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Reducing Patient Harm from Catheter Associated Urinary Tract Infections: A Quality
Improvement Project

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Abstract

Problem: The Institute of Medicine's seminal report on patient safety, *To Err Is Human* led to widespread effort to improve the safety of patients. Healthcare-associated safety problems, which include healthcare-associated infection (HAI), account for far more considerable morbidity and mortality than "never events". The first harm to be addressed as part of the "No Preventable Harms" campaign was catheter-associated urinary tract infection (CAUTI).

Context: The microsystem is a 20-bed mixed medical surgical intensive care unit. Unit assessment at the beginning of the quality project indicated that there were 2 CAUTIs attributed to the unit in a span of 6 months. CAUTI is associated with approximately \$15,000 to each patient care cost and increase length of hospital stay for an additional 5 to 7 days.

Intervention: To realize effective changes in the ICU and evaluate the action plan, changes are tested by incorporating patient lines on the multidisciplinary rounds (MDR) script to discuss accurate indication and date of insertion of the indwelling catheter. The staff nurse will articulate accurately the indication and confidently obtain an order to remove the catheter if the indication no longer exists during MDR. If the indwelling catheter is clinically indicated, the nurse ensures the bundles are in place such as presence of securement device, maintain an unobstructed flow, maintain drainage bag below level of the bladder, perform hand hygiene before and after patient contact and lastly, provide a labeled collection container for the patient.

Measures: The outcome measure for this project is to decrease the number of CAUTI in the ICU from 2 (April 2017 data) to 0 and further decrease the standardized infection ratio (SIR) of 1.48 by 50%. Compliance with catheter indication and or early removal when indication no longer exists would be the process measure, expecting 90% of compliance through random chart audits and MDR observation.

Results: The percent of ICU patients with accurate indwelling catheter indication during MDR is improving, but not yet stable. This requires on-going monitoring and feedback to ensure a standardized and reliable process. A positive trend indicates that non-indicated catheters are identified and discontinued during MDR and with regards to percent of ICU patients compliant with the CAUTI prevention bundle does not have enough data to establish a trend, but performance is moving in a positive direction indicates increasing compliance to the CAUTI bundle.

Conclusion: The last CAUTI in the unit was in November 2017. Solidifying the interventions into clinical practice will deter the development of CAUTI and supports this positive trend. Engaging staff and providers to reduce CAUTI rates to near zero requires a multidisciplinary approach and using the MDR as the venue commenced integration of the CAUTI prevention process into the front-line staff's daily routine. The data shows promise in standardizing the approach during MDR rounds to prevent CAUTI and a potential spread of practice to other units. In conclusion, the unit aims to decrease the standard infection ratio by 50% thus preventing CAUTI respectively.

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Section II. Introduction

The Institute of Medicine's seminal report on patient safety, *To Err Is Human* (IOM, 2000) led a widespread effort by healthcare providers to improve the safety of hospitalized patients, yet much is yet to be accomplished. Healthcare-associated safety problems, which include healthcare-associated infection (HAI), account for far more morbidity and mortality than “never events”—unexpected occurrences involving death or serious physiological injury (Saint et al., 2015). The first harm to be addressed as part of the *No Preventable Harms* campaign initiated by the IOM in collaboration with the Centers for Disease Control and Prevention (CDC) was catheter-associated urinary infection (CAUTI), which accounts for roughly one-third of all device-related infections (Saint et al., 2015). Approximately 25% of patients have an indwelling urinary catheter at any given time during hospitalization.

Problem Description

CAUTI is a common and harmful hospital-acquired infection (HAI) contributing to about 40% of all HAI in the U.S and costing hospitals between \$150 to \$450 million annually (Strouse, 2015). Evidence-based guidelines exist such as appropriate urinary catheter use, proper techniques for urinary catheter insertion and maintenance (CDC, 2007). All of the evidence shows a team approach is necessary to reduce CAUTI. Therefore, it is important to communicate the appropriate indication for use and early discontinuance of the catheter during MDR (See Appendix J) in the in-patient unit, such as an ICU, to decrease the incidence of CAUTI. Incorporation of leadership rounds in CAUTI prevention efforts were identified as necessary to ensure that expected practice changes occurred, and the appropriate groups or individuals were identified for follow-up (Purvis et al., 2017). A multidisciplinary approach, including the

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stepwise intervention strategy and CAUTI bundle, can significantly decrease utilization ratio and CAUTI rates (Gupta et al., 2017).

The inpatient ICU for this evidence-based change of practice project experienced two CAUTI events in a 12-month period (2016-2017) with a standardized infection ratio (SIR) of 1.48 against the target of 0.75. The aim of this project was to decrease the standard infection ratio by 50% by the end of August 2018.

Available Knowledge

PICOT Question

The PICOT question that guided the search for evidence in this project was: In an adult ICU (P) how does discussing the indication of an indwelling urinary catheter and obtaining an order to discontinue when not indicated (I) compare to no discussion or order to discontinue (C) reduce CAUTI (O) from April 2017 to August 2018? (T).

A comprehensive electronic search was conducted in January 2018 reviewing evidence that examined CAUTI prevention in acute care hospitals and system outcomes in the following databases: CINAHL Complete, Cochrane Database of Systematic Reviews, Pubmed, and Scopus. These databases were searched using combinations of the following search items: *CAUTI prevention, leader rounding, patient safety, hospital acquired infections, nursing bundle, staff-driven bundles, and nurse education*. Limitations were set to include English only, research, systematic reviews, randomized controlled trials, and publication dates no earlier than 2014. The search yielded 87 articles. Articles were considered for inclusion if they included analysis of CAUTI prevention and nurse-driven bundles.

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The Johns Hopkins Research Evidence Appraisal Tool 2017 (See Appendix A) was used to appraise the evidence for this review. The appraisal tool includes criteria to evaluate the strength and quality of the evidence.

Two studies were systematic review, a retrospective study, and one each were meta-synthesis, quasi-experimental, qualitative, and a descriptive study. The strongest were the systematic reviews, the retrospective study, the descriptive study, and the qualitative study with evidence ratings from VB to IIA. The three remaining articles (two non-experimental studies and a quality improvement study) were rated between VB and IIIB. (See Appendix M.)

Literature Review

Urinary tract infections (UTIs) are one of the most common types of healthcare-associated infection reported to the National Healthcare Safety Network (CDC, 2007). Among UTIs acquired in the hospital, approximately 75% are associated with a urinary catheter. Approximately 35% to 40% of all hospital-acquired infections (HAIs) in the United States are caused by CAUTI and cost hospitals \$150 to \$450 million annually to treat (Strouse, 2015). Additionally, the risk of infection increases 3% to 5% each day an indwelling catheter remains in use. Each CAUTI event can extend a patient's hospital length of stay. Furthermore, CAUTI is the most preventable type of HAI revealing 95,000 to 388,000 avoidable infections per annum (Strouse, 2015).

Between 15% to 25% of hospitalized patients receive short-term indwelling urinary catheters (CDC, 2017). In most cases, catheters are placed for inappropriate indications, and healthcare providers are often unaware that their patients have catheters, leading to prolonged, unnecessary use. Furthermore, an estimated 17% to 69% of CAUTI may be preventable with

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recommended infection control measures, which means that up to 380,000 infections and 9,000 deaths related to CAUTI per year could be prevented (Gould, Umscheid, Agarwal, Kuntz, & Pegues, 2016). The duration of indwelling urinary catheterization is an important risk factor for urinary tract infections. A devised strategy to decrease the utilization of indwelling urinary catheters (IUCs) will significantly decrease IUC use and CAUTI rate (Gupta et al., 2017).

Different approaches to disease prevention were investigated by Tenke, Mezei, Bode and Coves (2016). They determined that the most effective methods of prevention were avoiding unnecessary catheterizations and removing catheters as soon as possible. Multiple studies of the literature stated three fundamental components that are essential to prevent CAUTI include appropriate use of indwelling catheters, utilization of proper procedures for insertion, and utilization of proper techniques for catheter maintenance (Strouse, 2015). Catheter care also involves collaborative care. Therefore, rigorous training of nurses and everyone else involved in catheter care, is essential in CAUTI prevention (Gesmundo, 2016). Nurse-driven protocols (Durant, 2017) are useful in the timely discontinuance of the indwelling catheter when the indication no longer exists.

Rationale

One of the most challenging yet important roles in leadership is to effectively lead necessary changes to improve quality care for patients. The ADKAR change model (See Appendix G) presents an opportunity for effective change in the prevention of CAUTI. ADKAR is an acronym of the stages that an organization or an individual overcomes to succeed through the change: awareness, desire, knowledge, ability, and reinforcement (Paun, 2014). To be successful, there must be awareness for the need to change, the desire for the individual to

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participate, the knowledge necessary for implementation, ability to produce essential changes, and reinforcement to sustain the change.

Specific Project Aim

Patients admitted to the hospital, most especially the ICU are there to heal and return to their lives without any complications. It is evident that many CAUTIs are preventable and HAI such as CAUTI is considered a never event. CAUTI not only increases the patients' length of stay and recovery process but adds financial burden to the patients and the organization as well. The specific aim of this project is to decrease the standard infection ratio by reducing the number of CAUTI from a baseline of 2 to 0 by the end of August 2018.

Section III. Methods

Context

To realize effective changes in the ICU and evaluate the action plan, it is important to understand that change needs to be assimilated into the unit and normalized into the culture by individual participation in the initiatives. During the microsystem assessment, it was noted that catheters were being placed with no clear rationale for insertion nor continuation. Furthermore, in the ICU, catheters weren't discussed until the patient was ready for transfer to another unit or discharged to home. A SWOT analysis (See Appendix H) was conducted for a better understanding of the microsystem and help the unit identify and understand key issues affecting the project moving forward. A prevalent strength in the initiation of this project was the support from the organizations' stakeholders in the implementation of evidence-based practice. Additionally, the unit's culture in embracing change and their knowledge of evidence-based practice made this project a success. A few weaknesses were identified in the unit, including

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high turnover of ICU nurses, constant on-boarding and training of new staff, and the absence of nurse-driven protocols as part of an ongoing effort to prevent CAUTI. Opportunities were ongoing staff education, staff engagement in making changes in the unit, and improvement of overall patient outcomes. The threats encountered were the nurses' changes in practice, inability to focus on CAUTI prevention due to other competing priorities, and resistance to the changes.

The changes tested were incorporating patient lines on the MDR script (See Appendix J) to discuss the indication and date of insertion of the indwelling catheter. One of the most challenging yet important roles in leadership was to effectively lead necessary changes to improve quality care for the patients. The ADKAR change model presented an opportunity for effective change in the prevention of CAUTI. The ADKAR model provides building blocks for improving the connection between individual performance behavior and organizational change management for better results. What really gives this model the edge is its emphasis on individual change.

Improvements in the quality of care within an organization cause a ripple effect that can produce secondary financial return in the form of shorter lengths of stay, fewer readmissions and similar measures closely related to quality. The quality improvement project in the prevention of CAUTI in the ICU generated current cost savings of approximately \$24,000 thus far.

Intervention

The ICU staff was asked to look at the date of insertion and indication of all lines focusing on the indwelling catheters every day during MDR in contrast to the previous practice of addressing the lines only when the patient was ready to transition out of the ICU. The front-line staff then identifies the indication and articulates the indication during MDR. Additionally,

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the nurse obtains the order for removal of catheter when the indication does not exist.

Furthermore, the nurses ensure all CAUTI prevention bundles are in place for all patients that have the indwelling urinary catheter. The bundle defines a cluster of evidence-based interventions designed to prevent CAUTI. The team members came up with a tracer audit tool to ensure that changes in practice were taking place (See Appendix K). During the plan-do-study-act (PDSA) (See Appendix F), it was challenging to find all the needed information, most specifically the date of insertion, due to the many steps required. Therefore, the staff was not consistently reporting the date of insertion. Another method applied to evaluate change in practice was through leader rounding of the patient's environment to ensure all the essential measures were being practiced by the staff and real-time feedback is given to provide on-going education. Active participation by the nurses during MDR strengthened not only nurses' confidence but improved health outcomes as well. Direct observation during MDR by the management team, shift lead, and committee members is an ongoing opportunity to ascertain that the individual is adapting to the changes. The manager will ultimately be able to discern any gaps and provide training, clarity, on-going education, and coaching to increase nurses' confidence in their changes in practice.

Study of the Intervention

During MDR the nurses were observed articulating the necessity of the patient's indwelling catheter. However, upon further chart review, the indication did not accurately reflect the patient's diagnosis nor further need for the indwelling catheter. The most common indication charted during chart review in the ICU was the necessity of the indwelling catheter for strict output monitoring. The presence of an external male and female urinary catheter in the ICU abates the need for an indwelling catheter, unless acute urinary retention is present. Additionally,

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nurses articulate the need to keep the urinary indwelling catheter if a patient has any planned procedure. In fact, an indwelling catheter is indicated for perioperative use only for selected surgical procedures such urologic surgery or other surgery on contiguous structures of the genitourinary tract, anticipated prolonged duration of surgery, patients anticipated to receive large-volume infusions or diuretics during surgery, and need for intraoperative monitoring of urinary output (CDC, 2007). Consistent leadership observation during MDR and real-time coaching was helpful in the ongoing efforts to educate the front-line staff and enhance practice change.

Measures

The outcome measure for this project was to decrease the number of CAUTI in the ICU from 2 to 0 and further decrease the SIR by 50% based on the Infection and Control update report. Compliance with accurate catheter indication and or early removal when not indicated is the process measure, with expected 90% compliance through random chart audits and MDR observation. The balancing measure is a probable increase in CAUTI caused by re-insertion of an indwelling catheter when indicated and a possible skin breakdown with the use of external catheters. That data can be obtained from the Infection and Control update report and the Wound Care Daily Report (See Appendix C).

Ethical Considerations

To address the ethical considerations of this project, staff involvement to educate the patient and family is needed to expand discussions about appropriate indication for the indwelling catheter use and the discontinuance of the catheter when no longer indicated. Additionally, any type of communication in relation to the project is done with honesty and

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transparency. Several experiences from the bedside nurses implied the refusal of some of the patients or family to discontinue the indwelling catheter for comfort purposes like difficulty to get out of bed in time. This touches the autonomy of the patient and family in making a decision about their care and what they think is best for them. However, conflicts with the principle of beneficence for the medical team in making sure the intervention provided is clinically indicated and what is best for the patient.

There are no ethical implications for the interventions of this project. The purpose of this project is to improve communication with patients which is part of the usual care provided to them. Patient consent is not needed as this does not involve research. This project meets the guidelines for the Evidence-based Change in Practice Project as outlined in the Project Checklist and Statement on Non-Research Determination Form (See Appendix B). It was reviewed by faculty and is determined to qualify as an Evidence-based Change in Practice Project, rather than a research project. An Institutional Review Board (IRB) review is not required.

Section IV. Results

Results

The outcome measure for this project, to decrease if not eradicate CAUTI in the ICU, showed positive results. Performance is improving, but not yet stable. To ensure a standardized and reliable process, ongoing staff monitoring, and feedback is required. Furthermore, a positive trend shows that non-indicated catheters are being identified and discontinued during MDR (See Appendix L). The tracer audit tool implemented ensures the nurses are following the CAUTI prevention bundle if an indwelling catheter for the patient is indicated. There is not enough data about prevention bundles to identify a trend, but performance is moving in a positive direction

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with increasing compliance to the CAUTI bundle. The last CAUTI in the unit was in November 2017. Solidifying the interventions into clinical practice will deter the development of CAUTI, supporting this positive trend.

Section V. Discussion

Summary

Infection is the most important adverse outcome of urinary catheter use. Catheter use is associated with negative outcomes in addition to infection, including nonbacterial urethral inflammation, urethral strictures, mechanical trauma, and mobility impairment. CAUTI has been reported to be associated with increased mortality and length of stay. The duration of catheterization is the most important risk factor for developing infection. Reducing unnecessary catheter placement and minimizing the duration of catheterization are the primary strategies for CAUTI prevention (Lo et al., 2014).

The key findings in making this project a success began with the assessment of the microsystem, identifying strengths, weaknesses, opportunities and threats. Understanding the baseline knowledge of CAUTI prevention in the unit helped institute committee work that can drive CAUTI prevention efforts moving forward. The committee then started the PDSA cycle in refining implementation and started the quality improvement project in reducing patient harm from CAUTI.

Improvement projects can instill many important lessons about teams, communication, processes, and behaviors over time. These lessons can be used to create a process change, run efficient meetings, and work towards building a better team. The best discovery from a project is

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the potential to improve on the next undertaking. For this particular project, the most valuable lesson learned was getting prepared with a framework, a SMART goal that stands for specific, measurable, attainable, realistic and, time framed. Sharing that information with the team at the first meeting helped set the stage. This framework constantly was a guide to organize the work, assess improvement, and evaluate successes or failures to steer the project in the right direction.

This project will continue until August 2018, so the final result has not yet been fully ascertained. Currently, the nurses are consistently articulating the indication for an indwelling catheter during MDR and obtaining an order to discontinue the indwelling catheter if the indication no longer exists. Where an indwelling catheter is indicated, the nurses ensure that the CAUTI prevention bundle is in place. The team is launching the shift by shift tracer audit and “foley police”—oversight and one-on-one dialogue with the nurses who are falling out on their bundles.

Conclusions

The opportunity to gather all the evidence, tools and resources to lead a positive change in patients’ outcomes is rewarding. To witness the team coming together to study, learn, brainstorm and problem solve brings to fruition the project implementation in the unit. The result impacts the patient and contribute to developing a culture in the unit of working together, collaborating with stakeholders, and putting individualized patient care at the center of the microsystem. This change in practice improvement opened doors to other performance improvements in the unit. This project is expected to be sustainable due to the partnership of leadership and the frontline staff.

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By experiencing this project improvement to prevent CAUTI in the ICU, the CNL student learned to assess risks, implement best practices based on evidence, coordinate care, communicate inter-professionally, lead teams, and measure outcomes. The experience will not only develop front-line staff at the microsystem but polish and prepare the CNL to transform each involved nurse to advance in their profession.

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Section VII. Appendices

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Appendix A

**Johns Hopkins Nursing Evidence-Based Practice
Appendix E: Research Evidence Appraisal Tool**

Evidence Level and Quality: _____

Article Title:		Number:	
Author(s):		Publication Date:	
Journal:			
Setting:		Sample (Composition & size):	
Does this evidence address my EBP question?	<input type="checkbox"/> Yes	<input type="checkbox"/> No Do not proceed with appraisal of this evidence	
Level of Evidence (Study Design)			
A. Is this a report of a single research study? <i>If No, go to B.</i> 1. Was there manipulation of an independent variable? 2. Was there a control group? 3. Were study participants randomly assigned to the intervention and control groups?		<input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No
If Yes to all three, this is a Randomized Controlled Trial (RCT) or Experimental Study →		<input type="checkbox"/> LEVEL I	
If Yes to #1 and #2 and No to #3, OR Yes to #1 and No to #2 and #3, this is Quasi Experimental (some degree of investigator control, some manipulation of an independent variable, lacks random assignment to groups, may have a control group) →		<input type="checkbox"/> LEVEL II	
If No to #1, #2, and #3, this is Non-Experimental (no manipulation of independent variable, can be descriptive, comparative, or correlational, often uses secondary data) or Qualitative (exploratory in nature such as interviews or focus groups, a starting point for studies for which little research currently exists, has small sample sizes, may use results to design empirical studies) →		<input type="checkbox"/> LEVEL III	
NEXT, COMPLETE THE BOTTOM SECTION ON THE FOLLOWING PAGE, "STUDY FINDINGS THAT HELP YOU ANSWER THE EBP QUESTION"			

**Johns Hopkins Nursing Evidence-Based Practice
Appendix E: Research Evidence Appraisal Tool**

B. Is this a summary of multiple research studies? If No, go to Non-Research Evidence Appraisal Form.		<input type="checkbox"/> Yes	<input type="checkbox"/> No
1. Does it employ a comprehensive search strategy and rigorous appraisal method (Systematic Review)? If No, use Non-Research Evidence Appraisal Tool; if Yes:		<input type="checkbox"/> Yes	<input type="checkbox"/> No
a. Does it combine and analyze results from the studies to generate a new statistic (effect size)? (Systematic review with meta-analysis)		<input type="checkbox"/> Yes	<input type="checkbox"/> No
b. Does it analyze and synthesize concepts from qualitative studies? (Systematic review with meta-synthesis)		<input type="checkbox"/> Yes	<input type="checkbox"/> No
If Yes to either a or b, go to #2B below.			
2. For Systematic Reviews and Systematic Reviews with meta-analysis or meta-synthesis:			
a. Are all studies included RCTs?	→ □ LEVEL I		
b. Are the studies a combination of RCTs and quasi-experimental or quasi-experimental only?	→ □ LEVEL II		
c. Are the studies a combination of RCTs, quasi-experimental and non-experimental or non-experimental only?	→ □ LEVEL III		
d. Are any or all of the included studies qualitative?	→ □ LEVEL III		
COMPLETE THE NEXT SECTION, "STUDY FINDINGS THAT HELP YOU ANSWER THE EBP QUESTION"			
STUDY FINDINGS THAT HELP YOU ANSWER THE EBP QUESTION:			

NOW COMPLETE THE FOLLOWING PAGE, "QUALITY APPRAISAL OF RESEARCH STUDIES", AND ASSIGN A QUALITY SCORE TO YOUR ARTICLE

Quality Appraisal of Research Studies					
<ul style="list-style-type: none"> • Does the researcher identify what is known and not known about the problem and how the study will address any gaps in knowledge? • Was the purpose of the study clearly presented? • Was the literature review current (most sources within last 5 years or classic)? • Was sample size sufficient based on study design and rationale? • If there is a control group: <ul style="list-style-type: none"> ○ Were the characteristics and/or demographics similar in both the control and intervention groups? ○ If multiple settings were used, were the settings similar? ○ Were all groups equally treated except for the intervention group(s)? • Are data collection methods described clearly? • Were the instruments reliable (Cronbach's α [alpha] ≥ 0.70)? • Was instrument validity discussed? • If surveys/questionnaires were used, was the response rate $\geq 25\%$? • Were the results presented clearly? • If tables were presented, was the narrative consistent with the table content? • Were study limitations identified and addressed? • Were conclusions based on results? 	<input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No	<input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA <input type="checkbox"/> NA		
Quality Appraisal of Systematic Review with or without Meta-Analysis or Meta-Synthesis					
<ul style="list-style-type: none"> • Was the purpose of the systematic review clearly stated? • Were reports comprehensive, with reproducible search strategy? <ul style="list-style-type: none"> ○ Key search terms stated ○ Multiple databases searched and identified ○ Inclusion and exclusion criteria stated • Was there a flow diagram showing the number of studies eliminated at each level of review? • Were details of included studies presented (design, sample, methods, results, outcomes, strengths and limitations)? • Were methods for appraising the strength of evidence (level and quality) described? • Were conclusions based on results? <ul style="list-style-type: none"> ○ Results were interpreted ○ Conclusions flowed logically from the interpretation and systematic review question • Did the systematic review include both a section addressing limitations and how they were addressed? 	<input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No			
QUALITY RATING BASED ON QUALITY APPRAISAL					
A High quality: consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence					
B Good quality: reasonably consistent results; sufficient sample size for the study design; some control, and fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence					
C Low quality or major flaws: little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn					

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Appendix B

Statement of Non-Research Determination Form

**CNL Project: Statement of Non-Research Determination Form****Student Name: Grace C. Cooper****Title of Project:**

Catheter associated urinary tract infection (CAUTI) prevention

Brief Description of Project: CAUTI is a common and harmful hospital acquired infection (HAI) and attributes to about 40% of all HAI in the U.S and can cause health care organizations about \$150 to \$450 million annually. Evidence-based guidelines exist about catheter use and mitigating CAUTI risk requires a team approach. Therefore, it is important to communicate the appropriate indication and early discontinuance of the catheter during multi-disciplinary rounds (MDR) in the ICU to decrease the incidence of CAUTI

A) Aim Statement: The aim of this project is to decrease the number of catheter-associated urinary tract infection (CAUTI) in the intensive care unit from a baseline of 2 to 0 by August 2018 by discussing the indication and or discontinuance of urinary indwelling catheter during multidisciplinary rounds.

B) Description of Intervention: Compliance with catheter indication and or early removal when indication no longer exists by active discussion during multidisciplinary rounds (MDR)

C) How will this intervention change practice? This will increase awareness in the indication of appropriate urinary catheter use and early removal when the indication no longer exists.

D) Outcome measurements:

Decrease the number of CAUTI in the ICU from a baseline of 2 (Jan to Oct 2017 data) to a target of 0.

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>

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Health Professions

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

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

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

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

Project Title:	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 X hospital or agency and as such was not formally supervised by the Institutional Review Board."	X	

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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): Grace C. Cooper

DATE: 2/4/2018

SUPERVISING FACULTY MEMBER NAME (Please print):

Dr. Nancy Taguino

Signature of Supervising Faculty Member

DATE

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Appendix C

Family of Measures

††

Outcome Measure	Data Source	Target
Decrease the number of CAUTI in the ICU from a baseline of 2 (Jan to Oct 2017 data)	S L Infection and Control Update Report	0
Process Measure		
Compliance with catheter indication and or early removal when indication no longer exists.	Chart audits	90%
Balancing Measure		
Increase in CAUTI that is caused by re-insertion of an indwelling catheters	S L Infection and Control Update Report	0

□

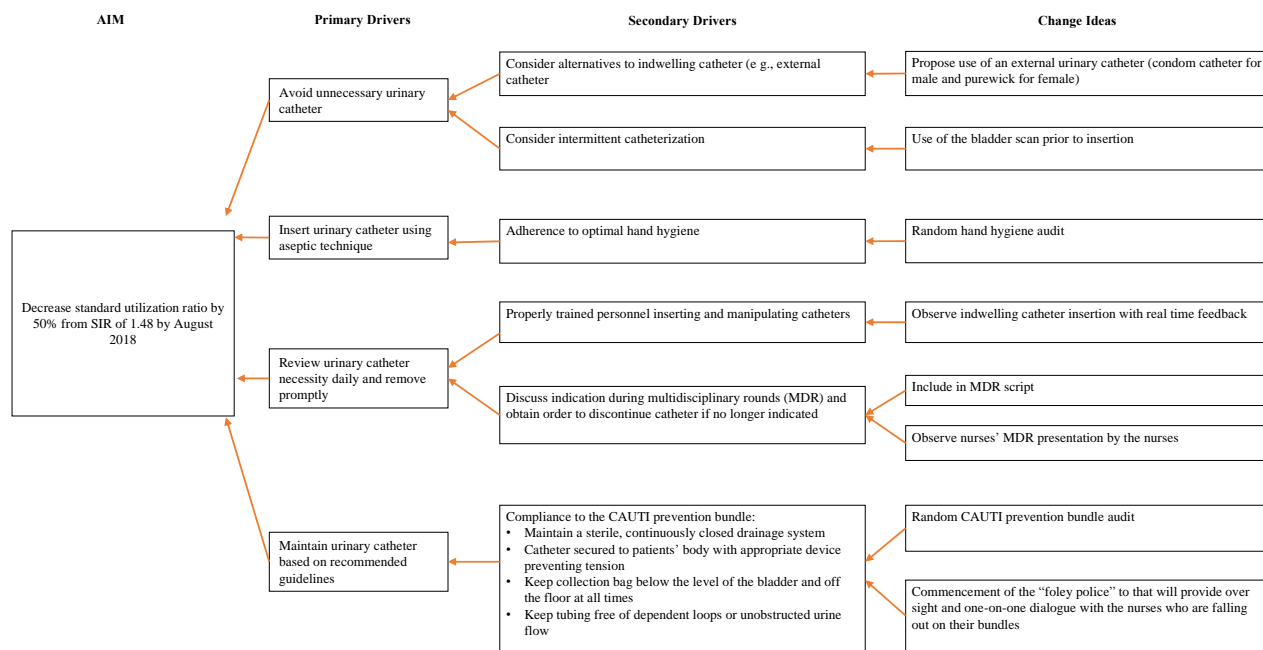
Project Timeline

	Oct 8	Nov	Dec	Dec	Dec-Mar	Dec-Mar	Apr	May	Aug
Define Topic									
Aim Statement and Background									
Measures Develop Charter									
Measurement Strategy									
Collect Data Identify Changes to Test									
Complete Charter									
Driver Diagram									
Finalize Charter Prepare Presentation									
Final Presentation									

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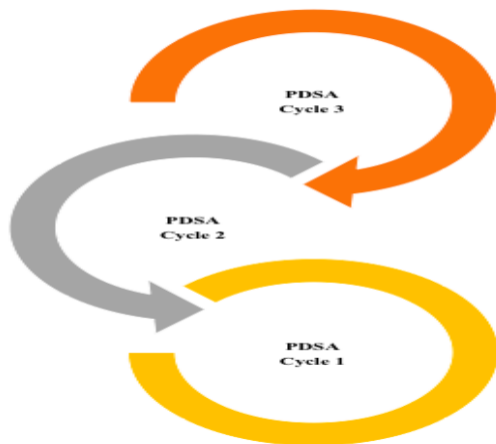
Appendix E

Driver Diagram



Appendix F

PDSA Cycle



PDSA Cycle 1: Educate staff accurate indications for indwelling catheter in the ICU.

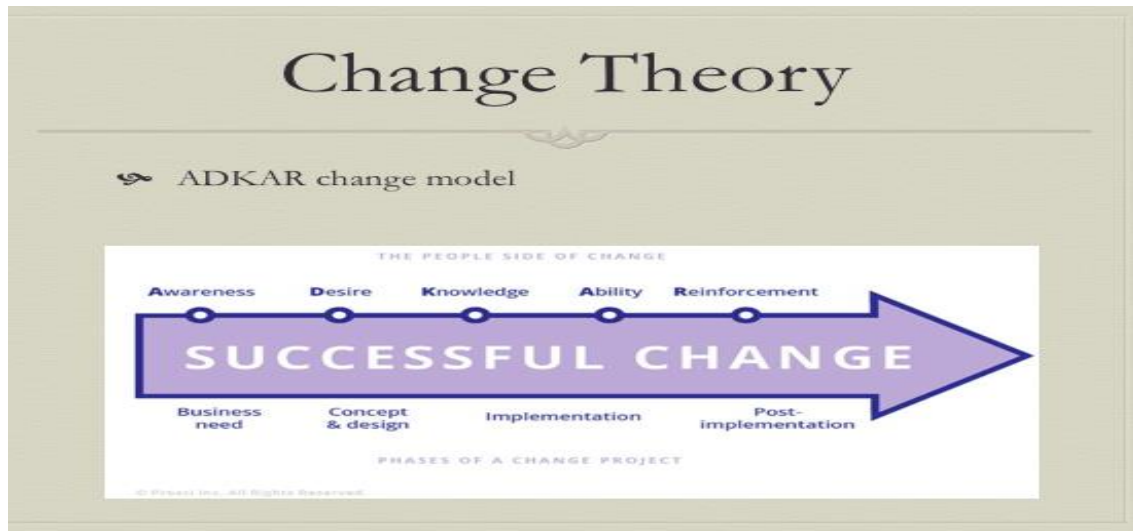
PDSA Cycle 2: Include indwelling catheter indication in the MDR script and obtain order to discontinue catheter when indication no longer exists.

PDSA Cycle 3: Develop a tracer audit to ensure all CAUTI prevention bundle is in place and creation of a "foley police" that will have a one to one dialogue with staff who are falling out on their bundle.

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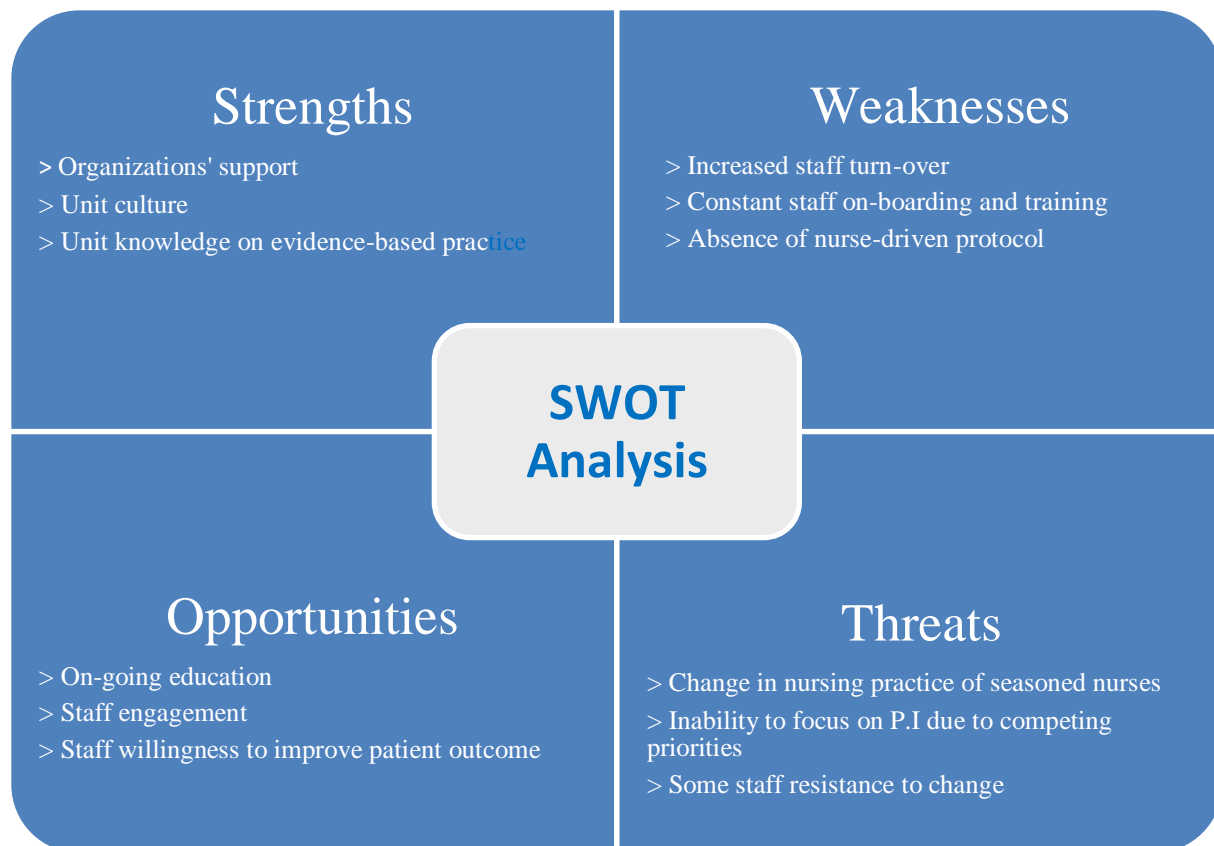
Appendix G

Change Theory



Appendix H

SWOT Analysis



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Appendix I

Return of Investment (ROI)

2 cases of CAUTI occurred at the beginning of the quality project

Description	Calculation per month	Calculation per year
Decrease patient length of stay (LOS) per case: 5 days	Expected number of days decrease in 1 month = 5	Expected number of days decrease in 1 year = 10 days
Improvement Cost	Cost of staff education and training: Number of staff x time x rate per hour: 7RNs x 2 hours committee work x \$60.00 approximate wages = \$840.00	Cost of staff education and training in 1 year: \$840.00 x 3 times = \$2,520.00
Calculated Revenue: Saving per day LOS: \$2,166.00	Savings per day on reduction of LOS: \$2166.00	Total revenue: number of days reduced LOS in a year x cost per day (12 x \$2166.00 = \$25,992.00)
Calculated Return of Investment (ROI)		Total Revenue – Total Cost: (\$25,992 - \$2,520 = \$23,472.00)
		Initial Annual Saving: \$23, 472.00

Cost Avoidance Measure

Description	Cost Avoidance Measure	Assume Reduction by 50%	Cost Savings
CAUTI: 2 cases in a 12-month rolling period	Average loss per CAUTI case: \$14,000 x 2 cases= \$28,000	\$14,000	\$14,000

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Appendix J

MDR Script

ICU MULTIDISCIPLINARY ROUNDS: (Total RN Time: 1-2 min presentation)	BEFORE SHIFT ENDS (Have you charted?)
<ul style="list-style-type: none"> ● Diagnosis ● RASS & CAM ICU ● SAT= pass or fail? Why? ● Blood Sugar: _____ <ul style="list-style-type: none"> ➢ Current coverage: _____ <p>State your recommendation if out of the (80-180 range & follow escalation process, nph, insulin drip?)</p> <ul style="list-style-type: none"> ● Lines/ drains- obtain DC order if not indicated <ul style="list-style-type: none"> ➢ Foley _____ indication ➢ Foley: _____ days ➢ CL _____ indication (state location if FEMORAL) ➢ CL: _____ days ➢ PICC _____ indication ➢ PICC: _____ days ● Mobility/ Prior Level of Function (State goal for the day and time planned) <p>Are we meeting all goals? Speak to exceptions (only mention what we are missing). Say if not indicated (ex. bleeding risk).</p> <ul style="list-style-type: none"> ➢ DVT prophylaxis ➢ PUD prophylaxis ➢ Chlorhexidine ● Overall Goals for the Day/ Recommendations 	<ul style="list-style-type: none"> ● CAM ICU (8A, 1600 and new admits on your shift) ● SAT (8A- coordinate with RT for SBT) ● Mobility (All movement counts) ● SCDs, I.S, Skin (turning q2) ● Restraints (q2 & order renewal) ● Sedation (meets ordered parameters, q1h RASS if no changes) ● BPAM <ul style="list-style-type: none"> ➢ Pre-transfusion verification (consent, blood product & 2 pt identifiers). ➢ Second verifier ➢ Pre-meds given? ➢ V/S (pre-transfusion, 15 mins, 1hour, post-transfusion) ➢ “Stopped” and “Complete” documentation

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Appendix K

ICU CAUTI Tracer Auditing

The following list will be what auditors are looking for when auditing line necessity and charting.

CAUTI Prevention:

1. Was catheter necessity documented at least once each shift and *does this accurately meet defined criteria for catheter necessity?*

Y ☐ ☐ N ☐ ☐

2. Is the catheter secured to the patient's body with appropriate device?

Y ☐ ☐ N ☐ ☐

3. Is the bag below the bladder?

Y ☐ ☐ N ☐ ☐ ☐

4. Is the tubing free of dependent loops?

Y ☐ ☐ N ☐ ☐ ☐

5. Is the bag and/or tubing secured to the bed/chair to prevent tension?

Y ☐ ☐ N ☐ ☐ ☐

6. Is the bag hanging free from the floor?

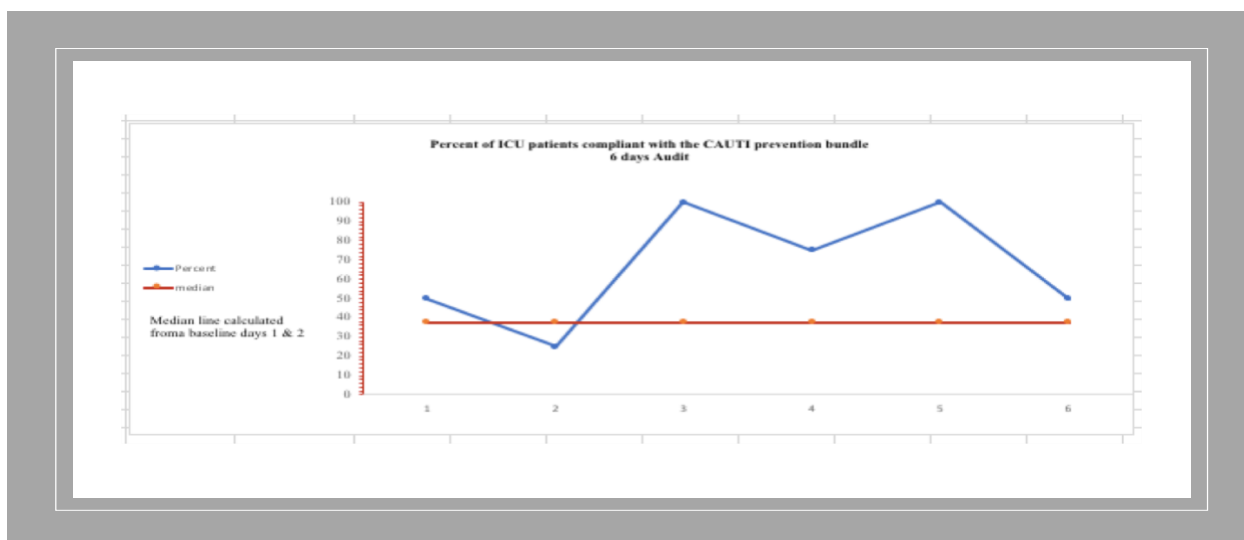
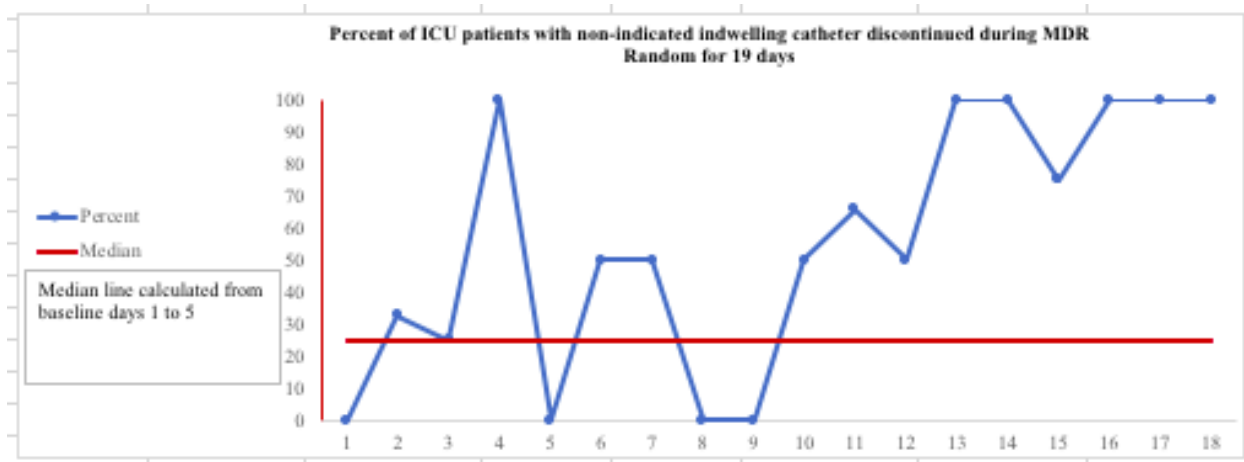
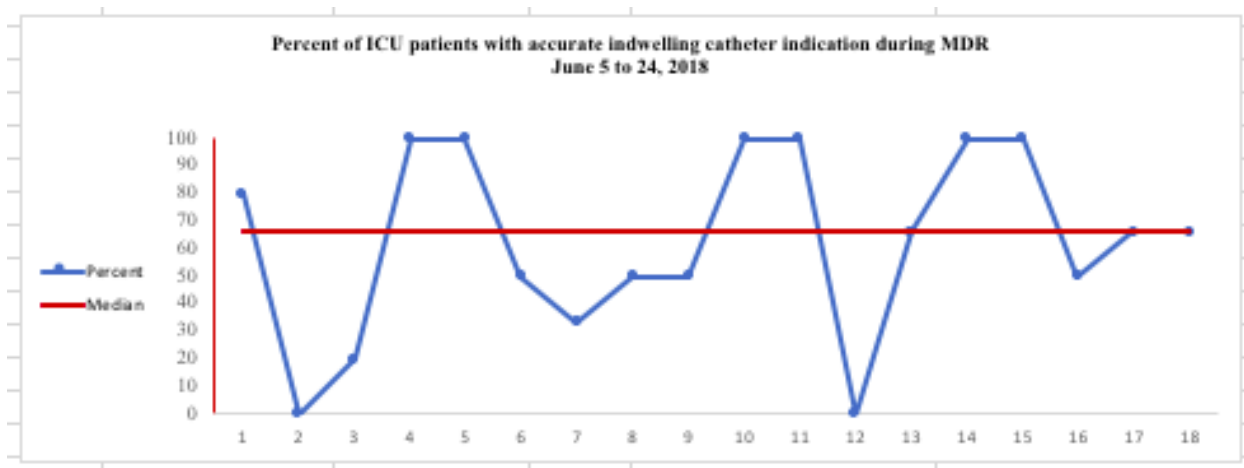
Y ☐ ☐ N ☐ ☐ ☐

7. Has catheter care been documented once per shift?

Y ☐ ☐ N ☐ ☐ ☐




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Appendix L


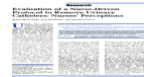


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Appendix M

Study	Design	Sample	Outcome/Feasibility	Evidence rating
Durant, D. J. (2017) Major Article: Nurse-driven protocols and the prevention of catheter-associated urinary tract infections: A systematic review. <i>American Journal of Infection Control</i> , 45(12), 1331-1341. Doi:10.1016/j.ajic.2017.07.020	Systematic Review	None	Nurse Driven Protocols appear to have a positive impact on the clinical predictors and prevalence of CAUTI.	Level V B 
Gupta, S. S., MD, Irukulla, P. K., MBBS, Shenoy, M. A., MBBS, Nyemba, V., MD, Yacoub, D., RN, BSN, MPA, CIC, & Kupfer, Y., MD. (2017). Successful strategy to decrease indwelling catheter utilization rates in an academic medical intensive care unit. <i>American Journal of Infection Control</i> , 45, 1349-1355. https://doi.org/10.1016/j.ajic.2017.06.020	Retrospective Study	A 20 bed Medical ICU	The study showed that a multidisciplinary approach, including the stepwise interventions strategy and CAUTI bundle, can significantly decrease the IUC utilization ratio and CAUTI rates.	Level IV A 
Gesmundo, Monina (2016) Enhancing Nurses' Knowledge on Catheter- Associated Urinary Tract (CAUTI) Prevention. <i>Kai Tiaki Nursing Research</i> , 7(1), 32-40. http://0-eds.a.ebscohost.com.ignacio.usfca.edu/eds/pdfviewer/pdfviewer?vid=1&sid=ee843bc7-7435-469b-8130-2ee293041e6e%40sessionmgr4009	Interrupted time series (ITS) design, quasi experimental	2 Post Op wards of a tertiary hospital	The CAUTI education package had a significant impact on nurses' knowledge of indwelling catheter management and CAUTI prevention.	Level II A 

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Purvis, S., Kenny, G. D., Knobloch, M. J., Merver, A., Marx, J., Rees, S.,...Shirley, D. (2017). Incorporation of Leadership Rounds in CAUTI Prevention Efforts. <i>Journal of Nursing Care Quality</i> , 32(4), 318-323. Retrieved from http://0-dx.doi.org.ignacio.usfca.edu/10.1097/NCQ.0000000000000239	Systematic Review	None	Indwelling urinary catheter days and CAUTI rates significantly decreased with implementation of leadership rounds.	Level IV A 
Olson-Sitki, K., Kirkbride, G., & Forbes, G. (2015). Evaluation of a nurse-driven protocol to remove urinary catheters: Nurses' perceptions. <i>Urologic Nursing</i> , 35(2), 94-99. doi:10.7257/1053-816X.2015.35.2.94	Descriptive	91 Nurses	Implementation of a nurse-driven urinary catheter removal protocol significantly improved nurses' perceptions of job ease and patient feedback.	Level V B 
Fletcher, K. E., Tyszka, J. T., Harrod, M., Fowler, K. E., Saint, S., & Krein, S. L. (2016). Qualitative validation of the CAUTI Guide to Patient Safety assessment tool. <i>American Journal of Infection Control</i> , 44, 1102-1109. doi: https://doi.org/10.1016/j.ajic.2016.03.051	Qualitative Study	49 participants from 4 MICU & 4 M/S units	Using the GPS to assess several stakeholders' views could allow a given unit to move its CAUTI prevention efforts forward in a more informed manner.	Level III B 