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**Increasing Adherence to a Nurse-Driven Removal Protocol to Reduce Indwelling Urinary
Catheter Days**

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N670: ME-MSN Internship

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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

Increasing Adherence to a Nurse-Driven Removal Protocol to Reduce Indwelling Urinary Catheter Days

The Centers for Medicare & Medicaid Services (CMS) classifies catheter associated urinary tract infections (CAUTIs) as “never events” because they have serious consequences for patients yet are identifiable and usually preventable. As such, when CAUTIs occur, care is not reimbursed by CMS, giving hospitals financial motivation to make efforts toward prevention (Centers for Medicare & Medicaid Services, 2006).

The Centers for Disease Control and Prevention (CDC) estimates that 75% of urinary tract infections acquired in the hospital result from indwelling urinary catheter (IUC) use, and 15-25% of hospitalized patients have an IUC placed during their stay (CDC, 2016). Progress is being made to reduce CAUTIs, with a 12% decrease in CAUTIs in acute care hospitals between 2021 and 2022 and a 27% decrease in CAUTIs in ICUs in the same time period (CDC, 2023). Prompt removal of IUCs is important for CAUTI prevention as CAUTI risk increases with each additional day of catheterization (Letica-Kriegel et al., 2019). As patient advocates and stewards of safety, nurses have a role to play in reducing catheter days to protect patients from risk of infection and harm.

Problem Description

The surgical intensive care unit (ICU) of Hospital X, an urban academic medical center in Northern California, has sixteen beds and has service lines under both open and closed unit models. In a closed ICU, patients are admitted under the care of trained intensivists who consult with surgeons and specialists while maintaining the holistic view of the patient’s care while patients under an open ICU model are admitted and managed by the specialist team with consultation by intensivists (Legrand & Aldrich, 2021). Closed ICUs have been shown to reduce

mortality among patients, have better clinical outcomes and improve communication and care strategies (Baik et al., 2023, Legrand & Aldrich, 2021, Yang et al., 2019, and Yao et al., 2022). In Hospital X, communication regarding IUC removal and other patient care issues between interdisciplinary teams in the surgical ICU is complicated by the open and closed system.

Prevention of hospital acquired infections (HAIs) including CAUTIs is a system-wide priority at Hospital X. Daily administrative attention is focused on CAUTI prevention via reporting the number of IUCs on the unit in shift huddles that include attendings, the unit director, and charge nurses. System-wide and unit-specific CAUTI rates and device utilization ratios are monitored monthly via “true north” scorecards, providing standard metrics and targets for the unit. Instances of CAUTI are immediately reported to hospital infection prevention teams and analyzed to identify root causes and missed opportunities for prevention.

In the month preceding the project start, the surgical ICU CAUTI rate was 0.66 CAUTIs per 1,000 catheter days, which is below the target standardized infection ratio of 1. However, at the time of the project, the surgical ICU reached a count of three CAUTIs in the first three quarters of the fiscal year, already reaching the acceptability target of three CAUTIs for the entire 2023-2024 fiscal year. The surgical ICU IUC device utilization days were 1,663, with a ratio of 0.61 catheter days per patient days, which was the highest among all inpatient units in the hospital system.

A nurse-driven protocol (NDP) for IUC removal was implemented system-wide on December 3, 2018 with two subsequent revisions. Roll-out included email notification to nursing and physician staff. The protocol for nurse-driven removal is hyperlinked in the electronic health record for continued reference. The surgical ICU director recognized IUC device utilization was

high in the surgical ICU and identified the opportunity to improve adherence to the nurse-driven protocol among unit staff, ultimately reducing incidents of CAUTIs.

Available Knowledge

PICOT Question

This literature review seeks to answer the PICOT question “In adult patients in the surgical ICU, how does reducing barriers to implementation of a nurse driven IUC removal protocol affect the number of IUC days over a study period of 12 weeks?”

Search Methodology

To assess the PICOT question, CINAHL and PubMed were searched for relevant evidence. PubMed was searched using the terms *nurse-driven protocol* and *indwelling urinary catheter*. Limiting results to publication date in the last ten years produced 14 results. CINAHL was searched using the same terms and exclusions and produced 16 results. An additional search of PubMed to address the interdisciplinary perspective was performed using the terms *catheter, removal, barrier, and facilitator* resulting in 10 articles published in the last ten years. Nine articles cited in the academic medical center’s NDP were also reviewed. Ten articles were critically appraised using the Johns Hopkins Nursing Evidence Based Practice method of assessment for level and quality and are included in Appendix A (Dang & Dearholt, 2018). Studies included were evaluated to be Level II – V and were of high and good quality. Appraisal included a variety of research and non-research designs including a retrospective cohort study, four mixed methods designs, three qualitative studies, and one quality improvement project.

Literature Synthesis

Durant (2017) systematically evaluated the literature to explore the impact of nurse driven IUC removal protocols on clinical outcomes. While variation in measures and

methodology used in the reviewed articles made a meta-analysis impossible, Durant performed a qualitative analysis evaluating article quality and the NDPs' impact on clinical outcomes finding NDPs reduced urinary catheter utilization ratios with results ranging from a 4% reduction over a nine-month study period to a 50% reduction over a thirty-six-month study period (2017). While most studies reported a reduction in IUC days NDPs, a notable exception of increased IUC days was found in one study. Overall, the quality of studies evaluating NDPs for IUC removal need improvement, but the impact of NDPs is positive for reducing the amount of time patients have IUCs. Tyson et al. (2018) found an NDP resulted in reduced catheter utilization in a surgical ICU, indicating the NDP has the potential to be effective in this high acuity microsystem. Though the magnitude of the impact of NDPs on catheter utilization varied, the research by Durant (2017) and Tyson et al. (2018) supports the NDP in the surgical ICU. One can expect that with increased adherence to the protocol by nurses, catheter utilization will decrease in the surgical ICU.

While the initial impact of NDPs on catheter utilization is high, Fakhri et al. (2013) and Schiessler et al. (2019) found sustained impacts of NDPs reach a threshold level but do not revert to baseline as time proceeds. Fakhri et al. (2013) found that IUC utilization decreased from a baseline of 17.3% in 2006 to 12.7% in 2009 with the implementation of an NDP. This reduction was sustained but not further decreased from 2010 through 2011. Schiessler et al. (2019) used a quality improvement approach to implementing an NDP for IUC removal in a pediatric ICU and reduced catheter days by 28% in the first six months and saw sustained reduction from baseline at a one-year evaluation point. Although pre-post analyses of catheter utilization may suffer from publication bias in favor of implementations that had positive results, the surgical ICU can

expect that renewed attention to the NDP and CAUTI prevention will decrease catheter utilization as evidenced by the literature (Fakih, 2013 and Schiessler et al., 2019).

Blodgett and Sheets (2021) found that nurses reported using a NDP for urinary catheter removal as “acceptable” for CAUTI prevention when asked to rate acceptability with the Abbreviated Acceptability Rating Profile, but paradoxically did not think their patient’s condition was severe enough to warrant use of the protocol. In open responses, nurses noted that the NDP may not be acceptable to their physician colleagues. Blodgett & Sheets note that interdisciplinary rounds provide an opportunity to discuss the NDP and this research highlights the challenges of the change of practice in an environment where perceived physician importance or acceptance of a NDP is low (2021). This research further suggests that surgical ICU nurses require buy-in from all stakeholders to implement the NDP with confidence. Interdisciplinary rounds should be explored as an opportunity for communication about IUCs despite the intention of the NDP to provide nurse autonomy (Blodgett & Sheets, 2021).

Further literature analysis supports identification of barriers to successful implementation of an NDP applicable to the surgical ICU, especially interdisciplinary communication. Quinn et al. (2020) discusses persistent barriers to timely IUC removal in an “open” unit, similar to the surgical ICU, found catheter removal is rarely discussed or prioritized among clinicians, IUC data are hard to find, clinicians disagree on protocols and indications for removal, and communication barriers create challenges. In the studied unit, the policy of the institution is that nurses remove IUCs. A systematic review by Huang et al. (2022) also found that improvements in relationship between nurses and physicians would facilitate that better CAUTI prevention and IUC removal. Focus groups conducted by Parker et al. (2020) cited a need for shared training with doctors and nurses to ensure engagement with CAUTI prevention. Though the surgical ICU

has an NDP in place for IUC removal, the literature indicates removal without consultation with physician colleagues is unlikely and interdisciplinary communication needs to be addressed.

In the surgical ICU, efforts to facilitate NDPs occur in the context of many other behaviors and priorities. In a systematic review of barriers and facilitators to reduce catheter-associated urinary tract infections (CAUTIs), Atkins et al. (2020) identified six domains of CAUTI prevention practices including: environmental context, knowledge, beliefs about consequences, social influences, memory, and role identification. The authors then paired previously adopted solutions to address each of the common barriers, linking barrier investigation research with intervention research. The analysis supports taking into consideration these domains in context when considering initiatives for increasing adherence to the NDP (Atkins et al., 2020).

De Puccio et al. (2020) investigated barriers to NDPs nurse-driven protocols by interviewing 449 frontline staff across 17 hospitals. They found nurse deference to physicians, physician push-back, and miscommunication about IUC removal were cited as barriers while training on NDP use, discussing IUC removal during rounds, reminders to use the NDP, and getting buy-in for the NDP across the hospital were cited as facilitators for adhering to NDPs and should be applied to the surgical ICU.

The reviewed literature supports the use of NDPs for IUC removal practice, but early successes, less rigorous studies and publication bias may overestimate their real-world effectiveness and potential impact in the surgical ICU. In line with the evidence, interventions to decrease barriers to NDP implementation in the surgical ICU should focus on nurse-physician relationship and communication, rounding, getting buy-in from physicians and nurses, and reminders of the consequences of waiting to remove IUCs.

Rationale

Change theories and frameworks are tools to explore why and how behaviors persist and why desired behaviors may or may not be consistently employed. Quality improvement work requires that individuals examine and modify their behavior and adhere to standards that improve outcomes for patients. In infection prevention, such as CAUTI reductions, practices and protocols to protect patients exist but adherence is often poor. Change theories allow for exploration of the reasons why the desired behavior is inconsistent without making assumptions or jumping to conclusions (Greene & Wilson, 2022).

The Theoretical Domains Framework (TDF) was developed by multidisciplinary consensus and designed to pull from multiple change theories and create a practical tool for implementation of evidence-based practice. The twelve domains are knowledge, skills, social/professional role and identity, beliefs about capabilities, beliefs about consequences, motivation and goals, memory, attention, and decision processes, environmental context and resources, social influences (norms), emotions, behavioral regulation, and nature of behaviors (Michie et al., 2005). Theoretical Domains Framework is strong in its thoroughness and inclusion of example interview questions for exploring each domain. Elements of theory were employed as an exploration of why the current NDP is not implemented consistently without assumptions or judgements. Interviews with nurses who implement the protocol as well as those who are inconsistent include questions such as “what are your thoughts about the nurse driven protocol” to address motivation and “what problems have you encountered” to address beliefs about capabilities (Michie et al., 2005). These interviews led to insights on what strategies to employ to improve adherence to the protocol. Identifying interdisciplinary communication as a

barrier to implementation will avoid interventions that may not be the right fit for the challenges of NDP adherence.

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.

The Jesuit value *cura personalis* or “care for the whole person” in mind, body, and spirit (University of San Francisco, 2024), is central to the nurse’s ethical responsibility to advocate for the patient to remove the IUC as soon as possible. In the ICU, special care must be taken to balance the benefits and harms of interventions such as catheterization, sedation, intubation, and more, to prevent mental, physical, and emotional damage to the patient because of measures taken to save the patient’s life (Thornton et al., 2017). The nurse’s participation in advocacy for individual patients as well as changes to micro and macrosystem policies to protect patients is required under the American Nurses’ Association Code of Ethics Provision 3.4 “Professional Responsibility in Creating a Culture of Safety” (American Nurses Association, 2015). The ICU nurse’s time and attention to one or two patients per shift provides an opportunity to provide attention to the *cura personalis* and advocate for prevention of harms that other care team members may not see in their scope of practice. The NDP for IUC removal gives the nurse autonomy to prevent CAUTIs. Reducing barriers to implementing the NDP by improving

communication can help the nurse create a culture of safety that is ethically and professionally required of nursing.

Project AIM

The overall aim of this quality improvement project was to reduce the catheter utilization ratio in the surgical ICU from 0.61 catheter days per patient day in April 2023 by 10% to 0.55 by April 21, 2024. The long-term goal of the surgical ICU is to reduce the device utilization ratio to 0.45 catheter days per patient day, the rate among all critical care units at Hospital X. The project also aimed to improve interdisciplinary communication about catheter indication and removal plans during interdisciplinary rounds from 23% to 75%.

Methods

Context

The surgical ICU microsystem of Hospital X was analyzed according to the five P's of purpose, patients, professionals, processes, and patterns (Godfrey et al., 2024) to give context to the planning and implementation of the intervention. Adherence to the nurse-driven protocol for IUC removal is in line with Hospital X's purpose and values of professionalism and excellence. Nurses who adhere to the protocol and address barriers to implementation are accountable, reliable, and responsible professionals in line with the value of professionalism. People served by the microsystem include insured and uninsured adult patients, their family and caregivers, locals and patients traveling from out-of-town for surgery, and those who are English-speaking and non-English speaking. The microsystem includes many professionals and specialties to serve the acute needs of the very sick patients in the surgical ICU including nurses, physicians, nurse practitioners, social workers, medical assistants, physical and occupational therapists, unit

secretaries, IT staff, administrators, and students and volunteers. While all processes in the microsystem are related to providing excellent care for patients, daily review of IUC order to assess readiness for removal and appropriateness of use according to the NDP, interdisciplinary rounds led by nurses, tier one huddles, and consultations between specialty teams are particularly important microsystem processes related to adherence to the NDP. Patterns of physician-nurse communication, frequency and method of training nurses on protocols, and assessment and communication of CAUTI rates and goals are pertinent to the project.

Intervention

The project team employed multiple tools to understand the root causes of low adherence to NDP the on the unit and to help choose an appropriate intervention. The project timeline was over the course of twelve weeks from January 23 through April 30, 2024. Project milestones with start and end dates were depicted in a Gantt chart to visualize progress toward project completion (Appendix C).

To better understand nurse's perspectives on the nurse-driven IUC removal protocol and develop ideas for the intervention, a pre-intervention survey was conducted (Appendix D). Nurses were asked to rate their likelihood to remove the IUC without consulting with the physician, in addition to open-ended questions on the challenges associated with implementing the nurse-driven protocol. Many nurses reported feeling at ease with the NDP, however only one third would remove the IUC without consulting the physician. By observing interdisciplinary rounds led by the surgical ICU attendings, the project team found only 23% of rounds for patients with IUCs included discussion of indication or removal.

Root causes were explored with a fishbone diagram, with "lack of adherence to the nurse-driven IUC removal protocol" at the head and contributing factors under the categories of

patients, professionals, policies, processes, and place (Appendix E). While contributing factors exist under all categories explored, the unit practice of notifying the physician prior to removal and the nature of the open and closed ICU complicated communication between nurses and multiple physician specialty teams were seen as major contributing factors to the problem.

Information gathered via surveys, observations, and root cause analysis led to proposing intervention ideas aiming to reduce barriers to communication regarding IUC removal between the interdisciplinary teams. With guidance from the unit director and medical director, the project team developed a urinary catheter reminder poster, stickers, and one-on-one rounding as the intervention.

An analysis of the strengths, weaknesses, opportunities, and threats (SWOT) was performed to understand the context of the micro- and meso-systems as they relate to proposed intervention to address the communication barrier to removing IUCs in a timely manner according to the NDP (Appendix F). While weaknesses and threats exist, the positive unit culture, CAUTI champion on the unit, and hospital-wide metrics attention to CAUTI prevention stood out as strengths and opportunities to support the project.

Lastly, to assess the costs of the project versus potential costs savings from reduced CAUTIs, a cost-benefit analysis was performed (Appendix G). The Agency for Healthcare Research and Quality (2017) estimates that each CAUTI incurs a cost of \$13,793 above the cost of a hospital stay for the same patient without a CAUTI. Accounting for materials including printing costs for stickers and laminated posters and gift card prizes (\$144.14), nurse time at staff meeting for 15-minute student presentation (\$699.44), and unit director time spent on the intervention (\$1,249.05), and 200 hours of masters educated nurse time on the project (\$16, 152)

avoidance of two CAUTI incidents as a result of the quality improvement intervention would save Hospital X \$9,341.37.

Study of the Intervention

Intervention implementation and study followed a “plan, do, study, act” (PDSA) format and occurred following leadership approval of the urinary catheter reminder poster intervention (Appendix H).

The planning phase included development of the bedside urinary catheter reminder poster (Appendix I) to include the decision flow chart from Hospital X’s NPD for IUC removal, as well as fields for nurses to update on a daily basis regarding date of IUC insertion, whether the removal is under a nurse-driven or provider-driven protocol, and most prominently, the number of catheter days to date in the upper right hand corner. Posters were laminated so that they can be easily cleaned and so that nurses can update the posters with dry erase markers. The project team created a sticker for physicians and nurses to wear to increase awareness of the project. The sticker’s message “Why am I here?” with an image of an IUC similar to those used on the unit was developed to bring humor and prompt discussion of the indication and removal plan for IUCs on the unit (Appendix J). To standardize teaching in one-on-one rounding with nurses regarding the project and poster intervention, the QI project team created a one-on-one rounding script including information on the unit’s device utilization rate, results from the pre-intervention survey, project aim, and instructions on how to use the posters (Appendix K).

The “do” phase of the intervention followed the hanging of the posters, handing out stickers, and one-on-one rounding. The project team observed interdisciplinary rounds for a second week to note whether IUC indication or removal was discussed for patients with IUCs.

The “study” phase included analysis of the data collected when observing interdisciplinary rounds, observing whether fill-in poster fields are being updated regularly, assessing the catheter utilization ratio in the post intervention time period, and gathering additional feedback from nurses during an all-staff meeting (Appendix H).

With information gathered from the “study” phase, the team proposed actions to modify the intervention to increase its efficacy (Appendix H). The team first adjusted poster locations based on feedback from nurses on visibility. Next the team proposed that posters be filled out by the unit secretary rather than the nurses to promote consistency and relieve busy nurses of the task. The team also proposed poster updates be added to the duties of the experienced nurses on their administrative days. Lastly, the team proposed dry erase markers be provided at each bedside to reduce barriers to filling out the posters.

Outcome Measures

To evaluate the effectiveness of the urinary catheter reminder poster, stickers, and one-on-one rounding, the project team measured 1) the number of nurses reached for one-on-one rounding discussions, 2) the proportion of interdisciplinary rounds for patients with IUCs that included discussion of IUC indication or removal in the post-intervention period, and 3) the surgical ICU’s catheter utilization ratio compared to the pre-intervention period and to other critical care units at Hospital X.

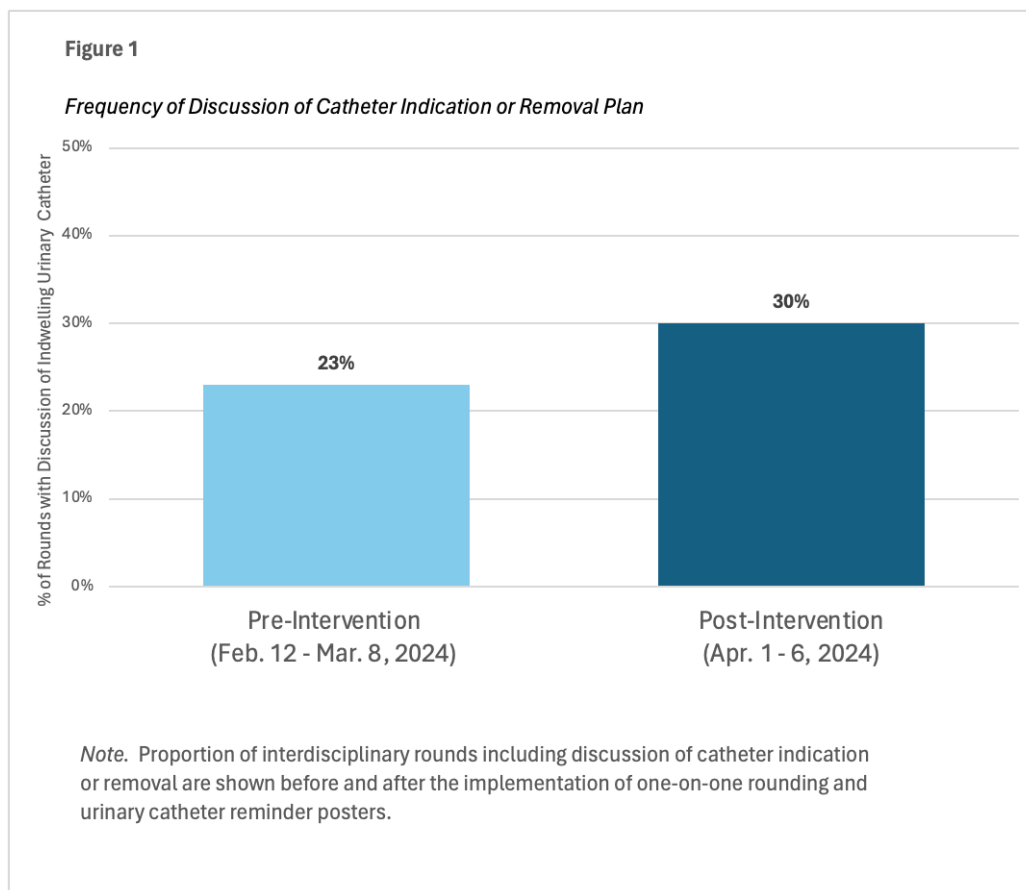
The team collected feedback from nurses via a Qualtrics survey following presentation of early results at a staff meeting on April 10th. The survey included three Likert scale questions and three open-ended questions. The Likert scale questions were regarding 1) helpfulness of the 1:1 rounding with students, 2) usefulness of the urinary catheter reminder poster, and 3) importance of discussing indication or removal of the IUC during interdisciplinary rounds (Appendix L).

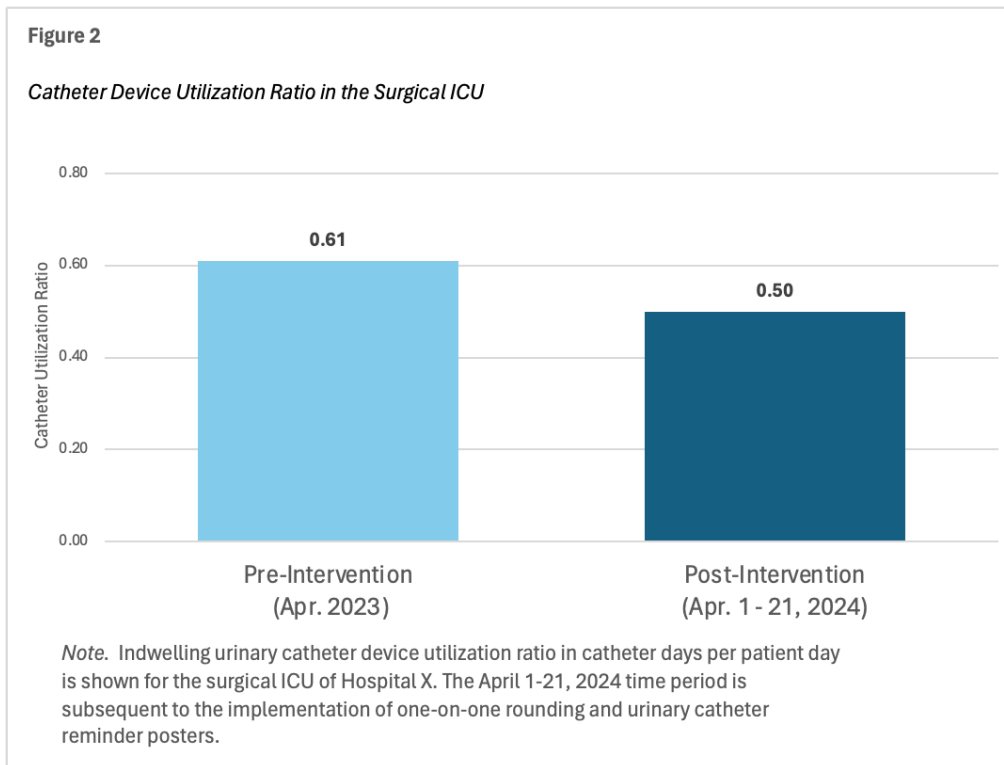
Open-ended questions requested 1) ideas for decreasing catheter days on the unit and 2) what the student project team could have done better. Nurses who were not present at the meeting were able to access the survey via a Quick Response code posted on flyers throughout the unit through April 18th. Survey participants were entered in a raffle to win one of two \$50 gift cards.

Results

A total of 30% (21/70) of nurses were reached for one-on-one conversation regarding the urinary catheter reminder posters and project background from March 28-29, 2024.

Post intervention, the project team observed interdisciplinary rounds from April 1-6, 2024 for a total of 44 patients with IUCs. Discussion included the indication or removal plan for the IUC for 30% (10/44) of patients. This was a 7% increase from the 23% of rounds including discussion of IUC indication or removal plan prior to the intervention (Figure 1).





The catheter device utilization ratio was analyzed from April 1 – 21, 2024 and found to be 0.50 catheter days per patient day, a 20% decrease from 0.61 catheter days per patient day in April 2023 (Figure 2).

A total of 31% (22/70) of nurses completed the feedback survey most reporting that their one-on-one conversation with a student was very helpful (42%) or somewhat helpful (27%) and the remainder (31%) did not have a one-on-one. Regarding the utility of the urinary catheter reminder posters 50% of surveyed nurses found the posters very helpful and 42% found them somewhat helpful. 88% of nurses surveyed agreed with the statement “It is important that I discuss the IUC indication and plan for removal for every patient with an IUC during interdisciplinary rounds.” Open ended responses provided multiple ideas for how the unit should address catheter days including increased reporting on IUCs during rounds, ongoing and more stringent evaluation of need for the catheter, and inclusion of providers as drivers of the removal,

and clarifying whether the order is nurse or provider driven as there are errors in ordering. Feedback on what the students could do better included more facetime on the unit, more facetime with night shift, and appreciation for the students' work. Complete survey results are included in Appendix M.

Discussion

Summary

This quality improvement project to increase adherence to a nurse-driven protocol for IUC removal took place at Hospital X in the surgical ICU microsystem over a twelve-week period with promising yet limited results. The project was conducted by a group of nursing students under the direction of a clinical instructor and the unit director of the surgical ICU. The project team utilized root cause analysis and microsystem assessments to develop a urinary catheter reminder poster and one-on-one rounding intervention to address the barrier of interdisciplinary communication that had a basis in the literature and was cited by nurses on the unit in interviews.

Over the course of the project, the surgical ICU moved closer to the long-term target of 0.45 catheter day per patient, the average of critical care units at Hospital X. Utilization decreased 20% from 0.61 catheter days per patient in 2023 to 0.50 following the intervention from April 1-21, 2024, surpassing the target 10% reduction in the project timeframe.

While the device utilization rate decreased, discussion of IUC indication or removal during interdisciplinary rounds showed only a small increase of 7%, suggesting the improvements in utilization may not have resulted from improvements to communication during rounds. The urinary catheter reminder poster was developed to bring catheter days to the forefront where interdisciplinary teams meet to address patients' needs. When the project team

observed interdisciplinary rounds they noted urinary catheter reminder posters were not filled out consistently with accurate numbers of catheter days. Future PDSA cycles should test poster fill-in by unit secretaries or nurses on administrative time to improve completion and utility of the posters. Additionally, brief follow up interviews with nurses regarding changes they have made to improve device utilization since the start of the project could shed light on future interventions that might be more effective and replicable to other units.

While the surgical ICU microsystem benefits from a culture of quality improvement and leadership attention to CAUTI prevention, a culture of deference to physicians within the complex system of the open and closed ICU does not foster an environment that empowers nurses to remove IUCs to enact the NDP without physician consultation. Future projects should continue to focus on nurses and providers together to address this important issue.

Limitations

This project was subject to multiple limitations. First, the twelve-week semester did not allow time for multiple PDSA cycles to implement tests of change from early findings. Additional PDSA cycles could have addressed barriers to nurses filling out the posters and allowed a more accurate assessment of the posters' utility. Second, the project would have been improved by additional time rounding one-on-one with nurses to teach nurses about the posters and the background of the project. Over three days, the project team only reached 30% of nurses on the unit. Rounding with closer to 100% of nurses on the unit could have improved project outcomes. Third, the feedback survey may have been subject to bias in the helpfulness of the poster and one-on-one rounding. Nurses were eager to be supportive of students and may have overstated their positive reflections on the project.

Conclusion

Early findings suggest that promoting interdisciplinary communication with visual reminders slightly increases communication and moderately decreases indwelling urinary catheter utilization. More evaluation is needed to determine the attributable cause of the reduction in device utilization and the sustainability and impact of the intervention over time.

References

- Agency for Healthcare Research and Quality. (2017, November). *Estimating the additional hospital inpatient cost and mortality associated with selected hospital-acquired conditions*. Results. <https://www.ahrq.gov/hai/pfp/haccost2017-results.html>
- American Nurses Association. (2015). *Code of ethics for nurses*. American Nurses Publishing. <https://www.nursingworld.org/practice-policy/nursing-excellence/ethics/code-of-ethics-for-nurses/>
- Atkins, L., Sallis, A., Chadborn, T., Shaw, K., Schneider, A., Hopkins, S., Bunten, A., Michie, S., & Lorencatto, F. (2020). Reducing catheter-associated urinary tract infections: A systematic review of barriers and facilitators and strategic behavioural analysis of interventions. *Implementation Science*, *15*(1). <https://doi.org/10.1186/s13012-020-01001-2>
- Baik, S.M., Yang, N.R., Kim, T.Y., & Hong, K.S. (2023). Excellence of the closed intensive care unit system in critically ill surgical patients. *PloS one*, *18*(4), e0285035. <https://doi.org/10.1371/journal.one.0285035>
- Blodgett, T. J., & Sheets, C. (2021). Perceptions of a nurse-driven urinary catheter removal protocol in a hospital setting. *Clinical Nurse Specialist*, *35*(2), 73–79. <https://doi.org/10.1097/nur.0000000000000579>
- Centers for Disease Control and Prevention. (2015, October 16). *Catheter-associated urinary tract infections (CAUTI)*. https://www.cdc.gov/hai/ca_uti/uti.html

Centers for Disease Control and Prevention. (2023, December 1). *Current HAI progress report*.

<https://www.cdc.gov/hai/data/portal/progress-report.html>

Centers for Medicare & Medicaid Services. (2006, May 18). *Fact sheets: Eliminating serious, preventable, and costly medical errors - never events*. CMS.gov Centers for Medicare &

Medicaid Services. <https://www.cms.gov/newsroom/fact-sheets/eliminating-serious-preventable-and-costly-medical-errors-never-events>

Dang, D., & Dearholt, S.L. (2018). *Johns Hopkins nursing evidence-based practice: Model & guidelines (3rd ed)*. Sigma Theta Tau International

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>

Durant, D. J. (2017). Nurse-driven protocols and the prevention of catheter-associated urinary tract infections: A systematic review. *American Journal of Infection Control*, 45(12), 1331–1341. <https://doi.org/10.1016/j.ajic.2017.07.020>

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>

- Greene, C., & Wilson, J. (2022). The use of behaviour change theory for infection prevention and control practices in healthcare settings: A scoping review. *Journal of Infection Prevention, 23*(3), 108–117. <https://doi.org/10.1177/17571774211066779>
- Huang, A., Hong, W., Zhao, B., Lin, J., Xi, R., & Wang, Y. (2022). Knowledge, attitudes and practices concerning catheter-associated urinary tract infection amongst healthcare workers: A mixed methods systematic review. *Nursing Open, 10*(3), 1281–1304. <https://doi.org/10.1002/nop2.1384>
- Legrand, M., & Aldrich, M. (2021). Further evidence in support of closed ICUs. *Anaesthesia Critical Care & Pain Medicine, 40*(6), 100978. <https://doi.org/10.1016/j.accpm.2021.100978>
- Letica-Kriegel, A. S., Salmasian, H., Vawdrey, D. K., Youngerman, B. E., Green, R. A., Furuya, E. Y., Calfee, D. P., & Perotte, R. (2019). Identifying the risk factors for catheter-associated urinary tract infections: A large cross-sectional study of six hospitals. *BMJ Open, 9*(2). <https://doi.org/10.1136/bmjopen-2018-022137>
- Godfrey, M., Foster, T., Johnson, J., Nelson, E. & Batalden, P. (2024). *Quality by design: a clinical microsystems approach* (2nd Ed.). Jossey-Bass.
- Parker, V., Giles, M., King, J., & Bantawa, K. (2020). Barriers and facilitators to implementation of a multifaceted nurse-led intervention in acute care hospitals aimed at reducing indwelling urinary catheter use: *A qualitative study. Journal of Clinical Nursing, 29*(15–16), 3042–3053. <https://doi.org/10.1111/jocn.15337>
- 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. *The Joint Commission Journal on Quality and Patient Safety*, 46(2), 99–108. <https://doi.org/10.1016/j.jcjq.2019.10.004>

Schiessler, M. M., Darwin, L. M., Phipps, A. R., Hegemann, L. R., Heybrock, B. S., & Macfadyen, A. J. (2019a). Don't have a doubt, get the catheter out: A nurse-driven CAUTI Prevention Protocol. *Pediatric Quality & Safety*, 4(4).
<https://doi.org/10.1097/pq9.000000000000183>

Thornton, K. C., Schwarz, J. J., Gross, A. K., Anderson, W. G., Liu, K. D., Romig, M. C., Schell-Chaple, H., Pronovost, P. J., Sapirstein, A., Gropper, M. A., & Lipshutz, A. K. (2017). Preventing harm in the ICU—building a culture of safety and engaging patients and families. *Critical Care Medicine*, 45(9), 1531–1537.
<https://doi.org/10.1097/ccm.0000000000002556>

Tyson, A. F., Campbell, E. F., Spangler, L. R., Ross, S. W., Reinke, C. E., Passaretti, C. L., & Sing, R. F. (2018). Implementation of a nurse-driven protocol for catheter removal to decrease catheter-associated urinary tract infection rate in a surgical trauma ICU. *Journal of Intensive Care Medicine*, 35(8), 738–744. <https://doi.org/10.1177/0885066618781304>

University of San Francisco. (2024). *Cura personalis*. Our Mission and Values.
<https://www.usfca.edu/who-we-are/reinventing-education/our-mission-and-values#chapter=chapter-187-Cura-Personalis>

Yao, T., Jensen, H. K., Reif, R. J., Kimbrough, M. K., Schlortt, K. R., Bennett, J. W., & Bhavaraju, A. (2023). Closed collaborative surgical intensive care unit modeling and its association with trauma patient outcomes. *Journal of Surgical Research*, 283, 494-

499. <https://doi.org/10.1016/j.jss.2022.11.015>

Yang, Q., Du, J.L., & Shao, F. (2019). Mortality rate and other clinical features observed in open vs closed format intensive care units: A systematic review and meta-analysis. *Medicine*, 98(27), e16261. <https://doi.org/10.1097/MD.00000000000016261>

Appendix A

Johns Hopkins 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	Atkins, L., Sallis, A., Chadborn, T., Shaw, K., Schneider, A., Hopkins, S., Bunten, A., Michie, S., & Lorencatto, F. (2020). Reducing catheter-associated urinary tract infections: A systematic review of barriers and facilitators and strategic behavioural analysis of interventions. <i>Implementation Science</i> , 15 (1). https://doi.org/10.118	Mixed Methods A mixed-methods, three-phased study	Included systematic review of 25 articles on behaviors related to CAUTI prevention in England	Multiple behaviors by interdisciplinary teams are involved in CAUTI prevention but interventions typically focus on education. CAUTI prevention could be improved by varying interventions to address more behaviors.	Level III A	Limitations: Studies reviewed were from multiple countries and practice guidelines are for England; findings may not be generalizable to the U.S. Key Findings: Limited or inconsistent documentation, lack of knowledge of guidelines and risks of catheter use, memory, social factors, and professional roles were the consistent domains of barriers and facilitators across studies.
2	Blodgett, T. J., & Sheets, C. (2021). Perceptions of a nurse-driven urinary catheter removal protocol in a hospital setting. <i>Clinical Nurse Specialist</i> , 35 (2), 73–79. https://doi.org/10.1097/nur.0000000000000579	Mixed-methods: A modified version of the Abbreviated Acceptability Rating Profile was used in this study, along with 3 open-ended questions.	Two 110-bed hospitals in the United States. 7 nurses were sampled by convenience with 25 patient opportunities for protocol implementation and survey. 13 surveys were completed (52%)	The study found algorithm for nurse-driven removal protocol includes an explicit note at the top stating "you do not need to contact the physician prior to discontinuing the urinary catheter." Acceptability of this algorithm was high with the note in place.	Level III B	Limitations: Nurses selected for the study were chosen based on randomly selected patients rather than voluntary participation, which could strengthen the study. Responses could have been influenced by the interviewer with nurses wanting to please with the appropriate response. Small sample size. Key Findings: 22% reduction in catheter use in the intervention group.
3	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	Qualitative interviews	35 acute care hospitals in the United States selected by purposive sampling were invited to participate and 17 agreed to participate. Researchers conducted 449 key informant interviews at the 17 sites.	There are three major barriers to nurse-driven catheter removal protocols (1) nurse deference to physicians, (2) physician push-back, and (3) miscommunication about IUC removal. Facilitators to help overcome these barriers include (1) training care team members to use the UCNDP, (2) discussing IUC necessity and the opportunity to use the UCNDP during rounds, (3) reminding care team members to follow UCNDPs, and (4) building buy-in for UCNDP use across the hospital.	Level III B	Limitations: interviews were conducted as part of a larger research project on hospital acquired infections. Additional barriers and facilitators might have been identified in a study on UCNDPs only.

4	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	Systematic review of case-control studies	29 studies published in the United States since 2006	29 included case-control studies showed improvements resulting from implementation of UCNDPs. Studies varied in application of the intervention, outcome measured, and quality of the study.	Level III A	Limitations: Variation in outcome measures in the studies made it impossible to compare effects across studies
5	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. <i>American Journal of Infection Control</i> , 41 (3), 236–239. https://doi.org/10.1016/j.ajic.2012.04.328	Mixed methods: non-experimental observational analysis of trends over time and cross-sectional survey	Non-intensive care units of an 804 bed teaching hospital analyzed for catheter utilization; Bedside nurses, nurse managers, and case managers surveyed for perceptions on IUCs with 63.9% response rate	Decreased IUC use was sustained over a 5-year period following efforts to avoid unnecessary placement and encourage removal of IUCs as quickly as possible. Nurses reported perceptions that they were responsible for assessing the necessity of the IUC each shift and 40% of nurses reported physicians were receptive >90% of the time when an order for removal was requested by the nurse.	Level III B	Limitations: ICU beds excluded in study of catheter days and nurse perceptions. Article is more than 10 years old but provides background information on perceptions. Key Findings: bedside nurses (97.4%), case managers (93.8%) and nurse managers (91.7%) are confident in knowing IUC indications and non-indications. 67% of bedside nurses felt biweekly catheter prevalence evaluations helped the unit focus on catheter removal
6	Huang, A., Hong, W., Zhao, B., Lin, J., Xi, R., & Wang, Y. (2022). Knowledge, attitudes and practices concerning catheter-associated urinary tract infection amongst healthcare workers: A mixed methods systematic review. <i>Nursing Open</i> , 10 (3), 1281–1304. https://doi.org/10.1002/nop2.1384	Mixed methods systematic review	2342 records were screened for inclusion and 34 articles were included	The study aimed to review published literature to identify attitudes, barriers and facilitators for CAUTI prevention	Level III B	Key Findings: Barriers of healthcare workers' knowledge, attitudes and practices level of infection prevention included heavy workload, understaffing, physician variability in indwelling urinary catheter (IUC) practice by diagnosis, nursing variability in IUC placement technique, poor relationship and nurse's poor documentation. Leadership, better education, teamwork, technique training and information technology support, advocacy for nurse-driven protocol and IUC removal reminder were considered as facilitators
7	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.2017.07.021	Systematic review of case-control studies	30 studies published in the United States since 2006	30 included case-control studies showed improvements resulting from implementation of UCNDPs. Studies varied in application of the intervention, outcome measured, and quality of the study.	Level III A	Limitations: Variation in outcome measures in the studies made it impossible to compare effects across studies

8	<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.icjq.2019.10.004</p>	<p>Qualitative study with observations and interviews</p>	<p>20-bed "open" unit in an academic tertiary care hospital.</p> <p>133 hours of observation and 19 clinicians interviewed including 8 nurses, 7 physicians, 3 PAs, and 1 NP</p>	<p>Five overall themes emerged: 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 authority to remove catheters; 4) there is a lack of agreement on standard protocols and indications for removal; and 5) communication barriers among clinicians create challenges.</p>	<p>Level III A/B</p>	<p>Limitations: Clinician behavior may have been altered by the presence of the observer. Key Findings: Discussion of catheters observed in rounds did not include duration, indication or plan for removal.</p>
9	<p>Schiessler, M. M., Darwin, L. M., Phipps, A. R., Hegemann, L. R., Heybrock, B. S., & Macfadyen, A. J. (2019a). Don't have a doubt, get the catheter out: A nurse-driven CAUTI Prevention Protocol. <i>Pediatric Quality & Safety</i>, 4(4). https://doi.org/10.1097/pq9.0000000000000183</p>	<p>Quality Improvement Project</p>	<p>N/A</p>	<p>A multidisciplinary team of nurses, doctors and administrators developed an evidence-based nurse driven protocol for IUC removal. The protocol gave nurses autonomy to remove IUCs and they were empowered to do so. The article presents a unit that as achieved the nursing autonomy where 13ICU has not. Differences between 13ICU and the PICU in the article - NDP was developed at the microsystem level and nurses were assured of provider buy-in and support.</p>	<p>Level V B</p>	<p>Key Findings: Device days on the unit decreased by 60% one month after implementation and CAUTI reduction was sustained for one year after the intervention. Limitations: Article lacks reflection on limitations.</p>
10	<p>Tyson, A. F., Campbell, E. F., Spangler, L. R., Ross, S. W., Reinke, C. E., Passaretti, C. L., & Sing, R. F. (2018). Implementation of a nurse-driven protocol for catheter removal to decrease catheter-associated urinary tract infection rate in a surgical trauma ICU. <i>Journal of Intensive Care Medicine</i>, 35(8), 738–744. https://doi.org/10.1177/0885066618781304</p>	<p>Retrospective cohort study</p>	<p>A surgical trauma ICU in the United States. 14,732 patient days and 11,490 catheter days were included in the pre-intervention period from January 2013 - July 2014. 11,799 patient days and 8,186 catheter days were included in the post-intervention period from September 2014 to December 2015. A washout period of two months was</p>	<p>The evaluation of a nurse-driven protocol for catheter removal in a surgical ICU found a reduction in CAUTI rate and catheter device utilization compared with pre-intervention data from the same unit.</p>	<p>Level II B</p>	<p>Key Findings: implementation of a nurse-driven protocol for catheter removal as part of a CAUTI prevention bundle resulted in a decreased CAUTI rate (5.1 to 2.0) and decrease catheter utilization rate (0.78 to 0.70). Limitations: the study lacked data on protocol compliance and it is possible that changes seen were not due to the nurse-driven protocol for catheter removal.</p>

Appendix B

Statement of Non-Research Determination



Project: Statement of Determination and Non-Research Determination Form

Student Name: Hannah Brosnan

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used:

(<http://answers.hhs.gov/ohrp/categories/1569>)

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

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

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

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

Project Title:	YES	NO
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	X	
The specific aim is to improve performance on a specific service or program and is a part of usual care . ALL participants will receive standard of care.	X	
The project is NOT designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does NOT follow a protocol that overrides clinical decision-making.	X	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does NOT develop paradigms or untested methods or new untested standards.	X	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does NOT seek to test an intervention that is beyond current science and experience.	X	

<p>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.</p> <p>The project has NO funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.</p>	X	
<p>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.</p>	X	
<p>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></p>	X	

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

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



STUDENT NAME (Please print): Hannah Brosnan

Signature of Student: *Hannah Brosnan*

DATE 3/5/2024

SUPERVISING FACULTY MEMBER NAME (Please print):

Dr. Alicia Kletter

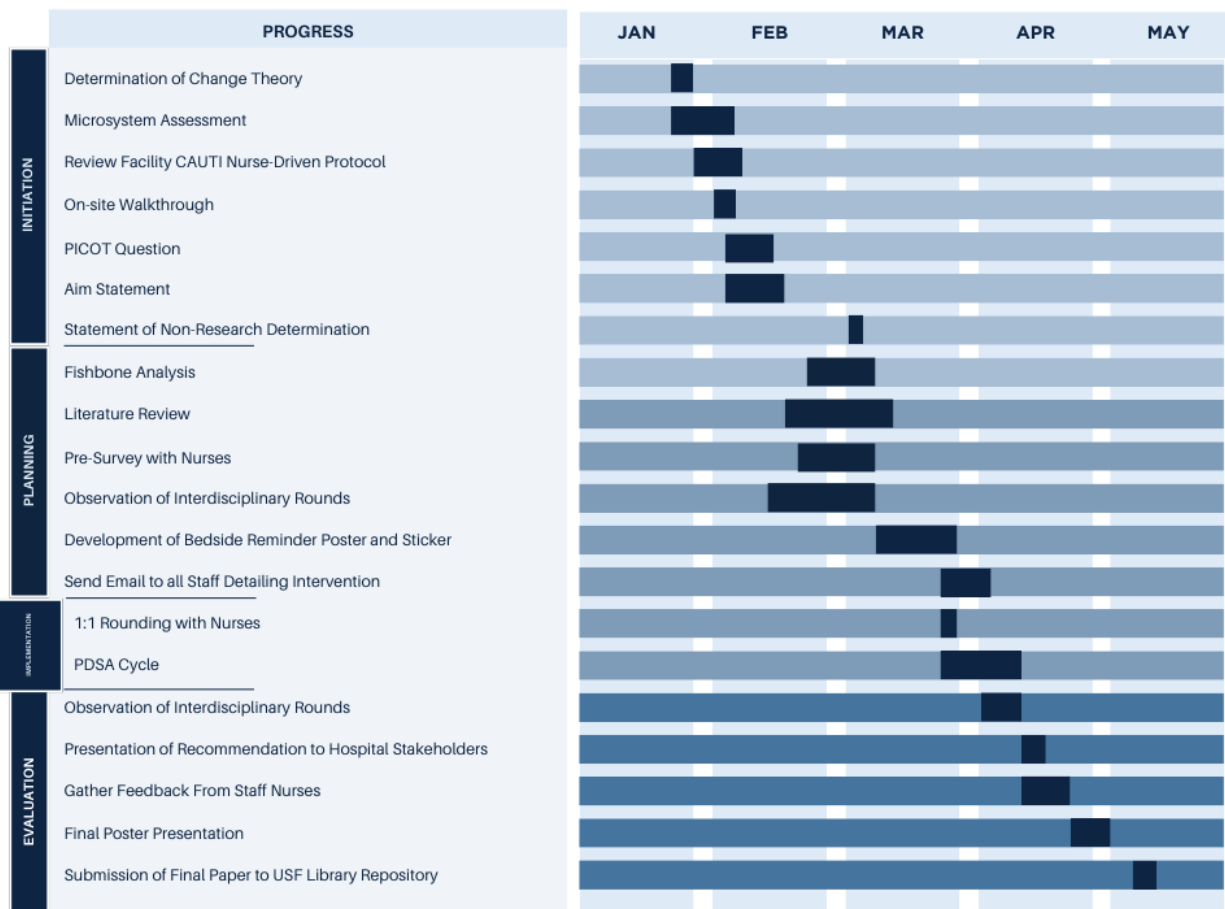
Signature of Supervising Faculty Member

AKletter

DATE 3/11/2024

Appendix C

Gantt Chart

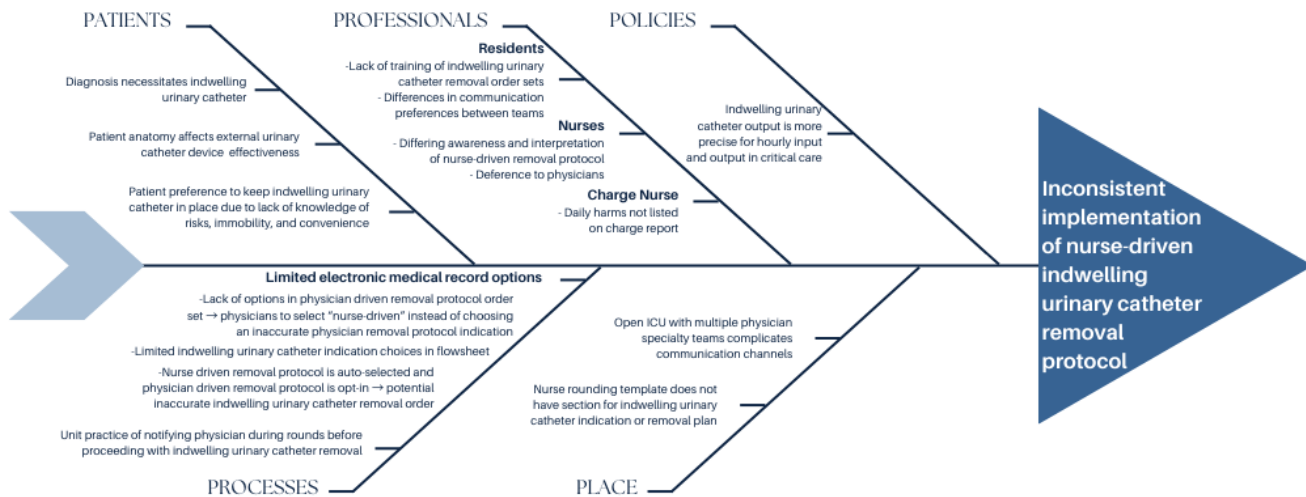


Appendix D

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

Root Cause Analysis (RCA): Fishbone Diagram



Appendix F

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

STRENGTHS

- Involved unit director
- Scheduled administrator days with experienced nurses providing clinical supervision and evaluation for the unit
- Small unit with 16 beds
- Positive staff culture on unit
- Unit has a proactive catheter acquired urinary tract infection champion

S

WEAKNESSES

- Variable awareness of nurse-driven removal protocol and indwelling urinary catheter indications
- Open ICU
- Surgical unit results in higher indwelling urinary catheter utilization
- Indwelling urinary catheter removal not prioritized due to high patient acuity
- Indwelling urinary catheter indication and duration not included in rounding script

W

THREATS

- Rotating physician staff at teaching hospital
- Policy implementation notification via email is insufficient

T

OPPORTUNITIES

- Engaged catheter-acquired urinary catheter champions committee at hospital
- Quality Improvement initiatives shared across units
- Centers for Medicare and Medicaid Services incentives for reduced hospital-acquired infections
- Teaching hospital
- Existing hospital-wide metrics and catheter acquired urinary tract infection reduction goals

O

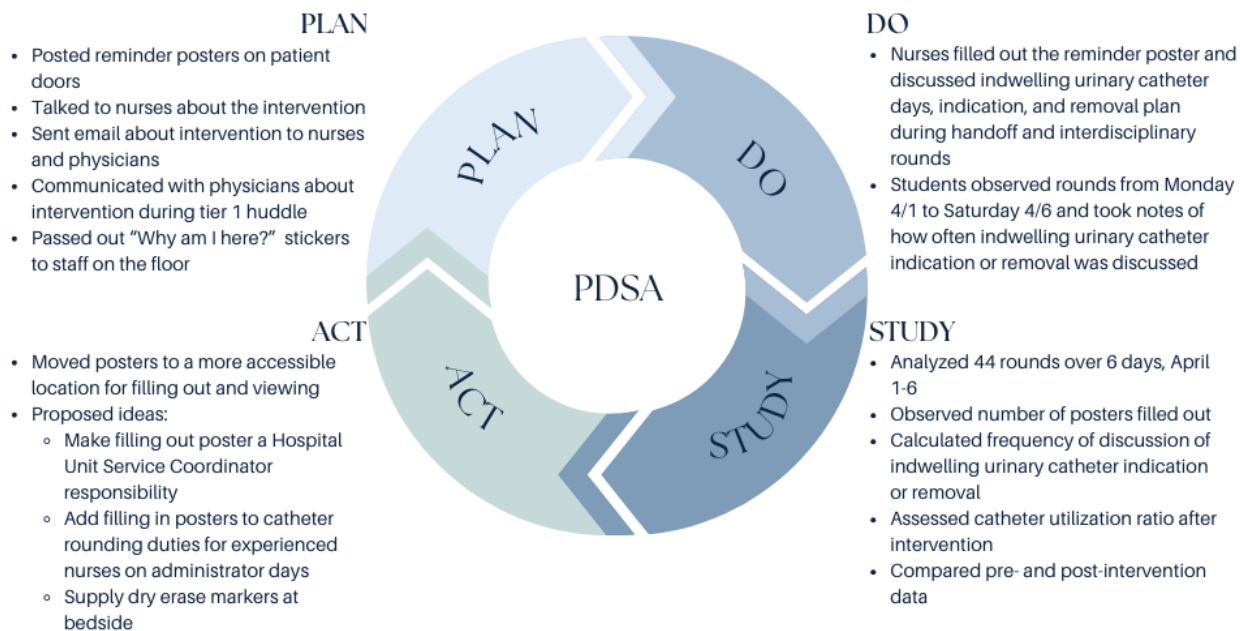
Appendix G

Cost Benefit Analysis (CBA)

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 surgical ICU	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 H

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



Appendix I

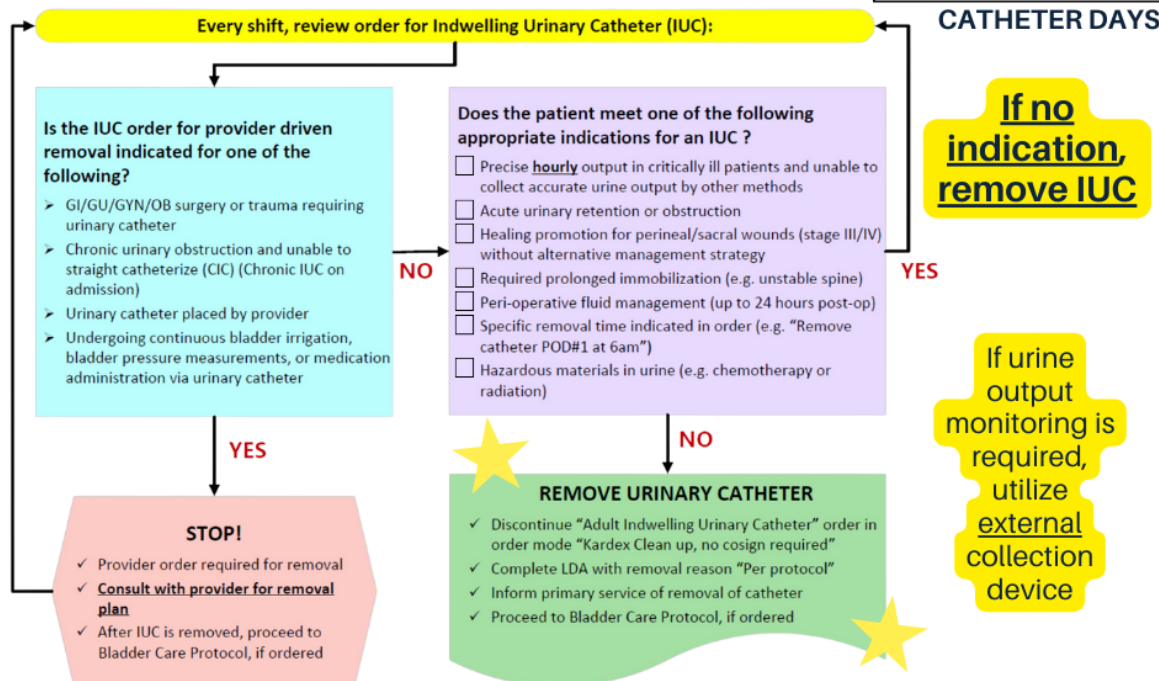


URINARY CATHETER REMINDER

Today's Date: _____ RN: ___ BED: ___
 IUC Insertion Date: _____

 Nurse-driven Provider-driven

Nurse Driven Protocol to Remove Urinary Catheters



Appendix J

Why Am I Here? Sticker



Appendix K

1:1 Rounding with Nurses
Talking Points
<p>Intro 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 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)
<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 L

Staff Feedback Survey

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

Very helpful Somewhat helpful Not so helpful Not at all helpful N/A (did not have a 1:1)

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

Very helpful Somewhat helpful Not so helpful Not at all helpful
 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.

Agree Somewhat agree Neither agree nor disagree Somewhat disagree Disagree
 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.

Agree Somewhat agree Neither agree nor disagree Somewhat disagree Disagree

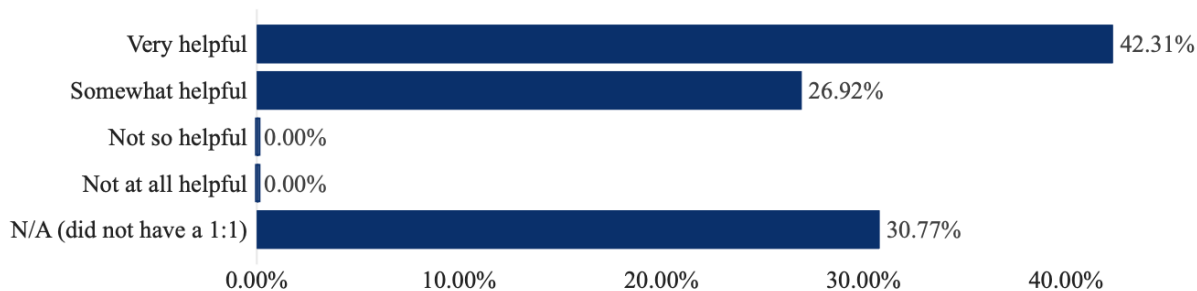
How could this surgical ICU better address the issue of prolonged IUC days? (i.e. What ideas do you have?)

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

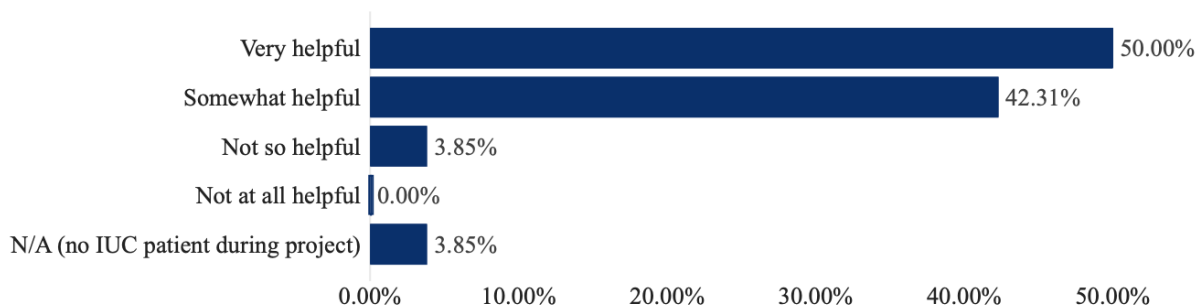
Appendix M

Feedback Survey Results

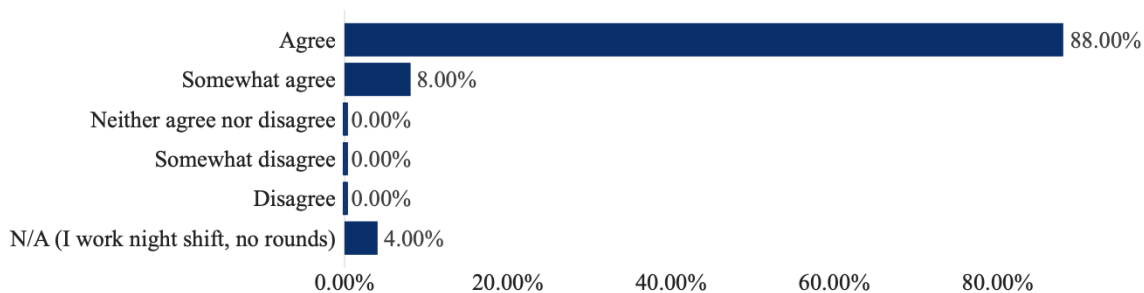
Q1. How helpful/informative was your 1:1 conversation with a nursing student about the urinary catheter reminder posters?



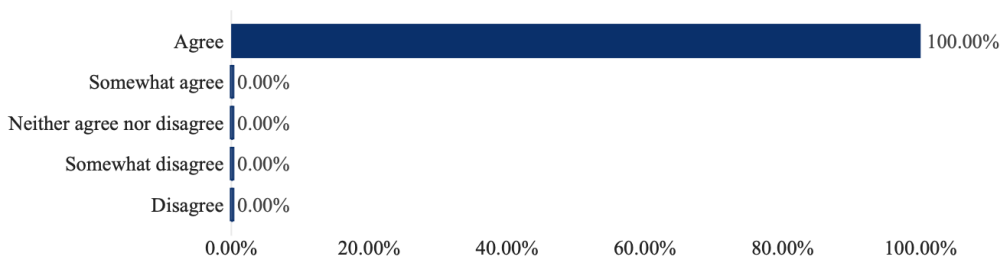
Q2. How helpful/informative are the IUC reminder posters for you?



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 very 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