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# Improving catheter-associated urinary tract infections in the intensive care unit: implementation of a rounding tool to enhance communication and collaboration.

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# Improving Catheter-associated Urinary Tract Infections in the Intensive Care Unit: Implementation of a Rounding Tool to Enhance Communication and Collaboration

by

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## Dedication

*I would like to dedicate this manuscript to my three sons: Hunter, Hayden, and Rowdy. I hope you always know that all things in life I do for you, my greatest blessings.*

**Acknowledgments**

I would like to acknowledge and express my deepest gratitude and appreciation to my project chair Dr. Shannon Shumaker for her support and guidance throughout the course of this DNP project. I would also like to acknowledge and thank the nurses who participated in this project for their time and extra commitment. Additionally, I would like to extend a special thank you to my loving parents, devoted husband, and dearest Nana, who supported me unwaveringly along this journey.

## Abstract

**Background/Significance:** Catheter-associated urinary tract infections (CAUTIs) are avoidable and costly healthcare-associated infections (HAIs) and are associated with high morbidity and mortality. A rise in CAUTIs at the project site, and the need for a standardized CAUTI prevention communication process, prompted this quality improvement project.

**Purpose:** The purpose of this quality improvement project was to decrease CAUTIs through improved communication and collaboration amongst the critical care team.

**Methods:** Twelve nurses completed the Collaboration and Satisfaction about Care Decisions (CSACD) questionnaire pre- and post- intervention which, evaluated communication and collaboration. Nurses also assessed IUC indication and removal during interdisciplinary rounds.

**Intervention:** This project incorporated a rounding tool that addressed IUC maintenance, during interdisciplinary rounding, to improve interdisciplinary communication and collaboration and facilitate early IUC removal, among intensive care unit (ICU) patients.

**Results:** Fifty percent of participants demonstrated an improvement in CSACD scores from pre- to post-intervention; however, this improvement was not statistically significant ($p = 0.118$). CAUTI rates remained unchanged; IUC utilization rates increased.

**Discussion:** Although communication and collaboration scores did not demonstrate a statistically significant improvement, the results demonstrate clinical significance. With rounding tool implementation, nurses were able to identify patients without proper indication for IUCs and discuss removal with the care team.


*Key words:* Catheter-associated urinary tract infection, healthcare-associated infection, indwelling urinary catheter, rounding tool, interdisciplinary communication, multidisciplinary rounding, intensive care unit

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## Improving Catheter-associated Urinary Tract Infections in the Intensive Care Unit: Implementation of a Rounding Tool to Enhance Communication and Collaboration

The United States Department of Health and Human Services (HHS) (2021) defined HAIs as nosocomial infections, originating from a healthcare facility, that individual's contract while obtaining care. These infections are not present at the initial time care is received and are contracted from the facility at some point due to various, often preventable, causes. CAUTIs are the most common type of HAIs and are known to cause serious complications (Werneburg, 2022). CAUTIs are often directly related to indwelling urinary catheterization, with approximately 75% of urinary tract infections (UTIs) acquired in the hospital being associated with a urinary catheter (Centers for Disease Control and Prevention [CDC], 2015).

A CAUTI occurs when microorganisms migrate along the urinary catheter, enter the urinary tract, and cause an infection (Iowa Department of Public Health, 2021). There are many factors that contribute to CAUTI occurrences, with IUC placement the primary predisposing factor. After a IUC is inserted, duration of catheterization is the leading risk factor for CAUTI occurrence; there is a 5% risk for UTI development each day an IUC is in place (Chen et al., 2013).

Patients residing in the ICU have the highest risk for CAUTI development, due to the frequency and length of IUC use (Alqarni, 2021). Additionally, the critically ill population is at an elevated risk for CAUTI development, due to the presence of comorbid conditions and the interruption of natural defense mechanisms (Galiczewski, 2015). Surprisingly, given the data at hand, a universal approach to CAUTI prevention in the critical care population has not been implemented; although, several tactics for CAUTI reduction have been explored. The purpose of this quality improvement project was to establish an effective intervention for CAUTI reduction

among intensive care patients. This project investigated the implementation of a quality improvement process change to accomplish CAUTI reduction.

## Background/Significance of the Problem

The National Healthcare Safety Network (NHSN) established the standardized infection ratio (SIR) as the primary summary measure used to track HAIs on a national, state, and local level (2022). Given the standard population, the SIR compares the predicted number of HAIs to the actual number reported. The national benchmark SIR for CAUTI has been set at 1.0, based on 2015 national aggregate data. Given this information, a SIR less than 1.0 indicates that fewer CAUTIs were reported than predicted; on the contrary, a SIR greater than 1.0 implies that more CAUTIs occurred than expected, when compared to the national baseline.

The HHS (2021) established national targets in 2016 for CAUTI reduction. Based on 2015 data, the goal was to reduce CAUTIs in ICUs and ward located patients by 25% by the year 2020. According to the CDC, 3,749 general acute care hospitals submitted data to the NHSN in 2020 and a total of 19,738 CAUTIs were reported. The data demonstrated that SIRs for CAUTIs were significantly reduced by 25% from 2015 to 2020, with national SIRs for CAUTI totaling 0.75 across general acute care hospitals in 2020. Overall, there was no significant change in CAUTI SIRs between 2019 and 2020 and approximately a 10% increase in SIRs for CAUTIs was observed in the ICU. While national SIRs for CAUTI remain below the benchmark of 1, increases in SIRs in ICU are prevalent and extensive action is still needed to reduce and eliminate this HAI.

On the state level, CAUTI occurrence has steadily declined from 2015 to 2020. Kentucky SIRs improved from 0.89 to 0.75, Tennessee SIRs improved from 0.92 to 0.71, and Indiana SIRs improved from 0.97 to 0.75, over the five-year span (CDC, 2020). When compared to

surrounding states, Kentucky's CAUTI rates are comparable, but even as CAUTI ratios are trending downward and infection numbers fall below the national baseline, improvements are still necessary to further decrease occurrences.

The SIRs for CAUTIs at the Doctor of Nursing Practice (DNP) project site were well above the national benchmark of 1. According to infection prevention personnel, the SIR from October 2021 to September 2022 was 2.26; the SIR during this timeframe for critical care patients was 3.89. SIRs for CAUTIs in the ICU were alarmingly high, which further supported investigation and action to decrease and prevent infection occurrences.

**Population Affected**

IUCs are utilized to manage acute and chronic patient conditions. According to the CDC (2015) appropriate indications for IUC placement include acute urinary retention or bladder outlet obstruction, urine output monitoring in the critically ill, perioperative use for certain surgical procedures, sates of prolonged immobilization, end of life care, and to assist with the recovery of wounds that may be hindered by urinary incontinence. The use of this type of catheter has many benefits; however, usage can provide an entryway for pathogens inside the sterile urinary system.

In accordance with CDC guidelines, IUCs can be appropriately implemented to monitor urine output in critically ill patients. Due to the severity of illness, IUC placement is a common practice among the critically ill; however, overuse of IUCs among this patient population can lead to an increase in CAUTI development, which further complicates disease progression. CAUTI rates at the DNP project site were steadily increasing, despite standard infection prevention measures. Between August 2021 and August 2022, there were six CAUTIs in the surgical intensive care unit (SICU) and seven in the coronary intensive care unit (CICU).

## Literature Review

A thorough search of the literature was performed to identify effective interventions to decrease and prevent CAUTI occurrences in the ICU. The National Library of Medicine's PubMed search engine was utilized to explore research articles pertaining to the issue of interest. Synonym search terms were linked with the word "OR" and Boolean strings were linked with the word "AND" to yield maximum search results. The search terminology was as follows: ((((((Healthcare Associated Infection) OR (Nosocomial Infection)) OR (Hospital Infection)) OR (Cross Infection)) OR (Catheter-Related Infection)) OR (Catheter-Associated Infection)) AND ((((Urinary catheterization) OR (Urinary Catheters)) OR (Foley catheterization)) OR (Indwelling Catheters))) AND ((((((Intensive Care) OR (Critical Care)) OR (Intensive Care Units)) OR (Coronary Care Units)) OR (Surgical Intensive Care)) OR (Critical Care Nursing)). The initial search stemmed 1,069 research articles. Resulting literature was narrowed by publication date; articles that were not published within the last five years were excluded. Results were further narrowed by quality of evidence, only articles that were classified as randomized controlled trials, meta-analyses, systematic reviews, or reviews were included in the search. Additionally, only studies published in the English language and those containing adult participants were considered for review.

The final search yielded 30 articles. The results were scrutinized; twenty-six articles were eliminated based on their irrelevance to the research topic, leaving four articles. Date of publication was extended to include articles published within the last eight years. The search yielded 44 articles. Of those additional articles, two of relevance were deemed seminal and selected, totaling six articles for the integrative literature review. The same search in Cumulative Index to Nursing and Allied Health Literature (CINAHL) yielded 597 articles. Results were

narrowed to include articles of the English language, adult participants, and publication within the last five years. Of the 60 remaining articles, three were duplications within PubMed. The results were further scrutinized based on relevance and level of evidence, seven were selected for review. The process was repeated in Ovid and Embase, yielding an additional two articles. A total of 15 articles were chosen for the literature review. The Cincinnati Children's Let Evidence Guide Every New Decision (LEGEND) evaluation system was used to appraise the evidence. Seven of the studies were considered strong level one and two studies. The other eight studies were level three and four studies, which were thoroughly scrutinized for relevance and applicability.

Upon examining the literature, various interventions were employed to establish CAUTI reduction in the ICU. Duszynska et al. (2017), Swan et al. (2016), and Fasugba et al. (2019) examined the effects of a chlorhexidine-based solution on ICU infection rates. Chlorhexidine is frequently used as a topical skin disinfectant prior to invasive procedures and can be used to prevent microbial colonization (Duszynska et al., 2017). Swan et al. (2016) and Duszynska et al. (2017) implemented full-body bathing with a 2% chlorhexidine solution, while Fasugba et al. (2019) examined the use of a 1% chlorhexidine solution for meatal cleansing. Using a pretest-posttest study design (n=272), daily, full-body, bathing with a 2% chlorhexidine solution was found to significantly ($p$=0.04) reduce general incidence of HAIs from 22.2% to 12.7%; however, reduction in density of UTIs by 33% was insignificant (Duszynska et al., 2017). In a single center, randomized controlled trial (n=325), Swan et al. (2016) discovered that when compared to soap and water bathing, chlorhexidine bathing every other day significantly reduced HAI risk by 44.5% ($p$=0.049). This study was not powered to detect differences in individual infection types, limiting the connection between full-body chlorhexidine bathing and CAUTI

reduction. Fasugba et al. (2019) conducted a multicenter stepped wedge randomized controlled trial (n=1642) and concluded that 0.1% chlorhexidine solution for meatal cleansing prior to urinary catheterization was associated with a 94% reduction in CAUTI rates; results revealed 13 CAUTIs per 2889 catheter days in the control period compared to four CAUTIs per 2338 catheter days ($p$=0.0008) in the intervention timeframe.

Inconsistent standardized policies and procedures surrounding CAUTI prevention contribute to the undermanagement of this HAI. After performing a systematic review of 28 CAUTI studies, Patel et al. (2018) introduced a conceptual model "Disrupting the Life Cycle of a Catheter" as a helpful tool for CAUTI reduction. The framework is tailored to disrupt the four stages of the life cycle of the urinary catheter: placement, maintenance, removal, and re-insertion. Studies that incorporated interventions disrupting steps within the life cycle of a catheter (avoidance, aseptic placement, optimal maintenance, and prompt removal), combined with multidisciplinary care team efforts for compliance and sustainability, were successful in CAUTI reduction. Based on the findings of the literature, conceptual models can be successfully implemented to standardize CAUTI prevention strategies.

A quality improvement collaborative project, mirrored after the Breakthrough Series (BTS) model, was implemented by de Melo et al. (2021). The "Improvement Model" featured a bundle of interventions for HAI reduction and was implemented in a quasi-experimental study across five ICUs in Brazil. In the BTS collaborative model, a topic is identified in which a care gap exists. A team of experts is then assembled to develop an evidence-based practice change to close the care gap. Other organizations are invited to assist in this process. Preventive measures for HAIs were applied in small groups and then throughout entire units. Interventions addressed: indication for urinary catheter insertion, aseptic insertion technique, closed system maintenance,

correct technique during drainage, urethral meatus hygiene, and need for maintenance. The study resulted in a 45% reduction ($p$=0.009) in CAUTI incidence density. Results from the study also demonstrated a significant reduction in the monthly percentage utilization rate of urinary catheters from 60.6 $\pm$ 7.9 to 43.4 $\pm$ 6.1 ($p < 0.001$) establishing a correlation of 37% ($r$=0.374, $p$=0.042) with the 45% reduction in CAUTI incidence density.

Most often, the IUC is the first method of choice for urine collection in ICU patients. Trial of additional types of urinary collection devices, prior to insertion of indwelling catheters, is seldom explored. Warren et al. (2021) and Akcam et al. (2019) examined the effectiveness of alternative urinary catheterization measures. Implementation of an external female urinary catheter was found to significantly decrease ($p$=0.141) indwelling urinary catheter ratios in ICUs from a mean of 0.464 to 0.401; although, no significant reduction ($p$=0.0594) in CAUTI rates was discovered (Warren et al., 2021). In a randomized controlled study (n=54) investigating the effectiveness of antimicrobial-coated catheters, Akcam et al. (2019) demonstrated an insignificant association between catheter type and incidence of bacteriuria ($p$=0.98). Twelve (46.2%) of the patients with normal catheters had bacteriuria present and 13 (46.4%) patients with silver-coated catheters had bacteriuria. Although the present study found no correlation between silver-coated catheters and infection rates, Maki et al. (2001) reported significant reduction in CAUTI rates in individuals receiving nitrofurantoin containing catheters (as cited in Akcam et al., 2019).

CAUTI development is directly associated with the presence of an IUC; therefore, primary prevention measures should focus on IUC avoidance. This concept has been difficult to implement in the ICU due to provider viewpoints on IUC necessity in the critically ill population (Gupta et al, 2017). Policies and practices limiting IUC insertion can decrease inappropriate

catheter usage. Gupta et al. (2017) implemented a quality improvement project to decrease the indwelling urinary catheter utilization ratio. Through provider training and a strict urinary catheter insertion protocol, significant reductions in indwelling catheter utilization ratios from 0.92 to 0.28 ($p$<0.0001) and CAUTIs from 5.47 to 1.08 ($p$=0.0134) were noted. Chen et al. (2013) utilized a criteria-based reminder system to decrease the incidence of urinary catheters and subsequent UTIs among critically ill patients. In this randomized controlled trial (n=278) IUC utilization rates were significantly reduced by 22% (relative risk, 0.78; 95% CI, 0.76-0.80; $p$<0.001) and CAUTIs were significantly reduced by 48% (relative risk, 0.52; 95% CI, 0.32-0.86; $p$=0.009), through a reminder system established based on the CDC and the Society for Healthcare Epidemiology of America/Infectious Diseases Society of America guidelines for appropriate indwelling urinary catheter use. If the patient did not meet criteria for catheter use and maintenance, removal was discussed with the provider.

Several studies featured bundled strategies for CAUTI prevention. Tyson et al. (2020) introduced a multimodal CAUTI prevention strategy incorporating improved catheter care, maintenance, urine culture ordering, and urine collection practices with a nurse-driven protocol for early catheter removal. The bundle was successful in significantly reducing catheter utilization rates from 0.78 to 0.70 ($p$<0.05) and CAUTIs from 5.1 to 2.0 infections per 1000 catheter-days ($p$<0.01). In a similar study (n=120), Yazici and Bulut (2018) implemented a HAI prevention bundle addressing catheter indication, bag and catheter location (below bladder level, bag elevated off the floor), and withdrawal from the urinary bag. No significant results were found; however, bundle incompatibility may have contributed to the effectiveness of the study. Halperin et al. (2016) implemented interventions that included daily IUC review utilizing the Ann Arbor criteria, educating staff on IUC insertion and maintenance, a standardized insertion

kit, and a mobile CT in the ICU. CAUTIs/month decreased significantly over the course of the study from 2.4 per month to 0.8 per month ($p<0.0001$) and IUC utilization rate per 1000 catheter days decreased from 10.9 to 6.2 ($p=0.04$). Decreased transport from ICU for imaging and decreased urinary catheter use were key factors for the success of this study. In an integrative review of 14 research studies, Galiczewski (2015) concluded that whether implemented as a single intervention or in a bundle, interventions that review daily IUC need, implement early catheter discontinuation (less than seven days), or follow insertion criteria for catheter use, were significantly successful in reducing CAUTI rates in the ICU.

Other methods employed for CAUTI reduction include bladder irrigation and implementation of a daily ICU rounding checklist. In a prospective, blinded, randomized controlled trial (n=60) among critically ill patients, daily bladder irrigation with sterile normal saline decreased ($p<0.001$) the risk of CAUTI by 99% (Ramezani et al., 2018). Bladder irrigation can eliminate deposits, calculi, and clot retention, helping prevent urine stasis and UTIs (Ramezani et al., 2018). Nassikas et al. (2020) implemented an ICU checklist, in a longitudinal study over a three-year time span. The checklist prompted clinicians to inquire if the patient had a urinary catheter, if the catheter was indicated, if a catheter order was placed, and whether the catheter could be removed. In the first year after the intervention was implemented catheter utilization ratios increased from 0.60 to 0.67 ($p=0.0079$). The catheter utilization ratio decreased in the second year (0.53 vs 0.60; $p=0.0992$) and in the third year (0.53 vs 0.60; $p=0.0224$). CAUTI rates per 1,000 urinary catheter days were examined in the post- intervention period. CAUTI rates decreased in the first year from 4.62 to 2.12 ($p=0.2104$). In the second year the CAUTI rate was 0.45 ($p=0.0275$) and 0.96 in the third year ($p=0.0532$). No real pattern of significance was shown in this study which might be related to interval of intervention

implementation and checklist completion rates. Integrating a rounding checklist is relatively reasonable in the ICU, but more research is needed to evaluate effectiveness.

In several studies, single strategies for CAUTI prevention were successful; however, a multimodal, multidisciplinary approach, addressing prompt removal, appears the most efficacious in CAUTI prevention. Implementation of care bundles decreases patient mortality and morbidity while providing safe, evidence-based healthcare (Yazici & Bulut, 2018). Care bundles were proven as an effective means of CAUTI reduction, incorporating multiple aspects of CAUTI management. Although adherence to prevention bundles was seen as a limitation, auditing staff compliance was effective in correcting this issue.

Several themes were evident throughout the body of literature and commonalities among the studies were present. Significant interventions focused on disrupting the four stages of the life cycle of the urinary catheter. Avoidance, aseptic placement, optimal maintenance, and prompt removal are all important steps Patel et al. (2018) identified in the conceptual model "Disrupting the Life Cycle of a Catheter", formulated for CAUTI prevention. Tyson et al. (2020) and Halperin et al. (2016) implemented a bundle of interventions focusing on improvements in catheter care and early removal. Significant results were established by limiting IUC insertion and improving maintenance techniques in multiple studies (Gupta et al., 2017; Chen et al., 2013). IUC insertion, maintenance, and removal were all addressed in a bundle of interventions implemented by de Melo et al. (2021). Fasugba et al. (2019) significantly reduced CAUTIs by utilizing a 0.1% chlorhexidine solution for meatal cleansing prior to urinary catheterization.

This collection of literature provided ample evidence for the development of interventions and strategies targeting CAUTI reduction. Analysis of these findings provided insight into both successful and ineffective CAUTI prevention tactics. Interventions that

addressed prompt IUC removal appear the most efficacious for CAUTI reduction. Integrating an interdisciplinary rounding tool, that addresses IUC maintenance and removal, has potential for successful CAUTI reduction in the ICU. A rounding tool can standardize IUC evaluation amongst the multidisciplinary team and enhance communication and collaboration surrounding CAUTI prevention practices. This was considered a feasible intervention among ICU patients at the DNP project site.

**Inconsistencies and Gaps in The Literature**

Multiple studies had promising results but lacked credibility, reducing the ability to generalize findings. While bladder irrigation had significant results, generalizability of this process is limited due to lack of substantial supportive evidence. Few research studies have examined bladder irrigation as an effective measure for CAUTI reduction (Ramezani et al., 2018). The small sample size in the study (n=62) also leads to further questioning of reliability. Chlorhexidine full-body bathing has the potential to reduce HAIs, but its effect on CAUTI reduction has not been sufficiently studied. Lack of adequate data in the literature prevents correlation between full body bathing and CAUTI regression (Swan et al., 2016).

Studies utilizing IUC alternatives exhibited insignificant results. Additional research on alternative catheter types is needed, as few studies demonstrating significant CAUTI reduction have been published (Galiczewski, 2015). Significant reduction in CAUTI was achieved with catheter avoidance; however, prevention and early discontinuation of IUCs may require a cultural change in the ICU (Gupta et al, 2017). IUC avoidance has been difficult to implement in the ICU as IUC use has become customary among critically ill patients. Hemodynamics are frequently monitored in the ICU and urine output is regularly assessed. Education to alter

provider viewpoints on IUC necessity in the critically ill population is important for change implementation.

**Problem**

CAUTIs are a serious type of HAI that require prompt identification and treatment. CAUTI occurrence is quite common among acute care hospitals, accounting for more than 30% of reported infections (CDC, 2015). Significant consequences, such as increased morbidity, mortality, and length of hospital stay, may arise from CAUTI development (Podkovik et al., 2019). Patients who are critically ill and require IUCs are at an increased risk for CAUTI development. In fact, UTIs among the critically ill have been directly linked to indwelling catheterization, as an estimated 95% of UTIs in the ICU are associated with an IUC (Chenoweth & Saint, 2013). Additionally, bacteria residing in the urinary tract can enter the bloodstream and lead to a system wide infection. Bloodstream infections resulting from urosepsis carry a fatality rate of 32.8% (Chenoweth & Saint, 2013).

CAUTIs can also lead to numerous financial implications for the healthcare system and patient. Each CAUTI occurrence costs approximately $600 and bloodstream infections related to urosepsis can cost at least $2,800 (Chenoweth & Saint, 2013). Annual CAUTI expenses in the United States are estimated around $350 million (Saint et al., 2014). CAUTIs remain the most common type of HAI, accounting for up to 23% of infections in the ICU and 40% of all nosocomial infections in hospitals (Chen et al., 2013). It is estimated that there are over 449,334 CAUTI cases and over 13,000 CAUTI related deaths annually (NHSN, 2009). Reducing CAUTI rates can substantially decrease expenses related to this HAI. Additionally, CAUTI reduction and prevention will promote the overall safety and wellbeing of patients.

**Intervention**

Effective communication amongst the healthcare team is a vital component of patient care. According to the Joint Commission (2022), leading causes of sentinel events in healthcare are primarily linked to inadequate communication. Incorporation of a rounding tool is an achievable intervention at the DNP project site and can enhance communication amongst the interdisciplinary team. Often, IUCs are continued under the premises of retention or monitoring of urinary output, without clarifying with the ordering provider of the necessity. Utilization of a daily rounding tool is a suitable intervention for communicating catheter necessity and facilitating early removal.

Reducing IUC utilization is important for increasing patient safety and quality care measures, as a reduction in IUC use is directly related to CAUTI reduction (Gupta et al., 2017). Development of a standardized process for IUC assessment with the multidisciplinary team is essential for consistently evaluating IUC utilization in the ICU. According to Afsar-manesh et al. (2019) a multidisciplinary communication tool is simple and customizable instrument for HAI risk factor reduction. The focus of the proposed intervention is that reducing CAUTI occurrence in the ICU can be achieved, by decreasing IUC utilization, through improved communication.

**Summary/Justification**

Allen et al. (2014) stressed that catheters are often automatically inserted in all patients admitted to the ICU and further asserted that nurses are hesitant to remove urinary catheters, inclining to maintain them during the ICU stay, until the patient transfers or discharges. Elevated IUC utilization rates, paired with increased susceptibility, lead to the high incidence of CAUTI rates seen among ICU patients. IUCs should only be implemented when medically necessary, and assessment for removal should occur on a routine basis. It is essential to address CAUTI

prevalence in ICUs and to explore appropriate reduction measures. Successful nurse–provider communication can decrease length of hospital stay and reduce adverse healthcare events (Tschannen & Kalisch, 2009; Riga et al, 2015). A rounding tool, addressing IUC maintenance, can successfully enhance nurse-provider communication and facilitate early IUC removal and CAUTI reduction among the critically ill population.

## Rationale

### Needs Assessment

A needs assessment was performed, which determined that there was an increase in CAUTIs among intensive care patients. It was determined that there was not a standardized process for evaluating IUC maintenance in real-time with the multidisciplinary team. A rounding tool could be achievably implemented into current practice to enhance communication and collaboration surrounding IUCs.

## Purpose & Specific Aims

The purpose of this doctoral nursing project was to establish a standardized process to implement in the intensive care setting to decrease CAUTIs. This project investigated the implementation of a quality improvement process change to accomplish CAUTI reduction. Integrating a rounding tool, that addresses IUC maintenance, is a successful and achievable intervention for CAUTI reduction in the ICU. A rounding tool can facilitate nurse-provider communication, while addressing IUC discontinuation, in a standardized fashion during interdisciplinary rounds. The specific aims for this project were to: (a) decrease CAUTI rates; (b) decrease IUC utilization rates; (c) and develop a communication process that would enhance communication during interdisciplinary rounds.

## Quality Improvement Model: Iowa Model of Evidence Based Practice

This project was framed using the Iowa Model of Evidence Based Practice (EBP). The Iowa Model serves as a guide for introducing an evidenced based change into practice (Appendix A). There are ten steps to consider when utilizing the Iowa Model to implement a practice change (Titler, et al., 2001). The first step in the Iowa Model is to identify either a problem-focused trigger or a knowledge-focused trigger where an EBP change might be warranted. The second step in the Iowa Model is to determine if the problem is a priority problem for the organization. Step three consists of establishing a team that will help develop, evaluate, and implement the EBP change. Step four consists of gathering and critiquing research concerning the practice change. This step also includes the development of a patient, intervention, comparison, outcome, and time (PICOT) question. During step five, a literature review is performed to establish a supportive body of evidence for the proposed practice change. In step six it is determined if there is a sufficient research base. During step seven, the change is piloted into practice; through this step, outcomes are determined, baseline data is collected, EBP guidelines are established, EBP is piloted, processes and outcome are evaluated, and practice guidelines are modified. In step eight, it is determined if the change is appropriate for permanent practice adoption. During step nine, the change is implemented into practice. Step ten consists of disseminating the results.

The problem focused trigger identified was an increase in CAUTIs in the ICU. This was a priority problem because there are major patient health and safety concerns associated with CAUTIs. Members of the team were established as the SICU/CICU manager, SICU/CICU educator, SICU/CICU director, project resource and development committee (PRDC), and the CAUTI committee. Information surrounding the practice change was gathered and critiqued. The

proposed PICOT question was: In intensive care patients (P) with an IUC, how does implementation of a daily rounding tool (I) compared to current practice (C) affect CAUTI rates, IUC utilization rates, and communication and collaboration amongst the interdisciplinary team (O) within a six-week timeframe (T)? A comprehensive literature search was performed to provide evidence to support the practice change. It was determined that an extensive research base was available. Outcomes were established, and baseline data was collected. After the change was piloted into practice, it was determined if the intervention was appropriate for permanent practice adoption. Once analyzed, the results of this quality improvement project were disseminated.

## Methods

### Design

This quality improvement project focused on improving the processes and outcomes surrounding CAUTIs in the ICU. This project utilized a pre-posttest design. Nurses who cared for patients with an acute IUC were included in the project.

### Setting

The environment this DNP project took place in was the 20-bed Medical-Surgical ICU, in a privately owned, urban hospital in Elizabethtown, Kentucky. The project site was a 300-bed, acute care, community hospital, which is part of a larger multi-hospital system. The organization serves approximately 400,000 persons residing in ten centrally surrounding Kentucky counties. The 20-bed ICU is divided into the 10-bed SICU and the 10-bed CICU. Both the SICU and the CICU house medical/surgical patients, there is not a difference in care standards received on either side.

### Sample

The target population was SICU/CICU registered nurses (RNs). Nurses are ultimately responsible for the practices surrounding IUC maintenance and discontinuation. Participants were selected through a convenience sample. There were 15 nurses currently employed on the dayshift SICU schedule and 16 nurses on the dayshift CICU schedule. It was anticipated that 12-15 participants would be necessary to establish sufficient data. Inclusion criteria included RNs working part time, full time, or PRN on SICU/CICU day shift. Exclusion criteria included, nurses pulled from other units, nurses who were under agency contract that would end prior project completion, and night shift nurses, due to interdisciplinary rounding taking place on day shift only.

## Context

### *Root Causes of Problem: Communication*

At the DNP project site, current practice did not include a standardized process for evaluating foley catheter maintenance during daily interdisciplinary rounding in the ICU, and a standardized rounding tool was not currently implemented. Interdisciplinary rounds were led by the ICU attending physician and included a multidisciplinary team comprised of a dietician, pharmacist, nurse practitioner or physician assistant, respiratory therapist, and the primary RN. During rounding, a general synopsis of the patient's condition was discussed, along with overnight changes, in an informal interdisciplinary communication setting. There was not a formal process or prompt for evaluating IUC maintenance with the multidisciplinary team.

Communication among healthcare providers during interdisciplinary rounds is a vital piece for CAUTI reduction. In fact, addressing IUC appropriateness during interdisciplinary rounds using a report tool resulted in a decrease of 5304 to 4541 urinary catheter days and a decrease in urinary catheter infections from 4.71 to 1.98 infections per 1000 ICU days ($p<0.05$);

improved communication, coupled with increased surveillance, led to a significant reduction in CAUTIs and IUC days (Arora et al., 2014). The introduction of a daily rounding tool can lead to increased monitoring of IUC utilization and improved communication among the interdisciplinary team. Addressing IUC appropriateness with the multidisciplinary team, during interdisciplinary rounding, can lead to decreased IUC utilization rates and a subsequent decrease in CAUTIs.

### *Key Stakeholders*

This quality improvement project aligned with the agencies goals to provide quality care to patients. The use of IUCs is an invasive practice that places the patient at an increased risk for infection and increases morbidity and mortality. It is crucial to discover the link between increasing CAUTI rates and the intensive care population to improve patient outcomes and reduce healthcare costs. Key stakeholders involved in this project included the SICU/CICU manager, director, educator, and RNs, CAUTI committee, PRDC, and intensivists.

### *Culture*

IUC maintenance is routinely evaluated by the primary RN each shift. The primary RN is responsible for assessing and documenting the IUC medical necessity in the electronic medical heath record. Medical necessity is based upon the facilities IUC protocol, which closely follows the CDC guidelines for appropriate IUC placement.

## Facilitators to Project Implementation

Construction of a multidisciplinary CAUTI Team comprised of the SICU/CICU manager, SICU/CICU educator, SICU/CICU director, CAUTI committee, and the PRDC aided in the discussion, implementation, and evaluation of this quality improvement project. The PRDC exists to provide support and guidance to individuals who are interested in engaging in research

activities or EBP and quality improvement projects. The committee functions to assist with project formation, project approval process, and dissemination of results.

**Barriers to Project Implementation**

There were various barriers surrounding the execution of this DNP project. Staff recruitment and engagement was a significant obstacle. Employee email was utilized as a broad method of communication and means of recruitment. Education was provided to support the addition of a rounding tool, as a seamless and innovative intervention, for streamlining communication. Nurse convenience was also a significant obstacle to overcome to decrease IUC usage and assist with early catheter discontinuation. In many instances, IUC usage eases daily patient care activities in the ICU; with an indwelling catheter in place, patient care needs can decrease drastically. For the completion of this project, nurses had to be willing to embrace new changes, such as early catheter removal. Time was an additional barrier surrounding this DNP project. The addition of a rounding tool, review of educational material, and questionnaire completion required additional time from each participant and may have been a significant barrier to project involvement.

**Ethical Considerations/Permissions**

An application was approved by the facility's PRDC prior to project implementation. The application process was comprised of several steps, including the development of a PICOT question and performance of a literature review. Signatures from the unit manager and director were collected as part of the approval process for this application (Appendix B). A final approval vote was received from the PRDC council, with a letter of support signed by the PRDC co-leader and the facilities chief nursing officer (Appendix C). The application was sent to the organizations Institutional Review Board (IRB) for further approval. Authorization from the

University of Louisville's (UofL) IRB was also obtained prior to implementing this quality improvement project. CITI training on human subjects' rights protection was completed for both UofL and the project site. The creator of the CSACD tool, Dr. Judith Baggs, provided permission for distribution of the instrument via electronic format and all copyright standards have been protected. Dr. Baggs has requested that the tool not be published, so that she may maintain copyrights.

Participants in this project were not coerced or incentivized in any way. Participants were provided with an implied consent form, that explicitly specified the following details: project participation was completely voluntary, project participation would not affect employment, participants could withdrawal at any time, and confidentiality with project participation may be breeched. Participants were provided with a link to a questionnaire on an online survey platform called SurveyPanet™. Questionnaire results were anonymous, and confidentiality and integrity of all participant data was maintained; only a number was attached to results for data collection purposes. In an additional effort to protect the identity of participants, rounding tool implementation was a mandatory process change, during interdisciplinary rounding, over the six-week duration of this DNP quality improvement project.

Informed consent from patients was not necessary, as data concerning CAUTI and IUC utilization rates was routinely obtained by infection prevention personnel at the facility. Chart reviews were not conducted by the DNP student. No patient identifiers were collected in this quality improvement project; personal health information was not recorded or stored. Data collection forms containing information relating to this project were kept in an unmarked lock box, behind a locked door.

**Procedure/Intervention Implementation**

One week prior to project implementation, the unit manager was notified of the project initiation date and timeline (Appendix D). At this time, ICU providers and nursing staff were notified by employee email of the project plans and go live date; an informational flyer (Appendix E) and implied consent document (Appendix F) were attached. The same flyers, were posted in the two employee breakrooms, outlining project details. The implied consent document was also posted in the employee breakrooms.

In the first week of implementation, nurses received the CSACD questionnaire, evaluating the effectiveness of communication and collaboration amongst the interdisciplinary team. Demographic data were collected from participants at this time as well. The questionnaire was distributed by employee email in an electronic format developed through an online survey tool called Survey Planet™. To pair data collected from pre- and post- questionnaires, participants were asked to provide their mothers date of birth. Results remained anonymous.

After completion of the initial CSACD questionnaire, a recorded educational session was distributed, via employee email, to all RNs invited to participate in the project. The implied consent document was re-distributed again at this time. The teaching session included background information about the problem, a brief outline of the hospital IUC protocol, and introduced the interdisciplinary rounding tool. Staff were educated on rounding tool (Appendix G) implementation and expectations. On weeks two through five, the rounding tool was implemented into practice. On week six, the same participants completed a CSACD post-questionnaire. Data surrounding CAUTI and IUC utilization rates were collected six weeks before and six weeks after project implementation.

## Measures

### *Demographic Data*

Demographics were obtained on nursing participants and were collected on the pre-questionnaire. Data included age, education level, years of nursing experience, years of ICU experience, and employment status.

### *Communication*

The CSACD tool was used to evaluate participants' views on communication and collaboration amongst the interdisciplinary team. Participants were instructed to choose the response that best represented their judgment about the team process and the decision to remove or maintain the IUC. The CSACD instrument "was developed to measure nurse-physician collaboration and satisfaction about care decisions in the intensive care units" (Baggs, 1994, p. 176). It is a 9-item tool with two subscales: collaboration and satisfaction. Each question is on a 7-point Likert scale where 1 = strongly disagree through 7 = strongly agree, 1 = no collaboration through 7 = complete collaboration, and 1 = not satisfied through 7 = very satisfied. Questions evaluating the subscale of satisfaction were excluded in this project. Collaboration and communication questions consisted of 7-items, which sum for a total score, with a possible range of 7 to 49; lower scores indicate less perceived collaboration and communication. The CSACD instrument has demonstrated high reliability with a Cronbach's alpha of 0.95. The instrument has established construct validity verified with factor analysis explaining 75% of the variance in collaboration.

### *CAUTI Rates*

Data were collected six weeks before and six weeks after project implementation. Data surrounding CAUTI rates was extracted and compiled monthly by the facility. Infection prevention personnel were consulted to extract data surrounding CAUTIs pre/post project implementation. CAUTIs were identified by the infection surveillance specialist in the infection

prevention department. Results from lab cultures were reviewed daily by infection prevention personnel. If positive urine cultures were identified, further investigation was required to evaluate for criteria that meet specifications for hospital-acquired and device related infections. No chart reviews were conducted by the DNP student.

#### *IUC Utilization Days*

Data were collected six weeks before and six weeks after project implementation. Data concerning IUC utilization rates was extracted and compiled monthly by the facility. Infection prevention personnel were consulted to extract data surrounding catheter utilization days pre/post project implementation. IUC days are collected as the number of indwelling catheters in place at midnight and are reported to the house manager daily; these numbers are aggregated for a monthly total. No chart reviews were conducted by the DNP student.

## Data Analysis

### SPSS

Statistical Package for the Social Sciences (SPSS) version 29 was used for data analysis.

### Demographics

Frequencies and proportions were used to analyze demographic data collected from the nurses.

### Outcome Measures

Outcomes were measured to analyze the results associated with the implemented intervention.

#### *Communication*

Inferential statistics were used to analyze data concerning communication. A paired *t*-test was performed to evaluate the mean differences between pre-intervention and post-intervention scores on the CSACD instrument. Significance was set at $p < 0.05$.

### *CAUTI Rates*

CAUTI rates before and after DNP project implementation were collected using data extracted and compiled by infection prevention personnel.

### *IUC Utilization Days*

Catheter utilization days before and after DNP project implementation were collected using data extracted and compiled by infection prevention personnel.

## Evaluation of Process

Process measures were also analyzed over the course of this project. The process surrounding this DNP project was evaluated to ensure compliance with the intervention, which was a mandatory process implemented by management over the course of this project. Weekly rounding tool collection permitted the assessment of rounding tool completion and accuracy, staff question and answer sessions, and reinforcement of the intervention.

### *Facilitators*

Factors that assisted with the process of implementation were identified as facilitators and were fundamental in the success of the project. Facilitators included the unit manager mandating the intervention, project leader involvement with process assessment, and staff engagement and willingness to participate.

### *Barriers*

Barriers were identified over the course of the project as potential obstacles preventing the implementation of the intervention. Barriers included high patient acuity, time constraints with rounding tool completion, and staff shortages.

## Results

### Demographic Data

A total of 12 SICU/CICU nurses participated in the DNP project. Attrition rate was 0% as no participants were lost to follow-up. Demographics data included age, education level, years of nursing experience, years of critical care experience, and employment status. Frequencies and proportions were used to analyze demographic data. Table 1 contains aggregated data surrounding participant demographics (Appendix H).

Half of the participants were ages 31-50 years of age, 42% were 18-30, and 8% were age 50 and above. Most participants (75%) had obtained a bachelor's degree or above, and the other 25% had an associate degree in nursing. Fifty percent of participants had 5 + years' experience in the nursing profession. There were 25% of participants who had 5 + years of critical care experience, while the majority (50%) had 2-5 years' experience in critical care. Employment status findings indicated that 50% of those who participated worked full time, 33% worked part-time, and 17% worked PRN, agency, or travel positions. There were no missing demographic data.

### Communication

A paired *t*-test was used to evaluate the mean difference in score of the nurses' responses on the CSACD instrument. Significance was set at $p < 0.05$. The communication and collaboration total score was analyzed and compared. Pre-questionnaire CSACD scores ranged

from 28 to 49. Post-questionnaire CSACD scores ranged from 25 to 49. A paired *t*-test demonstrated a mean difference of -2.500 $\pm$ 5.108 ($p = 0.118$).

### CAUTI Rates

In the six weeks prior to DNP project implementation, there were no recorded CAUTIs. There were also no reported CAUTIs in the six weeks post project implementation. There was one CAUTI occurrence during the four-week implementation phase.

### IUC Utilization Days

IUC days were recorded as total number of device days and not calculated per patient days. In the six weeks prior to project implementation, the IUC utilization rates were 4.38 devices/day. Six-week post project implementation, the ICU utilization rates were 5.43 devices/day.

## Discussion

### Summary

The purpose of this quality improvement project was to increase communication and collaboration amongst the interdisciplinary team, by implementing a rounding tool to address the necessity of IUC maintenance during interdisciplinary rounding, with the overall goal of decreasing IUC utilization rates and CAUTIs. CAUTIs have been on the rise, despite standard infection prevention measures, at the DNP project site. It was determined that there was not a standardized process for evaluating IUC maintenance in real-time with the multidisciplinary team. Current practices were revised to include a rounding tool for evaluating IUC maintenance during daily interdisciplinary rounding, as a means of increasing nurse-provider communication.

Fifty percent of participants had 5 + years' experience in the nursing profession and 2-5 years' experience in critical care. There were 75% of participants who held a BSN degree. Years

of nursing experience and critical care practice can influence nursing perception and knowledge of CAUTI prevention tactics. In critical care nursing, an increase in professional work experience has a statistically significant ($p$=0.031) association with nurses' knowledge in preventing CAUTIs (Teshager et al., 2022). Consistent CAUTI prevention education is beneficial for all levels of nursing experience to maximize interdisciplinary communication and collaboration of CAUTI prevention.

The CSACD tool was utilized to establish if nurses' perceptions of communication and collaboration improved with the addition of an interdisciplinary rounding tool. Data were analyzed to determine if rounding tool implementation would affect CAUTI and IUC utilization rates. With rounding tool implementation, nurses were able to identify patients without proper indication for IUCs and discuss their removal with the care team. Upon review of rounding tool forms, 25% of catheters, inserted for monitoring intake and output, were triggered for removal during interdisciplinary rounding. The intervention facilitated nurse-provider communication and expedited IUC removal.

Findings concluded that there was no statistically significant difference in CSACD scores pre- and post- CSACD questionnaire; however, an increase in communication and collaboration was reported in 50% of participants, as demonstrated by CSACD scores. Although communication and collaboration scores did not demonstrate a statistically significant improvement, the results demonstrate clinical significance. With rounding tool implementation, nurses were able to identify patients without proper indication for IUCs and discuss removal with the interdisciplinary care team.

CAUTI rates were maintained at zero, six weeks post project implementation. This finding may have clinical significance, indicating that rounding tool implementation assisted

with preventing CAUTI occurrence, but no statistical significance was identified. IUC utilization rates increased over the course of this project, but the relevance for this increase is unclear. Over the duration of the project, catheter utilization days increased from 4.38 devices/day to 5.43 devices/day. This finding could be due to an increase in patient acuity and census variability. Although the census and patient acuity were not directly measured, increases in both variables can have a direct impact on IUC use in the ICU.

## Limitations

Staff participation was a significant limitation to this DNP project. Given the small sample size ($n$ = 12), the inclusion of incentives would have likely increased staff willingness to participate. Management mandating full staff participation would have been another useful technique for participant recruitment. In person educational sessions may have also increased staff participation and awareness of the project; however, in person educational sessions may have also been a deterrent, if participants were not able to attend on their day off. Employee email may not have been the best route of communication, as staff members may not stay active on their employee outlook account.

Project timeframe could also be considered a limitation. A longer implementation phase would have allowed for a greater duration of data collection. The intervention was implemented over four weeks, and longer duration of the project may yield greater improvements in communication and collaboration, given the clinically significant results seen in this project. Additionally, recent measures implemented for CAUTI reduction on the unit may have interfered with project results. Lastly, variables such as census and patient acuity were not measured, which have the potential to be helpful considerations.

## Conclusions

Interdisciplinary communication is crucial for coordination of patient care. In the critical care setting, rounding tools have been associated with increased patient safety, decreased health care related costs, and improved continuity of care (Lancaster et al., 2022). A standardized communication process for IUC discontinuation is essential, as uniform measures are crucial to establish preventative CAUTI policies and procedures. This quality improvement project demonstrated that the implementation of a rounding tool provided a clinically significant improvement in communication and collaboration surrounding CAUTI prevention in the ICU, which support a sustainable standardized communication and collaboration process.

Evidence-based interventions can be used across organizations to create a standard of care for CAUTI prevention. Furthermore, this project reflects the importance of ongoing collaboration and communication among multidisciplinary critical care team members. For future implementation, research should include a systems-based rounding tool to further evaluate clinical benefit in the intensive care setting. The implementation of a rounding tool was useful for increasing nurse-provider communication and collaboration; although, no reduction in CAUTI and IUC utilization rates was established. Additional research is needed to establish a correlation between rounding tool implementation and CAUTI reduction.

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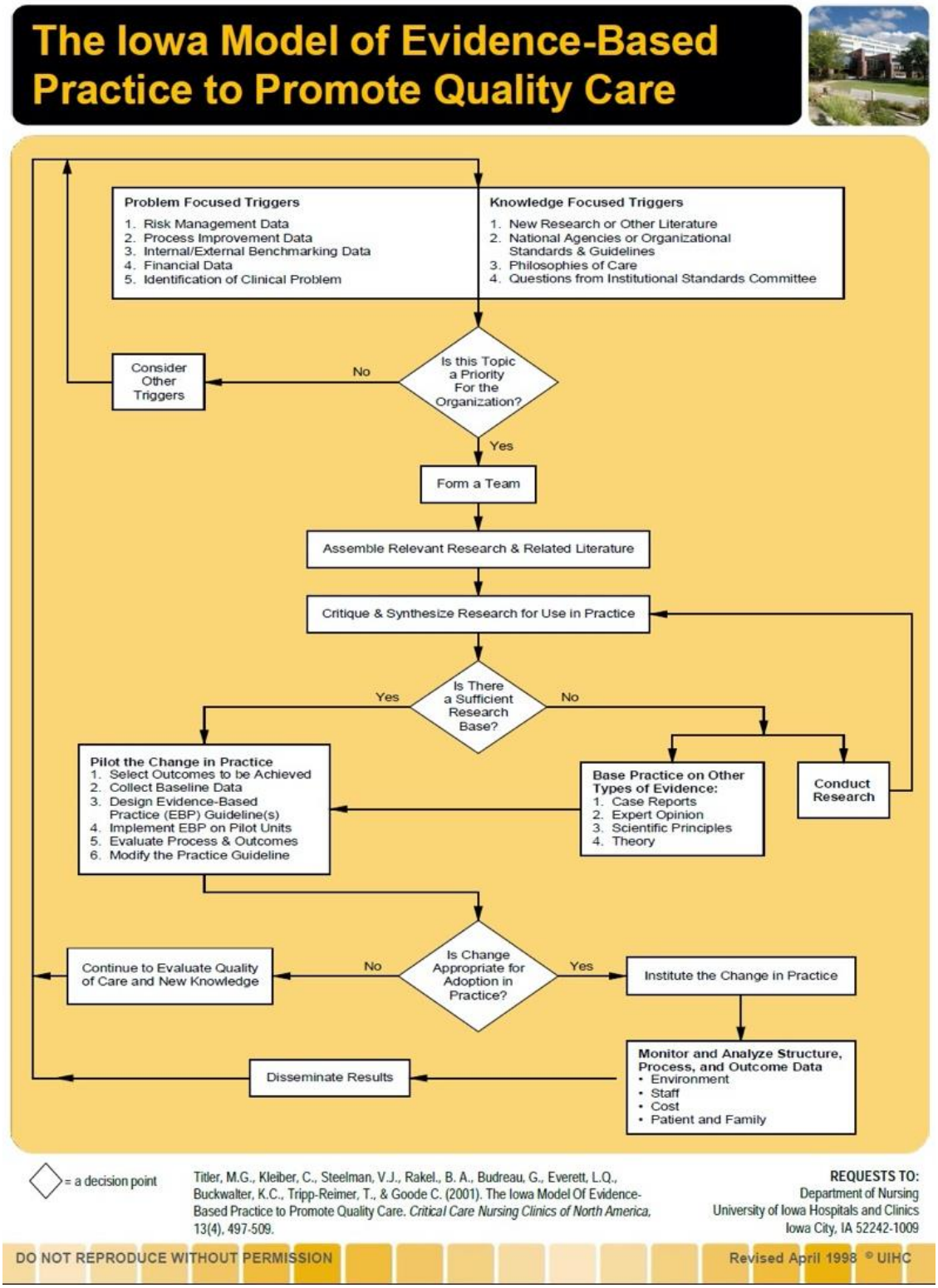
Appendix A

The Iowa Model of Evidence-Based Practice to Promote Quality Care



# Appendix B

## Project Resource and Development Application: Part 2 Approval Form

**Project Resource and Development Application: Part 2**

BAPTIST HEALTH HARDIN

**Date:** 11/18/2022
**Project Title:** Improving Catheter-associated Urinary Tract Infections in the Intensive Care Unit: Implementation of a Rounding Tool to Enhance Communication and Collaboration
**Project Leader Name:** Bethany Risen

***This section to be completed by PRDC Leader only:***

- Type: EBP, QI, Research
- Date of Part 2 Mtg. _____
- PRDC Mentor Name: _____
- PRDC Mentor Signature: _____

**Next Steps:**

1. Now that you formed your PICOT question, it's time to develop your Project Title. It's important to form a title and stick with that title if at all possible for the remainder of your project. If your project requires IRB application, it's difficult to change the title once submitted. Fill out the title in the section above.
2. Critical Analysis of Literature (This is a separate form that will need to be attached to this application.)
3. Complete the question below regarding measurement of data.
4. Meets with applicable Unit Manager. Allows Unit Manager to review Part 1 & 2 of the application. Obtains Manager's signature of support.
5. Returns Application Part 2 and Appraisal of Literature to PRDC advisor.

**Looking at your PICOT question, what are you measuring? How will you measure this?**
**SEE ATTACHED**

**Attention Departmental Manager or Director:**

Please review the application with the Primary Investigator. By signing below you agree that this project is applicable, appropriate and employees associated with this project are within good standing in the organization; therefore the application may proceed to the PRDC for final review. Upon review by the PRDC, if approval is declared, a formal approval letter will be provided for the Primary Project Investigator, Manager, Director and CNO to sign.

Brittany Fain/Nathan Ernst *(Manager/Director Printed Name)*

Brittany Fain/N.Ernst *(Manager/Director Signature)* Date 12/7/22

STOP

**Applicant: Once you have leadership approval/signature, please notify your mentor and your application will be presented to the PRDC council meeting. If possible, we encourage you to join us during that meeting in order to be able to speak to your project, clarify, etc. If you are unable to attend, your mentor will help to present your application.**

- In the event there are necessary edits or questions the mentor is unable to answer on your behalf, the application will be returned for edits and resubmitted for approval.
- If approval is granted of your application, you will continue to meet with your mentor (suggested once per month). They will help to assist you in the next steps of the process.

Revised 11/3/21 KMS

# Appendix C

## Quality Improvement, Evidence Based Practice and Research Approval Form

### Quality Improvement, Evidence Based Practice and Research Approval Form

**To whom it may concern:**

On behalf of the Project Resource and Development Council (PRDC), we are pleased to inform you that your employee or student **Bethany Risen** has submitted application to the council for consideration of a Quality Improvement/ Evidence Based Practice Problem/Research study. Details of the study are listed below for your review.

After reviewing the information, taking account for any budgetary analysis or consideration, by signing below you agree for the project leader to proceed under direction of the PRDC and/or IRB. Review of full PRDC application is available upon request.

Thank you,
Kim Scarborough and Mary Bauer, Co-Leaders of PRDC

**Project Leader Name: Bethany Risen**

O **BHH Employee:** CICU (Area) / Brittany Fain (Manager) / Nathan Ernst (Director)

O **Nonaffiliated Investigator**: Place of employment _____

O **Student:** School/University University of Louisville Degree Program_Adult Geriatric Acute Care DNP
Instructor's Name: Shumaker, Shannon C. Email: shannon.shumaker@louisville.edu

**Additional Research Team Members:**
N/A

**Type of study (select one):** X Quality Improvement X Evidence Based Practice Problem ____Research Study

**Title of study:** Improving Catheter-associated Urinary Tract Infections in the Intensive Care Unit: Implementation of a Rounding Tool to Enhance Communication and Collaboration

**Brief description of question/problem associated with the study:** In intensive care patients (P) with an indwelling urinary catheter, how does implementation of a daily rounding tool (I) compared to current practice (C) affect catheter-associated urinary tract infection rates, indwelling urinary catheter utilization rates, and communication and collaboration amongst the interdisciplinary team (O) within a six-week timeframe (T)?

**Projected impact on BHH:** Goal is to maintain IUC utilization days 50% below baseline four weeks after implementation. The tool is aimed to enhance communication and collaboration to meet the goals listed above.

Lead Researcher Signature: Bethany Risen, DNP Date: 12-7-22

PRDC Co-Leader Signature: KScarborough BSN RN-BC RRT Date: 12/7/22

CNO of BHH Signature: Sharon Wright VP/CNO Date: 12/7/22

Appendix D

Diagram of Project Timeline

**Timeline of Project Phases**

| Project Activity | Aug 2022 | Sept 2022 | Oct 2022 | Nov 2022 | Dec 2022 | Jan 2023 | Feb 2023 | Mar 2023 | Apr 2023 | May 2023 | Jun 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Proposal development | | | | | | | | | | | |
| Final proposal submission | | | | | | | | | | | |
| DNP Project committee meeting/proposal approval | | | | | | | | | | | |
| DNP Project proposal defense | | | | | | | | | | | |
| Project Resource and Development Committee approval | | | | | | | | | | | |
| IRB Submission & approval | | | | | | | | | | | |
| Advertise to nursing staff | | | | | | | | | | | |
| Implement project | | | | | | | | | | | |
| Analyze data | | | | | | | | | | | |
| Prepare final report | | | | | | | | | | | |
| Develop final poster | | | | | | | | | | | |
| Disseminate - Poster session | | | | | | | | | | | |

Appendix E

Staff Flyer

# DAYSHIFT RN'S


**WHAT: To participate in a DNP QI project focusing on CAUTI reduction**
**WHO: Led by Bethany Risen, DNP student**
**WHEN: TBA**
**WHY: Additional education will be distributed via employee email**

I LOOK FORWARD TO YOUR PARTICIPATION!

## Appendix F

## Implied Consent

Dear SICU/CICU RNs,

You are invited to participate in a Doctor of Nursing Practice (DNP) quality improvement project at Baptist Health Hardin. I am interested in examining nurse-provider communication and how that correlates with indwelling catheter utilization rates and CAUTIs. I plan to use the information gained from this project to implement a standardized rounding tool among critical care patients.

Participation in this project involves an educational session that will take approximately 15-20 minutes. If you agree to participate, I ask that you complete a pre/post questionnaire and incorporate a daily rounding tool into interdisciplinary rounding. Questionnaire completion will take approximately 10 minutes. All responses are anonymous.

Your participation or lack of participation will not change your employment at Baptist Health Hardin or the Baptist Health System. The only risk to you, if you choose to participate, is the potential loss of confidentiality. I will make every effort to protect your identity and ensure anonymity of questionnaire results. Any information you provide will be kept in a confidential file that only I can access. This project may be reviewed by the Baptist Health Lexington and University of Louisville Institutional Review Board (IRB).

Completing the questionnaire can contribute to knowledge about nurse-provider communication. Project results may be submitted for publication in a national journal, but you will not be identified as a participant in the project. Of course, you have a choice about whether to complete the questionnaire and participate in the project, but if you do participate, you are free to skip any questions or discontinue at any time.

Thank you in advance for your anticipated participation.

**Bethany C. Risen**
**University of Louisville DNP student**

Appendix G

CAUTI Rounding Tool

**CAUTIous Communication**

**Is there an indwelling urinary catheter present?** (Circle one)

Yes No

**Does the indwelling urinary catheter have an appropriate indication?** (Circle one)

Acute urinary retention

Chronic urinary retention

Acute urinary obstruction

End of life care/comfort measures

Abdominal surgery

Genitourinary tract surgery

Stage III/IV sacral or perineal wound management (incontinent patient)

Required activity restriction

Hourly output in the critical unstable patient requiring frequent intervention

Placed by genitourinary physician

Continuous bladder irrigation

**What day was the catheter inserted? _____ Day # _____**

**Is there an order for the indwelling urinary catheter?** (Circle one)

Yes No

**Can the indwelling urinary catheter be removed?** (Circle one)

Yes No

**Did you remove the indwelling urinary catheter?** (Circle one)

Yes No

Appendix H

Participant Demographics

**Table 2**

*Demographics of ICU Nurses*

| Demographic Variable | Participants (n=12) | Proportions (%) |
|---|---|---|
| **Age** | | |
| 18-30 | 5 | 42 |
| 31-50 | 6 | 50 |
| 50+ | 1 | 8 |
| **Highest Level of education** | | |
| Associate degree | 3 | 25 |
| Bachelor's degree and above | 9 | 75 |
| **Years of experience in profession** | | |
| 6 months-2 years | 2 | 17 |
| 2-5 years | 4 | 33 |
| 5+ years | 6 | 50 |
| **Yeats of experience in critical care** | | |
| 6 months-2 years | 3 | 25 |
| 2-5 years | 6 | 50 |
| 5+ years | 3 | 25 |
| **Employment status** | | |
| PRN/Agency/Travel | 2 | 17 |
| Part-time | 4 | 33 |
| Full-time | 6 | 50 |

Appendix I

Paired *t*-test Table

**Table 2**

*CSACD Scores Before and After Rounding Tool Implementation (n=12)*

| | **Pre-intervention Mean ± SD** | **Std. Error Mean** | **Post-intervention Mean ± SD** | **Std. Error Mean** | **Mean Difference** | **Confidence Interval** | ***p*-value** |
|---|---|---|---|---|---|---|---|
| **CSACD score** | 42.33 ± 6.867 | 1.982 | 44.83 ± 7.196 | 2.077 | -2.500 | 95% | *p = 0.118* |