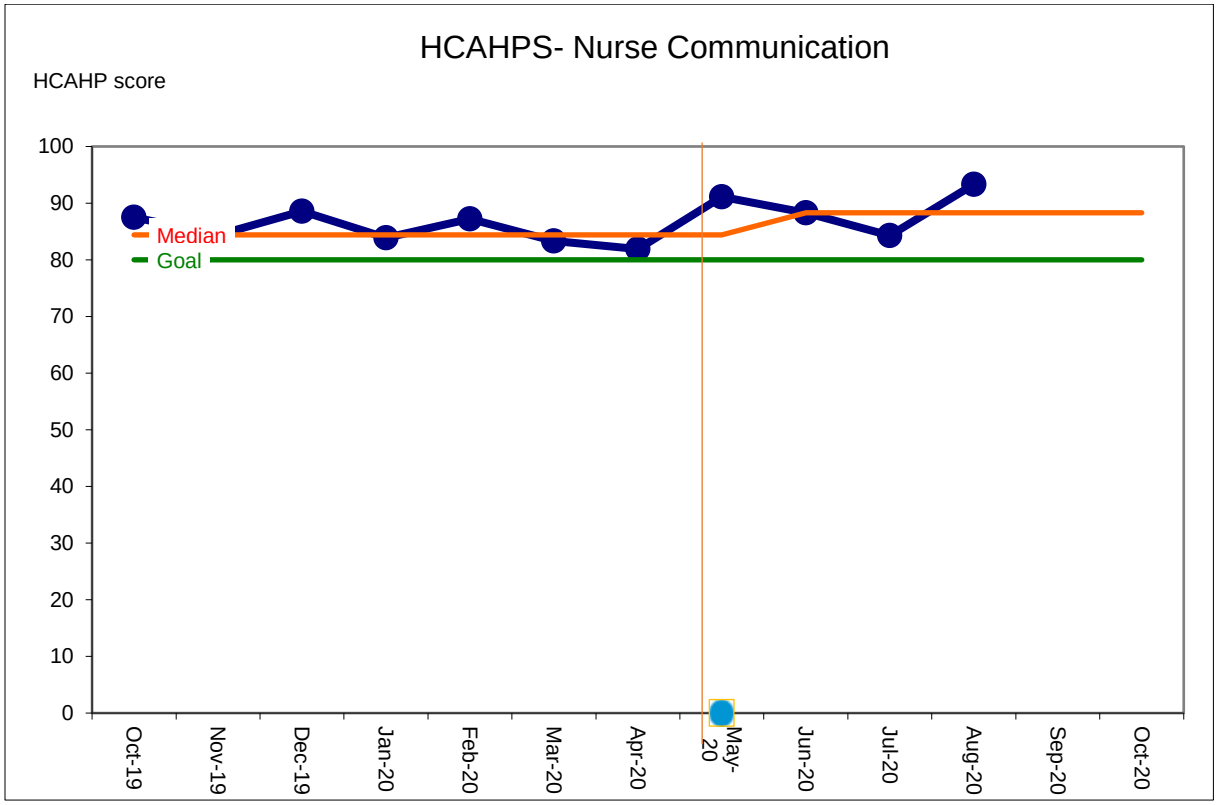
Visual Tracking Board Compliance



Urinalysis, Foley used before Urine Culture, Foley



Appendix N. Balancing Measure Result



Appendix O. Standard Work for Visual Tracking Board

Standard Work Description: Visual tracking board for daily review and prompt removal of indwelling urethral catheter				
Role Performing Activity:		Assistant Nurse Manager (ANM)		
Location:				
Dept:		Owner: Assistant Nurse Managers		
Date of Revision:	6-Jun-20	Total Cycle Time: Daily		
Summary:				
Related Documents:				
Quality Check		Safety Precaution		
◆		✚		

STEP Add symbols as needed	TASK/MAJOR STEP (What?)	KEY POINTS (How? Key tips and tools)	REASON (Why?)	CYCLE TIME
◆	Identify patients with indwelling urethral catheter (IUC) in unit	Use Health Connect to identify patients with urinary catheters		EVE shift
	Writes on visual tracking board room numbers, indication and plan for IUC	Visual tool for appropriate indications laminated and posted beside visual tracking board. Indwelling urethral catheter indication can be found on physicians progress notes clinical checklist and also in the nursing flowsheet, LDA documentation		EVE shift
◆	Review of patients with urinary catheter on ANM handoff	Indication and plan for all patients with lines reviewed on ANM handoff		between EVE and NOC shift
◆	Review of lines necessity with primary registered nurse (RN) on shift	Line necessity reviewed with primary RN and coach primary RN for excellence as appropriate		NOC shift
	Nursing sends a Dear Doctor note for patients needing physician review and orders to discontinued line	Write a communication under Dear Doctor tab using the .EBYfoley smartphrase to review and discontinue line as appropriate.	MD receives the communication early and is able to review and discuss plan for lines on MDR.	NOC shift
◆	Review of line necessity on ANM handoff	ANM goes over visual tracking board and reviews lines that needs to be discontinued	ANM ready to huddle with frontline staff lines that needs to be discontinued for the day	Between NOC and DAY shift
	Review of lines necessity with primary RN on day shift huddle	Huddle with frontline staff and review lines present in the unit	Primary RN aware and ready to discuss line necessity on NKE and MDR	DAY shift
	Follow up on orders to discontinue line that are no longer indicated			DAY shift
✚	Escalate to Unit Medical Director (UMD) if there are any issues with lines	Send cortext to (UMD) if escalation regarding lines is needed		DAY shift
◆	Ensure all lines that needs to removed are discontinued.			EVE shift
	Cross out all lines that are discontinued and updated board with interventions completed			EVE shift
	Takes a picture of visual tracking board and send picture through internal email to unit's leadership team.		To document process measure	EVE shift