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Reducing Barriers to Timely Indwelling Urinary Catheter Removal

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Abstract

Problem Nurse-driven removal protocols (NRDPs) have been shown to reduce indwelling urinary catheter (IUC) days and prevent catheter-associated urinary tract infections (CAUTIs). Communication barriers prevent consistent implementation of the NDRP, leading to delayed IUC removal and increased risk of CAUTIs. **Context** The project was conducted in a 16-bed adult surgical intensive care unit (ICU) at a teaching hospital in a major metropolitan area. **Interventions** Urinary catheter reminder posters displaying IUC days were posted at each bedside to prompt discussion of IUC indication and removal. An email describing the project background was sent to all nurses and physicians by the unit director. One-on-one conversations explaining the use of the posters were conducted with bedside nurses. Stickers with a cartoon IUC and the text "Why am I here?" were distributed as a light-hearted conversation starter to promote IUC discussion. **Measures** Interdisciplinary rounds were observed before and after the intervention to measure the proportion of rounds in which IUC indication or removal was discussed by members of the care team. The catheter utilization rate was compared between the pre- and post-intervention periods. **Results** The frequency of interdisciplinary rounds discussing IUC indication or removal increased from 23% to 30%. Catheter days per patient day decreased by 20% from a rate of 0.61 in April 2023 to 0.50 from April 1-21, 2024. **Conclusions** Early findings suggest that promoting interdisciplinary communication with visual reminders increases communication and decreases IUC utilization. More evaluation is needed to determine sustainability and impact over time.

Keywords: NDRP, barriers, CAUTI, empowerment, interdisciplinary communication

Reducing Barriers for Timely Removal of Indwelling Urinary Catheters

Hospital X is a 600-bed teaching hospital, located in Northern California. A quality and patient safety team is established for reducing healthcare-associated infections (HAIs). Common HAIs include catheter associated urinary tract infection (CAUTI), central line-associated bloodstream infections, surgical site infections, and ventilator-associated pneumonia (Monegro et al., 2023). According to the Centers for Disease Control and Prevention HAIs pose significant complications due to their association with high morbidity and mortality, as well as their direct contribution to medical costs exceeding $28.4 billion annually (2021). Given the high acuity characteristic of the intensive care unit, a significant portion of patients admitted to the floor often require an indwelling urinary catheter (IUC). Consistent results have suggested that promoting the use of nurse-driven urinary catheter removal protocols reduces catheter days, and a shorter duration of catheterization is strongly associated with a lower CAUTI rate (Van Decker et al., 2021). With this evidence-based knowledge, the clinical nurse leader and nursing unit director at a 16-bed adult surgical intensive care unit (ICU) is interested in reducing the CAUTI rate, specifically focusing on decreasing the number of IUC days.

Problem Description

The surgical ICU at hospital X cares for many high acuity patients through collaboration with various primary medical teams, such as the liver transplant team, kidney transplant team, and vascular surgery team. This represents an open ICU model, where a patient has multiple generalists caring for them with or without involvement of the ICU-specific intensivists. Another model is a closed ICU where the management of patients is primarily under the control of a dedicated team of ICU intensivists. A benefit of the closed ICU model is its ability to streamline coordination of care and minimize complications due to proximity and fewer communication

channels (Belkin et al, 2024). The surgical ICU at hospital X utilizes a combination of both open and closed ICU management and therefore, unique challenges arise in ensuring efficient communication. In addition, the frequent rotation of attending physicians further complicates this scenario. Similarly, as observed by Part et al. (2023), having constant change in clinicians introduces more variability in preferences for treatment and opportunities for miscommunication. As discussed with the unit director and ICU nurses, specialty teams have varying preferences for keeping IUCs in place and are not always certain of the unit's indications for IUC placement (J. Elzinga, personal communication, February 2024). An example observed by the quality improvement (QI) team is a provider's order for strict urinary inputs and outputs or if the patient is on Lasix, a diuretic medication. Yet according to the hospital standard of care, diuresing the patient is not an indication for IUC placement. Given the open ICU model and despite the unit policy, there is often confusion about whether the nurse has authority to remove the IUC.

Based on performance scorecard matrices in the surgical ICU, as of February 2024, the department has the highest IUC utilization days among all inpatient adult services at Hospital X. This surgical ICU has in place an established urinary catheter nurse driven protocol (UCNDP) for the removal of IUCs which states that nurses are authorized to remove catheters from patients who meet clinical criteria without a physician's order. However, nurses encounter barriers that hinder adherence to the protocol. Nurse driven protocols for removal of IUCs have generally been shown to reduce IUC days and therefore reduce risk of CAUTI (DePuccio et al., 2020). Therefore, this QI project aimed to increase awareness about UCNDP and IUC indication as part of comprehensive bladder care.

Available Knowledge

PICOT Question

A Population, Intervention, Comparison, Outcome, and Time, (PICOT) question was constructed to help guide the literature search of this QI project. The PICOT question was created as follows: In adult patients in the surgical ICU, how does reducing barriers to hospital UCNDPs affect the number of IUC days over a study period of 12 weeks?

Search Methodology

A literature review was conducted from February 13 to February 29, 2024, using PubMed and the Cumulative Index to Nursing and Allied Health (CINAHL) databases via Gleeson Library at the University of San Francisco. The search terms included phrases such as *CAUTI, barriers, UTI bundles catheters, catheter-related infections, nurse-driven catheter removal protocol, hospital-acquired urinary tract infections,* and *nurse-directed protocols*. The results were limited to 15 years to date for both databases. The search is also limited to English language only and in inpatient settings. The inclusion criterium of ICUs in urban areas limited the search to 14 results. An additional search of *barrier* and *empowerment* in PubMed yielded more results and contributed to addressing the communication hindrance during interdisciplinary rounding. The same inclusions and exclusions were used to search in CINAHL.

These key terms as well as the inclusion and exclusion criteria outlined above proved instrumental in identifying non-leading, related articles relevant to the PICOT question. A total of ten articles were chosen and evaluated using the Johns Hopkins Research Evidence Appraisal Tool (Appendix A) to critically assess the appropriateness of the evidence (Dang et al., 2022). This comprehensive literature review encompasses various academic journals and levels of evidence for the timely removal of urinary catheters using UCNDP. The studies included are of Levels I, II, III, and V, characterized by high quality, reliable evidence, and consisted of

experimental, non-experimental design, and mixed study methods such as quasi-experimental study, qualitative study, and meta-analysis.

Literature Review and Synthesis

Conner et al. (2013) assessed the impact of education on evidence-based practice (EBP) and CAUTI across two nursing units. The allocation of the treatment group, which received the educational intervention, was determined through randomization by a coin flip. The comparator unit acted as a control by maintaining existing care practices without any changes. Over a five-year follow-up period, the group that received the education demonstrated significantly improved attitudes, perceptions, and adherence to the UCNDP compared to the control group. Specifically, the intervention group experienced a mean reduction in catheter duration of 1.7 days (Conner et al., 2013).

The improvements mentioned are further supported by Fakih et al. (2013), who implemented similar interventions, including the adoption of UCNDP and standardized guidelines for IUC insertion in emergency departments. These measures resulted in a significant 26% reduction in catheter usage. The authors believed that this success is largely attributed to the efforts of nurse managers to engage their staff and enhance the appropriateness of catheter placement (Fakih et al., 2013). This belief is further explored by Krein et al. (2013) who highlights a significant barrier to adherence to UCNDPs: the lack of engagement between nurses and physicians. According to interviews with numerous nurses in the study, the engagement gap stems from differing levels of interest and priority between the two groups, resulting in low buy-in. This issue is exemplified by the difficulty many hospitals face in recruiting a urologist or nephrologist willing to champion CAUTI prevention efforts. Gupta et al. (2023) also examined the effect of empowerment among nurses to prompt removal of IUC including the utilization of

automatic stop orders of IUC 72 hours after insertion. The findings suggest a significant decrease in device days between pre and post intervention and CAUTI rates per 1000 patient days dropped from 7.6 to 0 per 1000 device days (Gupta et al., 2023). However, one limitation of these studies is their failure to identify which specific intervention had the greatest impact.

The effectiveness of interventions in reducing catheter-related infections hinges greatly on workflow and communication among multidisciplinary teams (Manojlovich et al., 2019). The study examined communication-related barriers between physicians and nurses and their impact on the appropriateness of IUC placement or removal. Through extensive interviews with physicians, nurses, physician assistants, and nurse practitioners, the authors identified workflow misalignment, social hierarchy, and interpersonal relationships between physicians and nurses as significant barriers to reduction in IUC days. Despite the existence of UCNDPs, nurses reported feeling uncomfortable proceeding without at least notifying physicians (DePuccio et al., 2020; Manojlovich et al., 2019, Quinn et al., 2020).

Additionally, miscommunication about IUC removal is another factor. Nurses often find themselves in a dilemma between removing an expiring IUC or requesting a continuation order, leading to uncertainty about adhering to the protocol (DePuccio et al., 2020). This challenge is also observed in Meddings et al. (2013) who emphasizes the importance of implementing catheter indication and restriction protocols to avoid inappropriate use of IUCs. One strategy recommended is linking physician orders for catheter indication to a “Foley Maintenance Protocol,” which includes nurse-directed IUC removal (Parry et al., 2013). Implementing this change in the electronic health record and providing biweekly reports on catheter use from unit nurse managers led to a significant reduction in CAUTI rates; over a three-year period, IUC use decreased by 50.2% (Parry et al., 2013).

Another recent study points out a general lack of awareness regarding catheter care and criteria for its removal, leading to uncertainty about who is authorized to remove the IUC (Quinn et al., 2020). Insights from onsite visits and interviews with healthcare professionals reveal that discussions about IUCs typically occur only when infection signs are evident. Moreover, these discussions often only acknowledge the presence of the IUC without considering its appropriateness, medical indication, or the duration for which the catheter has been in place (Quinn et al., 2020). This finding underscores the need for more comprehensive education and clearer protocols regarding catheter management to prevent unnecessary usage and associated infections.

Van Decker et al. (2021) implemented a comprehensive five-year CAUTI reduction plan, incorporating several interventions such as education on EBP to enhance CAUTI awareness and standardizing Foley catheter insertion and maintenance protocols. The initiative showed significant reduction in the mean CAUTI rate. However, the study did not explore the effect of UCNDP on IUC days or CAUTI rate.

Synthesis of the literature highlights an overarching theme: UCNDPs are effective in reducing the duration of IUC use. Crucially, the success of these protocols hinges on empowering nurses, underscoring the importance of enabling them to adhere to the UCNDP guidelines. Additionally, the social hierarchy between nurses and physicians can hinder communication and collaboration. Without overcoming these obstacles, patients are at risk of prolonged catheterization, subsequently increasing their susceptibility to CAUTI. Addressing these challenges is essential for minimizing CAUTI risks and enhancing patient care outcomes.

Rationale

The chosen change theory for this QI project is the Nudge theory. This theory is unique in that it relies on credible guidelines and EBP so that employees will engage in less resistance and participate in the desired change direction. There are 3 steps to implement a change with the Nudge Theory: (1) define changes or identify the target behavior, (2) determine the barriers or the employee's point of view, and (3) design and implement nudges to achieve desired behavior (Murayama et al., 2023). The nudges are designed to allow employees to see the need for change and promote overcoming resistance or barriers. The goal is to minimize IUC utilization days by enhancing communication between interdisciplinary professionals. It will involve the use of evidence-based guidelines and the collaboration of the nurses and physicians. Importantly, this process would require assessment of the microsystem and feedback from the nurses as nurses are the key stakeholders. Additionally, small tests of change via feedback from interprofessional staff helps determine what works and how to improve it. The Nudge model is useful for this QI project because it is not a model that is designed to influence the employees or force nurses to change their mind. Rather, it emphasizes the practicality of the change that is backed by research and credible evidence (Murayama et al., 2023).

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 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 for this QI project are grounded in the core principles of fidelity, veracity, nonmaleficence, and beneficence. The ICU nurses are encouraged to have autonomy in patient assessing and removing the IUCs when they are no longer indicated. This autonomy not only highlights the nurse's commitment for continuous learning but also emphasizes their ability to make sound clinical decisions. This approach aligns with Provision 4 of the American Nurses Association Code of Ethics (2015), which stresses the nurse's responsibility and accountability in safe healthcare delivery. Similarly, at the University of San Francisco, students are also held to be accountable for their actions and for the well-being of others, reflecting one of the Jesuit values promoted by the institution, "serving others" (University of San Francisco, 2024).

Project AIM (1/2 page)

The specific aim of this project is to reduce IUC days and therefore reduce CAUTI risk. The overarching aim is to reduce the catheter utilization ratio in the Surgical Intensive Care Unit (SICU) from 0.61 currently to 0.55 by April 19, 2024, a reduction of 10% which aligns with our QI project timeline. The primary objective to meet this goal is to increase communication among healthcare team members during patient rounding about the patient's IUC status, including its duration, indication, and the necessity for removal, with the ultimate goal of reducing unnecessary IUC days. Meeting this primary objective will show that discussing IUC indication and removal at morning interdisciplinary rounds will increase from a baseline of 23% to 75% in 12 weeks by implementing a bedside IUC reminder poster.

Methods

Context

Microsystem Assessment

To identify the underlying factors contributing to the lack of adherence to the UCNDP in the surgical ICU, the fishbone diagram approach which included patients, professionals, policies, and place, was employed (see Appendix C). The patient-related factors include immobility, incompatibility for external urinary collection device due to anatomical variations, lack of awareness about associated risks, and a preference for the convenience of IUCs, complicating efforts to minimize unnecessary IUC utilization. The surgical ICU has an interdisciplinary team of intensivists, nurses, and charge nurses. As observed on the microsystem during interdisciplinary rounds, not all medical residents received adequate training of the UCNDP (bedside rounding, personal communication, February 2024). As a result, the delegation of IUC removal orders is the responsibility of the providers. The assessment also included informal interviews with the nurses using the pre-intervention survey (see Appendix D). The interview reveals there is a difference in preference in communication, which poses a barrier to advocating for IUC removal and this example may be a strong implication of deference to the providers. Current policies, such as hourly urinary output monitoring for specific diagnoses, and processes, like the limited options in electronic medical records, hinder accurate documentation and compliance with UCNDP guidelines. For example, nurse-driven removal auto-selection while provider-driven removal is opt-in, and there should be a dropdown menu for a clear indication of the IUC insertion. Furthermore, the absence of a 'daily harm' section in the charge nurse's handoff report tool diminishes awareness of the risks associated with prolonged IUC use. Having details about the number of patients with IUC and urinary tract infection is important in alerting the nursing staff and raising more awareness about the risk of long catheter days.

Lastly, the mix of open and closed ICU models within the microsystem results in many communication channels and causes complications, especially for advocating for IUC removal.

In addition, the RN rounding tool lacks the section for IUC indication and removal plans. Therefore, it gives little opportunity to be discussed during rounds. This root cause analysis is an evaluation of the unit, staff, and processes that highlights the intervention needed for this development of the quality improvement project.

SWOT Analysis

A Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis was conducted to further evaluate the microsystem in relation to this QI project (see Appendix E). Some strengths of the unit include high engagement from the unit director, clinical nurse IIIs, and a dedicated CAUTI champion. The involvement of staff is essential for driving the initiative forward. Weaknesses observed included varying awareness of UCNDP indications, the open and closed ICU model, high IUC utilization compared to other inpatient units, low priority for IUC removal due to high acuity levels, and the absence of IUC indication and removal in the rounding template. As part of a teaching hospital, opportunities for the unit include engaged CAUTI champions and the presentation of CAUTI projects and other QI initiatives hospital-wide and across campuses. However, the high frequency of rotating physician staff and insufficient methods in policy implementation pose threats to the microsystem.

Financial Analysis

To gain buy-in from key stakeholders, a cost benefit analysis was established to further prove the significance and feasibility of the QI project. The analysis involved calculating the project cost, cost per CAUTI event, and potential costs saving (see Appendix F). The project's implementation cost includes the clinical nurse leader's onsite hours of $80.76 per hour for 200 hours ($16,152), materials plus gift cards supplied by the unit ($144.14), the nurse time at staff meeting for 15-minute student presentation ($699.44), and the unit director's time spent in 11

sessions of 1 hour/week ($1,249.05), totaling $16,152. Each CAUTI event incurs a cost of $13,793 (Agency for Healthcare Research and Quality, 2017). For this project to be cost-effective, the hospital must anticipate preventing at least two CAUTI events. Therefore, the implementation of this project is not recommended for hospitals with minimal room for improvements. With the implementation of the QI project, the calculated difference between the total cost and the estimated avoidance cost of two CAUTIs will save Hospital X $9,341.37.

Timeline with Stakeholders Analysis

The Gantt chart was utilized to manage time and establish goals for the duration of this QI project (see Appendix G). The timeline tracks progress over twelve weeks and is divided into four distinct phases: project initiation, planning, implementation, and evaluation.

During the initiation phase, the clinical nurse leader students reviewed the importance of change theory and explored two change frameworks to assess their relevance to the project. They also dedicated time to reviewing the facility's UCNDP and met with the clinical instructor and onsite clinical manager to orient themselves with the unit and Hospital X and discuss project goals. Following the orientation, the students collectively worked as a group to submit the Statement of Non-Research Determination, PICOT question, and the AIM statement.

During the planning phase, a significant portion of the effort was dedicated to attending rounds and devising the appropriate intervention for the project. This phase also involved synthesizing the literature review, analyzing the microsystem using the fishbone diagram (see Appendix C), and developing the reminder poster and sticker.

Moving into the implementation phase, the focus shifted to putting up the posters and informing the unit staff about the intervention, which will be discussed in detail below. Finally, in the evaluation phase, observations of interdisciplinary rounds, feedback collection, and

presentation of findings to key stakeholders during the monthly staff meeting on April 10 were conducted. As a result, the allotted time for one PDSA cycle was only able to take place from March 25 to April 9.

The key stakeholders of this QI project included patients, nursing staff, intensivists, the unit director, and nursing students. Patients are essential stakeholders as they need to be informed about the risks associated with indwelling urinary catheter (IUC) insertion. The success of the project relies on the promotion and discussions of IUC removals and reducing unnecessary IUC utilization during interdisciplinary rounds, which heavily involves the nurses and providers. Additionally, nursing students play a crucial role in collaborating closely with the unit director to establish the intervention and introducing it to the staff.

Intervention

Early in the development of the intervention, the team explored various ideas aimed at optimizing resource utilization and reducing barriers to discussing IUC removal plans. One initial plan involved updating the rounding script on the electronic health record, which was inspired by observations of rounds on a different ICU unit. The suggestion was to include "daily harms," such as IUC days or CAUTI, at the top of the rounding script and to incorporate a dropdown menu for catheter indication. However, after discussions with the unit director and several subject experts, the team determined that this approach would not be feasible due to the complexity involved in engaging the engineering and IT departments. The team brainstormed further and developed a plan to create a poster reminder for each room, along with stickers to facilitate conversation. The urinary catheter reminder poster visually depicts the nurse-driven removal protocol, IUC indication options, and includes a prominent box displaying IUC days to prompt discussion. The back side of the poster contains the flow diagram of the bladder care

protocol, once the IUC is removed (see Appendix H). Nurses were encouraged to fill out these posters, ideally during the night shift, so they can be utilized during handoffs. Additionally, "Why Am I Here" stickers were handed out during rounds to serve as a fun conversation starter (see Appendix I).

Study of the Intervention

The study of the intervention used the Plan, Do, Study, Act (PDSA) cycle model (see Appendix J). The results collected from the intervention are compared with the pre-intervention data.

Before the intervention, nursing students made observations during patient rounds and found that discussions regarding IUC indication or removal plans occurred in only 10 out of 43 patient rounds observed, accounting for 23.3% of cases. Even when IUCs were mentioned, the indication for their placement or plans for removal were not fully brought up. The team also used the pre-intervention survey to interview the nurses working both morning and night shifts (see Appendix D). The self-reported data collected reveal a lack of confidence among most nurses when it comes to removing IUCs without consulting the specialist. Specifically, only 6 out of 19 nurses surveyed (32%) expressed confidence in their ability to remove an IUC without the need to notify the provider beforehand. This finding highlights a potential barrier for timely removal of IUC; hence, it increases the chance for unnecessary catheter utilization.

During the “plan” stage, the surgical ICU staff were introduced to the intervention and its goal through an email communication. Following this, the students posted the reminder cards and engaged in one-on-one conversations with the nurses, using talking points template to provide further information and demonstrate how to use the poster effectively (see Appendix K). Physicians were also informed about the posters during tier 1 huddles and stickers were

distributed during these conversations. However, due to time constraints, the students were only able to reach 19 nurses on the floor, both night and day shifts.

Moving to the "do" stage, nurses filled out the reminder posters and engaged in discussions about IUC days, indication, and removal plans during handoffs and interdisciplinary rounds. Subsequently, the students attended rounds for six consecutive days, and recorded the IUC discussions on a spreadsheet. They also took note of the posters that were filled out during this period.

In the “study” stage, the nursing students analyzed the notes taken during 44 rounds, calculated the frequency of IUC discussion or removal, and assessed the catheter utilization ratio post-intervention. Then, the data were compared side-by-side between the pre- and post-intervention periods.

The last step is “act” to identify and implement necessary changes to further enhance the intervention. One of the actions was to reposition the posters to make them more visible and accessible to the nurses. Most of the learning process also occurred in this phase. The students figured out what worked and what did not. Due to time limitations, the students were not able to proceed to the PDSA cycle 2. The subsequent action involves making recommendations for the future to further the success of the intervention. Several recommendations were proposed, including having the service coordinator or unit secretary fill out the poster before rounding and ensuring that dry erase markers are readily accessible.

After collecting and analyzing the data, the students presented the project at the monthly staff meeting via Zoom.

Outcome Measures

The outcome measures collected included responses from the pre-intervention survey and discussion notes from both pre- and post-intervention during interdisciplinary rounds. The responses were anonymous. The outcome measures collected were the responses from pre-intervention surveys and discussion notes from both pre- and post-intervention during interdisciplinary rounding. The students collectively analyzed these responses and tallied instances where IUC indication and/or removal plans were discussed during rounds. This total was then divided by the number of rounds observed to calculate a percentage, which helped the students assess whether there was an improvement in IUC discussion. The data and calculations were organized and stored in a spreadsheet to maintain order and ensure easy access for all team members.

In the presentation to the unit staff, the team shared the project goal and results, and sent out a feedback survey via Qualtrics to increase engagement. The feedback focused on evaluating the nurses' perspectives on the poster, including whether they found it helpful and how likely they were to use it. The questions and responses are provided below (see Appendix L).

Results

After observation, it was noted that most posters were left blank or not updated. An unintended consequence of that is if the poster remains unfilled or not updated, it may lead to discrepancies if a patient has an IUC or has had it for longer than indicated on the poster. However, there was increased frequency in IUC discussion in interdisciplinary rounds.

A process measure tracked the progress of the outcome measure. Before the intervention, discussions about IUC indications and/or removal plans occurred in 23% of the rounds observed. After implementing one-on-one nurse conversations, reminder posters, and stickers, the discussion increased by 7%. The outcome measure is the change in the catheter utilization

ratio—was calculated by dividing the number of IUC days by patient days on National Healthcare Safety Network surveillance units. In April 2023, the ratio was 0.61. Following the intervention, it decreased by 20% to 0.50 from April 1-21, 2024 (see Appendix M). This 20% decrease exceeded the 10% threshold goal.

The team distributed the feedback survey to 70 nurses, achieving a 31% participation rate. In the survey, most nurses found the reminder poster and the one-on-one conversations helpful. Approximately 70% of the participating nurses agreed on the importance of discussing indwelling urinary catheter indications and removal plans for every patient during interdisciplinary rounds (see Appendix M).

Discussion

Summary

This QI project demonstrated a significant 20% reduction in the catheter utilization ratio within just two weeks after implementing the intervention. The results support the effectiveness of using visual reminders to enhance interdisciplinary communication, leading to more frequent discussions about IUC indication and removal plan. Although the increase in IUC discussions during rounds did not meet the 75% target, a modest 7% rise still highlights a positive shift. This slight change was observed over six consecutive days. A factor that may skew these results is that some nurses cared for the same patients for two or more days, which limited the opportunity for variance in the findings. In addition, nurses provided heartfelt feedback, noting that the pre-intervention survey and one-on-one conversations empowered them to adopt the nurse-driven removal protocol confidently, encouraging them to remove IUCs without consulting with providers first. However, more evaluation is needed to better understand the continual impact of the reminder poster and its sustainability.

Several key factors contributed to the success of this QI project. The first factor is the strong support from the intensivists. As one of the key stakeholders, their endorsement played a crucial role in driving the initiative forward. The second factor is the active involvement of the unit director and clinical nurse III's. Their enthusiastic engagement further encouraged collaboration between nurses and nursing students, fostering an environment conducive to effective teamwork and learning. This supportive environment was essential for facilitating meaningful changes.

A valuable lesson learned from this experiential process was the importance of teamwork. Initially, part of the intervention was already in development, but it became apparent that it would not be feasible due to complexities introduced by other departments, such as engineering and IT teams. In response, the students collaborated closely and pivoted their approach together, demonstrating the significance of teamwork in overcoming challenges and adapting to changing circumstances. The project also taught the students to be creative in addressing nurses' resistance to change. To gain buy-in and build rapport, the students developed talking points and showcased evidence-based practices to help nurses understand why the change was necessary. Therefore, the visual cue of the poster served as a helpful reminder in this process.

Limitations

One of the weaknesses of this project is the time constraint. The limited time for this project did not allow for observing its impact over a longer period. With more time, the students could assess the sustainability of the project, ensuring that the positive effects endure beyond their involvement. This would help in eliminating the potential observer effect, where changes are influenced by the presence of the students rather than the intervention itself. Another

weakness is that this project relies heavily on the perspectives of nurses, which may be prone to self-reported bias. This highlights the importance of allocating additional time to determine its long-term sustainability.

Conclusion

Although the limitations of time and reliance on self-reported data were acknowledged, the effectiveness of the reminder poster, one-on-one conversations, and stickers in promoting IUC discussions was evident. The project resulted in a significant 20% reduction in catheter days following the intervention. The sustainability of this intervention is promising, as the implementation of the reminder poster is highly feasible. Greater efficacy can be achieved if the dry-erase markers are readily available at bedside and the filling out the posters is the unit coordinator's responsibility.

To further enhance impact, several recommendations are proposed. Firstly, it is recommended to involve providers in IUC removal plans and CAUTI initiatives. Once the physicians are behind the project, their support is crucial in empowering nurses to take ownership of nurse-driven protocols, fostering rapport between providers and nurses. This is crucial in facilitating communication and eliminate deference. Lastly, to create change, it is essential that the nurses need to see the need for change; hence, providing evidence-based research is an effective approach to garner buy-in.

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Appendices

Appendix A

Evidence Appraisal Table

Journal #	Citation	Evidence Type	Sample, Sample Size, Setting	How Does Article Address Problem?	Quality of Evidence	Other Highlights from Article (consider including limitations & outcomes)
1	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. *Journal of Nursing Care Quality*, *28*(4), 319–326. https://doi.org/10.1097/ncq.0b013e3182852ce7 (Conner et al., 2013)	Prospective pilot study	The study takes place at a 400-bed acute care hospital located in rural South Carolina 2-group pre-/post-study design (intervention vs. control) on 2 similar 32-bed telemetry units	Intervention group: Staff education and training on new early discontinuation of IUC nurse driven protocol, education on benefits of EBP to support intervention, and ongoing reminders via posters, emails, and meeting discussions Control group: usual routine existing care, no education on EBP nor the early discontinuation of IUC, physicians are not approached/made aware of the intervention Qualitative findings: the nurses' perceptions, attitudes, and knowledge related to EBP were higher in intervention group was higher than the control group The intervention group had more enthusiastic support for nurse-driven intervention, placed high value on education about EBP and CAUTI, and found reminder posters helpful Education on EBP and CAUTI helped to	Level IB Good quality study with participant-driven inquiry and definitive conclusions, based on EBP and application into the intervention The suggested results are also consistent with other data	Protocol was evidence-based and required RNs to assess patients' need for IUCs beyond 48 hours Interesting note: 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. Limitations: Clustered-randomized sample → may not be generalizable to other health care organizations because all nurses were not randomly sampled Potential for cross-influence because of the study took place in 1 single hospital Potential for systematic bias → some of the subjects had participated in similar EBP intervention Study is over 10 years old The studied units were not ICU

				promote adoption of nurse driven protocol Mean catheter duration decreased by 1.7 days after the intervention - consistent with other studies that used similar intervention.		(The days for the intervention group decreased from 23,598 during the pre-intervention period to 13,780 during post-intervention, while the control group days increased from 14,144 to 25,944.)
2	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. *The Joint Commission Journal on Quality and Patient Safety*, *46*(12), 691–698. https://doi.org/10.1016/j.jcjq.2020.08.015 (DePuccio et al., 2020)	Non-experimental qualitative design	17 hospitals in the United States with varying characteristics (teaching, non-teaching, higher and lower performing, size, geographical areas) Onsite visits and 449 semistructured interviews conducted with executive leaders, managers (including both nonclinical and nurse managers), infection preventionists, and frontline staff (i.e., nurses, physicians)	The components of the interview include: 1) management practices surrounding infection prevention, 2) policies related to and enactment of urinary catheter nurse-driven protocols (UCNDPs), and 3) perceptions of best practices for infection prevention These help identify barriers to implementing and adhering to UCNDP The article also includes interventions that contributed to successful use of UCNDP and overcome barriers	Level III B The study is well sampled, with illustrations of data that answers the research question. Method is well designed It provides insights into barriers and moderately relevant interventions with some discussion of limitations	The article identified the common barriers to the use of UCNDPs: 1) nurses deferring to patients, some nurses still have to check with the providers 2) physician push-back, and 3) miscommunication about IUC removal Interventions/facilitators suggested to promote protocol adherence/usage: 1) training care team members to use UCNDP, 2) discussing IUC necessity during rounds, 3) reminders about IUC removal when appropriate such as using daily huddles or daily lists of patients with IUCs, and 4) gaining buy-in from hospital leaders and physicians Limitations: The study did not measure success or effectiveness of intervention implementation; The study did not differentiate physicians by their specialty (urology vs. cardiology) which may influence use of protocol

						The study was done in supporting HAI prevention Varied stages of implementation across hospitals which may influence perceptions to UCNDP The potential for conformity bias especially with group interviews
3	Fakih, M. G., Rey, J. E., Pena, M. E., Szpunar, S., & Saravolatz, L. D. (2013). Sustained reductions in urinary catheter use over 5 years: Bedside nurses view themselves responsible for evaluation of catheter necessity. *American Journal of Infection Control, 41*(3), 236-239. https://doi.org/10.1016/j.ajic.2012.04.328 (Fakih et al., 2013)	Quasi-experimental study (no randomization of treatment or control)	The facility is an 804-bed tertiary care teaching hospital. 5-year study (2006-2012) that involves 227 bedside nurses, 16 case managers, 13 nurse managers	This article discusses 3 types of intervention over 5 years: 1) a nurse driven multidisciplinary effort for early IUC removal, 2) education on emergency department to promote appropriate IUC placement, and 3) twice-weekly assessment of IUC prevalence with periodic feedback on performance It includes interviews of nurses, nurse managers, and case managers on IUC placement and removals. The study highlights the viewpoint of the nurses: evaluation of IUC necessity as a shared responsibility; they valued the twice-weekly IUC prevalence evaluations (see Table 1 for the responses to 9 questionnaire items) Bedside nurses view themselves responsible for the appropriate use of catheters.	Level IIIB Quasi-experimental	Limitations: small sample size, a retrospective analysis in a single hospital, no control group, lacks appropriate IUC use over time, relied on self-reported data via questionnaires, did not include the nurse's IUC performance and how often they evaluate patients for the need of IUC. This study surveyed non-IUC units. However the twice-weekly eval may help bring more attention to patients with IUC during rounds such as duration, insertion, the need to continue or removal.
4	Gupta, P., Thomas, M., Mathews, L., Zacharia, N., Fayiz Ibrahim, A., Garcia, M.	Quasi-experimental study (no randomization of treatment	The study was conducted at a tertiary cardiac care facility with 114 inpatients. The intervention was	This study uses the bundle approach and nursing staff empowerment for prompt removal of IUC (unless indicated by	Level IIB The study shows consistent results and trends. However, it was only conducted on 1 ICU unit	There are several barriers to sustain the effectiveness of the CAUTI prevention strategies:

	L., Simbulan, C., Attia Mohamed, F., & El Hassan, M. (2023). Reducing catheter-associated urinary tract infections in the cardiac intensive care unit with a coordinated strategy and nursing staff empowerment. *BMJ Open Quality*, *12*(2), e002214. https://doi.org/10.1136/bmjoq-2022-002214 (Gupta et al., 2023)	or control)	implemented in a 20-bed cardiac intensive care unit (CICU). Per month, the consensus is around 400-500 patients with an average 1.5 days LOS.	providers) to reduce CAUTI. The study used autonomic stop orders of IUC 72 hours after the insertion. Nurses are educated on the guidelines maintenance of the IUC and empowered to remove IUC. Refer to figure 1: the driver diagram that consists of the bundle elements and components of staff empowerment Results suggest that the monthly rate pre-intervention was significantly lower than post-intervention, p=0.02, CAUTI rate per 1000 patient days dropped from 7.6 per 1000 device days to 0 per 1000 device days. Annual CAUTI count trend as followed: 4 in 2017, 6 in 2018 (pre-intervention) to 4 in 2021 and 0 until August 2022 (post-intervention)	(inadequate sample size) and not able to determine the impact of the bundle, the bundle elements, and the staff empowerment on CAUTI rate.	1. variable awareness of physicians regarding patient's catheter status (28% of catheters are unrecognized); thus, this may lead to unnecessary catheterization. 2. the study failed to determine which part of the intervention made the most impact on CAUTI reduction 3. the study was not a randomized control trial and there was no control group, which made it difficult to assess the effectiveness of each component of the bundled approach
5	Krein, S. L., Kowalski, C. P., Harrod, M., Forman, J., & Saint, S. (2013). Barriers to reducing urinary catheter use: A qualitative assessment of a statewide initiative. *JAMA Internal Medicine*, *173*(10), 881-886. 10.1001/jamainternmed.2013.105	Qualitative	Purposeful sample of 12 of 54 hospitals in the state of Michigan Variation of geographic area, hospital size (100-400 beds), and inpatient unit 3 of 12 hospitals were selected to conduct on-site visits	This article examines barriers and successes to implementation of a state-wide CAUTI prevention initiative via semi-structured phone interviews and site visits with direct involvements. The interviewees are nurses, physicians, infection control nurses/managers, Themes of common barriers, examples of strategies that were successful in overcoming these barriers at participating	Level IIIA Good quality qualitative study with well chosen sample size, proactive insight into potential limitations, consistent conclusions, and efforts to reduce potential biases in study design	Common barriers found (3): 1) difficulty with nurse and physician engagement; 2) patient/family request for indwelling catheters; and 3) the emergency department (ED) role in catheter insertion. Strategies to help overcome these barriers: 1) have a nurse champion (better if it is a physician champion like urologist), 2) provide patient education, and 3) ED staff education about the indications, use,

	(Krein et al., 2013)			institutions, and the use of Bladder Bundle are presented in Table 3		promote less invasive alternative in appropriate pts Limitations: one state only, study is 10+ years old Our sample setting is adult SICU, information from other units like ED and non-ICU are less relevant for our area of interest Potential for response bias from interviewees Study did not include any data on IUC use, indications, or removal times in correlation with surveyed experiences
6	Manojlovich, M., Ameling, J. M., Forman, J., Judkins, S., Quinn, M., & Meddings, J. (2019). Why don't we talk about catheters? characterizing contextual barriers to communication between physicians and nurses about catheter use. *American Journal of Critical Care: An Official Publication, American Association of Critical-Care Nurses*, *28*(4), 290-298. https://doi.org/10.4037/ajcc2019372 (Manojlovich et al., 2029)	QuaLitative study	The study takes place at a large academic medical center in the Midwestern region of the United States All nurses, PAs, and NPs who provided care for patients on a single progressive care unit	This study focuses on: (1) communication-related barriers between physicians and nurses, and (2) understand how these barriers affect appropriate use and/or removal of indwelling urinary and vascular catheters. Problem analysis, from May to August 2016, that includes interviews with physicians, nurses, PA/NPs: challenges they experience in the monitoring and surveillance of indwelling urinary and vascular catheters, and to gather their suggestions Pirnejad's communication space framework: Identified common themes are:	Level IIIA The study used Pirnejad's communication space framework and has a clear purpose, research questions; with purposeful sampling even though it was small Collected data, information, and findings are insightful and sufficient	Highlights and suggestions: Success of a nurse empowerment strategy depends on nurse and physician engagement/interpersonal communication in CAUTI reduction initiatives Design a structure for discussion topics during rounds Limitations: The identified themes are likely unique to the single site → lack generalizability

				1) Organizational complexity, [workflow misalignment] 2) cognitive complexity [wide variety of communication channels (e.g., verbal, non-verbal) and media (e.g., paper, EMR, pagers)] 3) social complexity, 2 subthemes: (1) interpersonal relationships between physicians and nurses, and (2) a social hierarchy with both professional and organizational components		
7	Meddings, J., Rogers, M. A. M., Krein, S. L., Fakih, M. G., Olmsted, R. N., & Saint, S. (2013). Reducing unnecessary urinary catheter use and other strategies to prevent catheter-associated urinary tract infection: An integrative review. *BMJ*. https://doi.org/10.1136/bmjqs-2012-001774 (Meddings et al., 2013)	Integrative review and meta-analysis	The review summarizes 30 studies that aimed to reduce the use of unnecessary urinary catheters in the acute care of adults.	The review highlights the strategies to avoid unnecessary use of IUC, strategies to prompt removal of the IUC, and interventions with the use of reminders and/or stop orders to prompt the removal. The article also offers recommendations for future research and implementation of intervention to reduce unnecessary use of IUC, hence it helps in reducing CAUTIs	Level VB The systemic review includes pre-post designs, 1 randomized control trial, 1 non-randomized crossover control trial The article is externally peer-reviewed and is supported by the Agency for Healthcare Research and Quality (AHRQ) However, it does not address the solutions to reducing barriers to nurse-driven IUC removal protocol.	The article mentions the barriers to implementation of intervention which include: active resistors (personnels who oppose changes to practice) and organizational constipators (management that lacks the mandate of compliance, data collections, and sensitivity to provide feedback). The intervention of the "reminder" implementation is either cost-neutral or cost-saving Unique challenge: some nurses are reluctant to remove the IUC without the physician's order
8	Parry, M. F., Grant, B., & Sestovic, M. (2013). Successful reduction in catheter-associated	Non-experimental study	The study takes place in a 300-bed, community, teaching hospital in Connecticut, Ohio; on all units Duration: 36 month	Nurse driven removal protocol is essential to reducing IUC days Promoting biweekly unit reports on catheter use rates and CAUTI rates	Level VB The study has the most potential for improvement Gives strong and clear recommendation	Wide variation between units in IUC reduction efforts (Patient population? Culture?). “Aggressive” utilization of nurse-driven removal protocol resulted in fewer IUC days and

	urinary tract infections: Focus on nurse-directed catheter removal. *American Journal of Infection Control*, *41*(12), 1178-1181. 10.1016/j.ajic.2013.03.296		Statistics: 181,785 patient days and 30,747 catheter days	Interventions consisted of changes in EHR charting modules and required documentation (provider indication), nurse-driven removal protocol enacted hospital wide, and biweekly unit-specific feedback on catheter use rates and CAUTI rates in a multidisciplinary forum. IUC use reduced by 50.2% over 36-month period CAUTI rates per catheter-day fell by 3.3% per month over the 36-month period	(aggressive implementation of nurse driven IUC removal), but does not address barriers to implementation	CAUTIs. Nurse ownership of IUC care and removal was critical to the change process, especially because of resultant change in teamwork and communication among disciplines Limitations: Study is dated (2013) Lack of statistical significance in CAUTI reduction on individual units - not ICU Lack data on asymptomatic infection that could contribute to over or underestimation of the CAUTI rate
9	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. *Joint Commission Journal on Quality & Patient Safety*, *46*(2), 99-108. https://doi.org/10.1016/j.jcjq.2019.10.004 (Quinn et al., 2020)	Qualitative Quality Improvement project which includes observation of the 20-bed unit and interviews with nurses, clinicians, PA, and NP	20-bed "open" unit providing intermediate/progressive care in a large teaching tertiary care hospital study consists of 133 clinical observation hours; with sample size of 19 clinicians (8 nurses, 7 physicians, 4 PA/NPs	The study identifies common barriers to timely catheter removal, 5 themes were identified (refer to Table 2 for detailed reference). The study also offers potential intervention to address these barriers 1.Catheter data is hard to find, not accurate, or not available. 2.Catheter removal is not a priority. 3.Confusion exists about who has the authority to remove catheters. 4.There is a lack of agreement on, and awareness of, standard protocols and indications for removal. 5.Communication barriers create challenges. Potential intervention: a) implementing standard protocols for removal, improving recognition that the	Level IIIA The report describes sufficient details about the study design, has meaningful data, well chosen setting even though the sample size was small	The study points out the lack of routine discussion of catheter in general, and discussions only take place when there are signs of infections. This study is helpful in identifying the common barriers to timely removal of catheters. Limitation: a) the study was conducted in a single hospital >>> limit the generality to bigger populations b) relied on self-reported data (interviews) >>> may be subjected to bias, inaccuracies >>> Hawthorne effect (alter behaviors due to being observed) c) participants were volunteers >>> poor sampling method, may be subjected to bias, inaccuracies

				catheter is no longer necessary, and clarifying authority to remove >>> improve multidisciplinary communication b) improve alerting system in EHR, add details for catheter such as checklist, insertion date, duration, indications visibly present during round c)		
10	Van Decker, S. G., Bosch, N., & Murphy, J. (2021). Catheter-associated urinary tract infection reduction in critical care units: A bundled care model. *BMJ Open Quality*, *10*(4), e001534. https://doi.org/10.1136/bmjoq-2021-001534 (Van Decker et al., 2021)	Quality Improvement Project	ICUs at Boston Medical Center (BMC)	Based on a PDSA framework 5-year CAUTI reduction plan: 5 PDSA cycles were conducted 1) education initiative to increase awareness of CAUTIs and standardized foley catheter insertion and maintenance protocols 2) evidence-based foley catheter use 3) urinalysis (UA) with reflex to culture 4) advocate for utilization of PureWick female incontinence device 5) chlorhexidine gluconate (CHG) bathing to reduce drug resistant infections Findings: the use of PureWick EUCDs, CAUTI awareness/education, and insertion/removal protocols are most significant in lowering CAUTI rates	Level VB Provides quality examples of effective interventions, but does not address challenges/limitations in detail Findings are consistent with other similar studies	Following the CAUTI reduction plan implementation, catheter Total number of CAUTIs decreased from 53 in 2013 to 9 in 2017 (83% reduction) and a 33.8% reduction in indwelling foley catheter utilization Mean CAUTI rate decreased to 3.25 per 1000 ICU patient-days BMC has a strong interprofessional focus and good communication across disciplines (per authors); this likely helped the success of the initiative Limitations: project did not examine the effect of nurse-driven protocols on IUC days or CAUTI rate Lack quantifiable assessment of staff knowledge, or impact of the implemented education, potential to influence to CAUTI rate improvement

Appendix B

Statement of Non-Research Determination

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

UNIVERSITY OF SAN FRANCISCO | School of Nursing and Health Professions

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

Project Title:	**YES**	**NO**
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	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: *"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."*	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.

UNIVERSITY OF SAN FRANCISCO | School of Nursing and Health Professions

STUDENT NAME (Please print) and SIGNATURE:

Huyen Nguyen
DATE: 3/5/24

SUPERVISING FACULTY MEMBER NAME (Please print):

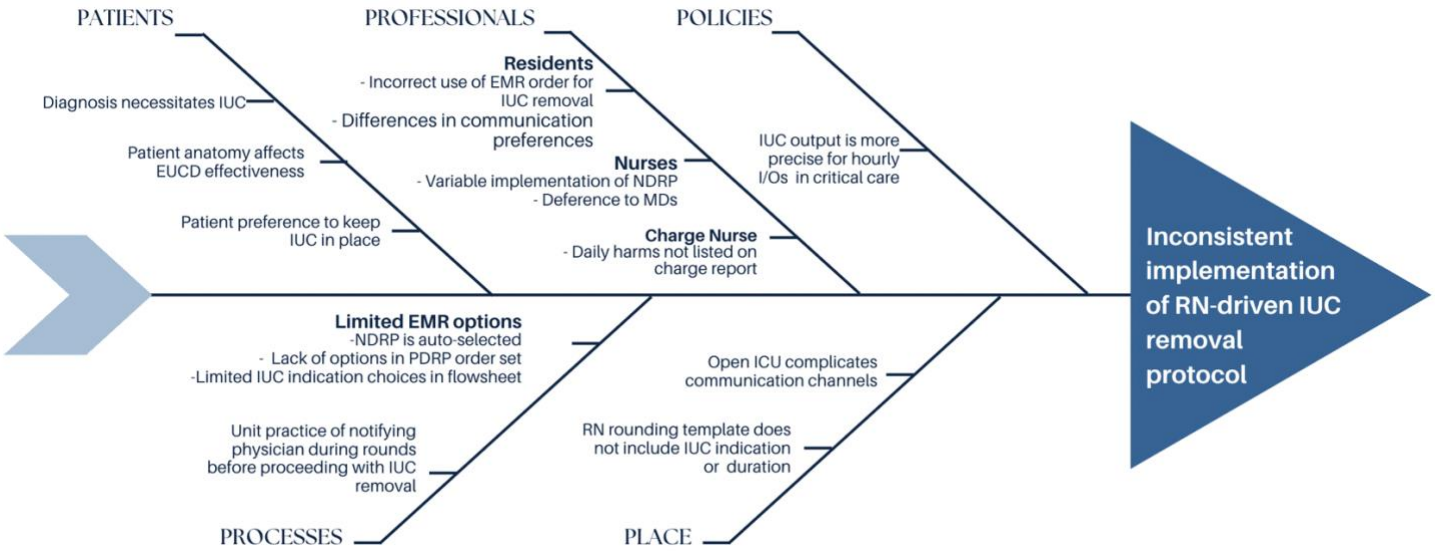
Dr. Alicia Kletter, RN, MSN, DNP, PMHNP-BC, FNP-BC

Signature of Supervising Faculty Member

DATE: 3/11/2024

Appendix C

Root Cause Analysis: Fishbone Diagram



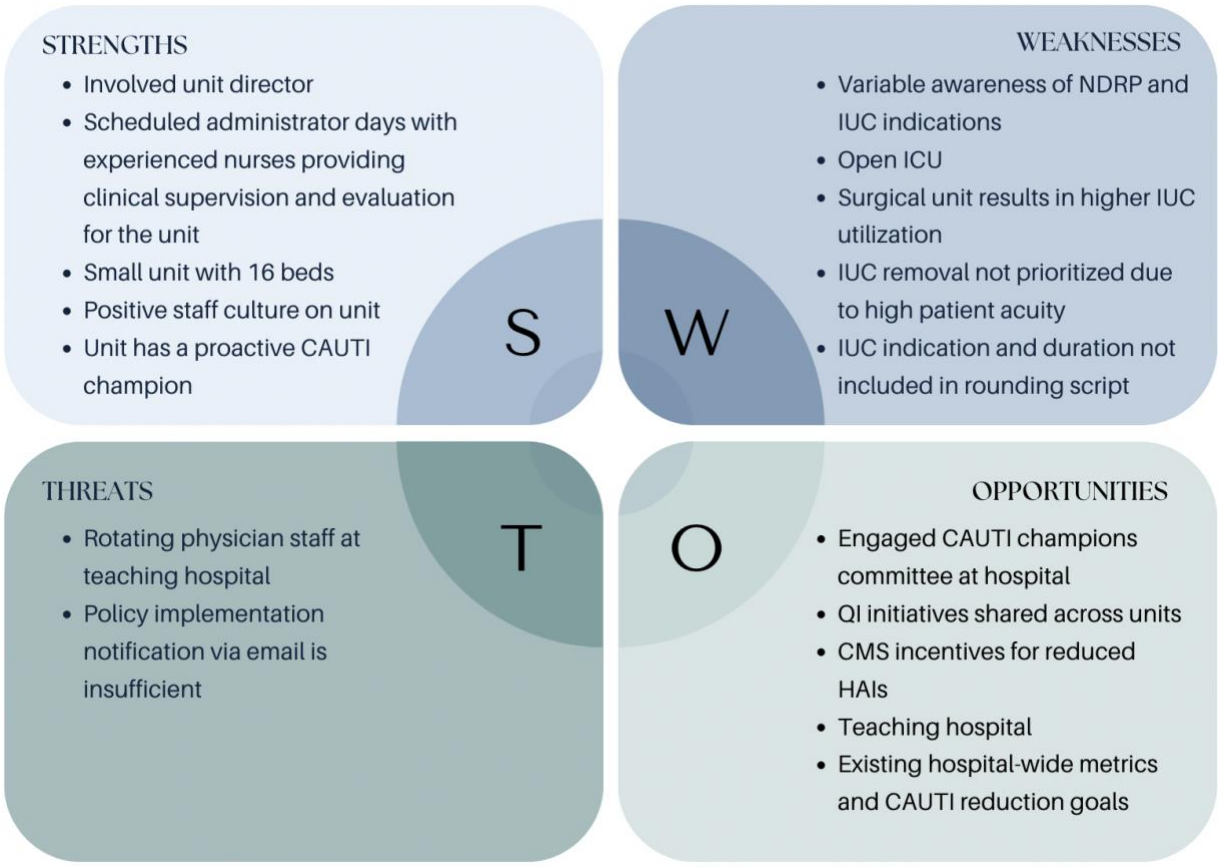
Appendix D

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 E

Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis



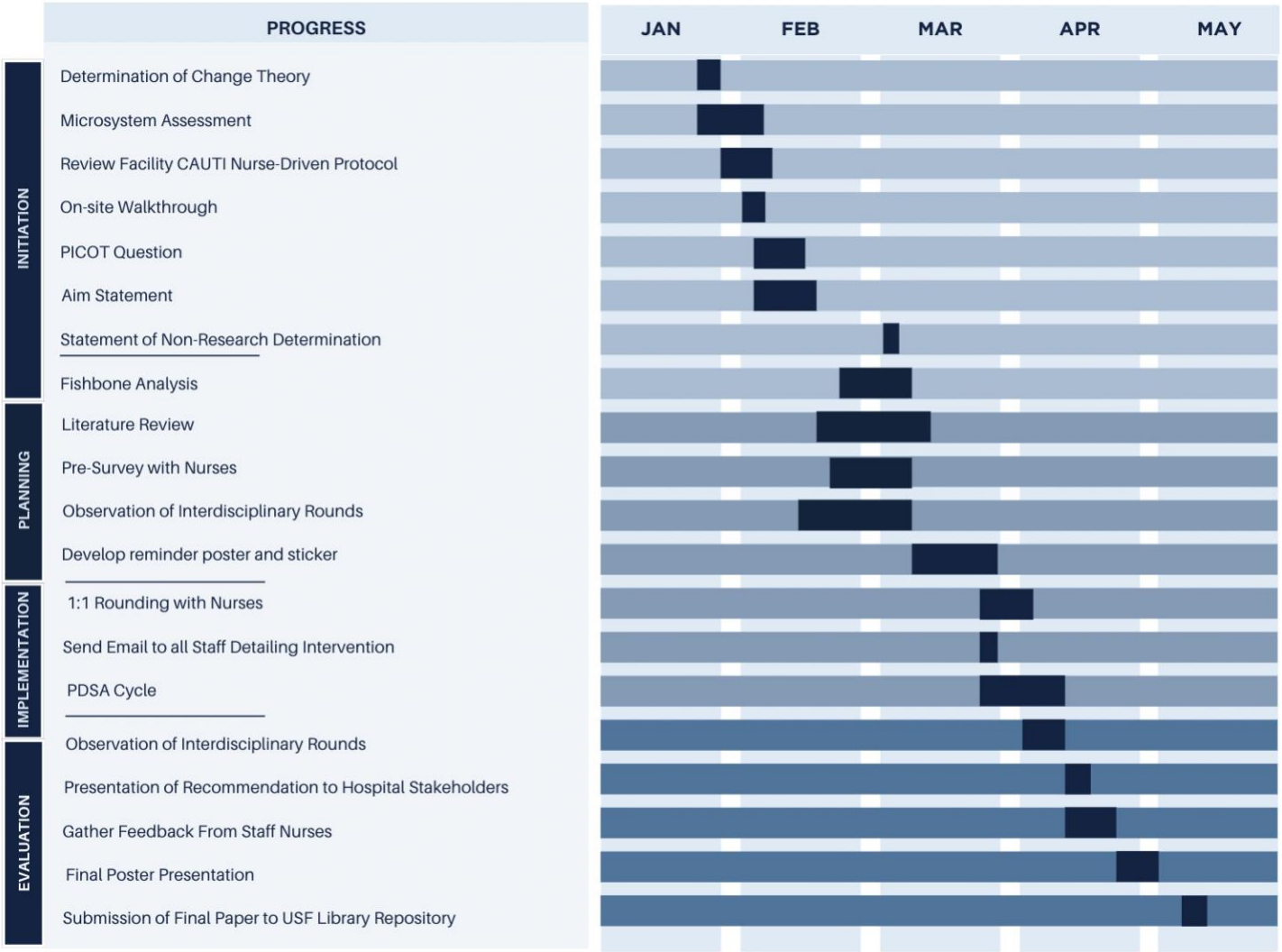
Appendix F

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

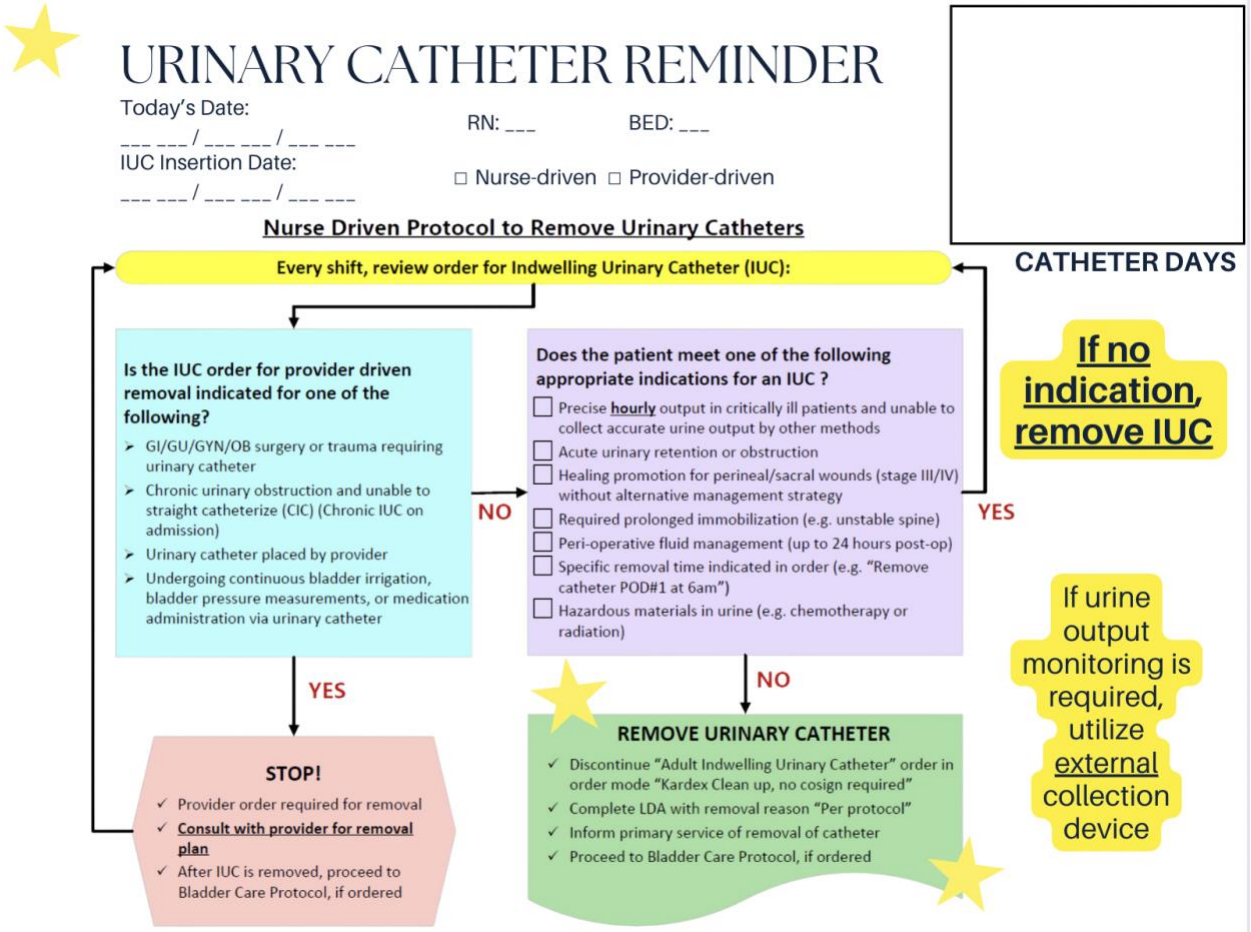
Appendix G

Gantt Chart

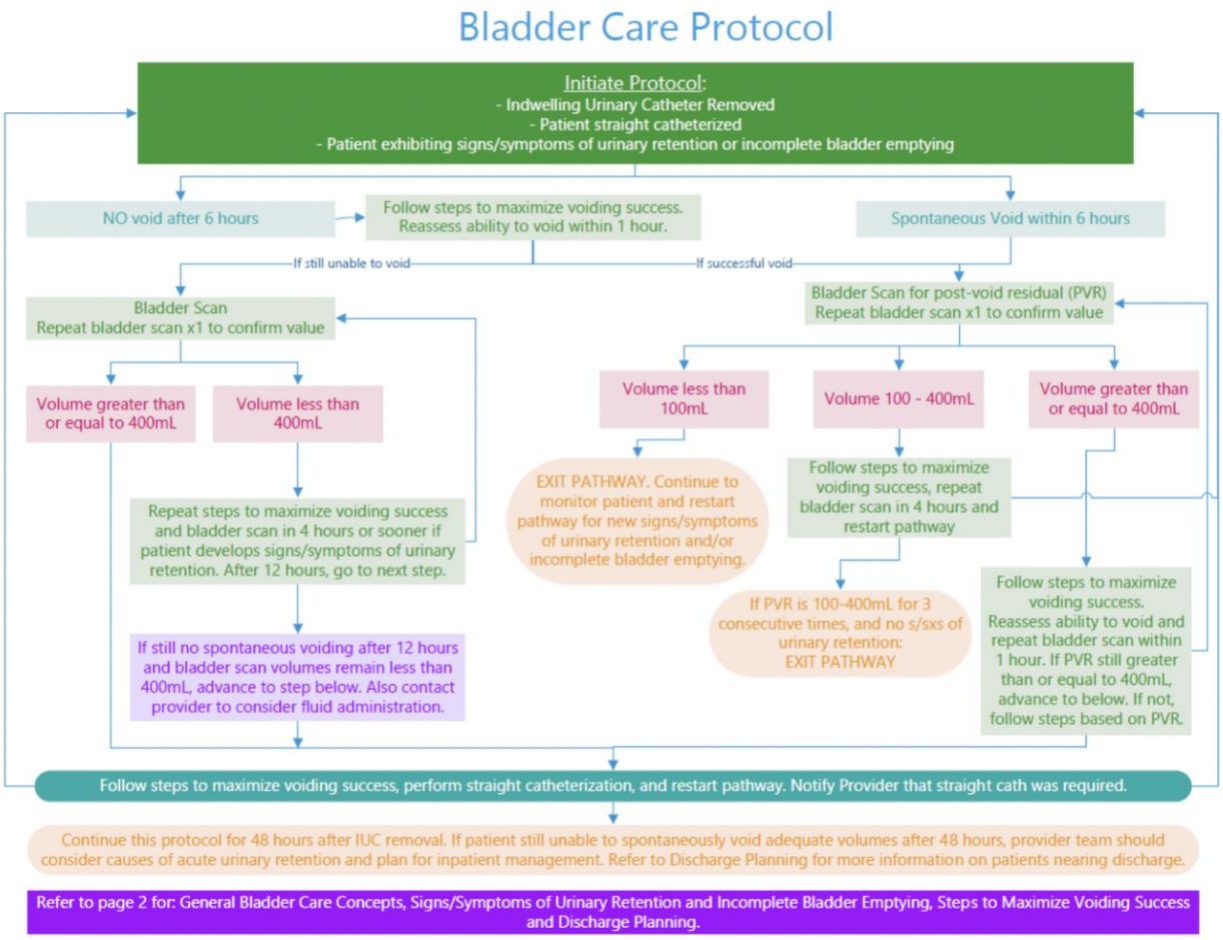


Appendix H

Urinary Catheter Reminder Poster and Back Side



Back Side of Reminder Poster: Updated Bladder Care Protocol



Appendix I

Why Am I Here? Sticker

Appendix J

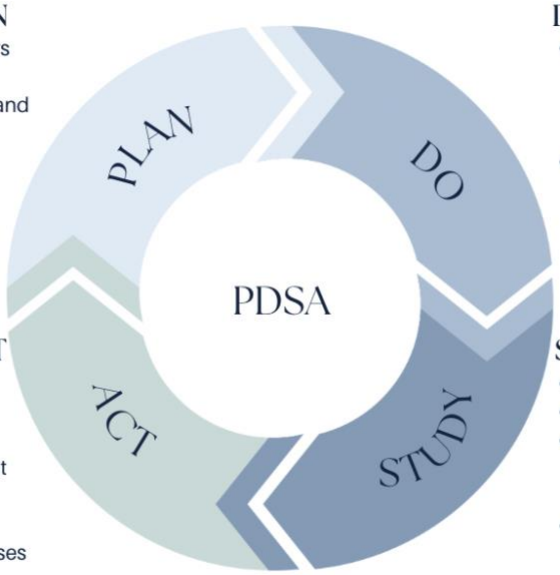
PDSA Cycle

PLAN

- Posted reminder posters on patient doors
- Talked to nurses about the intervention
- Sent email about intervention to nurses and physicians
- Communicated with physicians about intervention during tier 1 huddle
- Passed out "Why am I here?" stickers to staff on the floor

DO

- Nurses filled out the reminder poster and discussed indwelling urinary catheter days, indication, and removal plan during handoff and interdisciplinary rounds
- Students observed rounds from Monday 4/1 to Saturday 4/6 and took notes of how often indwelling urinary catheter indication or removal was discussed



ACT

- Moved posters to a more accessible location for filling out and viewing
- Proposed ideas:
  - Make filling out poster a Hospital Unit Service Coordinator responsibility
  - Add filling in posters to catheter rounding duties for experienced nurses on administrator days
  - Supply dry erase markers at bedside

STUDY

- Analyzed 44 rounds over 6 days, April 1-6
- Observed number of posters filled out
- Calculated frequency of discussion of indwelling urinary catheter indication or removal
- Assessed catheter utilization ratio after intervention
- Compared pre- and post-intervention data

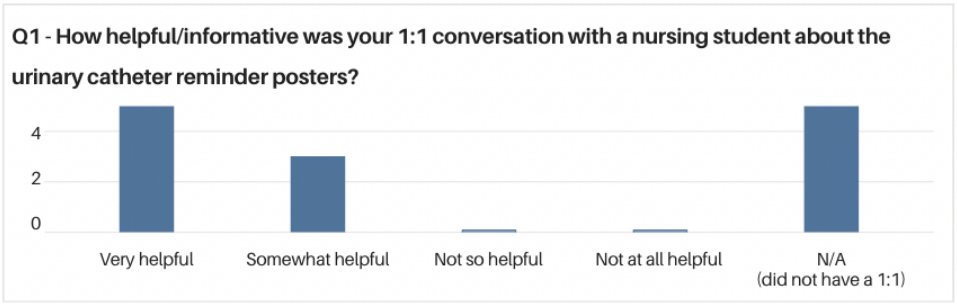
Appendix K

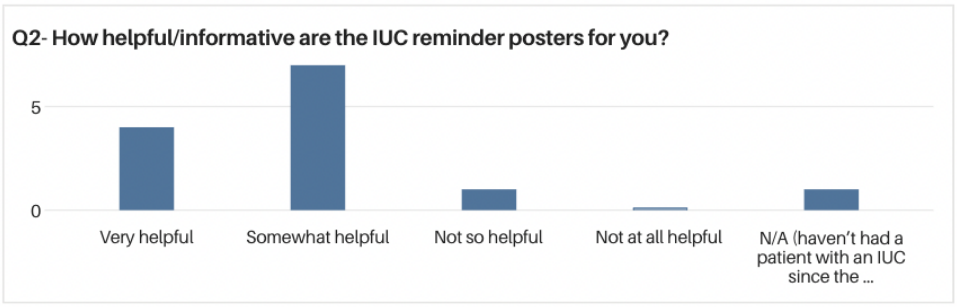
1:1 Rounding with Nurses

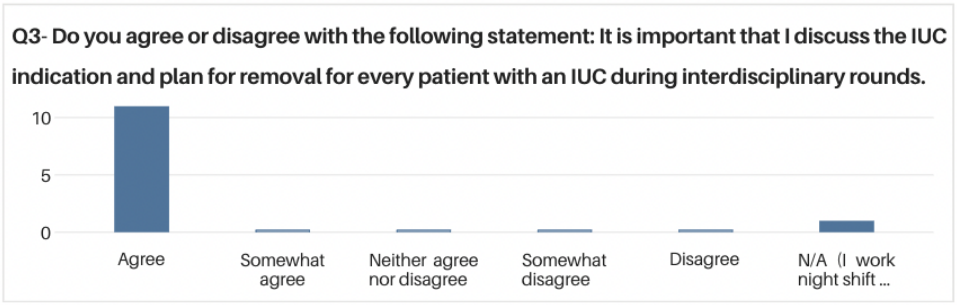
Talking Points
Intro ourselves and project We are nursing students from USF working with Janice on a CAUTI prevention quality improvement project to reduce catheter days in 13ICU
Show reminder poster and explain sections, bladder protocol on back
Explain intentions of the poster, points in email ◦ From 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. ▪ 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 Janice's and the CNS's support
• Background points for why we are doing this: ◦ From the literature: Interdisciplinary communication can be a barrier to catheter removal in ICU settings ◦ From our interviews/surveys with nurses, ▪ 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 13 ICU: Of 43 patient rounds over 6 days, foley indication and/or removal plan was discussed 10 times (23.3% of the time), whether raised by a physician or a nurse • 13ICU'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 among all critical care units at UCSF)
PM nurses fill out laminated poster, and handoff to AM nurses? ◦ Please fill out this poster and refer to it during handoff to AM nurses.
Questions/comments

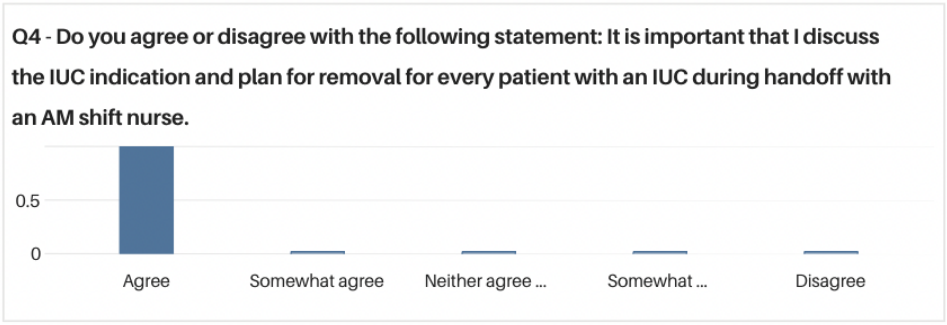
Appendix L

Qualtrics Survey Results from Staff Meeting









Q5 - How could 13ICU better address the issue of prolonged IUC days? (i.e What ideas do you have?)

Raffle prizes
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
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)
Removal upon admit :), or removal POD1 orders
Maybe add it onto our rounding template— add length of time foley in, need, etc
Make it one of the talking points in icu rounds
Should be provider driven
Providers should be the primary driver on this as a harm to the patient.
IUC status mentioned in the rounds.
na

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.

Provide dry erase markers at every chart outside room.
Continue face time snd education with the bedside nurses
I felt like I barely saw you guys on the unit! Or maybe it wasn't obvious to me on days I worked
Great presentation
Place poster in break room or bathroom for increased awareness
This group was excellent, committed, and v respectful
You guys were great!!! Thank you for the stickers, love the flow chart.
Excellent work! Thanks for your help
None
Also include Night Shift rounding. PM shift are the one doing the rounding scripts for Day shift nurses.
That visual aid in the bedside was helpful!
na

Appendix M

Results: Outcome Measure and Feedback Survey