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**Reducing Indwelling Urinary Catheter Days: Improving Interdisciplinary Communication
in a Surgical Intensive Care Unit**

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NURS 670: ME-MSN Internship

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Abstract

Problem Urinary catheter nurse-driven removal protocols (UCNDRPs) are evidence-based algorithms that promote the timely removal of indwelling urinary catheters (IUCs) and prevent catheter-associated urinary tract infections (CAUTIs). Communication barriers hinder consistent implementation of the UCNDRP, resulting in delayed IUC removal and increased risk of CAUTIs.

Context This quality improvement project was conducted in a 16-bed surgical intensive care unit (SICU) in an academic medical center in the San Francisco metropolitan area. **Interventions**

Urinary catheter reminder posters displaying the duration of IUC days were placed at the bedside to prompt interdisciplinary communication about IUC indication and removal. An email detailing the project's background was sent to nurses and physicians by the unit director. One-on-one conversations describing the use of the posters were conducted with bedside nurses. Stickers with an image of an IUC accompanied by the question "Why am I here?" were distributed as light-hearted conversation starters to initiate discussion about IUCs. **Measures** Interdisciplinary rounds

were observed pre- and post-implementation to determine the number of rounds in which the care team discussed IUC indication or removal. The catheter utilization ratio was compared between the pre- and post-intervention periods. **Results** The frequency of interdisciplinary rounds discussing IUC indication or removal increased by 7% from 23% to 30%. The catheter utilization ratio decreased by 20% from 0.61 in April 2023 to an average of 0.50 from April 1-21, 2024.

Conclusion These findings suggest that promoting interdisciplinary communication through visual cues enhances communication and reduces IUC utilization. Further evaluation is needed to ascertain sustainability and long-term impact.

Keywords: nurse-driven removal protocol, urinary catheter, barriers, catheter-associated urinary tract infection, interdisciplinary communication

Reducing Indwelling Urinary Catheter Days: Improving Interdisciplinary Communication in a Surgical Intensive Care Unit

Catheter-associated urinary tract infections (CAUTIs) are preventable yet persist as one of the most prevalent healthcare-associated infections. According to Whitaker et al. (2023), approximately 12-16% of hospitalized adult patients will require an indwelling urinary catheter (IUC), and each day the IUC remains, patients are estimated to have a 3-7% increased risk of developing CAUTIs. Studies have shown that the risk of CAUTIs increases with the duration of catheterization, resulting in increased length of hospitalization stays and costs. Additionally, CAUTIs can lead to complications such as urosepsis and even death if left untreated (Theobald et al., 2017). Because the prolonged use of IUCs is the most important risk factor for developing CAUTIs, it is imperative that IUCs be utilized only under appropriate indications and promptly discontinued once they are no longer needed (Centers for Disease Control and Infection, 2022).

Urinary catheter nurse-driven removal protocols (UCNDRPs) are evidence-based interventions that have been implemented at many hospitals to facilitate catheter use and timely removal based on medical necessity (Durant, 2017). This type of protocol grants nurses the autonomy to remove catheters that are no longer clinically indicated upon their assessment without a provider order. By implementing a nurse-driven protocol, IUCs are removed as soon as possible, decreasing the risk of CAUTI incidence and overall hospital costs (DePuccio et al., 2020).

Problem Description

Located in the greater San Francisco area, Hospital X is an academic medical center that functions as both a tertiary and quaternary care center and a community hospital. The microsystem of the adult surgical intensive care unit (SICU) of Hospital X is an open 16-bed

intensive care unit where multiple specialty teams of physicians care for critically ill patients with various complex surgical conditions; liver, kidney, or pancreas transplantation; and severe medical conditions such as sepsis, oncologic diseases, and autoimmune disorders. 70 nurses are employed on this unit, each with the expertise necessary to care for a diverse population of patients from various counties in the San Francisco Bay Area region.

While Hospital X currently has a UCNDRP in place, barriers that inhibit adherence to the protocol exist, increasing the number of catheter days. A review of data collected by the Nursing Quality and Analytics team at Hospital X revealed that in the 2024 fiscal year through January 2024, the duration of catheter device days was 1,663 days in the SICU, which was the highest of all adult inpatient units at Hospital X. In addition, the SICU director shared that the 2024 fiscal year through January 2024 catheter utilization ratio (number of catheter days/number of patient days) was 0.56, exceeding the average catheter utilization ratio of 0.45 for all critical care units at Hospital X (Hospital X SICU director, personal communication, March 20, 2024). Data also revealed that three CAUTI events were attributed to the SICU microsystem in the 2024 fiscal year to date (FYTD), already meeting the unit's safety and quality threshold of three CAUTI events within the first eight months of the fiscal year. This quality improvement (QI) project aims to identify barriers to the hospital's UCNDRP and use evidence-based practice to address the causes of inconsistent implementation of the protocol, enhance timely removal of IUCs, and ultimately reduce the risk of CAUTIs for all patients on this unit.

Available Knowledge

PICOT Question

The Population, Intervention, Comparison, Outcome, and Time (PICOT) question used to guide a literature search for this project is as follows: In adult patients in the SICU, how does

reducing barriers to the hospital UCNDRP affect the number of IUC days over a study period of 12 weeks?

Search Methodology

An electronic database search in Cumulative Index of Nursing and Allied Health Literature (CINAHL) Ultimate, PubMed, and Scopus was completed to retrieve relevant literature. Key search words included terms such as *urinary catheter*, *nurs* protocol*, *barriers*, *catheter-associated urinary tract infections*, and *CAUTIs*. Articles included in this literature review had the following inclusion criteria: studies written in the English language, available in full text, and conducted within the past 15 years. Because the project's microsystem cares for adult patients, exclusion criteria in the literature search included *pediatric*, *adolescents*, and *children*. Relevant articles were critically appraised using the Johns Hopkins Evidence-Based Practice Model for Nursing and Healthcare Professionals guidelines (Dang et al., 2022). A total of 11 articles were selected, including one Level II study (quasi-experimental design), seven Level III studies (one prospective pilot study, one systematic review, one retrospective chart review, and four qualitative studies), and three Level V studies (quality improvement), ranging from good quality to high-quality evidence (see Appendix A). Due to its comprehensive coverage of a broad range of information, this literature review serves as a robust sampling of the existing research on barriers that contribute to the non-adherence of UCNDRPs and strategies to mitigate those barriers.

Literature Synthesis.

Efficacy of Urinary Catheter Nurse-Driven Removal Protocols

By promoting the timely removal of unnecessary IUCs and providing guidelines for catheter utilization based on evidenced-based criteria, UCNDRPs are effective interventions in

CAUTI prevention. Durant (2017) found that after UCNDRPs were implemented, the urinary catheter utilization ratio decreased by up to 50%, the CAUTI rate was reduced by up to 72%, and the number of IUC days decreased by up to 68% across various critical care units. This study demonstrated that adherence to these standardized protocols based on an approved nurse decision-making algorithm resulted in measurable decreases in catheter utilization and CAUTI rates in the intensive care setting. Parry et al. (2013) showed similar findings in that researchers found IUC use decreased by 50.2% and CAUTIs were reduced by 70% within 36 months after the implementation of UCNDRPs. In addition to the reduction in IUC utilization rate, culture change resulted within the facility, promoting teamwork and encouraging ownership of the protocol (Parry et al., 2013). By emphasizing early catheter removal, UCNDRPs empower nurses to advocate for catheter removal when clinically appropriate, resulting in enhanced patient safety.

Barriers to Implementation of UCNDRPs

Effective communication and collaboration among healthcare team members are essential for ensuring adherence to nurse-driven protocols. However, poor communication and interdisciplinary collaboration can hinder protocol implementation. Studies emphasized the lack of communication among multidisciplinary teams in contributing to non-adherence to UCNDRPs (DePuccio et al., 2020; Manojilovich et al., 2019; Quinn et al., 2020). Despite having a UCNDRP in place, nurses reported feeling less empowered to follow it due to physicians only wanting IUCs removed with their approval or experienced physicians becoming upset when nurses acted upon the UCNDRP without communicating first (DePuccio et al., 2020). This disempowerment led to an increased number of catheter days due to nurses feeling hesitant to remove catheters on their own despite having the autonomy to do so. Manojilovich et al. (2019)

also discussed this challenge and highlighted that hierarchical power dynamics between physicians and nurses may discourage nurses from voicing their concerns or suggestions regarding catheter order and protocol adherence, leading to a lack of engagement and ownership in catheter care practices. Similarly, Krein et al. (2020) identified that a common barrier to the adherence of UCNDRPs is difficulty with nurse and physician engagement. Interviews with informants from this study attributed this lack of engagement to varying levels of interest in the topic of IUCs, leading to a lack of buy-in (Krein et al., 2020). These studies highlight that organizational hierarchy communication structure inhibits open dialogue and emphasizes the need for nurse and physician engagement in CAUTI reduction initiatives.

Similar issues of inadequate communication were observed by Quinn et al. (2020) who conducted observations and interviews with clinicians working on an open 20-bed progressive care unit of a large academically affiliated tertiary care hospital. The researchers asserted that the most important finding from this study was that catheters were generally not discussed, especially during rounds, patient assessment, and nurse handoff despite clinicians reporting these events being the best opportunities to have these discussions (Quinn et al., 2020). On the rare occasion when catheters were discussed, it was to clarify that the patient had a catheter in place, but the indication and duration of the catheter were seldom mentioned (Quinn et al., 2020). Because this study was conducted on a progressive care unit, catheter removal may not have been viewed as a priority as many of the patients had multiple health problems, similar to critical care settings. These findings underscore the importance of incorporating discussions about catheters into rounds, as they offer a valuable opportunity for interdisciplinary decision-making regarding the removal of IUCs.

Implementation Strategies

Elkbuli et al. (2018) assessed the effect of a CAUTI prevention bundle on reducing CAUTIs in adult trauma patients. In this study, catheter discontinuation was evaluated and discussed between the nurse and physicians during interdisciplinary rounds (Elkbuli et al., 2018). Similarly, a group of nursing staff, physicians, infection preventionists, and leadership performed a QI project to refine the understanding of appropriate indications for IUC use (Maxwell et al., 2018). To decrease the incidence of CAUTIs within the intensive care unit of a Level II Trauma Center in Colorado, the study's QI team provided education on appropriate IUC utilization and encouraged a focus on IUC discussion during daily multidisciplinary rounds (Maxwell et al., 2018). Nurses not only assessed catheters but also were expected to have a plan for IUC removal before rounds. Both studies emphasized the importance of communication during rounds as it not only reduced the CAUTI rate and IUC utilization but also promoted a behavioral change in CAUTI prevention and established a safety culture (Elkbuli et al., 2018; Maxwell et al., 2018). In contrast, Fuchs et al. (2011) improved interdisciplinary communication during rounds using a daily checklist applied to patients with an IUC in five intensive care units within one hospital. The checklist was used to assess the need for continued use of the IUC and nurse staff members were responsible for completing and documenting the checklist before morning rounds with physicians (Fuchs et al., 2011). The implementation of the checklist not only decreased the CAUTI rate from 2.88 per 1000 catheter days before the intervention to 1.46 per 1000 catheter days after the intervention but also served as a communication tool among healthcare team members (Fuchs et al., 2011). By prompting nurses to document key aspects of IUC management, including IUC presence and relevant indication, the checklist fostered accountability for interdisciplinary assessment of the IUC, prompted discussion of the plan for removal, and encouraged open communication regarding concerns.

Conner et al. (2013) assessed the effect that education had on the implementation of evidence-based UCNDRP. Staff education and training were provided to nurses in the intervention group before the UCNDRP was implemented on the unit while nurses in the control group continued to deliver routine catheter care. By the end of the study, the intervention group had increased perceptions, attitudes, and support for the UCNDRP compared to the control group. While participants of the study noted that education helped implement the UCNDRP, the researchers highlighted the value of posters placed in areas frequently visited by nursing staff such as the staff bathrooms, staff lounge, and the nurses' station to act as a reminder of the protocol (Conner et al., 2013). Notably, catheter days in the intervention group decreased from 23,598 during the pre-intervention period to 13,780 during the post-intervention period while the catheter days in the control group increased from 14,144 to 25,944 (Conner et al., 2013). These results were supported by Mori (2014) who performed a retrospective chart review to determine the effectiveness of UCNDRPs on CAUTI rates in a 150-bed community hospital in the northern United States. While results showed a decrease in facility CAUTI rate from 0.77% 3 months prior to implementation to 0.35% 3 months after implementation, nurses reported concerns about the consequences of patient incontinence such as compromised skin integrity, pressure ulcers, and frequent linen changes when IUCs are not in use (Mori, 2014). However, the study determined that face-to-face communication was the most effective way to overcome resistance to change when implementing the protocol (Mori, 2014).

Summary

The studies in this literature review emphasize the importance of enhancing communication between nurses and other interdisciplinary care team members regarding IUC removal. Face-to-face education; visual aids such as posters, infographics, or handouts; and a

checklist used during rounds can serve as tangible resources for review and knowledge reinforcement about the IUC removal protocol, promote interdisciplinary discussion about IUC removal, and empower nurse decision-making. This QI project implemented these components through a multi-faceted approach to enhance nurses' understanding of clinical indications for IUC removal under the hospital's UCNDRP, increase compliance to the protocol, and shift a change in the unit's culture to ultimately improve interdisciplinary communication.

Rationale

This QI project was guided by the Reinforcement Theory of Motivation. Consisting of five stages, this theory draws on the principles of operant conditioning in which individuals' behaviors are modified through positive and negative reinforcement (Isai Amutan, 2014). The first stage requires identifying the behavior that is to be modified. In this QI project, the targeted behavior is decreasing the duration of catheter days by addressing existing barriers to the UCNDRP. In the second stage, a baseline measurement of the undesired behavior is developed. The QI team assessed the microsystem to establish the current practices in the unit and surveyed nurses to determine their confidence in performing the UCNDRP. In the third stage, the causes and consequences of the undesired behavior are determined. The QI team observed that when IUCs were discussed during rounds, IUC indication and/or plan for removal were only addressed 23% of the time. In the fourth stage, an intervention is implemented. To increase the frequency of interdisciplinary discussion about IUC indication and removal, an intervention involving a reminder tool utilized during rounds was implemented. In the fifth and final stage, the behavior is periodically measured to determine the extent of the changes achieved.

Ethical Considerations

This project meets the guidelines for an evidence-based quality improvement project. An IRB review was not required. A statement of non-research determination (SONRD) form was completed to validate this quality improvement initiative (Appendix B) followed by a review and approval by the University of San Francisco School of Nursing and Health Professions clinical faculty. The project described received no funding, and the project group members declare no conflict of interest for the project.

Ethical considerations in the development of this QI project encompass beneficence and non-maleficence. According to the American Nurses (ANA) Code of Ethics (2015) under Provision 3.4, nurses have the responsibility of participating, reviewing, and adhering to policies that promote patient health to sustain a culture of safety. This provision underscores the nurse's responsibility to advocate for practices that protect patients from harms such as CAUTIs. By actively improving adherence to evidence-based protocols such as UCNDRPs, this QI project encourages nurses to prioritize patient safety while upholding professional ethical standards.

At its core, the Jesuit value of "being people for others" emphasizes a commitment to service and social justice in one's career, life, and community (University of San Francisco, n.d.). This value resonates with this QI project aimed to reduce the number of catheter days at Hospital X. In the spirit of "being people for others," this project embraces an interdisciplinary approach, fostering collaborative efforts between physicians and nurses to communicate about IUCs during rounds. Ultimately, this QI project strives to reduce the risk of CAUTIs, improve patient outcomes, and promote the well-being of the whole person.

Project AIM

The specific aim of this quality improvement project was to reduce the catheter utilization ratio by 10%, from 0.61 in April 2023 to 0.55 by April 21, 2024, in the SICU of

Hospital X. This was to be achieved by improving interdisciplinary communication regarding catheter indication and removal plan during rounds from 23% to 75% by implementing a bedside urinary catheter reminder poster.

Methods

Context

The SICU microsystem is a 16-bed unit in a 600-bed academic medical center in the San Francisco metropolitan area. Functioning as an open intensive care unit, the SICU encompasses multiple service lines and physician teams. Because patients in this unit undergo surgical procedures, they often require the insertion of IUCs.

Microsystem Assessment

Purpose. The purpose of the SICU in Hospital X is to serve as a specialized unit focused on delivering patient-centered care to patients experiencing post-operative or acute medical conditions in the perioperative setting. The implementation of the UCNDRP within the SICU underscores Hospital X's commitment to advancing health through evidence-based practice. By integrating its core values of professionalism, integrity, and respect into the SICU's protocols, Hospital X ensures that all aspects of patient care align with its dedication to providing the highest standard of care to every patient they serve.

Patients. The patient population at Hospital X's SICU encompasses a diverse array of individuals. This includes adult patients requiring post-operative care following major surgeries or severe medical conditions requiring intensive monitoring or treatment. Many of the patients are unstable or severely ill, necessitating comprehensive care and possible emergency interventions.

Professionals. The SICU microsystem is comprised of interpersonal teams including attending physicians, fellows, residents, physician assistants, and nurse practitioners. Both the intensivist team and various specialty teams provide care for patients on the unit. The backbone of the SICU is the clinical nurses who carry out the UCNDRP. Beyond nursing, the critical care team also includes pharmacists, respiratory care practitioners, social workers, physical therapists, occupational therapists, and nutritionists. This QI project was led by student nurses from the University of San Francisco under the guidance of the unit director.

Processes. At Hospital X, there is a UCNDRP in place under which nurses have the autonomy to assess patients with IUCs, determine whether an IUC is still necessary, and remove the IUC without a provider order. Evidence has demonstrated that this protocol promotes the timely removal of IUCs and reduces the number of catheter days, consequently reducing the risk of CAUTIs (DePuccio et al., 2020). Under the UCNDRP, nurses review the orders for IUCs once per shift, or more frequently as deemed necessary, to assess if the IUC's indication is still appropriate or if the IUC is ready to be removed. See Appendix C for details of Hospital X's UCNDRP.

Patterns. Despite the implementation of Hospital X's UCNDRP, barriers contribute to the inconsistent implementation of the protocol in the SICU. Through observations conducted during interdisciplinary rounds, the QI team found that in the 44 patient rounds observed, IUC indication and/or removal plan was discussed 10 times (23% of the time). Surveys conducted among the SICU nurses revealed that 68% (13 out of 19) of nurses surveyed would hesitate to remove an IUC with a nurse-driven removal order without consulting providers first despite nurses having autonomy to remove the IUC. These barriers contribute to the SICU having the highest number of catheter days of all the other critical care units at Hospital X.

Fishbone Analysis

A root cause analysis was conducted using a fishbone diagram to determine the factors that contribute to the inconsistent implementation of the UCNDRP in the SICU (see Appendix D). Patient diagnoses such as urinary retention necessitate IUC insertion because IUCs serve as a medical necessity. Deference to physicians among nursing staff contributes to hesitancy in initiating IUC removal under the UCNDRP. Additionally, urinary output is perceived to be more accurately measured via IUCs than external urinary collection devices. In critical care settings, accurate output measurement is crucial for renal function assessment and fluid balance management, contributing to the favoring of IUCs. Furthermore, nurses tend to consult physicians about IUC removal during interdisciplinary rounds rather than proceeding with the removal independently, thereby hindering nurse autonomy. The presence of multiple physician teams with different communication preferences and approaches to IUC management also contributes to the problem. Moreover, the absence of a section for IUC indication and removal plan in the nurse rounding template presents as a barrier to consistent documentation and communication about IUC management. Although the SICU nurses acknowledge the presence of IUCs during rounds, IUC indication and removal plan is seldom mentioned, indicating a need for improvement. Integrating these discussions into rounds allows healthcare teams to collaboratively assess the necessity of IUCs for individual patients and establish appropriate removal plans.

GANTT Chart

This QI project was conducted over a four-month period from January 2024 to April 2024. A Gantt chart was created to visualize a detailed overview of the project's timeline (see

Appendix E). The Gantt chart was divided into four phases: initiation, planning, implementation, and evaluation.

In the initiation phase, the QI team reviewed Hospital X's UCNDRP and met with the clinical instructor and SICU director to discuss the details, expectations, and goals of the project.

In the planning phase, a literature review was conducted to gather information on UCNDRPs, common barriers to the successful implementation of UCNDRPs, and recommendations to overcome such barriers. Additionally, the QI team observed 44 interdisciplinary rounds over six days and developed a pre-survey that inquired about nurses' perceptions and experiences regarding the UCNDRP (see Appendix F). Upon analysis of survey responses and observations of rounds, the team recognized the crucial role of interdisciplinary communication and developed a bedside urinary catheter reminder poster.

The implementation phase involved carrying out the following interventions: conducting one-on-one rounding with nurses and disseminating an email to both attending physicians and nursing staff containing details about the project. The phase concluded with a PDSA cycle.

During the evaluation phase, the QI team observed 44 interdisciplinary rounds post-intervention, documented findings, and presented this data to SICU stakeholders. Feedback from staff nurses was collected to gather improvement ideas.

SWOT Analysis

A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was conducted to identify internal factors (strengths and weaknesses of the SICU) as well as external factors (opportunities and threats of Hospital X) that have an impact on this QI project (see Appendix G).

Strengths. Strengths of the SICU include there being a unit director and CAUTI champion who are both proactive about reducing the catheter utilization ratio on the unit. Experienced nurses are also scheduled to complete staff administrator days during which they round on patients with IUCs and assess if there is an ongoing need for the IUC to remain inserted.

Weaknesses. Weaknesses include the SICU operating as an open unit with multiple physician teams, resulting in different catheter management practices. Because patients in this SICU undergo surgery, this contributes to high catheter utilization ratios. Furthermore, due to the high acuity of patients in the SICU, IUC removal is not always prioritized, leading to increased catheter days. Lastly, the interdisciplinary rounding script used in the SICU does not include specific sections for documenting catheter indications and days, potentially contributing to a lack of communication about these topics.

Opportunities. As an academic medical center, Hospital X cultivates a culture of teaching and sharing of QI initiatives and ideas across all its units and campuses. This facilitates knowledge exchange, allowing the SICU to benefit from insights gained in other units. Furthermore, an active CAUTI champions committee at Hospital X has established CAUTI reduction goals for the SICU and regularly evaluates hospital-wide metrics on CAUTIs. This initiative offers an opportunity to implement strategies aimed at reducing catheter days and promoting best practices in catheter management.

Threats. Because Hospital X is a teaching hospital, physician teams rotate to the unit every week. The frequent change in physician personnel presents challenges related to continuity of care and may result in the disruption of communication. Moreover, email notifications to update staff about new policy changes may be insufficient in ensuring staff awareness and

compliance as these updates may be overlooked, potentially resulting in gaps in catheter management protocols.

Financial Analysis

A cost-benefit analysis was performed to determine the estimated expenses required to implement this QI project and the potential cost savings related to the reduced number of CAUTIs (see Appendix H). Hospital X is estimated to incur an additional \$13,793 for each patient who develops a CAUTI beyond the costs associated with caring for a similar patient without a CAUTI (Agency for Healthcare Research and Quality, 2017). In the 2023 fiscal year, the SICU had four CAUTI events, which amounted to an additional \$55,172 in total cost of CAUTIs for that period. If the SICU has a reduction in two CAUTI events, the unit will have an annual cost avoidance of \$27,586. Considering the expenses for purchasing, printing, and laminating posters, quick response (QR) code feedback survey flyers, and stickers in addition to purchasing gift cards used to incentivize survey participation (\$144.14), compensation for staff nurse attendance for a 15-minute student nurse presentation for nursing staff to gain an understanding of the project (\$699.44), SICU director time spent on overseeing the QI project (\$1,249.05), and the time invested by a Clinical Nurse Leader to plan the project, develop the intervention, and collect and analyze data (\$16,152), the total implementation cost is \$2,092.63. By subtracting the annual cost avoidance from the total implementation cost, Hospital X will save \$9,241.37 from the reduction of two CAUTIs.

Intervention

This QI project carried out three interventions: 1) the development of a bedside urinary catheter reminder poster, 2) the development of a conversational prompt sticker, and 3) one-on-one rounding with nurses. Prior to carrying out these interventions, the QI team drafted an email

introducing the project and the tool to be implemented. This email was subsequently sent out to the attending physicians and nursing staff to provide them with an overview of the project objectives, the role of the tool in promoting the timely removal of IUCs, and the QI team's request for their participation.

The QI team developed a bedside urinary catheter reminder poster to visually display the duration of IUC days for each patient. Positioned prominently outside each patient's room door, the poster was printed, laminated, and placed in areas visible to nursing and physician teams during nurse-led interdisciplinary rounds. Its purpose was to prompt interdisciplinary communication regarding IUC indication and removal plans. Alongside the catheter days box, a flowchart outlining Hospital X's UCNDRP was included (see Appendix I). Nurses were asked to document the insertion date, type of IUC protocol (nurse-driven or provider-driven), current indication, and most importantly, the number of catheter days on the poster. Additionally, the reverse side of the poster featured a copy of Hospital X's updated bladder care protocol to be followed after IUC removal (see Appendix J).

The QI team also designed and distributed stickers featuring an image of an IUC accompanied by the question "Why am I here?" (see Appendix K). Nurses and physicians were encouraged to wear these stickers. The purpose of these stickers was to serve as light-hearted conversation starters to prompt discussions about IUCs and to maintain the topic at the forefront of the SICU team's awareness.

Members of the QI team conducted one-on-one rounding sessions with nurses over the course of one week, engaging in discussions with a total of 19 nurses. These sessions aimed to inform SICU nurses about the QI project's objectives. To facilitate these discussions, the QI team prepared talking points to introduce themselves, the project, and the bedside reminder tool

(see Appendix L). Key points covered included literature findings highlighting interdisciplinary communication as a common barrier to IUC removal in critical care settings, as well as data and results from observations conducted by the QI team.

Study of the Intervention

One Plan-Do-Study-Act (PDSA) cycle was conducted between March 2024 and April 2024 (see Appendix M).

In the Plan phase, reminder posters were strategically posted on patient doors to visually reinforce awareness of the number of catheter days for each patient with an IUC and provide an accessible copy of Hospital X's UCNDRP. At the beginning of the week, following the morning huddle, the QI team met with the attending physician to inform her of the intervention.

In the Do phase, nurses were requested to fill out the reminder poster and discuss IUC days, indications, and removal plans during both handoff and interdisciplinary rounds. Additionally, the QI team observed rounds from April 1st to April 6th, noting the frequency with which IUC indication or removal was discussed.

The Study phase involved assessing whether interdisciplinary communication during nurse-led rounds improved after implementing the project's interventions. To do this, the QI team observed 44 rounds over six consecutive days, recording instances when IUC indication or removal was discussed by either a physician or nurse. During these rounds, the QI team also took note of how many bedside urinary catheter reminder posters were accurately updated. Pre- and post-intervention data were compared to evaluate the intervention's impact on the SICU's catheter utilization ratio. Following the intervention implementation, a feedback survey was created and distributed during a staff meeting, as well as posted in visible areas on the unit (see Appendix N). The survey aimed to gather qualitative data on nurses' perceptions of the

importance of discussing IUC indication and removal plans during rounds and gather suggestions for project improvement. The surveys remained open for one and a half weeks, during which the QI team collected and analyzed the responses.

The subsequent Act phase identified potential areas of improvement for this project. One such change was moving the posters to more accessible areas for better visibility. Other proposed recommendations include assigning the SICU Hospital Unit Service Coordinator (HUSC) to fill out the poster rather than the nurses who are generally preoccupied with critical tasks, integrating filling out the posters into catheter rounding duties for experienced nurses on administrator days, and supplying dry erase markers at bedside since markers were only located at the front desk.

Process Measure

- Process Measure: Improve interdisciplinary communication regarding catheter indication and removal plan during rounds from 23% to 75% by implementing a bedside urinary catheter reminder poster.
 - This process measure will be evaluated by the QI team via observations of interdisciplinary rounds pre- and post-intervention. The number of times in which IUCs are discussed during these rounds will be recorded and totaled. This number will then be divided by the total number of rounds observed in the respective pre- and post-intervention periods. The resulting calculated percentages will be compared between the two phases.

Outcome Measure

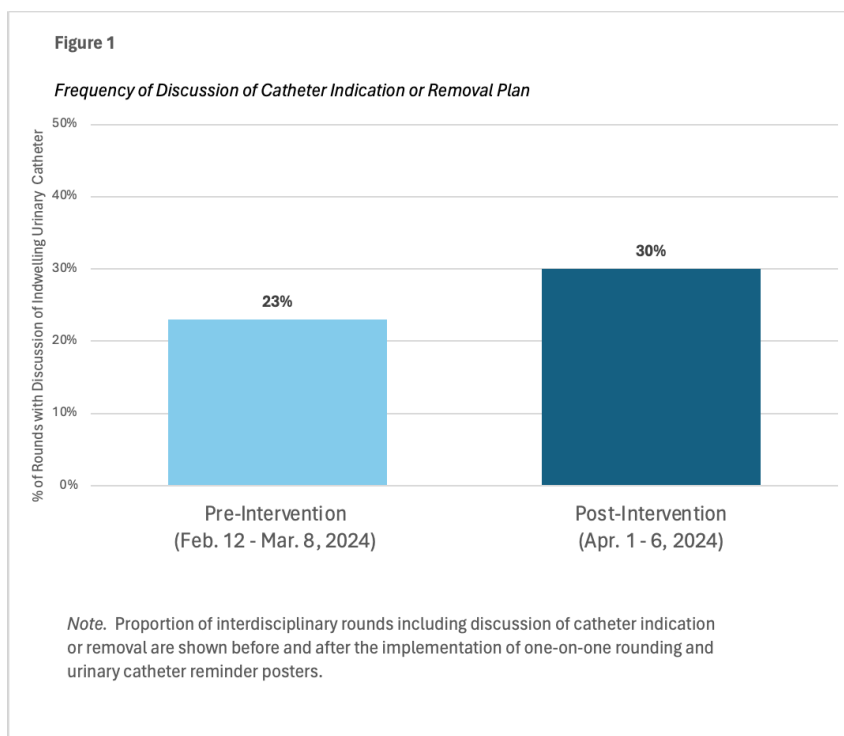
This QI project's outcome measure is extracted from the specific aim statement.

- Outcome Measure: Reduce the catheter utilization ratio by 10%, from 0.61 in April 2023 to 0.55 by April 21, 2024.

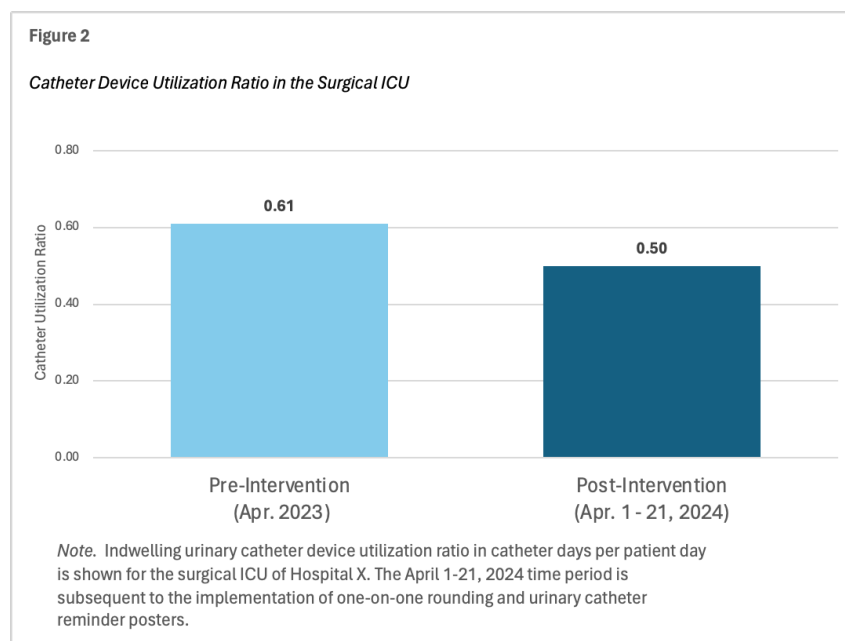
- This outcome measure will be evaluated by reviewing data collected by the Nursing Quality and Analytics team at Hospital X. The catheter utilization ratio in the pre-intervention period and post-intervention period will be compared.

Results

The QI team observed 44 interdisciplinary rounds during the pre-intervention period spanning from February 12, 2024 to March 8, 2024, and 44 interdisciplinary rounds during the post-intervention period from April 1, 2024 to April 6, 2024. To assess the effectiveness of the intervention on interdisciplinary communication concerning IUCs, the QI team recorded and compared the number of patient rounds in which IUC indication or removal was discussed by either a nurse or a physician between the pre- and post-implementation phases. Analysis of the data collected revealed that discussion of IUC indication and removal increased by 7% from 23% (10 out of 44 rounds) of the time during the pre-implementation phase to 30% (13 out of 44 rounds) of the time during the post-implementation phase (Figure 1).



To determine the impact of the intervention on the unit's catheter utilization, the catheter utilization ratio was compared between the pre- and post-intervention periods. Analysis of the data revealed that the ratio decreased by 20% from 0.61 in April 2023 to an average of 0.50 in the post-intervention period of April 1, 2024 to April 21, 2024 (Figure 2).



31% (22 out of 70) of SICU nurses participated in the feedback survey distributed to the unit after the intervention was implemented. The survey's first question inquired about the perceived informativeness of the one-on-one conversations regarding bedside urinary catheter reminder posters. 42% of the nurses reported these conversations to be very helpful, 27% reported that the conversations were somewhat helpful, and 31% reported that they did not have a one-on-one conversation. The second question assessed the perceived informativeness of the IUC reminder posters for nursing staff. Responses indicated that 50% found them very helpful, 42% somewhat helpful, 4% not so helpful, and 4% reported they did not have a patient with an IUC during the intervention period. The third question utilized a 5-point Likert scale and asked nurses to express their degree of agreement with the following statement: "It is important that I

discuss the IUC indication and plan for removal for every patient with an IUC during interdisciplinary rounds.” Results revealed that 88% agreed, while 8% somewhat agreed with the statement. Staff responses to open-ended questions suggested potential ideas for addressing catheter days, including incorporating discussions about IUCs during rounds, conducting thorough evaluations of the necessity of current catheters, and engaging physicians in CAUTI prevention initiatives. When asked to provide feedback on what the QI team could improve on, staff suggested more face-to-face interactions with unit staff, especially during the night shift, could be beneficial. See Appendix O for complete staff feedback survey results.

Discussion

Summary

Despite improvement in interdisciplinary discussions about IUC indication and removal plans falling short of the QI team’s target percentage during the post-intervention period with a marginal increase of 7%, the SICU’s catheter utilization ratio decreased by 20%, surpassing the QI team’s threshold goal of a 10% reduction. While the bedside urinary catheter reminder poster aimed to emphasize catheter days for patients with IUCs, the QI team noticed that the posters were not consistently filled out with the correct duration of catheter days. While these findings may suggest that improvement in catheter utilization might not have been attributed to communication during rounds, conversations with the staff nurses, physicians, and unit leaders may have contributed to these improvements by putting the topic of IUCs and CAUTI reduction at the forefront. However, it is difficult to ascertain whether the ratio reduction can be solely attributed to these conversations, as there was no way to measure their impact. Additionally, the launch of Hospital X’s updated bladder care protocol further complicates pinpointing the most

effective aspects of the intervention. Further evaluation is necessary to determine the contributions of these factors and to refine strategies for ongoing improvement.

Regardless, the results of the project suggest that bringing attention to the issue increased staff awareness of the problem and promoted change because it increased the number of discussions, heightened sensitivity to the importance of IUC management, and fostered a culture of accountability and improvement within the SICU. The feedback survey results showed that although a majority of nurses agreed that discussions about IUCs, visual reminders, and interdisciplinary communication were informative and important, the intervention developed by the QI team had room for improvement.

Several factors contributed to the successful implementation and positive results of this QI project. The main factor was the proactive involvement of the unit director who guided the QI team's improvement efforts. As a stakeholder, the unit director met with the QI team on a weekly basis, during which feedback and updates about the project's progress were shared. These regular meetings ensured that the intervention was implemented within the short timeframe. Another factor was the support of the staff nurses. They were receptive to the conversations with the QI team related to the project and used their experiences and knowledge of the unit to provide feedback, further improving the project's CAUTI prevention efforts. Additionally, some nurses also participated in filling out the bedside urinary catheter reminder poster and were mindful of discussing IUCs during rounds after learning about the project, demonstrating a willingness to change after being made aware of evidence-based practice and unit data. The third factor was input from attending physicians, who shared their insights about barriers to IUC management and actively participated in the QI team's initiatives, which played a vital role.

Overall, the collaborative culture within the unit fostered effective teamwork between the QI team and the unit.

A valuable lesson was the importance of adaptability when developing interventions in QI initiatives. Initially, the intervention involved revising the SICU rounding script template to include sections for catheter days, IUC indication, and anticipated removal date to ensure that nurses brought up these topics during rounds and further improved interdisciplinary communication. However, this request required approval from the electronic health record team at Hospital X and entailed a long process, making this not feasible during the limited timeframe of this project's duration. Upon learning that this intervention would not be possible to implement in the near future, the QI team reflected upon their observations and what they learned from the literature review and developed a different intervention that still addressed the issue of interdisciplinary communication.

Limitations

Several limitations impacted this QI project, with time constraints being the most significant. Because this project was conducted over four months, there was limited time to assess the microsystem, identify the root causes of the issue, determine key metrics for measuring success, develop and implement an intervention, and redesign processes. Specifically, the constrained time frame impacted the QI team's ability to engage in one-on-one conversations with all nurses on the unit, as only 19 out of 70 were able to participate in these discussions over the course of one week. This limited engagement impeded the team's ability to effectively inform nurses about observations and data regarding the inadequate mention of IUCs during rounds and the unit having the highest number of catheter days. This may have contributed to the staff's suboptimal participation in the intervention and potentially hindered the staff's

understanding of the project's objectives. Furthermore, the QI team was only able to observe rounds for six consecutive days in the post-intervention period. This reduced the variability in observed behaviors and discussions among healthcare providers, as it involved the same attending physician and patients with IUCs during the period. Consequently, this limited the validity of the comparisons with the pre-intervention period, where there was more diversity in attending physicians and patient cases. Additionally, while an email notifying SICU staff about the project was sent, many nurses reported being unaware of the new changes. This inadequate notification may have contributed to the inconsistent mention of IUCs during rounds, highlighting a potential communication gap that could have impacted the project's effectiveness.

Conclusion

While this project successfully exceeded its threshold goal of reducing the unit's catheter utilization ratio, discussions about IUC indication and removal during interdisciplinary rounds did not increase as significantly as anticipated. Consequently, it is unclear which aspects of the intervention contributed most to achieving the project's outcome measure. However, nurses reported that one-on-one conversations raised awareness of the issue. The research underscores the importance of interdisciplinary discussions and visual cues in improving communication and reducing IUC utilization (Elkbuli et al., 2018; Manojilovich et al., 2019; Quinn et al., 2020). Further evaluation is necessary to ascertain this intervention's sustainability and long-term impact in improving interdisciplinary communication and reducing catheter utilization. Nevertheless, the results show promise, and the unit leadership is open to adopting the proposed recommendations, including involving physicians in IUC removal and CAUTI reduction initiatives, empowering nurses to take ownership of nurse-driven protocols, and revising the rounding script to incorporate sections on IUC days, indication, and anticipated removal date.

The findings from this QI project provided insight into current IUC practices and laid a foundation for refining this intervention in the future.

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Appendix A

Evidence Appraisal Table

Citation	Design	Sample, Sample Size, Setting	How Does Article Address Problem?	Quality of Evidence	Other Highlights from Article (consider including limitations & outcomes)
<p>Conner, B. T., Kelechi, T. J., Nemeth, L. S., Mueller, M., Edlund, B. J., & Krein, S. L. (2013). Exploring factors associated with nurses' adoption of an evidence-based practice to reduce duration of catheterization. <i>Journal of Nursing Care Quality</i>, 28(4), 319–326. https://doi.org/10.1097/ncq.0b013e3182852ce7</p>	<p>Prospective Pilot Study</p>	<p>2-group pre-/post-study design on 2 similar 32-bed telemetry units within a 400-bed acute care hospital located in rural South Carolina</p>	<p>Study was conducted on an intervention group on one nursing unit and a control group on a similar unit within the same hospital.</p> <p>Staff was educated on new protocol, benefits of EBP to support intervention, and ongoing reminders via posters, emails, and meeting discussions.</p> <p>RNs in the intervention group reported that education on EBP and CAUTIs helped to motivate with adoption of protocol because they understood the rationale.</p>	<p>Level II B Good quality study with participant-driven inquiry and insightful data</p>	<p>Protocol was evidence-based and required RNs to assess patients' need for IUCs beyond 48 hours.</p> <p>While staff educational and training sessions were helpful, nurses reported that educational reminders via posters placed in strategic locations on the nursing unit such as the staff bathrooms, staff lounge, and nurses' station, email messages, and meeting discussions were the most valuable aspect of the intervention.</p> <p>Limitations: Results from study may not be generalizable to other health care organizations because all nurses were not randomly sampled, study is over 10 years old</p>

			Mean catheter duration decreased by 1.7 days after the intervention.		
DePuccio, M. J., Gaughan, A. A., Sova, L. N., MacEwan, S. R., Walker, D. M., Gregory, M. E., DeLancey, J. O., & McAlearney, A. S. (2020). An examination of the barriers to and facilitators of implementing nurse-driven protocols to remove indwelling urinary catheters in acute care hospitals. <i>The Joint Commission Journal on Quality and Patient Safety</i> , 46(12), 691–698. https://doi.org/10.1016/j.jcjq.2020.08.015	Non-Experimental Qualitative Design	449 interviews conducted with executive leaders, managers (including both nonclinical and nurse managers), infection preventionists, and frontline staff (i.e., nurses, physicians) across 17 hospitals in the United States	Identified common barriers to implementing and adhering to urinary catheter nurse-driven protocols via semi-structured interview questions about management practices regarding the protocol. Reveals interventions that contributed to successful use of urinary catheter nurse-driven protocol and overcome barriers.	Level III B Good quality qualitative study that provides insight into barriers and moderately relevant interventions with some discussion of limitations	Common barriers identified: nurses deferring to patients, physician push-back, and miscommunication about IUC removal. Barriers relevant to QI project discussed. Facilitators suggested to protocol adherence: training care team members, discussing IUC necessity during rounds, reminders about IUC removal when appropriate such as using daily huddles or daily lists of patients with IUCs, gaining buy-in from clinicians and managers to use protocol. Limitations: Study did not measure success or effectiveness of intervention implementation; study did not differentiate physicians by their specialty which may influence use of protocol; potential for conformity bias especially with group interviews.

<p>Durant, D. J. (2017). 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. https://doi.org/10.1016/j.ajic.2017.07.020</p>	<p>Systematic Review</p>	<p>29 studies; all case-control studies with pre-post design compared with a retrospective chart review</p> <p>Studies primarily conducted in intensive care units of hospitals in urban areas</p>	<p>Studies generally showed a reduction in urinary catheter utilization ratio, CAUTI rate, and IUC days after implementation of IUC removal nurse-driven protocol.</p>	<p>Level III B Good quality study with clear conclusions but results may be overstated due to high risk of methodological design of the studies (e.g. no control group, small sample size)</p>	<p>Limitations: Only 1 reviewer performed quality assessment of studies, possibility of bias due to studies that report dramatic results are more likely to be published than studies that reveal little to no effect.</p>
<p>Elkbuli, A., Miller, A., Boneva, D., Puyana, S., Bernal, E., Hai, S., & McKenney, M. (2018). Targeting catheter-associated urinary tract infections in a trauma population: A 5-s bundle preventive approach. <i>Journal of Trauma Nursing</i>, 25(6), 366–373. https://doi.org/10.1097/jtn.0000000000000403</p>	<p>Quality Improvement</p>	<p>12,962 trauma patients were admitted to the Trauma ICU during the 4-year study period from 2014 through 2017</p>	<p>CAUTI-5S bundle was implemented with the aim to reduce CAUTIs among trauma patients during the study period.</p> <p>5S-bundle measures:</p> <ol style="list-style-type: none"> 1. Staff: Nursing education for cleaning 2. Stabilization: Bladder catheter stabilization devices 3. Support: Education to patients, families, and 	<p>Level V B Purpose of study and recommendations are clearly stated, but results may not be generalizable to other units.</p>	<p>After implementing the 5S-bundle approach, there was an 80% reduction in the average CAUTI rate.</p> <p>Catheter discontinuation was evaluated daily by the assigned RN and MD team at the time of interdisciplinary rounds.</p> <p>This study emphasizes the importance of regular communication about IUC removal especially during rounds.</p> <p>Limitations: Study was conducted on one facility, intervention was only measured on trauma population, impact of</p>

			<p>caregivers on catheter risks</p> <ol style="list-style-type: none"> 4. Spot: Keeping the collection bag below the bladder and above the floor 5. Stop: Daily evaluation for discontinuation 		<p>individual interventions not determined since bundle approach was used</p>
<p>Fuchs, M. A., Sexton, D. J., Thornlow, D. K., & Champagne, M. T. (2011). Evaluation of an evidence-based, nurse-driven checklist to prevent hospital-acquired catheter-associated urinary tract infections in intensive care units. <i>Journal of Nursing Care Quality</i>, 26(2), 101–109. https://doi.org/10.1097/ncq.0b013e3181fb7847</p>	<p>Quality Improvement</p>	<p>924-bed tertiary academic medical center in the south-eastern United States with 5 adult ICUs each with 16 to 20 beds</p> <p>408 providers including permanent RN staff, nurse practitioners, physician assistants, and physicians from the 5 adult ICUs were eligible to participate in the electronic provider</p>	<p>A daily checklist was used on patients with an IUC to assess the need for continued use of IUC prior to morning rounds. If criteria for IUC continuance was not met, a treating physician is asked to order removal or justify the continued need for catheter.</p> <p>A retrospective chart review of the nurse-driven checklist after the intervention revealed that compliance was 61% in the neurosciences and 82.9% in the medical ICU.</p>	<p>Level V B Good quality study providing insightful data of intervention effectiveness but barriers to intervention not addressed.</p>	<p>Combined number of IUC days in the neuroscience and medical ICUs declined from 402 to 380 before and after the intervention.</p> <p>The overall CAUTI rate in all 5 ICUs declined from 2.88 per 1000 catheter days prior to the intervention to 1.46 per 1000 catheter days after the intervention.</p> <p>Study showed that the implementation of a rounding checklist can decrease CAUTI rates.</p> <p>Limitations: The study was conducted in a single-site, large tertiary academic teaching hospital so results may not be generalizable to other types of</p>

		satisfaction survey.	Compliance with the use of the daily checklist by staff in all the 5 ICUs was 75%.		hospitals of varying sizes, study is over 10 years old
Krein, S. L., Kowalski, C. P., Harrod, M., Forman, J., & Saint, S. (2013). Barriers to reducing urinary catheter use. <i>JAMA Internal Medicine</i> , 173(10), 881. https://doi.org/10.1001/jamainternmed.2013.105	Qualitative Study	12 purposely sampled hospitals in Michigan with varying hospital sizes and type of units Data collected via phone interviews, in-person interviews, and site visits at 3 of the 12 hospitals	Barriers influencing implementation of statewide CAUTI prevention program as well as strategies to overcome these barriers were identified.	Level III A High quality study with insightful information about potential barriers and facilitators	Common barriers identified: <ol style="list-style-type: none"> 1. Difficulty with nurse and physician engagement 2. Patient and family request for IUCs 3. Emergency department role in catheter insertion Recommended facilitators: Nurse champion, physician champion, hourly rounding, patient/family, and ED education Limitations: Results may not be generalizable to other hospitals/healthcare organizations because study was conducted in only one state, potential for response bias due to interview design, study does not include data about catheter days after implementation of program, study is over 10 years old
Manojlovich, M., Ameling, J. M.,	Qualitative Study	Progressive care unit in large	Identified challenges healthcare members	Level III B Good quality	Communication was consistently described as a

<p>Forman, J., Judkins, S., Quinn, M., & Meddings, J. (2019). Contextual barriers to communication between physicians and nurses about appropriate catheter use. <i>American Journal of Critical Care</i>, 28(4), 290–298. https://doi.org/10.4037/ajcc2019372</p>		<p>academic medical center in the Midwestern region of the United States</p> <p>Data collected via interviews physicians, nurses, physician assistants (PAs), and nurse practitioners (NPs)</p>	<p>experience when surveillance of IUCs and collected feedback and suggestions for improvement</p>	<p>qualitative study with clear conclusions but results may not be generalizable</p>	<p>barrier to removing catheters that were no longer necessary.</p> <p>Barriers to communication:</p> <ol style="list-style-type: none"> 1) Organizational complexity: Workflow pattern differences prevented physicians and nurses from communicating during rounds. 2) Cognitive complexity: Necessary medical information was on either paper or EMR, causing clinicians to have to remember where to look to find it. 3) Social complexity: Poor interpersonal relationships and hierarchical power dynamics between physicians and nurses <p>Limitations: Study identified barriers related to the organizational, cognitive, and social complexities on one unit so results may not be generalizable</p>
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<p>Maxwell, M., Murphy, K., & McGettigan, M. (2018). Changing ICU culture to reduce catheter- associated urinary tract infections. <i>Canadian Journal of Infection Control</i>, 33(1), 39-43. Retrieved from https://ipac-canada.org/photos/custom/CJIC/IPAC_Spring_2018_Maxwell.pdf</p>	<p>Quality Improvement</p>	<p>24-bed ICU at a Level II Trauma Center in Colorado</p>	<p>ICU team, including physicians, nurses, and certified nursing assistants received education about appropriate IUC utilization and IUC alternatives.</p> <p>Nurses were expected to monitor IUCs daily and identify an IUC removal plan before multidisciplinary rounds.</p> <p>The CNS or charge nurse maintained a log of each patient with an IUC, the indication, date inserted, and removal plan.</p>	<p>Level V B Good quality study with relevant findings and clear recommendations</p>	<p>CAUTIs decreased by 87.5% and IUC utilization decreased by 9%.</p> <p>By the end of the study, nurses reported IUC removal plan during multidisciplinary rounds before the topic was brought up.</p> <p>Study emphasized the importance of enforcing positive behavioral change by celebrating the reinforcement by daily verbal and formal recognition.</p> <p>Limitations: Study was done on one unit within one hospital so results may not be generalizable to other hospitals, process change may not be sustainable if physician and nursing staffing is not consistent.</p>
<p>Mori, C. (2014). A-Voiding catastrophe: Implementing a nurse-driven protocol. <i>MEDSURG Nursing</i>, 23(1), 15–28. Retrieved from https://pubmed.ncbi.nlm.nih.gov/24707664/</p>	<p>Retrospective Chart Review</p>	<p>150-bed community hospital in northern United States</p> <p>Population: any inpatient with an indwelling urinary catheter</p>	<p>Findings support the use of UCNDPs to reducing incidence and duration of IUC use which reduces incidence of CAUTIs.</p> <p>Indications and IUC alternatives were reviewed with both</p>	<p>Level III B Clear results drawn from the study, but low sample size of study may not be generalizable to other settings</p>	<p>Facility’s CAUTI rate decreased from 0.77% 3 months prior to implementation to 0.35% 3 months after implementation.</p> <p>Face-to-face communication was the most effective way to overcome resistance to change and address the challenges of protocol implementation.</p>

		inserted during hospitalization in this hospital. Patients admitted to obstetrics unit were excluded.	nursing staff and physicians. The CNS educated staff via online learning, posters, and one-on-one sessions to reinforce information.		Limitations: Small sample size, chronic catheters could not be excluded in study due to lack of documentation
Parry, M. F., Grant, B., & Sestovic, M. (2013). Successful reduction in catheter-associated urinary tract infections: Focus on nurse-directed catheter removal. <i>American Journal of Infection Control</i> , 41(12), 1178–1181. https://doi.org/10.1016/j.ajic.2013.03.296	Quasi-experimental Study	300-bed community teaching hospital in southwestern Connecticut	Nurse-driven IUC removal protocol was implemented at hospital. Other interventions that contributed to IUC nurse-driven protocol adherence included establishing hospital-wide protocol and implementing protocol to daily charting process for nurses in EMR.	Level IIB Good quality study with insightful data with proactive use of protocol but barriers to protocol are not addressed	IUC use in this facility decreased by 50.2% and a 70% reduction in CAUTIs over a 36-month period. Nurse-driven catheter removal protocol created culture change and improved teamwork along with less IUC use and CAUTIs. Study emphasizes the importance of biweekly quality briefings with leadership such as nurse managers to review CAUTI rates and catheter use rates and reinforce IUC nurse-driven protocol. Limitations: Results of protocol implementation on ICU not reported (results were hospital-wide not on specific units), study greater than 5 years old

<p>Quinn, M., Ameling, J. M., Forman, J., Krein, S. L., Manojlovich, M., Fowler, K. E., King, E. A., & Meddings, J. (2020). Persistent barriers to timely catheter removal identified from clinical observations and interviews. <i>The Joint Commission Journal on Quality and Patient Safety</i>, 46(2), 99–108. https://doi.org/10.1016/j.jcjq.2019.10.004</p>	<p>Non-experimental Qualitative design</p>	<p>20-bed unit in a large academically-affiliated tertiary care hospital – open unit (patients in this unit are cared by several teams of physicians)</p> <p>19 in-person interviews with clinicians in both leadership and bedside positions and 133 hours of field observations</p>	<p>Identified barriers to timely catheter removal.</p> <p>Study underscores need for regular clinician feedback to quality improvement initiatives and QI committees to monitor results.</p>	<p>Level III B</p> <p>Good quality qualitative study that provides insight into barriers but lacked data about interventions to facilitate barriers</p>	<p>Barriers identified:</p> <ol style="list-style-type: none"> 1) Catheter data difficult to find, inaccurate, or not available 2) Catheter removal is not high priority to clinicians especially for patients with serious and/or multiple health issues 3) Uncertainty about who has authority to decide catheter removal 4) Lack of awareness of standard protocols and indications for removal 5) Poor communication between nurses and physicians <p>Clinicians were not routinely discussing catheters especially during morning rounds and nurse handoff; sometimes catheter presence would be noted but rarely appropriateness, indication, or duration.</p> <p>Limitations: Study was done on one hospital unit and may not be</p>
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					applicable to all units, potential for Hawthorne effect due to observation aspect of study design
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Appendix B

Statement of Non-Research Determination

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *



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

Project Title: Reducing Indwelling Urinary Catheter Days: Improving Interdisciplinary Communication in a Surgical Intensive Care Unit	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.	YES	
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.	YES	
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.	YES	
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.	YES	
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.	YES	
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. The project has NO funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	YES	

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.	YES	
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: <i>“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.”</i>	YES	

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 NAMES (Please print): Karen Wong

Signature of Student:

Karen Wong

DATE: 3/6/2024

SUPERVISING FACULTY MEMBER NAME (Please print): Dr. Alicia Kletter

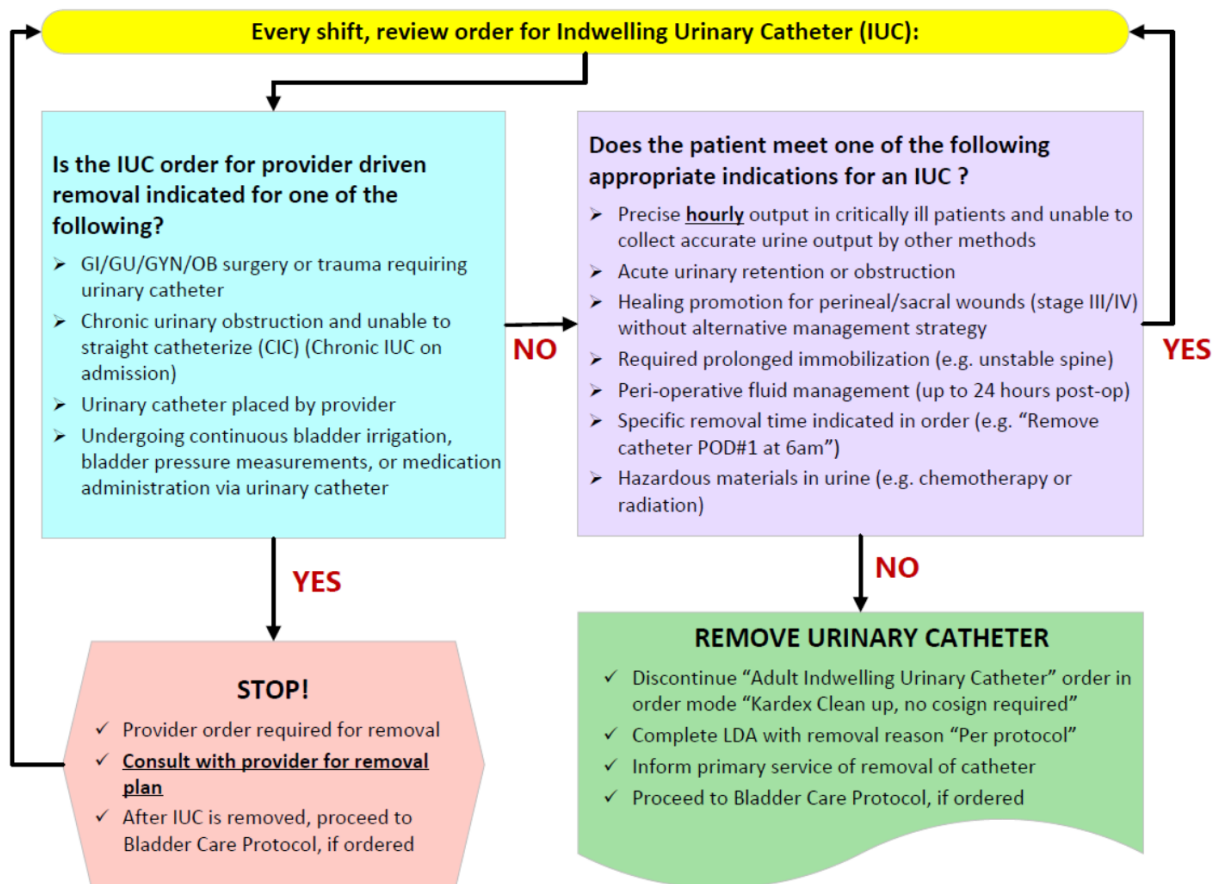
Signature of Supervising Faculty Member:

AKletter

DATE: 3/11/2024

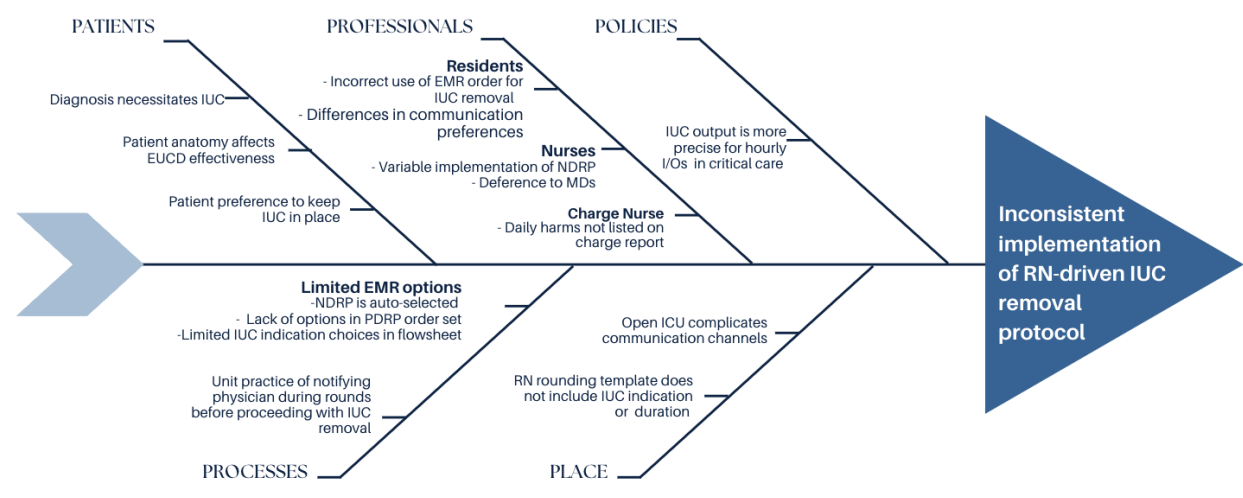
Appendix C

Nurse-Driven Protocol to Remove Urinary Catheters

Nurse Driven Protocol to Remove Urinary Catheters

Appendix D

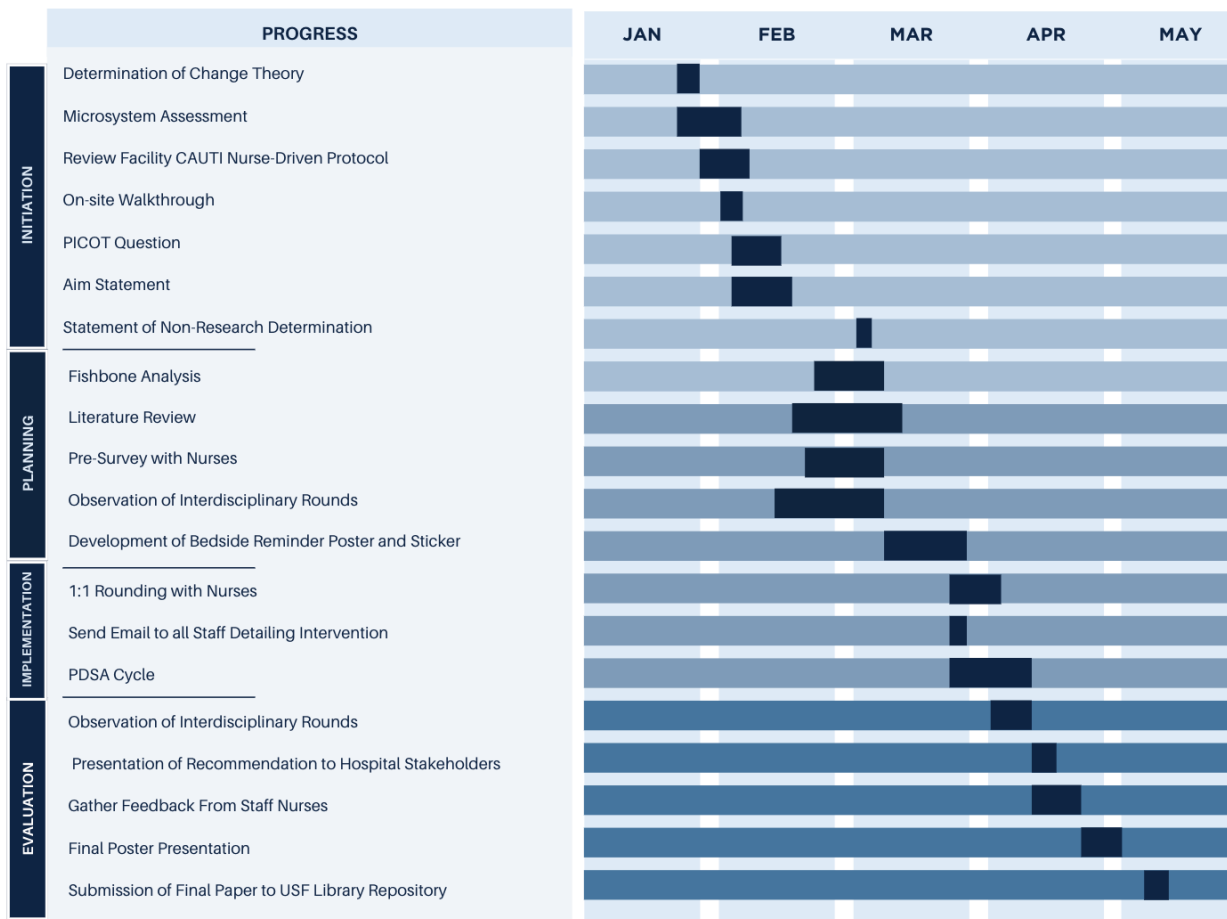
Root Cause Analysis: Fishbone Diagram



ACRONYMS
EUCD: external urinary collection device
EMR: electronic medical record
IUC: indwelling urinary catheter
I/O: input/output
MD: medical doctor
NDRP: nurse-driven removal protocol
RN: registered nurse
PDRP: physician-driven removal protocol
SICU: surgical intensive care unit

Appendix E

GANTT Chart



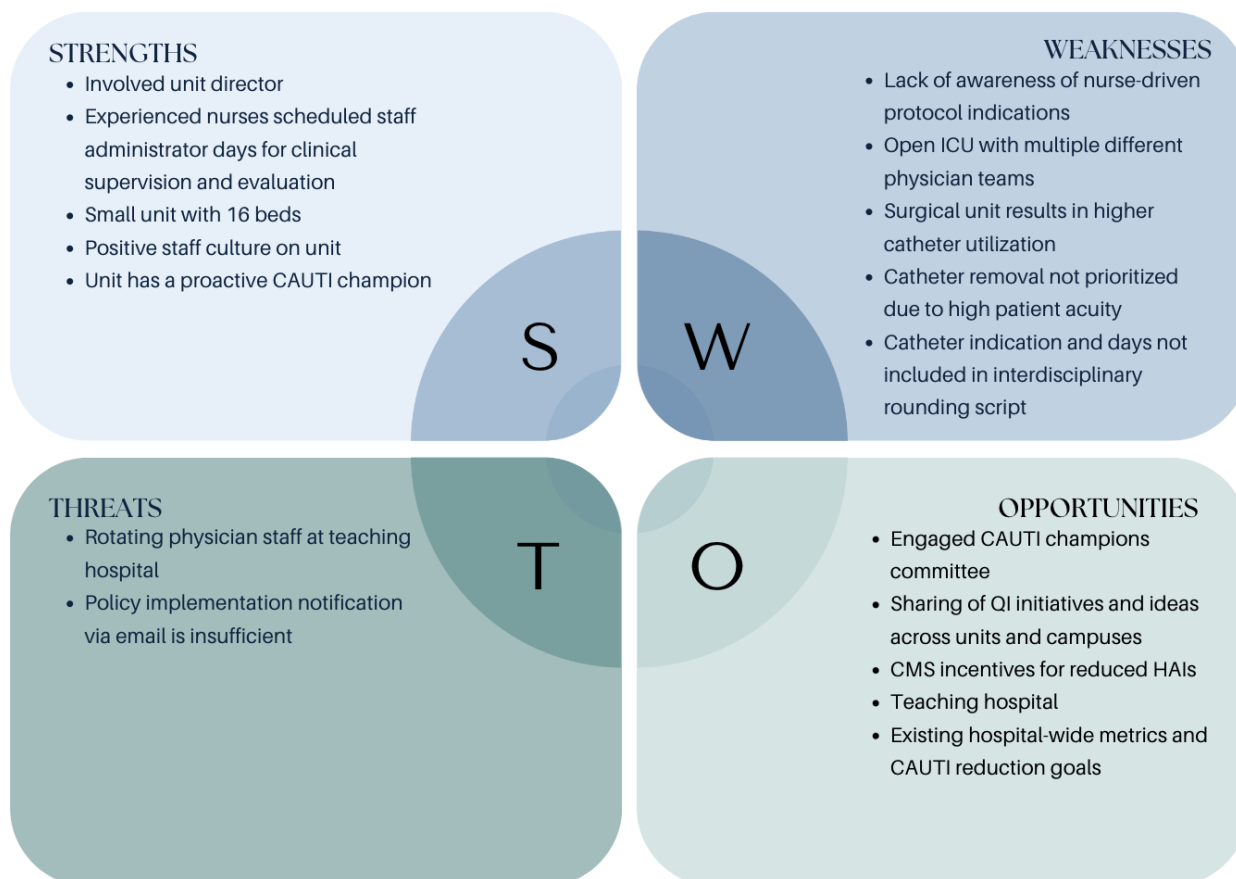
Appendix F

Pre-Intervention Survey with Nurses

Pre-Intervention Survey		
Question	Answer	Notes
Are you SICU staff or a float nurse? - If float, are you from the float pool or another unit?		
How many years of nursing experience do you have?		
How long have you worked at Hospital X?		
Does your patient have an indwelling urinary catheter?-If yes, what are the indications for the IUC?-Is the order nurse-driven or provider-driven?- Will the catheter be removed today? Why or why not?		
For what patient scenarios do you initiate the use of external urinary catheter devices?		
How do you feel about removing catheters according to the nurse-driven protocol? (If nurse says "what do you mean," explain that we're trying to understand how comfortable folks are with the protocol, Is it easy to initiate? Are there any barriers?)		
What do you think are the challenges to implementing the nurse-driven protocol? (for yourself or others)		
How do you approach communicating with the team about catheter removal?-How do you communicate with the SICU team compared to other teams?		
On a scale of 1-10, how likely are you to remove the IUC without waiting to check with the team beforehand, 1 being very unlikely and 10 being very likely? This is for nurse-driven protocol orders only.		

Appendix G

SWOT Analysis



Appendix H

Cost-Benefit Analysis

Current State FY2023	# Catheter Days	Catheter Utilization Rate	# CAUTIs	Cost Per CAUTI	Total Cost of CAUTIs Per Fiscal Year
Catheter-associated urinary tract infections (CAUTIs) in SICU	2,732	0.54	4	\$13,793	\$55,172
Improved State FYTD2024	# Catheter Days	Catheter Utilization Rate	# CAUTIs	Cost Per CAUTI	Annual Cost Avoidance
Reduction of catheter days with use of 1:1 rounding with nurses, bedside reminder posters, and stickers	1,905	0.56	2	\$13,793	\$27,586
Implementation Cost	Hours/Units		Description		Cost
Materials: Urinary catheter reminder poster, "Why Am I Here?" stickers, flyer for QR survey promotion	17 posters (\$ per poster) 15 sheets of stickers (\$ per sheet) 6 flyers (\$ per flyer) 2 gift cards		Printing and laminating costs Incentives for survey participation		\$144.14
Nurse Attendance at Staff Meeting	\$84.78/hr x 33 staff		15 minute student presentation		\$699.44
ICU Unit Director time	\$237,100/yr (\$113.55/hr)		1 hr/week x 11 weeks		\$1,249.05
RN as MSN student (onsite hours)	\$80.76/hr x 200 hr total per 1 CNL/RN				\$16,152
Total Cost					\$18,244.63
Estimated Project Savings Per CAUTI Incident					\$9,341.37

Appendix I

Bedside Urinary Catheter Reminder Poster



URINARY CATHETER REMINDER

Today's Date: _____

RN: _____ BED: _____

IUC Insertion Date: _____

Nurse-driven Provider-driven

Nurse Driven Protocol to Remove Urinary Catheters

Every shift, review order for Indwelling Urinary Catheter (IUC):

CATHETER DAYS

If no indication, remove IUC

Does the patient meet one of the following appropriate indications for an IUC ?

- Precise hourly output in critically ill patients and unable to collect accurate urine output by other methods
- Acute urinary retention or obstruction
- Healing promotion for perineal/sacral wounds (stage III/IV) without alternative management strategy
- Required prolonged immobilization (e.g. unstable spine)
- Peri-operative fluid management (up to 24 hours post-op)
- Specific removal time indicated in order (e.g. "Remove catheter POD#1 at 6am")
- Hazardous materials in urine (e.g. chemotherapy or radiation)

YES

NO

YES

NO

STOP!

- ✓ Provider order required for removal
- ✓ Consult with provider for removal plan
- ✓ After IUC is removed, proceed to Bladder Care Protocol, if ordered

REMOVE URINARY CATHETER

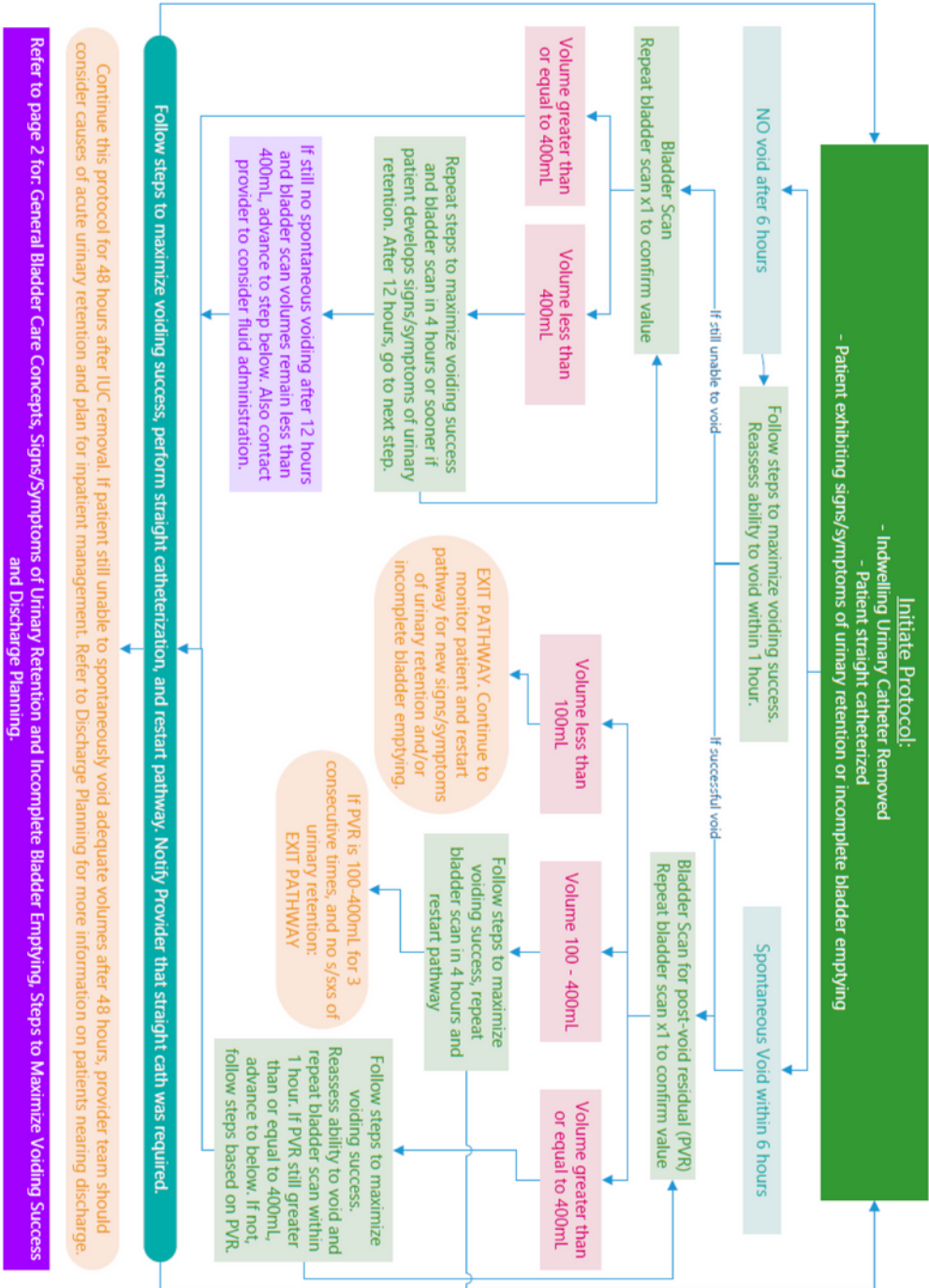
- ✓ Discontinue "Adult Indwelling Urinary Catheter" order in order mode "Kardex Clean up, no co-sign required"
- ✓ Complete LDA with removal reason "Per protocol"
- ✓ Inform primary service of removal of catheter
- ✓ Proceed to Bladder Care Protocol, if ordered

If urine output monitoring is required, utilize external collection device

Appendix J

Backside of Reminder Poster: Hospital X's Updated Bladder Care Protocol

Bladder Care Protocol



Appendix K

Why Am I Here? Sticker



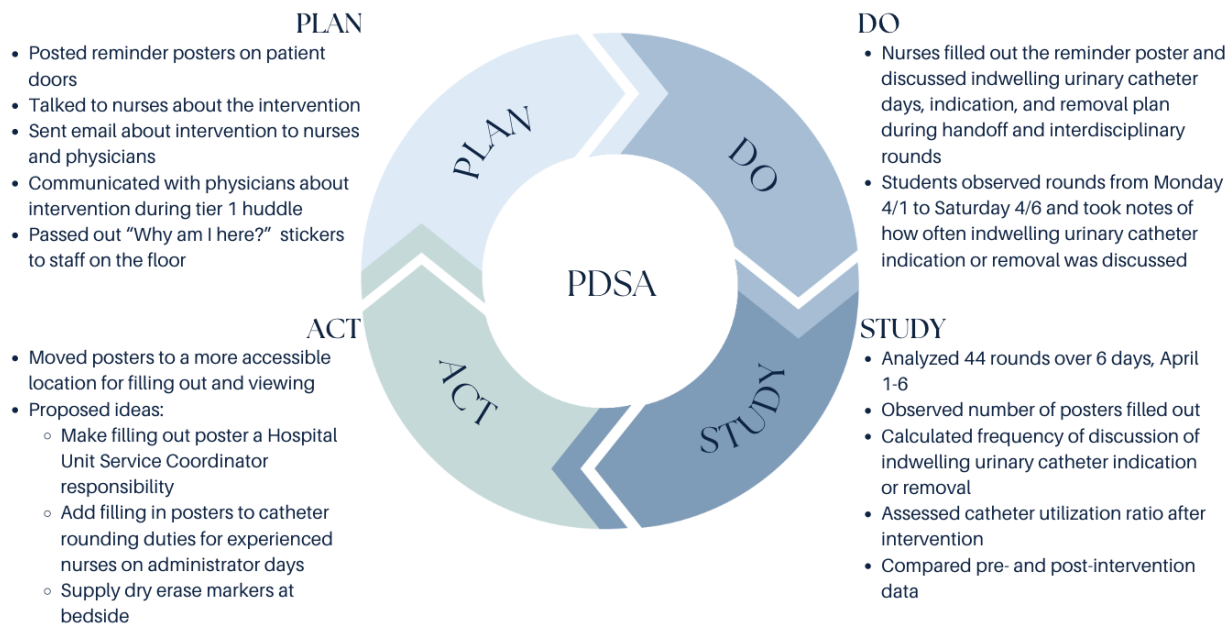
Appendix L

One-to-One Rounding with Nurses Talking Points

1:1 Rounding with Nurses
Talking Points
<p>Introduce ourselves and project We are nursing students from USF working with the unit director on a CAUTI prevention quality improvement project to reduce catheter days on this surgical ICU</p>
<p>Show reminder poster and explain sections, bladder protocol on back</p>
<p>Explain intentions of the poster, points in email</p> <ul style="list-style-type: none"> ○ From conversations with staff nurses and observation of rounds, we've learned that discussion about IUC removal can fall to lower importance. ○ We created this catheter reminder poster for the patient's bedside. It has some fields for you to fill out: date of insertion, removal protocol type, indication, and most importantly, number of catheter days. <ul style="list-style-type: none"> ▪ The idea is that this tool will be visible to physicians and nurses during nurse-led interdisciplinary rounds to facilitate discussion focused on IUC indication and removal ▪ The tool has been introduced to attendings and staff nurses via email (DATE OF EMAIL) and has the unit director's and the CNS's support
<ul style="list-style-type: none"> • Background points for why we are doing this: <ul style="list-style-type: none"> ○ From the literature: Interdisciplinary communication can be a barrier to catheter removal in ICU settings ○ From our interviews/surveys with nurses, <ul style="list-style-type: none"> ▪ We found that only 32% reported that they would remove an IUC without checking in or notifying providers first. ▪ Nurses also reported that an intervention to improve adherence to nurse-driven protocol should include physicians. (Physicians have been notified about this intervention as well and asked to participate by engaging in IUC discussions) ○ From our observation during interdisciplinary rounds on SICU: Of 44 patient rounds over 6 days, foley indication and/or removal plan was discussed 10 times (23% of the time), whether raised by a physician or a nurse • SICU's # of catheter days is 1,663 in FY 2024 (through January) which is the highest among all adult inpatient units • FYTD, the current catheter utilization ratio (# of catheter days/# of patient days) is 0.56. Goal is 0.45 (rate of all critical care units at Hospital X)
<p>PM nurses fill out laminated poster, and handoff to AM nurses?</p> <ul style="list-style-type: none"> ○ Please fill out this poster and refer to it during handoff to AM nurses.
<p>Questions/comments</p>

Appendix M

Plan, Do, Study, Act (PDSA) Urinary Catheter Reminder Poster Cycle



Appendix N

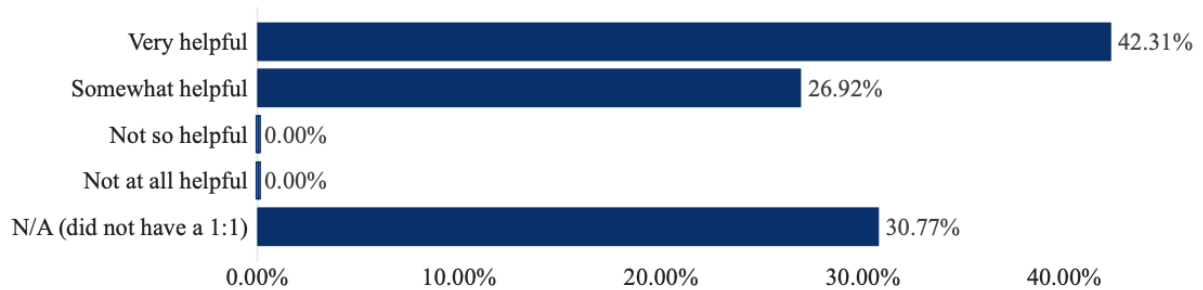
SICU Staff Feedback Survey

SICU Staff Feedback Survey	
Question	
How helpful/informative was your 1:1 conversation with a nursing student about the urinary catheter reminder posters?	<input type="checkbox"/> Very helpful <input type="checkbox"/> Somewhat helpful <input type="checkbox"/> Not so helpful <input type="checkbox"/> Not at all helpful <input type="checkbox"/> N/A (did not have a 1:1)
How helpful/informative are the IUC reminder posters for you?	<input type="checkbox"/> Very helpful <input type="checkbox"/> Somewhat helpful <input type="checkbox"/> Not so helpful <input type="checkbox"/> Not at all helpful <input type="checkbox"/> N/A (haven't had a patient with an IUC since the initiation of the project)
Do you agree or disagree with the following statement: It is important that I discuss the IUC indication and plan for removal for every patient with an IUC during interdisciplinary rounds.	<input type="checkbox"/> Agree <input type="checkbox"/> Somewhat agree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Somewhat disagree <input type="checkbox"/> Disagree <input type="checkbox"/> N/A (I work night shift and don't participate in interdisciplinary rounds)
Do you agree or disagree with the following statement: It is important that I discuss the IUC indication and plan for removal for every patient with an IUC during handoff with an AM shift nurse.	<input type="checkbox"/> Agree <input type="checkbox"/> Somewhat agree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Somewhat disagree <input type="checkbox"/> Disagree
How could SICU better address the issue of prolonged IUC days? (i.e What ideas do you have?)	
What is one thing that we, the USF students, could do better? Please share any other thoughts or feedback you have about this project.	

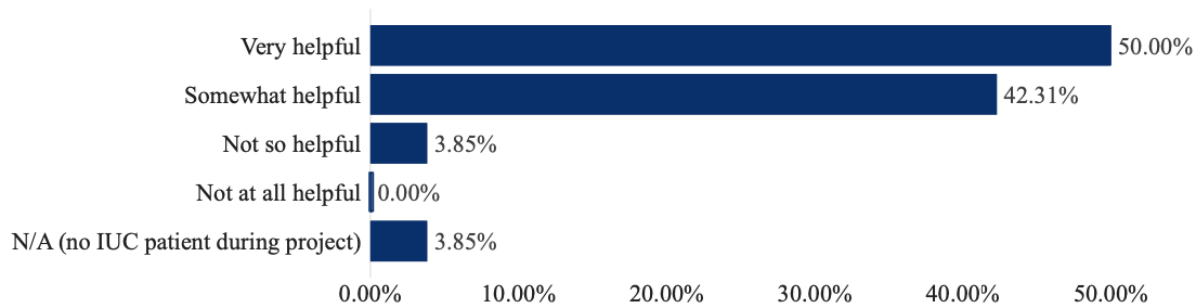
Appendix O

Staff Feedback Results

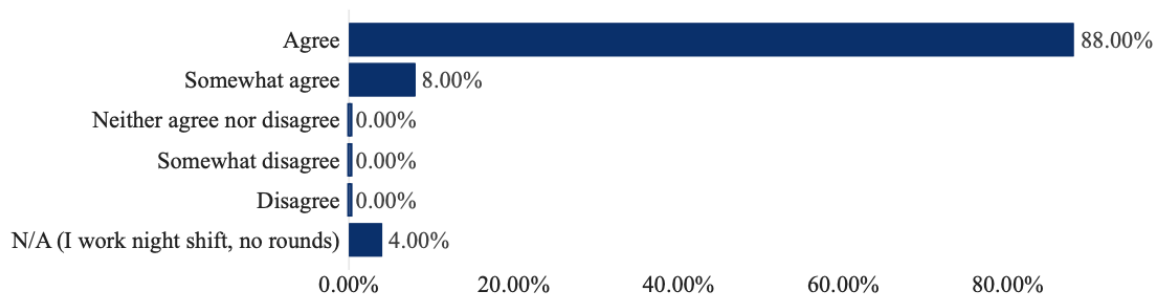
Q1. How helpful/informative was your 1:1 conversation with a nursing student about the urinary catheter reminder posters?



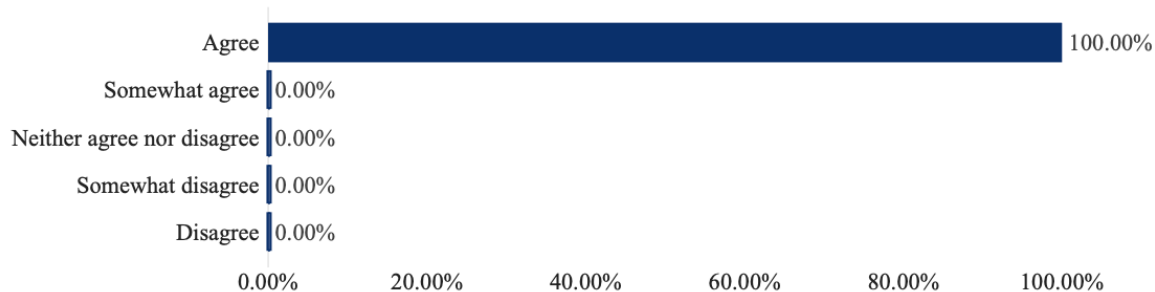
Q2. How helpful/informative are the IUC reminder posters for you?



Q3. Do you agree or disagree with the following statement: It is important that I discuss the IUC indication and plan for removal for every patient with an IUC during interdisciplinary rounds.



Q4. For night shift: Do you agree or disagree with the following statement: It is important that I discuss the IUC indication and plan for removal for every patient with an IUC during handoff with an AM shift nurse.



Q5. How could SICU better address the issue of prolonged IUC days? (i.e What ideas do you have?)

na

make it part of NLR in the AM

Should be provider driven

Removal upon admit :), or removal POD1 orders

Raffle prizes

Pt that are not voiding remove foley after 24 hours. Sometimes teams don't want this needs to be a strong reminder

Providers should be the primary driver on this as a harm to the patient.

Observe and assess if the patient really needs it and if not have it removed

Not sure

More stringent daily justification for allowing catheter to remain in place.

Maybe add it onto our rounding template— add length of time foley in, need, etc

Management round on pts with prolong IUC days

Make it one of the talking points in icu rounds

IUC status mentioned in the rounds.

I wonder if we should encourage the nurses to talk about this in their handoff.

Have Foley catheter removal protocol more obvious on the unit

Evaluate the need for the catheter, are we tracking accurate I&O? Are the patients able to void in the commode or urinal to track I&O? If no indication, then educate team to remove catheter if the need for it does not outweigh the risk of UTI

Definitely, ongoing disposition rounds helps facilitate a successful exit strategy from ICU to floor

Bring up discussion on removal during rounds, having providers enter RN or MD driven correctly (sometimes they wants MD driven even though it is ordered as RN driven so RN wait to remove foley)

N/A

N/A

N/A

N/A

N/A

N/A

N/A

N/A

N/A

N/A

Q6. What is one thing that we, the USF students, could do better? Please share any other thoughts or feedback you have about this project.

Also include Night Shift rounding. PM shift are the one doing the rounding scripts for Day shift nurses.

Continue face time and education with the bedside nurses

Excellent work! Thanks for your help

Great presentation

Great work

I felt like I barely saw you guys on the unit! Or maybe it wasn't obvious to me on days I worked

It's good. It gives us refresher and serves a reminder on the importance of an infection free patient

N/A

N/A

Na

None

Not sure, sorry!

Nothing, it was another great way to raise awareness. The cumulative effect of these interventions will make A difference eventually.

Place poster in break room or bathroom for increased awareness

Provide dry erase markers at every chart outside room.

That visual aid in the bedside was helpful!

This group was excellent, committed, and v respectful

You guys were great!!! Thank you for the stickers, love the flow chart.

na

N/A

N/A

N/A

N/A

N/A

N/A