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Reducing Urinary Catheter Usage in the Intensive Care Unit Setting and Education Related to Preventing CAUTIs: A QI Project

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Reducing Urinary Catheter Usage in the Intensive Care Unit Setting and Education related to Preventing CAUTIs: A QI Project

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A DNP Project submitted in fulfillment of the requirements for the degree of Doctor of Nursing Practice

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This is to certify that the DNP Project Final Report by

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has been approved by the DNP Project Team on

April 10, 2023

for the Doctor of Nursing Practice degree

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Abstract

Significance and Background: Catheter-associated urinary tract infections (CAUTIs) are common but preventable hospital-associated infections. The inappropriate and prolonged use of indwelling urinary catheters can pose a significant risk for patients and healthcare organizations. The Centers for Disease Control and Prevention identified that the most important factor related to an increased risk of CAUTI is the length of time an indwelling catheter remains in place. This DNP (Doctor of Nursing Practice) project assessed the barriers to removing indwelling catheters in the intensive care unit (ICU) while providing encouragement of prompt removal.

Purpose: Three aims were developed for this quality improvement project: 1) Educate staff nurses in the ICU setting and encourage prompt removal of the indwelling urinary catheter; 2) Track compliance of utilizing catheter algorithm; and 3) Reduce the length of time an indwelling catheter remains in place.

Intervention/Setting: For this project, the Institute for Healthcare Improvement was the model chosen to improve the quality of care. Plan, Do, Study, Act (PDSA) drove the changes in practice. Two PDSA cycles were completed, including pre-intervention surveys to discuss barriers, beliefs, and current knowledge related to indwelling catheters, educational sessions, and an algorithm to determine the continued need for a catheter. Participants included any nurse working in the intensive care unit from June 1st to August 12th, 2022.

Evaluation: Pre-implementation survey revealed barriers associated with prompt removal by nurses, including convenience, inadequate staffing, patient immobility, and acuity of patients. Foley catheter use decreased by 20.3% with use of alternative measures and use of an algorithm, by the end of the 10-week implementation. The compliance rate of algorithm use increased by 55% by the end of the project.

Discussion: Implementing education sessions and an algorithm to determine the continued use of an indwelling catheter can be helpful in an ICU setting when used appropriately. Despite this being a small ICU and other variables leading to the results, bringing awareness to the need for the prompt removal of a catheter can help reduce the length of days, leading to a reduced risk of developing a CAUTI.

Keywords: catheter-associated infection, hospital, urinary tract infection, indwelling catheter, Intensive Care Unit

Problem Identification, Development of Clinical Question, and Evidence Review

Background and Significance of Problem

Urinary catheters are standard in a hospital setting for indications such as acute urinary retention, strict output for critically ill patients, neurogenic bladder, benign prostatic hyperplasia, and others. They can pose the risk of catheter infection. Catheter-associated urinary tract infections (CAUTIs) are prevalent in the hospital setting and are considered preventable hospital-acquired infections (HAI). The Institute for Healthcare Improvement identified that urinary catheters account for 75% of all infections and 40% of CAUTIs (Leontie, 2021). Approximately 25-35% of hospitalized patients may have an indwelling urinary catheter during admission to a hospital setting, and poor outcomes can lead to discomfort, prolonged hospitalization, and increased cost and mortality (Fletcher-Gutowski et al., 2019).

The use of indwelling urinary catheters is valuable in certain instances of patient care, but prolonged or unnecessary use increases the risk of infectious and noninfectious catheter harm. A policy for using urinary catheters can be implemented to help reduce the incidence of CAUTI. The Center for Medicare and Medicaid Services does not reimburse the hospital stay if a CAUTI occurs, making a policy and standards of urinary catheter care essential (Leontie, 2012).

This small community hospital intensive care unit (ICU) currently has two protocols regarding urinary catheters, including nurse- and provider-driven protocols. The nurse-driven protocol was established to reduce the time a urinary catheter is left in place and reduce CAUTIs, giving nurses the autonomy to use their clinical judgment. Further interventions that can assist in reducing the usage of urinary catheters and CAUTIs include bladder scanning, external catheters (PureWick, Texas), straight catheter protocols, and behavioral therapy (including toileting).

Educational sessions regarding inclusion and exclusion criteria regarding using external catheters and alternative measures versus inserting a urinary catheter are essential for staff members who work directly with patients.

Pre-intervention assessments can help identify staff barriers to removing an indwelling catheter when no longer indicated and their current attitudes and knowledge related to CAUTIs. Further education includes insertion, maintenance, and discontinuation of urinary catheters to maintain a lower risk for CAUTIs in the intensive care setting. Assessing the staff member's knowledge and barriers to removing a urinary catheter can help implement interventions related to reducing the number of days a urinary catheter stays in place, ultimately reducing the risk of developing CAUTI.

Description of Local Problem

Patients admitted to intensive care units tend to use more indwelling urinary catheters than those admitted to general wards. Sampathkumar (2017) revealed that an ICU has 83% more catheters vs. 21% on a regular general medicine floor. This study's ICU tends to have patients who are downgraded from an ICU status rather quickly, but they may remain in the ICU due to high censuses on the medical floors. Catheters can remain in place longer than clinically necessary due to different barriers addressed during this DNP project.

There are many downfalls to keeping a urinary catheter in place, including the risks it poses for the patient and the healthcare organization. As a result, educational needs and interventions were identified among the ICU staff nurses to promote a prompter removal of an indwelling catheter and to assess the effectiveness of regularly assessing the continued need.

The goal is to reduce the use of urinary catheters and keep CAUTIs out of the Intensive Care Unit. In recent years, an updated policy change included a nurse-driven protocol, which can

help decrease the time a urinary catheter is left in place. Increasing accountability and decreasing the rates of CAUTIs can be beneficial by providing additional education and reinforcement of alternative methods.

The ICU in which this quality improvement project was performed has many downgraded patients that are either telemetry or general medicine patients. Patients are often left with an indwelling catheter for longer than medically necessary due to there not being a set discussion regarding continued use or a standard assessment tool. Therefore, the use of prolonged catheters on these patients can be addressed while raising awareness of the proper use of indwelling catheters. Addressing the continued need for urinary catheters at each change-of-shift report can lead to prompt removal of catheters when no longer medically necessary. Nurses can use their clinical judgment to remove a catheter under the nursing-driven protocol or to practice a questioning attitude among the care team to determine if a catheter can be discontinued. By encouraging the practice of bedside shift reports, a urinary catheter assessment can be made, raising awareness of the discontinuation of the device.

The steps leading to the removal of a catheter, when no longer indicated include:

1. Recognizing that the patient has a catheter (either RN or physician);
2. Recognizing catheter is no longer indicated;
3. Discussion among the medical team caring for the patient to verify it is no longer indicated (allows cross-checking);
4. Catheter is removed.

Focused Search Question

In intensive care unit (ICU) patients with foley catheters **(P),** was an algorithm utilized on a regular interval **(I)** compared to no algorithm **(C)** and does it play a role in the length of time a catheter stays in place**(O)** within a ten-week period **(T)?**

Evidence Search

External Evidence. The following databases were searched: PubMed, CINAHL, and the Cochrane Database of Systematic Reviews. The keywords searched were urinary, catheter, infection, hospital, associated, tract, sepsis, bacteria, checklist, intervention, indwelling, mortality, and morbidity, intensive, care, unit. Exclusion criteria included articles older than 2014. Inclusion criteria included English language, articles from 2014-2021, use of protocols for urinary catheter insertion, and barriers to implementation. Appendix A and B show the search for evidence-based on the database, search results, and search terms.

Internal Evidence. Nurses in this 14-bed-ICU were provided a pre-intervention assessment, provided in the Appendix, to assess current knowledge, beliefs, and attitudes regarding indwelling urinary catheters. Questions included barriers, insertion techniques, intervals in assessing the need for urinary catheters, and identifying reasons a catheter may be inadvertently left in place. By understanding a starting point, nurses could provide feedback that assisted in developing interventions, education, and reminders related to prolonged and inappropriate urinary catheter use in the Intensive Care Unit setting.

Evidence Appraisal, Summary, and Recommendations

Indwelling urinary catheters can be unjustified or inappropriate, creating avoidable and significant patient distress and pain, and activity restrictions (Parker et al., 2017). UTIs are the

most common healthcare-associated infection; CAUTIs account for up to 80% of these (Parker et al., 2017).

Appendix A and B show the search for evidence-based on the database, search results, and search terms. Appendix C demonstrates the evidence table and reviews the selected articles utilized during this DNP project.

There are barriers associated with the removal of indwelling urinary catheters. However, some approaches can help address those barriers. Specific barriers include being understaffed, lack of focus on removal of the catheter, having a provider-driven protocol that is not addressed, and staff simply thinking it is "easier" to keep a catheter in place. Some approaches can also help decrease the length a catheter remains in place, including utilizing a "CAUTI" acronym meaning C: Is it crucial? A: Are there alternative methods to utilize? U: Document the update (including why the catheter still meets the criteria to remain in place). T: Take out at the earliest possible time; I: What is the current clinical indication? S: Does the urinary catheter have a stat lock (Buckley et al., 2015)?

Project Plan

Project Goals

1) To assess current knowledge, beliefs, and practices related to indwelling catheters in the ICU setting
2) To implement educational sessions discussing the inclusion/exclusion criteria of a catheter, alternatives to a catheter, and by educating on ways to decrease CAUTI risk
3) To reduce the number of days a catheter remains in place utilizing an algorithm
4) To reduce urinary catheter usage, when possible, with an alternative method

Context

This setting in which this study took place was a 14-bed-intensive care unit. The participants included staff nurses, travel nurses, and float nurses from June 1st, 2022 to August 12th, 2022. Data was collected on indwelling catheters on patients admitted or transferred into the intensive care unit during that time.

Project Team Members and Roles

The educator for the ICU holds a MSN (Master of Science in Nursing), will oversee the project, implementation plan, and evaluation, and be a champion of the update. Four intensivists in the unit oversee the infection rates of patients with a urinary catheter. The practice expert, the ICU manager, will oversee the implementation phase. The staff, including nurses and physicians, will be key team members in this project. Dr. Susan Penque is the DNP project faculty advisor who will guide the project. The infectious disease physicians, infection control team, and patient safety members are also critical members of the successful implementation of this project.

Key Stakeholders and Buy-in

Implementing a new change can be difficult on units where protocols have remained the same for an extended period. The successful implementation of new interventions would include the responsibility of nurse leadership, educators, physicians, infection control, and registered nurses. The main reason for the change should be voiced to staff in a way that emphasizes the new changes' importance. As healthcare employees, the main goal is to provide the best patient-centered care, which includes keeping up to date with the best practices.

To ensure compliance with a new practice, educational sessions should be held for each member who plays a role in this change. It will allow staff to learn, implement, and provide feedback regarding the change. Education regarding the change will be provided to all

stakeholders involved. In addition, evidence-based research will be printed and available to reiterate the reason behind the change. Including all staff members in the education and roll-out of a new practice can promote communication, improve team culture, and promote positive reinforcement. A "champion" will also be used during both shifts to enhance compliance, including addressing the continued need for a urinary catheter during the shift report.

Key stakeholders include those carrying out the new intervention and the registered nurses in the Intensive Care Unit. As stated above, direct engagement with the staff and buy-in can facilitate a more straightforward implementation of a new practice update. The project leaders will help communicate the project goals, missions, and plans for reducing the number of days a urinary catheter remains in place when not meeting appropriate criteria (strict I&O in a critically ill patient, acute urinary retention and obstruction, surgical, neurogenic bladder, end-of-life care, and decubitus ulcers).

Framework PDSA Cycle #1

The methodology for this project is the use of the Institute for Healthcare Improvement Model. The tactics begin with identifying a problem and establishing a way to improve the current practice. The Plan, Do, Study, Act (PDSA) framework will guide the policy change and address the project goals. The steps include recruiting a team, drafting an aim statement, describing the current process, identifying the problem, doing, studying, and acting. PDSA cycle one started June 1, 2022, and ended June 29, 2022.

Plan. This DNP student will meet with the key stakeholders and team members of the infectious disease committee to discuss the alternative methods and need for educational sessions related to the inappropriate use of urinary catheters. This DNP student will obtain data regarding

rates of urinary catheter usage and the number of days urinary catheters remain in the ICU. This DNP student will provide all staff nurses with a pre-intervention questionnaire.

Do. In this phase, the algorithm (inclusion and exclusion criteria and the current average length of time a catheter is in place will be gathered. The implementation process will begin with a pre-implementation survey based on current urinary catheter insertion policies, the risk of breaking sterile technique, and current practices in place to reduce the rates of CAUTIs. The DNP (Doctor of Nursing Practice) student will educate the staff on the updated alternatives to urinary catheters (PureWick, Texas catheter), bladder scanning, and establishing the need for urinary catheters. There will be PowerPoints and flyers printed. As the PureWick was a newer device around the time of project implementation, the BARD representative will provide in-services for staff members, which will help promote buy-in of a female external catheter device.

There will be posters and reminders for using inclusion/exclusion criteria checklists and using PureWicks and Texas catheters appropriately. Audits will be performed to determine the percentage of urinary catheters in the ICU, unnecessary use of urinary catheters, and length of a urinary catheter remaining in place. Barriers associated with the prolonged use of catheters will be discussed with current staff members, leading to a new intervention implemented during PDSA cycle two.

Study Phase. Process measures include understanding staff knowledge, perception of urinary catheters, and current rates of CAUTIs before implementation. The DNP student, as stated above, will perform weekly compliance audits on the number of urinary catheters and the length of times a catheter remained in place during their ICU stay. The DNP student will review the results at the meetings and share results and potential feedback with the staff members responsible for the intervention. Changes will be made based on rates of adherence and feedback.

Act. This DNP student will revise the implementation and practice update based on adherence rates and potential feedback based on staff input. The PDSA model allows for continual assessment and changes in the intervention.

Possible Barriers to Implementation

Potential barriers to implementation include staff bias, inability to adapt to new interventions, feeling it is "easier" to insert a catheter, staffing shortages, use of traveler staff currently, and inability to attend educational sessions.

Individualized data feedback and auditing are crucial in creating a sustainable change in a hospitalized setting. The message to staff regarding the new policy update of urinary catheters is that this new practice can prevent the severe complications that urinary catheters can present patients with. Cullen et al. (2018) point out that celebrations are important in acknowledging unit progress and sustainability regarding an evidence-based practice change.

Data collection after the new practice has been in place for a period can provide staff with a summary of the change in clinical performance and outline key indicators contributing to improvement (Cullen et al., 2018). Evidence-based practice is essential for high-quality patient care (Kueny et al., 2015).

Sustainment

To sustain a new practice, there need to be reminders or practice prompts regularly. In this case, it can include "catheter champions" who audit staff reports and discuss the continued need for catheters at change-of-shift. This way, it will be addressed at least twice in 24 hours. Skill competence can be practiced by the "champion" watching staff successfully implement this new practice (Cullen et al., 2018). A crucial factor is identifying the pros and cons of this

implementation after it has been in use for a couple of weeks. This can help identify ways to improve the process and outcomes for staff and patients.

Communication and teamwork are essential factors in sustaining a new change, specifically when staff members are weary of the change. Examples of communication regarding the continued use of catheters include providing staff with data regarding the prolonged use of catheters and the detrimental effects they can pose for the patients, which will be displayed via PowerPoint.

An action plan for the sustainability of a new practice change includes individualized feedback, auditing, and relaying messages to staff about preventing the severe complications that urinary catheters can present to patients. Celebrations are important in acknowledging unit progress and sustainability regarding evidence-based practice change (Cullen et al., 2018).

Dissemination

Dissemination includes creating a familiar environment in the hospital about the new plan for implementation and ensuring it is relayed to target audiences (Sarver et al., 2020). It is a crucial step in the translational knowledge and utilization of pertinent data regarding CAUTIS. According to Melynk et al. (2019), dissemination works to clear the scientific evidence behind a new practice change.

There are two types of stakeholders, and each plays an essential role in disseminating information, including internal and external. An example of internal includes directors, managers, infection disease, physicians, and staff members directly dealing with the change and matter at hand. External stakeholders include community and hospital networks and published research regarding the change.

The importance of buy-in from internal stakeholders is that these people will carry out and maintain the change (Melnyk et al., 2019). Ways to buy in from stakeholders include providing visual data and representation of the current issue and the goal of the desired outcome. Monthly meetings, including all internal stakeholders, allow for troubleshooting of the new change and the ability to intervene as needed to produce the most desirable outcome.

External stakeholders play an equally significant role as internal stakeholders because the most crucial factor in sustainability is buy-in from both (Sarver et al., 2020). In this case, the main goal is not to cause any additional harm to the patient. People of the community or family members of a patient with a urinary catheter will agree that acquiring a catheter-associated urinary tract infection is undesirable. The subsequent consequences can cause more harm than good. Therefore, their buy-in for a change that creates more responsibility and accountability can benefit internal and external stakeholders.

Dissemination methods at other hospitals can include providing communities with the same data, PowerPoints, graphs, and tools as the stakeholders at the hospital will have. Appendix M shows the PowerPoint presentation for pre-education, as well as other educational resources. Melnyk et al. (2019) highlight the benefits of excellent preparation before disseminating essential information to the stakeholders and community. Raising awareness of the issue will help disseminate essential data and information, which is vital to the sustainability goal (Sarver et al., 2020).

Timeline

Doctor of Nursing Practice Project Roadmap

Student Name: Kristina Diurno

Project Title: Reducing Urinary Catheter Usage in the Intensive Care Unit Setting and Education related to CAUTIs: A QI Project

Phase 1: Problem Identification and Evidence Review
Clinical Inquiry including background and significance of problem
Describe a local problem and its significance. Include data to frame local problem.
· 09/02/2021
Organizational Priority
Summarizing information that supports topic/problem is an organizational priority.
· 09/02/2021
Searchable Question
Write a focused, searchable question using an established method (e.g., PICO (Problem, Intervention, Comparison, Outcome)).
· 09/02/2021
Evidence Search
External evidence
Summarize search strategy (e.g., databases, keywords, filters/limits, criteria for article selection tools for critical appraisal). Include practice-based evidence (e.g., evidence-based solutions that experts/other health systems have implemented to address practice problems).
· 09/30/2021
Internal evidence
Summarize applicable unit/community/department/hospital/organizational level data or data required for national entities (e.g., CMS, NDNQI, AHRQ (Agency for Healthcare Research and Quality).
· 09/30/2021
Perform Needs Assessment If Applicable: N/A
Evidence Appraisal, Summary, and Recommendations
Organize evidence that answers focused clinical question in a clear, concise format
· 10/21/2021
Appraise literature for quality and applicability of evidence using established method
· 10/21/2021
State recommendations(s) and link to evidence strength and quality and risk/benefits.
· 10/21/2021
Phase 2: Project Planning
Project Goals
State intended, realistic outcomes of project using established method
· 12/01/2021
Framework: Select framework/model to guide implementation
· 12/01/2021
Context: Describe project setting and participants and/or population
· 12/03/2021

Key Stakeholders: Identify agencies, departments, units, or individuals needed to complete the project
· 12/05/2021
Practice change/intervention: Provided detailed description of practice change or intervention
· 12/05/2021
Evaluation: Summarize plan for evaluating the effectiveness of the practice change. Identify applicable process and outcome data to be collected/tracked and tools to do this. Identify the methods for analyzing/interpreting the data
· 12/05/2021
Barriers to implementation
· 12/05/2021
Sustainment: Identify strategies to sustain the change
· 12/05/2021
Timeline: Create a realistic timeline
· 12/15/2021
Resources: Identify all the resources
· 12/15/2021
Ethical Merit: Identify and obtain approval from IRB (Institutional Review Board), institution
· 05/11/2022
Phase 3: Implementation
Implement Project
· June 1st, 2022- August 12, 2022
Track any deviations from the project plan:
· September 1, 2022
Phase 4: Evaluation
Results/Interpretation
· Complete by October 1, 2022
Report evaluation of the effectiveness of the practice change, including extend the practice change was implemented and extend to which the desired outcome(s) were achieved
· Complete by October 1, 2022
ROI: Identify the final resources that were used to implement the project
· Complete by September 30th, 2022
Phase 5: Dissemination
Traditional: Disseminate to the project setting in a way that is meaningful to them, disseminate the format required by the academic institution, prepare final project write-up
· Completed by April 2023
Nontraditional: Develop a website to display project: N/A

Resources

Resources for this project include the critical stakeholders listed in the section above. The staff nurses in the Intensive Care Unit, the educator and director of the ICU, and the staff nurses, multi-skilled technicians, and residents in the ICU.

Ethical Merit

The required review for this project includes identifying the issue (inappropriate use of urinary catheters) and buy-in from stakeholders and those at the frontline of inserting the catheters. Approval from the Sacred Heart University Institutional Review Board (IRB) was obtained on 05/11/2022 and is attached in Appendix F. Education for this DNP student included coursework from the Collaborative Institutional Training Initiative (CITI) program. CITI Certificates were completed and are attached in Appendix G.

Project Implementation, Evaluation, ROI

Framework PDSA Cycle #1

The methodology for this framework project began with identifying a problem and establishing a way to improve the current practice. The Plan, Do, Study, Act (PDSA) framework will guide the policy change and address the project goals. The steps include recruiting a team, drafting an aim statement, describing the current process, identifying the problem, doing, studying, and acting. PDSA cycle one started June 1, 2022, and ended June 29, 2022.

Plan. This DNP student will meet with the ICU educator, ICU director, and infectious disease committee to discuss the alternative methods and the need for educational sessions on the inappropriate use of urinary catheters. This DNP student will obtain data regarding rates of urinary catheter usage and the number of days urinary catheters remain in the ICU. This DNP student will provide all staff nurses with a urinary catheter questionnaire pre- and post-educational sessions.

Do. In this phase, the algorithm (inclusion and exclusion criteria) and the current average length of time a catheter is in place will be gathered. The implementation process will begin with a pre-implementation survey based on current urinary catheter insertion policies, the risk of breaking sterile technique, and current practices in place to reduce the rates of CAUTIs. The DNP student will educate the staff on the updated alternatives to urinary catheters (PureWick, Texas catheter), bladder scanning, and establishing the need for urinary catheters.

There will be posters and reminders for using inclusion/exclusion criteria checklists and using PureWicks and Texas catheters appropriately. After the six-week implementation plan, post-survey assessments of staff's perception will include adherence rates, potential bias, and barriers associated with the encouraged decreased use of urinary catheter insertions. Audits will be performed to determine the percentage of urinary catheters in the ICU, unnecessary use of urinary catheters, and length of a urinary catheter remaining in place. Barriers associated with the prolonged use of catheters will be discussed with current staff members, leading to a new intervention implemented during PDSA cycle two.

Study Phase. Process measures include understanding staff knowledge, perception of urinary catheters, and current rates of catheter usage before implementation. The DNP student, as stated above, will perform weekly compliance audits on the number of urinary catheters and the length of times a catheter remained in place during their ICU stay. The DNP student will review the results at the meetings and share results and potential feedback with the staff members responsible for the intervention. Changes will be made based on rates of adherence and feedback.

Act. This DNP student will revise the implementation and practice update based on adherence rates and potential feedback based on staff input. The PDSA model allows for continual assessment and changes in the intervention. In the next cycle, an algorithm sheet will

be rolled out to help establish usage, length of catheter days, and justified use for the continued catheter.

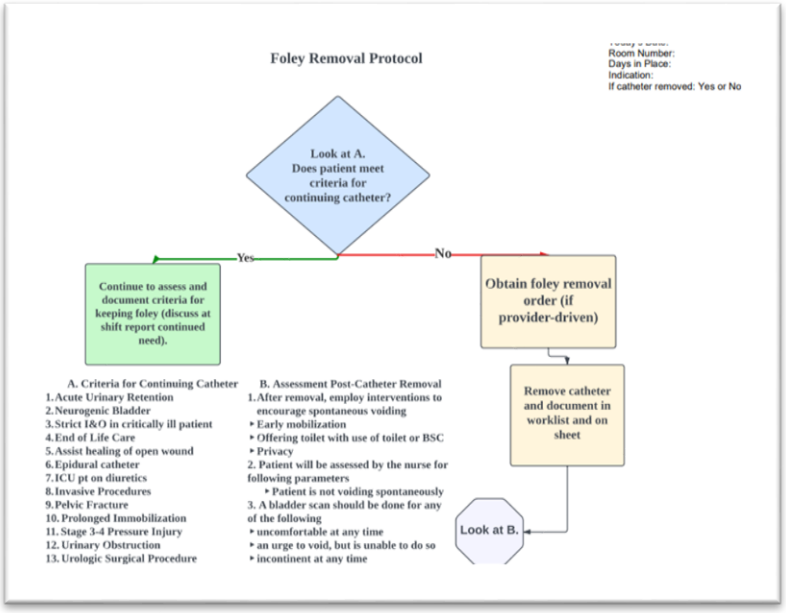
Description of Actual Project Implementation

The implementation of this project was described utilizing the PDSA cycle. Below is the second cycle of the model. The implementation cycle was from July 1, 2022, to August 12, 2022.

Plan. This DNP student met with the unit educator, manager, infectious disease, and several charge nurses to discuss the need for encouragement to remove urinary catheters promptly. This DNP student planned educational sessions and created an algorithm to follow to help decrease the length of days a urinary catheter remained in place. This DNP student will provide all staff nurses with a urinary catheter questionnaire pre- and post-educational sessions. This DNP student will then assess how likely a nurse is to consider the removal of a catheter post-educational session. The ICU educator (project mentor) and ICU director (project expert) gave final approval for this DNP project.

Do. The implementation phase of this project began with a pre-survey (see Appendix K) to help determine the pre-existing beliefs and knowledge related to urinary catheter usage in the Intensive Care Unit setting. Pre- and post-implementation surveys were conducted among staff members to help them better understand the knowledge and barriers associated with the prolonged use of catheters. This DNP student held weekly educational sessions during implementation, utilizing PowerPoints and flyers, describing the algorithm, and encouraging compliance with sheets. The PowerPoints and flyers were also emailed to all Intensive Care Unit and float staff members who may be working in the ICU at the time of implementation. There will be posters and reminders for using inclusion/exclusion criteria checklists and appropriate use

of PureWicks and Texas catheters (see Appendix M). After the six-week implementation plan, post-survey assessments of staff's perception will include adherence rates, potential bias, and barriers associated with the encouraged decreased use of urinary catheter insertions, utilizing a Likert scale (see Appendix J). Audits will be performed to determine compliance with the algorithm sheet (see Appendix L). Below is the algorithm staff nurses were encouraged to utilize to decrease the time a catheter remained in place.



- Nurses were highly encouraged to fill this sheet out at least daily or twice daily if a patient had an indwelling catheter. The sheet was likely not filled out on day of catheter placement, but nurses were also encouraged to consider alternative methods, if possible, before placing a catheter. If the catheter was remaining in place, appropriate care was required, including cleaning the catheter once per shift with the BARD kit. Other maintenance care included keeping the foley bag below waist level, regularly emptying drainage bag, and performing appropriate peri-care.

- To use this sheet, the nurse would look at A, which is the criteria for continuing a catheter, and if it was Yes, they would continue to assess and document the indication for the catheter
- If the patient did not meet the criteria that was listed, the nurse would obtain an order if provider-driven, and remove catheter, as well as look at B, which displayed the post-catheter removal protocol.
- Other information obtained included the date, the room number, the date of insertion for the catheter, and the continued need for catheter. If catheter was removed, date of removal was also obtained.
- Clear indications were listed for the urinary catheter criteria and post-removal protocols.

Study. The project implementation started in July 2022 with pre-intervention surveys for all staff nurses and providers working in the Intensive Care Unit. After thirty (30) staff members completed the pre-intervention survey, educational sessions (including flyers and PowerPoint presentations) addressed the risk of CAUTIs for the patients, inclusion/exclusion criteria, and the need for continued addressing of indication of the catheter (at least at the change of each shift). Urinary catheter champions were identified and encouraged in a bedside report, emphasizing the need for catheters. Staff completed a post-implementation survey to discuss barriers and compliance and determine the likeliness of removing a catheter using the *Likert* scale. Every week, the staff was encouraged to communicate any associated barriers or suggestions related to urinary catheter usage to assist with carrying out interventions.

Pre-Implementation Survey Results. A pre-intervention survey discussed barriers, beliefs, and practices regarding promptly removing an indwelling catheter. Thirty nurses completed

the survey. According to the results, 66.6% of nurses stated that they waited for an order to be placed for the patient to be downgraded before considering removing a catheter, while 23.3% said they did not wait, and 10% said it depended on the situation. 100% of nurses agreed that convenience plays a significant role in keeping an indwelling catheter. 50% of nurses discussed continued need with the nurse at bedside report prior to intervention.

In comparison, 30% said they did not discuss it during the report, and 20% said they possibly did, again, depending on the patient and other important factors. 100% of nurses agreed that they have instances where a foley is in place, but the continuing criteria still need to be met. 73.3% of nurses think that inadequate staffing plays a role in the desire to keep a Foley catheter in place longer than clinically necessary, while 16.7% did not believe it was an issue, and 10% were neutral about it. 50% of nurses believed catheters prevented early mobilization, 33.3% said they did not, and 16.6% said it depended on the patient. 80% of nurses believed it helped prevent skin breakdown if a patient had a catheter as opposed to not having one due to incontinence issues. In comparison, 13.3% did not believe it helped prevent skin breakdown, and 6.6% said it could help prevent skin breakdown, depending on the patient.

60% of nurses believed they did a regular assessment of foley removal; besides the proper charting in the worklist, it was sometimes easy to keep the foley in, while 16.6% said they were not regularly assessing foley catheter need.

100% of the nurses believed that a foley catheter could be removed on any shift; however, due to the current cultures, foleys were most likely removed on the day shift. Suggestions that were collected during the survey included a reminder in the worklist, an algorithm to determine continued need, adequate staffing, assistance to change incontinent patients that may be overweight, discussion with covering residents to determine continued

need, continued education on alternative methods, adequate supply of external catheters, and the considering of removing catheters on night shift.

Table 1. Displays the pre-intervention beliefs related to urinary catheters

Table 1

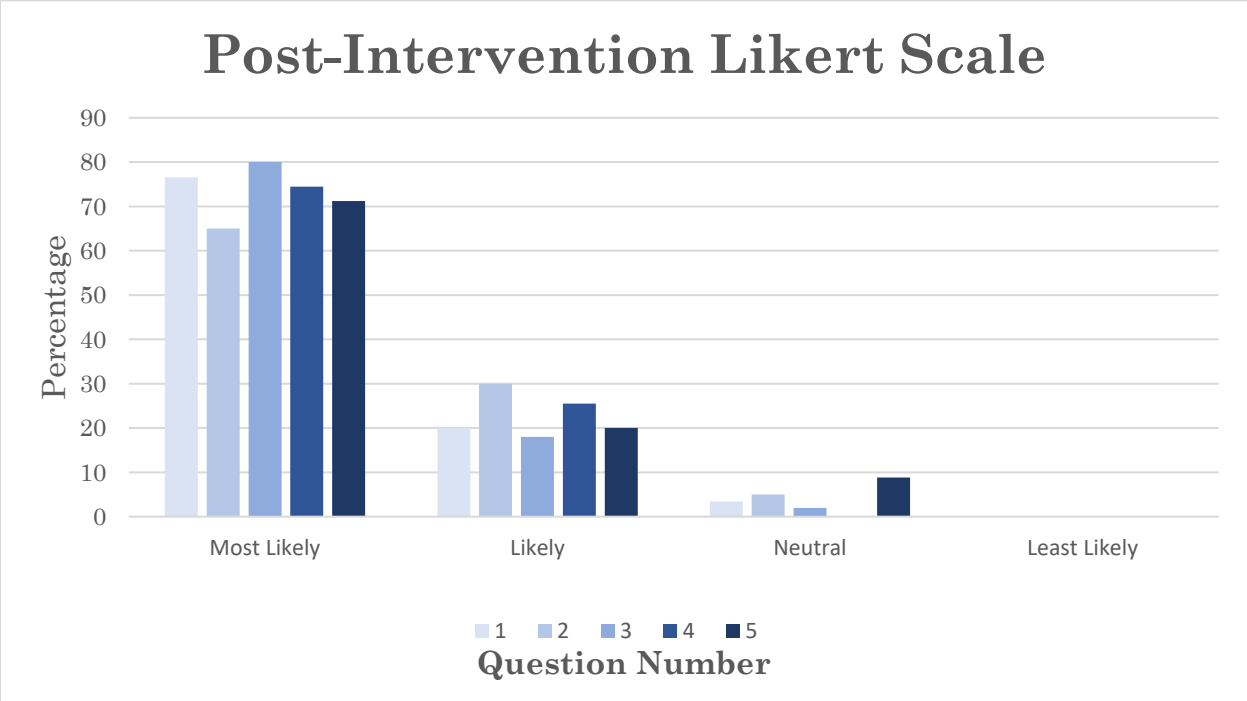
Pre-Intervention Survey Results

Pre-Intervention Beliefs	Yes	No	Maybe
Await downgrade prior to removing catheter	66.6%	23.3%	10%
Await physician order before thinking about removal	60%	20%	20%
Convenience	100%	0%	0%
Discussing continued need with nurse at bedside report	50%	30%	20%
Foley in place, criteria not met	100%	0%	0%
Inadequate Staffing	73.3%	16.7%	10%
Prevent mobilization	50%	33.3%	16.6%
Prevent skin breakdown	80%	13.3%	6.6%
Regular assessment of foley removal	60%	16.6%	23.3%
Removal on any shift	100%	0%	0%
Suggestions to improve urinary catheter reduction			
• Reminder in worklist • Algorithm to determine continued need • Adequate staffing, assistance to change incontinent patients • Discussion with residents covering patient on regular interval • Continued education on alternative methods • Adequate supply of Texas catheter and Purewicks • Removing catheters on night shift, not only on day shift			

Post- Intervention Results. After initiating the algorithm for staff nurses to fill out when working with a catheter, nurses were given a survey. A Likert scale (see Appendix J) assessed the likeliness of intervening if a catheter was in place without justification. Survey results included answers from 28 nurses instead of 30, which was the pre-implementation survey. Results indicated that providing educational support to staff nurses increased nurses' thoughts about assessing for removing a urinary catheter. Figure 1. Depicts the results from the Likert scale.

Figure 1

Likert Scale Regarding Post-Intervention Thoughts



Results from Likert Scale. This was a post-intervention Likert scale that was provided to the nurses. The questions are as follows:

1) How likely are you to consider removing a catheter at a more regular interval utilizing the algorithm after the intervention? 76.6% of nurses believed they were most likely to consider removal, while 20% reported likely, and 3.4% reported neutral.

2) How likely are you to consider removing a catheter prior to the patient transferring out of the ICU? 65% reported most likely, 30% reported likely, and 5% reported neutral

3) How likely are you to speak with the physician regarding removing a catheter and discussing the criteria for continued need? 80% reported most likely, 18% reported likely, and 2% reported neutral

4) How likely are you to utilize an alternative method (external catheter) prior to considering inserting a catheter and/or on a more regular basis (q shift)? 74% reported most likely and 25.5% reported likely

5) How likely are you going to try to discuss the option of a nurse-driven protocol, when appropriate? 71.2% said most likely, 20% said likely, and 8.8% were neutral

Act. The results from the educational sessions and encouragement of using the algorithm will be discussed in the results section later in this paper. Using an algorithm and bringing

awareness throughout the ICU helps reduce the time a catheter inappropriately remains in place. The barriers learned throughout this study act as steppingstones to help for the next cycle.

Description of Deviations from Project Plan

One barrier associated with implementation was the need for more sessions that could promote maximum attendance. Due to all nurses' different schedules, it was sometimes tricky. A solution to this problem was increasing the availability of the project leader, including staying early or later during shifts. This was a benefit, as it helped increase compliance and focus on specific needs for the unit. This was also possible because it was a small ICU; this likely would not have worked as well in a bigger hospital.

Data Collection

Process Measures. The study data were recorded and analyzed using Microsoft Excel. There were 30 staff nurse participants pre-intervention and 28 staff nurse participants post-intervention. The process measurement in this study included the number of staff members who completed the pre- and post-surveys and staff adherence to the implementation of the need for addressing urinary catheter indications. Other data collection included the number of urinary catheters, the time a catheter remained in place, time spent in the ICU, and the number of algorithm sheets filled out.

Outcome Measures. The outcome measures in this study include compliance with educational sessions and a review of the foley removal protocol sheet utilized at shift change, addressing the need to continue a catheter. The length of a catheter that remained in place following the implementation phase of this study decreased by 9.7%.

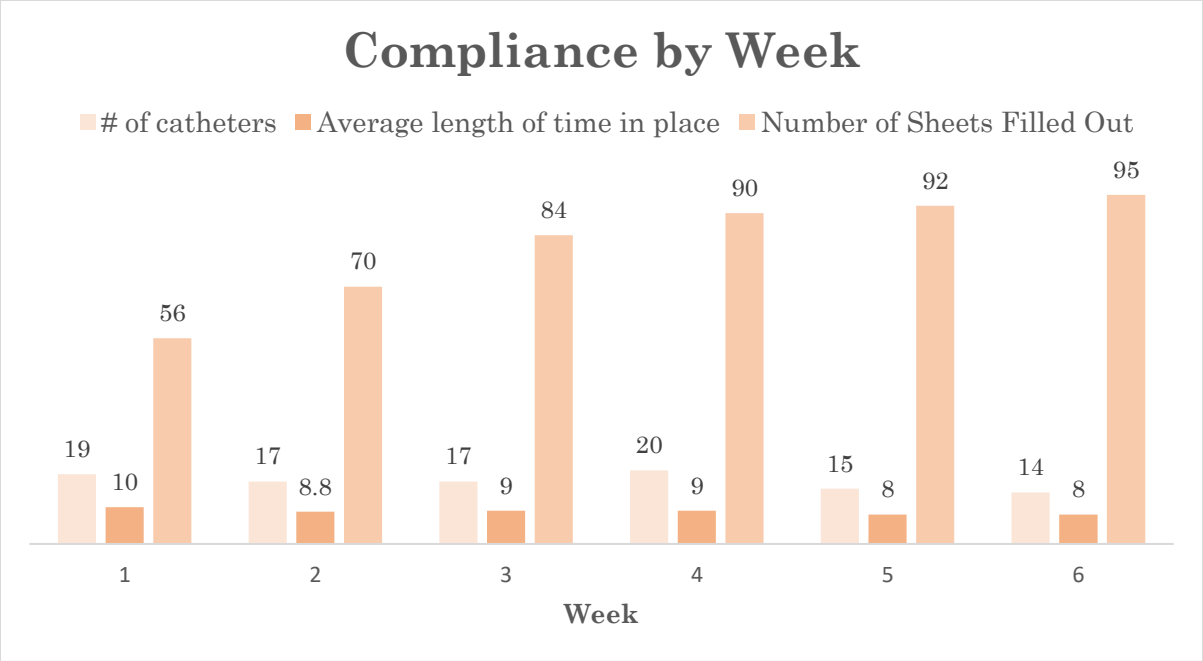
Results

The total number of indwelling catheters pre-intervention phase during six weeks was 128. During the intervention-phase six weeks, there were 102 incidences of an indwelling urinary catheter in place, an average of 17 urinary catheters per week. The average length of a catheter that remained in place was 9.2 days in the first three weeks of implementation and 8.3 days in the last three weeks. The total number of catheters decreased by 20.3% by the end of the implementation phase while the number of foley days decreased by 9.7%.

Several factors can alter the average number of catheter days, including the census in the ICU, the turnover rate in the ICU, the prolonged stay of patients in the ICU with an indwelling catheter, and the reason for admission (ex, if a patient was admitted for severe sepsis vs. a surgical procedure with a faster recovery). During this study, a good point was that there are outliers of patients who may have had a catheter in place for a month, or more, due to complexity of situation, ventilator needs, new dialysis needs, etc. The usual length of days a catheter remained in place would be less, if the data excluded the specific patients who had been in the ICU during the time of study for an extended period. Therefore, based off the results, there was a decrease in both the total number of indwelling catheters and the length of time a catheter remained in place.

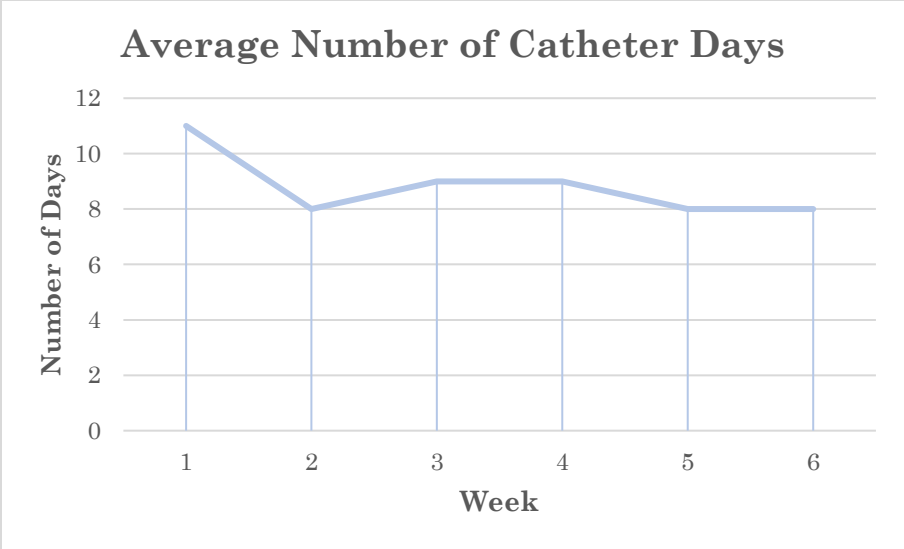
Figure 2 below depicts the algorithm used during the six-week period and figure 3 below depicts the average number of days an indwelling catheter was in place per week. Appendix O displays the executive summary of this project.

Figure 2
Compliance with algorithm among staff nurses



- This chart helped to understand the compliance by week of algorithms while listing the number of catheters and the average length of time in place. As you can see, the number of algorithm sheets increased by week six, which means increased compliance by 55% by week six. The number of foley days decreased by 9.7%.
- This was a tricky part of the project as the catheter was in place each day, and an algorithm sheet should have been filled out.
- Therefore, compliance with the sheets did prove to be an issue. The total number of catheter days and the number of catheters had decreased, which was one of the project's goals.

Figure 3
Average days a catheter was in place



During interviews, staff nurses brought up barriers to removing catheters, including external catheters not being successful in use (Texas, PureWick). Staff claimed that the purewick was about 80% successful at times but would often leak, and the patient still needed to be cleaned frequently. Staff nurses claimed Texas catheters would fall off frequently, leading to decreased use. Another perception among staff nurses was that urinary catheters might not be considered for removal until an infectious disease physician wrote a note on that patient, recommending discontinuation.

Data collected during PDSA cycle #1, helped determine the percentage of PD vs. ND urinary catheter orders before implementing the algorithm. It was determined that in two weeks, the nurse-driven and provider-driven orders were 50% and 50%, while in the other two weeks, PD orders were 76.9%/70% of the catheter orders, and ND were 23.1% and 30%, but both at 50% by the 4th week. This data helped determine the effectiveness of a provider-driven vs. nurse-driven order for the intervention phase.

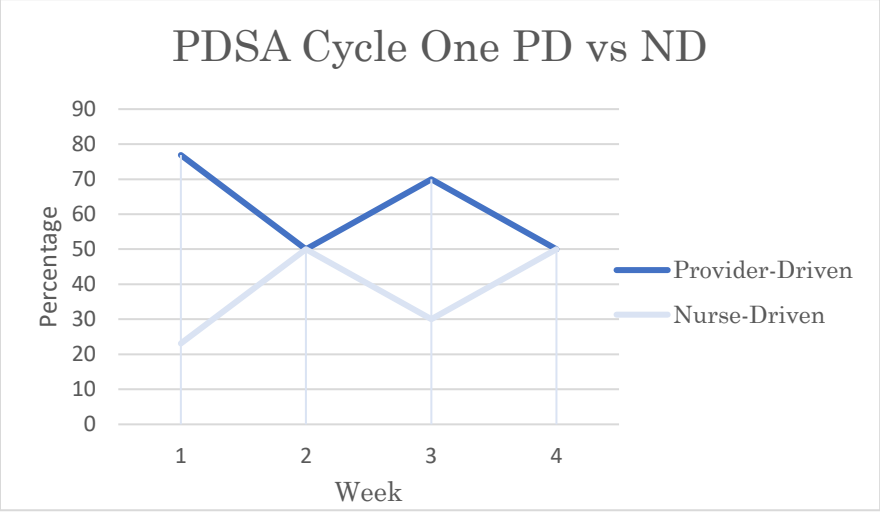
In PDSA cycle #2, while the algorithm was implemented, this data helped determine whether nurses could influence promptly removing catheters. This would mean decreasing the

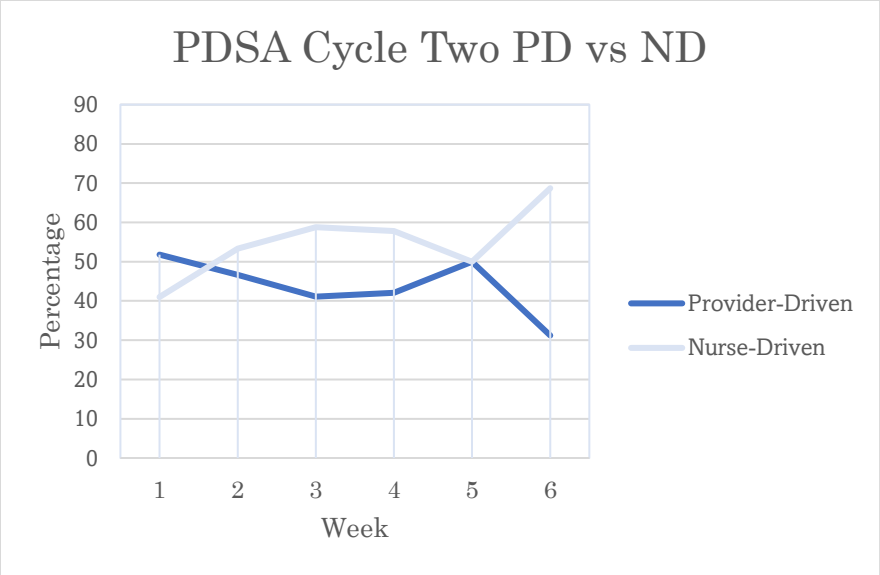
time a catheter stayed in place during the six-week phase. During weeks one and two, PD orders were 51.8% while ND was 41%; by week six, ND orders were 68.7%. This data is significant but also shows how there could be variables related to many factors during this study. For example, if a patient was a surgical patient, it was more likely that the catheter order may be under a provider-driven protocol and/or removed more promptly. Nurses are at the front line and can advocate for the patients and in doing so were encouraged to speak with the covering provider about having a nurse-driven protocol ordered instead of a provider-driven protocol to be able to use their clinical judgment to remove a catheter promptly.

Figure 4 shows the number of provider vs nurse driven catheters during the six-week period.

Figure 4

Provider vs Nurse Driven catheters





Variables to Results. Potential variables to the results include whether a patient was medical vs. surgical, admitting diagnosis, and whether the team taking care of a patient utilized the algorithm. These factors were not measured during this study; intervention compliance was measured. Depending which staff nurses were on each week, it could have affected compliance with intervention. Nurse-driven vs. provider-driven catheters can also create potential bias in results, as staff nurses may not deem it appropriate to consider removal if provider-driven. Variables to results include whether the patients were medical vs surgical, acuity of the patients, admitting diagnosis, compliance with algorithms, the fact that this was a small hospital and ICU, and the possible inconsistency of staff members. Certain patients during the study may have been in the ICU for a prolonged period (for example, months, and if they had a foley, this may have led to a higher total length of time a catheter was in place.

The admitting diagnosis, medical vs. surgical, and acuity of patients were not measured during this study. If a patient were admitted under urology and had surgery done, it would be more likely that the catheter would stay in place until urology cleared the patient. Nurse-driven vs. provider-driven catheters can also create potential bias in results, as staff nurses may not

deem it appropriate to consider removal if provider-driven. However, this was discussed as it should be open to prompt removal.

Return on Investment

According to the Agency for Healthcare Research and Quality, a CAUTI can range from $4,694 to $29,743 (ARHQ, 2017). Therefore, if a hospital has an estimated four CAUTIs per year, that can save the hospital an estimated $18,776 to $118,972, which is a significant amount of money. The overall goal of this project was to decrease the length of time an indwelling catheter remained in place when no longer indicated. Increased adherence with the algorithm and identifying a catheter no longer indicated can lead to prompt catheter removal. Four staff nurses were chosen as champions, encouraging compliance in addressing the need for catheters during shift reports. Education regarding reducing the length of time a urinary catheter remains in place can be simple and effective cost-wise but prevent a large amount of lost money for a healthcare system. This was a small hospital that may utilize a smaller number of indwelling catheters than an extensive healthcare system. Therefore, the return on investment can be variable, respectively.

Table 2 shows the estimated costs for using other methods instead of a urinary catheter and education supplies, champion extra hours, and celebratory breakfast for staff.

Table 2
Estimated Costs

Supplies	**Expenses**	**Total Yearly Expense**
Flyers	$51.30	$51.30
Champion's hours (10 per week)	$450 x 4	$1,800
PureWick Supplies	$49.99 x 12	$600
Purewick Device	$399 x 12	$4,788
Texas Catheter	$265.16 x 12	3,181.92

Celebratory Breakfast for staff	$150 x 12	$1,800
Total Expenses		$12,221.22

Barriers Reported During Implementation

Associated barriers include inadequately staffed nurses, traveler nurses (not there both pre- and post-intervention), compliance with practice change, and compliance with pre- and post-surveys. Other barriers discussed among staff nurses were not remembering to address the continued need for urinary catheters, patients being too “heavy,” and being “easier” to leave a urinary catheter in place. Other barriers included a lack of communication among physicians and nurses to discuss the continued need for indwelling catheters.

Nurses also proposed that "it is a benign intervention since it is already in place" and therefore did not think removing the catheter promptly was important. The newer addition to this ICU was the PureWick, which was encouraged as an alternative method during this implementation process. The limited supply of PureWicks or the need to change more often due to incontinent bowel movements also posed a barrier to implementing this new practice change.

The barriers associated with removing a catheter include convenience, shift priority (including patients with severe conditions, hemodynamically unstable, simply not enough time to consider removing the catheter or using an algorithm), incontinent patients, staffing concerns (if there are patients who are bedridden and have high BMIs, this can lead to difficulty with turning and therefore reluctance to remove a catheter, external catheters not working as they should (Texas catheter falling off, pure wick not suctioning urine), and mobility of a patient (a nurse would be more likely to remove a foley on an independent patient vs. not remove it on a bedridden patient or assist of two staff members to get up).

Dissemination

This project will be presented to the Sacred Heart University educational staff members and students with an oral and poster board presentation. The project implementation process, results, and critical lessons learned will be presented to the Sacred Heart University members. The executive summary will be presented to the Intensive Care Unit where this study occurred, the infectious prevention specialist, and intensivists. The rationale behind this project is that inappropriate and prolonged use of indwelling catheters can pose a significant risk to patients and healthcare systems. To reduce the number of days a catheter remains in place, staff nurses were educated and encouraged to complete an algorithm to determine the continued need for a catheter. Other vital data were tracked, including the number of catheter days and specific order reason for continuing the catheter. Implementing educational sessions, encouraging alternative methods, and determining the constant need can lead to more prompt catheter removal and better health outcomes.

Appendix P displays the DNP Project Poster.

Implications of Project Results

In implementing educational sessions and an algorithm to help facilitate the prompt removal of indwelling catheters, it is evident that multiple barriers need to be addressed to make a sustainable practice change. The project leader discussed those barriers with the staff nurses, and while some of those barriers the nurses could overcome during the project, some could not. The new use of an algorithm, with encouraged use at regular intervals, can benefit the intensive care unit by reducing the number of catheter days, ultimately decreasing any risk of a CAUTI. In

this case, it is a multidisciplinary approach to indwelling catheters, with providers and nurses taking responsibility.

Key Lessons Learned

Many lessons were learned, including the barriers associated with removing a catheter. Regardless of staff nurses addressing the need, poor communication among providers and teams led to increased times a catheter remained in place. This ICU has surgical and medical patients who are cared for slightly differently, depending on the surgeon or provider in charge of that patient. Despite encouraging alternative methods, some methods, like external catheters, posed more issues for the staff than helpful ones. An ICU can be a busy unit, and promoting compliance at change-of-shift with the algorithm to discontinue a catheter can be challenging, depending on the acuity of patients in the unit. Furthermore, travelers and float staff nurses make it challenging to sustain a change due to the variability of compliance. Staff retention is also an issue with sustaining a new practice.

Another key lesson learned was the amount of research and time goes into implementing an evidence-based intervention. The buy-in from staff directly participating in the change can prove to be difficult, depending on the environment and goal of intervention. Furthermore, it appears that some changes, for example, not regularly removing an indwelling catheter on night shift (before 0700), are challenging to be made due to the type of hospital and preconceived notions among the staff members and medical team.

Sustainability Plan

To sustain a change like this, an intervention should be added to the worklist that requires documentation at least every twelve hours. Attempting to change on paper alone decreases compliance rates, as forgetting to complete the sheet can be expected. Barriers discussed among

the staff nurses included lack of adequate staffing, compliance issues, shifts simply being too "busy," and the convenience of the catheter remaining in place. To address each barrier, one would need to intervene differently. If able to overcome some of the inevitable challenges associated with healthcare, new interventions can be successfully sustained.

Hailemariam et al. (2019) noted that there are two sustainment outcomes, one related to the implementation process and one related to the evidence-based intervention. Compliance with the implementation process is complex for numerous reasons when implementing any new practice change. Once the project leader has buy-in from the staff, sustaining that process is one task, while sustaining the intervention is another. A challenging task is the idea that evidence-based interventions are constantly evolving, leading to difficulties with consistent changes and new implementations of practices. A sustainability pearl includes ensuring the evidence-based intervention fits with the population, contexts, and circumstances (Shelton et al., 2018).

Key interventions that can lead to successful implementation and sustainment include communication, changes that make sense to stakeholders, staff challenges, implementation champions, good leadership, and celebrating successes.

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Appendix A

Description of Evidence Search

A search of the following databases was conducted: PubMed, CINAHL, and the Cochrane Database of Systematic Reviews. The key words searched were urinary, catheter, infection, hospital, associated, tract, sepsis, nursing, reducing, intervention, indwelling, mortality, morbidity, intensive, care, unit. Exclusion criteria included articles older than 2015. Inclusion criteria included English language, articles from 2014-2021, use of protocols for urinary catheter insertion, and barriers to implementation. Tables 1-3 show the search for evidence based upon database, search results, and search terms.

PICOT (Patient, Intervention, Comparison, Outcome, Time) question: In intensive care unit (ICU) patients with foley catheters **(P),** was an algorithm utilized on a regular interval **(I)** compared to no algorithm **(C)** and does it play a role in the length of time a catheter stays in place**(O)** within a ten-week period **(T)?**

Table A1.

PubMed Complete Search Terms and Search Results

Search Word	# of hits	# of articles reviewed	Duplicates	# of articles Selected
Sepsis	194733			
Urinary	7976	3		1
Catheter	44660	1		
Urinary and Infection	16634	5		2
	759	7		2

Catheter-Associated Urinary Tract Infection	392	5		3
Two-Person Urinary Catheter Insertion	2646	2	1	1
Urinary Catheter and Insertion	402	5		1
Urinary Catheter and Mortality				

Table A2.

CINAHL Complete Search Terms and Results

Search Word	# of hits	# of articles reviewed	Duplicates	Articles Selected
Sepsis	31935	0	0	0
Urinary	62143	2	0	1
Catheter	59734	0	0	0
Urinary and Infection	18479	2	0	1
Catheter-Associated Urinary Tract Infection	1293	5	0	2
Two-Person Urinary Catheter Insertion	7	7	0	2
Urinary Catheter and Insertion	371	3	0	1
Urinary Catheter and Mortality	339	2	0	1

Table A3.

Cochrane Database of Systematic Reviews

Search Word	# of hits	# of articles reviewed	Duplicates	Articles Selected
Sepsis	165	0	0	0
Urinary	353	0	0	0
Catheter	202	2	0	1
Urinary and Infection	129	0	0	0
Catheter-Associated Urinary Tract Infection	7	2	0	1
Two-Person Urinary Catheter Insertion	121	5	0	1
Urinary Catheter and Insertion	2	1	0	1
Urinary Catheter and Mortality	2	1	1	0

Appendix B

Evidence Synthesis Table: Urinary Catheter Use

Table B1

Levels of Evidence Synthesis Table: PICO Question #1

In intensive care unit (ICU) patients with foley catheters **(P),** was an algorithm utilized on a regular interval **(I)** compared to no algorithm **(C)** and does it play a role in the length of time a catheter stays in place**(O)** within a ten-week period **(T)?**

X (copy symbol as needed)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Level I: Systematic review or meta-analysis							
Level II: Randomized controlled trial	X						
Level III: Controlled trial without randomization							
Level IV: Case-control or cohort study				X			
Level V: Systematic review of qualitative or descriptive studies		X			X		X
Level VI: Qualitative or descriptive study, CPG, Lit Review, QI or EBP project			X			X	
Level VII: Expert opinion							

LEGEND

1= Mitchell et al., (2019). **2**= Sampathkumar (2017). **3**= Leontie (2021) **4**= Parker et al., (2017). **5**= Quinn et al., (2020). **6**= Shadle et al., (2021). **7**= Atkins et al., (2020).

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Outcome Synthesis Table: PICOT Question.

□, , —, NE, NR, P (select symbol and copy as needed)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
CAUTI	↓	✓	✓	✓	**NR**	**NR**	✓
SB	✓	↓	✓	↓	**NR**	**NR**	↓
INPTCC	**NE**	↑	✓	**NE**	↑	✓	**NC**
INK	**NE**	✓	**NR**	↓	**NR**	↓	↑
ICUB	↑	↑	**NE**	**NR**	↑	↑	↑
ICRT	↑	✓	**NR**	↓	**NE**	**NE**	↓

SYMBOL KEY

↑ = Increased, ↓ = Decreased, — = No Change, NE = Not Examined, NR = Not Reported (introduced at beginning but never reported at the end), ✓ = applicable or present

LEGEND

1= Mitchell et al., (2019). **2=** Sampathkumar (2017). **3=** Leontie (2021) **4=** Parker et al., (2017). **5=** Quinn et al., (2020). **6=** Shadle et al., (2021). **7=** Atkins et al., (2020).

LEGEND

CAUTI– Catheter-Associated Urinary Tract Infection, SB – Staff Bias –, – INPTCC – Improve Nursing Practice to Catheter Compliance, INK – Improve Nurses Knowledge, ICUB– ICU specific barriers, ICRT – Improve Catheter Removal Time

Appendix C

Evidence Summary Table

PICOT question: In intensive care unit (ICU) patients with foley catheters **(P),** was an algorithm utilized on a regular interval **(I)** compared to no algorithm **(C)** and does it play a role in the length of time a catheter stays in place**(O)** within a ten-week period **(T)?**

Table C1

Evidence Summary Table

Author/Year	Study Objectives	Level/Design/Subjects	Intervention Outcome Measures	Results	Study Limitations	Implications for OT
Atkins, L., Sallis, A., Chadborn, T., Shaw, K., Schneider, A., Hopkins, S., Bunten, A., Michie, S., & Lorencatto, F. (2020).	Review barriers associated with removing urinary catheters	Level III: Case Control Study Design: Random observation Subjects: ICU Patients	Intervention: Surveys to discuss with staff nurses and physicians related to barriers and/or facilitators to removing an indwelling catheter.	Results: Since initiating the change in process described above, the ICU has experienced zero catheter associated urinary tract infections in the ICU for 16 consecutive months.	Limitations: size of people interviewed	Interventions incorporated half the potentially relevant content to target identified barriers to and facilitators of CAUTI-related behaviors.
Mitchell, B. G., Northcote, M., Cheng, A. C., Fasugba, O., Russo, P. L., & Rosebrock, H. (2019).	To determine the effectiveness and ease of use of an electronic reminder device in reducing urinary catheterization duration.	Level II: A randomized controlled trial with a cross-sectional anonymous online survey and focus group.	An electronic reminder system, the CATH TAG, applied to urinary catheter bags to prompt removal of urinary catheters. Participants: All patients in the hospital with a urinary catheter	The intervention described in this study did not reduce the duration of catheterization, but potential benefits in patients outside the ICU were identified. Electronic reminders may be useful	Limitations: Study was not long enough.	There were four units that this study was performed on. The study indicated that there needs to be more units included in the study to determine effectiveness of the intervention.

			during the time of study.	to aid prompt removal of urinary catheters in the non-ICU hospital setting		
Leontie, S. L. (2021).	Objectives: Meet national benchmark for catheter associated-urinary tract infections with new implementation plans.	Level: II Design: A Rapid Cycle QI (Quality Improvement) model was used to guide this project. This project was completed at a 238-bed, not-for-profit hospital, part of a 12-hospital system Subjects: Patients admitted to the critical care, medical-surgical unit, or intermediate care unit	Intervention: Develop and implement a fight the foley line huddle and increase available alternative devices. Outcome: Reduce the rate of CAUTI Measures: Reduce the rate of CAUTIs, increase compliance of interventions	Results: After 12 months of interventions, there was a downward trend in catheter-associated urinary tract infections.	Limitations: Compliance of interventions and STOP huddles	Utilizing one of these three interventions (a daily 'Fight the Foley' line huddle for unit leaders, a Foley STOP huddle prior to insertion and increasing the availability of alternative devices) can help lower and sustain DUR and CAUTI rates.
Shadle, H. N., Sabol, V., Smith, A., Stafford, H., Thompson, J. A., & Bowers, M. (2021).	Decrease CAUTIs, improving patient outcomes and decreasing healthcare costs and associated mortality and morbidity.	Level: III Design: Analysis Subjects: Critically ill patients aged 18 and older in an Intensive Care Unit setting	Intervention: Bundles including educating staff, electronic daily checklist, nurse-driven urinary catheter protocol. Outcome: To reduce CAUTIs Measures: Data related to CAUTIs in a critical care unit	Results: No results to report from this study, shows "promise" in assisting to reduce CAUTIs	Limitations: Completing the study	Implementing these interventions can assist in reducing the rates of CAUTIs in critical care setting
Sampathkumar, P. (2017).	To decrease the rates of CAUTIs in 2018 in to decrease morbidity, mortality, and healthcare costs.	Level: VI Design: Meta analysis Subjects: Inpatients in an urban hospital with indwelling urinary catheters	Interventions: Wingman, audits, guidelines, and protocols to decrease rates of CAUTIs. This included a two-person urinary catheter insertion,	Results: A decrease in CAUTIs in ICU setting 0.94 to 0.45 and in non-ICU settings 1.51 to 0.24.	Limitations: N/A	The rates of catheter-associated urinary tract infections are associated with an increase in mortality, morbidity, and healthcare costs.

			noninvasive alternatives, and daily audit bundles.			
Quinn, M., Ameling, J. M., Forman, J., Krein, S. L., Manojlovich, M., Fowler, K. E., King, E. A., & Meddings, J. (2020).	To understand persistent barriers to detecting and removing unnecessary catheters, researchers conducted a multimethod qualitative study that included observations and in-person interviews with clinicians working on a progressive care unit of a large hospital. Observations consisted of shadowing nurses during shift change and while admitting patients, and observing physicians during morning rounds. Observational data were gathered using unstructured field notes. Interviews were conducted using a semistructured guide, audio-recorded, and transcribed. Qualitative content analysis was conducted to identify main themes.	Level: VI Design: Concurrent Subjects: Critically ill patients with an indwelling urinary catheter in medical, cardiac, or surgical ICUs.	Interventions: Surveys, observational data .	Results: There was noted to be a downward trend in reduction of CAUTIs in 2013, but the rate went back up when the lead nurse was on a leave of absence. In relation to her leave of absence, this led to a decrease in education, monitoring urinary catheter insertion, and compliance of newly put out interventions.	Limitations: Unable to evaluate for antibiotic exposure prior to developing CAUTI/ absence of CAUTI. Reporting on a single, tertiary hospital, which may not be applicable to other hospital settings.	It may be difficult to reduce the rates of CAUTIs in the hospital setting due to lack of compliance and lack of staff to increase compliance. There needs to be constant re-evaluation of interventions to determine efficacy and make changes as needed. Barriers include the need for urinary catheters in a critically ill patient that may make it difficult to remove (if nurse-driven).

Kulbay, A., Joelsson-Alm, E & Tammelin, A. (2021).	To evaluate the guidelines related to urinary catheter insertion and compliance with sterility when inserting a catheter.	Level: III Design: Structured Questionnaire Subjects: 852 persons who directly deal with urinary catheter insertion	Interventions: Structured questionnaire related to sterility of urinary catheter insertion. Questionnaire regarding the participant, working conditions, and performance of indwelling urinary catheters.	Results: Most participants considered their urinary catheter insertion technique "not sterile." 55-74% of participants of the questionnaire considered using different techniques to increase compliance of sterile techniques.	Limitations: Inconsistent use and non-uniform performance of the procedures, altering results.	An issue related to CAUTIs is the question of whether sterile techniques are being followed, as they always should be. The addition of a two-person urinary catheter insertion can help with sterile technique and ensure it is being complied with.
Parker, V., Giles, M., Graham, L., Suthers, B., Watts, W., O'Brien, T., & Searles, A. (2017).	Aim: Assessing the knowledge, attitude, and beliefs of catheter-associated urinary tract infections among healthcare professionals.	Level: VI Design: Qualitative study, questionnaire Studies: Study participants, inclusion, and exclusion criteria. Rating on a scale of 0-14 to assess knowledge basis of catheter-associated urinary tract infections and sterile technique, incidence of CAUTIs.	Interventions: Questionnaire, including demographics, overall attitude, knowledge, and beliefs. Knowledge on CAUTIs, practice on prevention of CAUTIs were included in the questionnaire to determine the basis.	Results: Knowledge on CAUTI: 28.4%-moderately adequate, 71.6% had adequate knowledge regarding CAUTIs. 82.1% were aware that CAUTI is one of the most common hospitals acquired infections. 94.7% were aware of the high-risk factors that can contribute to a CAUTI.	Limitations: Sample size small due to COVID-19 infection.	86% of healthcare professionals follow the guidelines for catheterization and the guidelines and protocols related to removing catheters/nurse driven vs provider driven.

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Tominaga, G. T., Dhupa, A., McAllister, S. M., Calara, R., Peters, S. A., & Stuck, A. (2014). Eliminating catheter-associated urinary tract infections in the Intensive Care Unit: is it an attainable goal? *The American Journal of Surgery,* 208(6), 1065–1070. https://doi.org/10.1016/j.amjsurg.2014.08.013

Appendix D

Key Points in Catheter Usage

Table D1

Key Points in Catheter Usage

Reducing Urinary Catheter Usages	Process Owner: Infection Control Staff
Date Updated/Revised: November 23, 2021	Performed by: RNs, Educators, ICU, Physicians, MSTs
Process # 1: *Collect data regarding CAUTIs and create presentation for upper management, educators, CNOs (Chief Nursing Officer), infection control physicians regarding the incidence of CAUTIs*	Key Points: Helps create buy-in
Process #2: *Introduce staff members to the need for a practice change using data, charts, and PowerPoint presentations*	Key Points: Creates buy-in from stakeholders
Process #3: *Introduce the need for assessing at regular intervals continued need for urinary catheter*	Key Points: Feedback and monthly meetings allow for staff members and key stakeholders to give their input
Process #4: *Choose a safety champion on each unit to facilitate the new practice implementation*	Key Points: In doing so, this ensures accountability and allows team members to feel supported
Process #5: *Hold meeting where staff members who will be utilizing the tool get signed off on completing the algorithm and educational sessions.*	Key Points: This step ensures that staff are competent in completing the algorithm and aware of its need.
Process #6: *Create a date that begins implementation of new policy and a date to hold the monthly meeting*	Key Points: This step shows there is a push for sustainability in this new practice

Process #7: *Receive feedback and troubleshoot the new practice change, make changes as problems arise*	

Appendix E

Table E1

Phase of Cycles

Phase One: Create Awareness and Interest

Strategies	Resources	People Involved	Date To Initiate
Education Sessions **PowerPoints** **Evidence-Based Practice** **Benefit of New Practice**	Data regarding CAUTIs Infection Control/Prevention Monthly Meetings with staff/stakeholders Buy-In and Support from staff	Educators RNs, RN Manager, Infection Control, Quality and Safety Committee MSTs Physicians	June 2022

Phase Two: Build Knowledge and Commitment

Strategies	Resources	People Involved	Date to Initiate
Education **Flyers posted in break room** **Pocket guides** **Algorithm introduction** **Input from educator, staff, nurses, MSTs, managers**	Staff meetings monthly Input from staff Pros/Cons What is working/what is not Data printed	Educators RNs, RN managers, ICU intensivists, MSTs Quality and Safety Control Committee	June 2022

Phase Three: Promote Action and Adoption

Strategies	Resources	People Involved	Date to Initiate

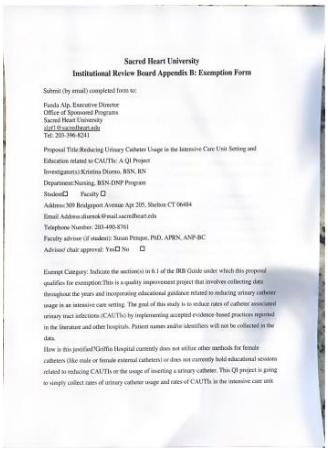
Education **Explore input from staff** **Competence regarding insertion** **Troubleshooting**	Education classes Education regarding insertion and EBP articles Access to shift "champion" regarding issues	ICU staff, RNs, MSTs, physicians, intensivist, educators, infection control	June 2022

Phase Four: Pursue Integration and Sustained Use

Strategies	Resources	Peopled Involved	Date to Initiate
Education sessions **Celebrate success of new practice** **Continued meetings with staff** **Data to support policy** **Feedback from staff**	Education Educator, ICU manager Data to support Auditing compliance	ICU staff, RNs, MSTs, physicians, intensivist, educators, infection control, distribution	September 2022

Appendix F

IRB Review Form



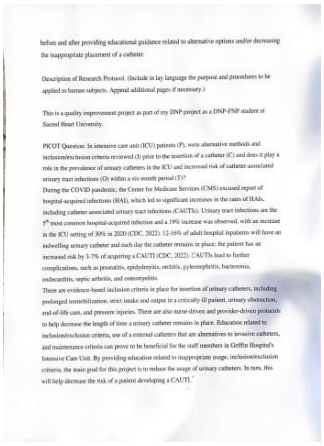
Sacred Heart University
Institutional Review Board Appendix B: Exemption Form

Submit (by email) completed form to:

Funda Alp, Executive Director
Office of Sponsored Programs
Sacred Heart University
alpf @sacredheart.edu
Tel: 203-396-8241

Proposal Title:Reducing Urinary Catheter Usage in the Intensive Care Unit Setting and Education related to CAUTIs: A QI Project
Investigator(s):Kristina Diorno, BSN, RN
Department:Nursing, BSN-DNP Program
Student☐ Faculty ☐
Address:369 Bridgeport Avenue Apt 205, Shelton CT 06484
Email Address:diornok4@mail.sacredheart.edu
Telephone Number: 203-490-8761
Faculty advisor (if student): Susan Perique, PhD, APRN, ANP-BC
Advisor/ chair approval: Yes☐ No ☐

Exempt Category: Indicate the section(s) in 6.1 of the IRB Guide under which this proposal qualifies for exemption:This is a quality improvement project that involves collecting data throughout the years and incorporating educational guidance related to reducing urinary catheter usage in an intensive care setting. The goal of this study is to reduce rates of catheter associated urinary tract infections (CAUTIs) by implementing accepted evidence based practices reported in the literature and other hospitals. Patient names and/or identifiers will not be collected in the data.
How is this justified?Griffin Hospital currently does not utilize other methods for female catheters (like male or female external catheters) or does not currently hold educational sessions related to reducing CAUTIs or the usage of inserting a urinary catheter. This QI project is going to simply collect rates of urinary catheter usage and rates of CAUTIs in the intensive care unit



before and after providing educational guidance related to alternative options and/or decreasing the inappropriate placement of a catheter.

Description of Research Protocol. (Include in lay language the purpose and procedures to be applied to human subjects. Append additional pages if necessary.)

This is a quality improvement project as part of my DNP project as a DNP-FNP student at Sacred Heart University.

PICOT Question: In intensive care unit (ICU) patients (P), were alternative methods and inclusion/exclusion criteria reviewed (I) prior to the insertion of a catheter (C) and does it play a role in the prevalence of urinary catheters in the ICU and increased risk of catheter-associated urinary tract infections (O) within a six-month period (T)?
During the COVID pandemic, the Center for Medicare Services (CMS) excused report of hospital-acquired infections (HAI), which led to significant increases in the rates of HAIs, including catheter-associated urinary tract infections (CAUTIs). Urinary tract infections are the 5th most common hospital-acquired infection and a 19% increase was observed, with an increase in the ICU setting of 30% in 2020 (CDC, 2022). 12-16% of adult hospital inpatients will have an indwelling urinary catheter and each day the catheter remains in place; the patient has an increased risk by 3-7% of acquiring a CAUTI (CDC, 2022). □AUTIs lead to further complications, such as prostatitis, epididymitis, orchitis, pyleonephritis, bacteremia, endocarditis, septic arthritis, and osteomyelitis.
There are evidence-based inclusion criteria in place for insertion of urinary catheters, including prolonged immobilization, strict intake and output in a critically ill patient, urinary obstruction, end-of-life care, and pressure injuries. There are also nurse-driven and provider-driven protocols to help decrease the length of time a urinary catheter remains in place. Education related to inclusion/exclusion criteria, use of a external catheters that are alternatives to invasive catheters, and maintenance criteria can prove to be beneficial for the staff members in Griffin Hospital's Intensive Care Unit. By providing education related to inappropriate usage, inclusion/exclusion criteria, the main goal for this project is to reduce the usage of urinary catheters. In turn, this will help decrease the risk of a patient developing a CAUTI.

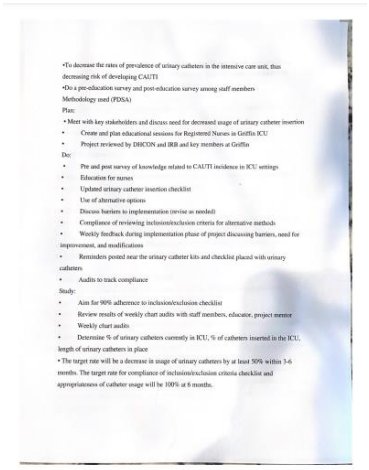
Educational sessions will be held monthly and reminders will be sent to the staff emails weekly to ensure compliance and adherence with education. The alternative options, including an external catheter, regular toileting, and straight catheter usage will be discussed every two weeks and rates of urinary catheter usage will be audited monthly via the Meditech charting system used by this hospital. The inclusion/exclusion criteria checklist will be printed and next to the urinary catheter kit, to help promote compliance and as a reminder prior to insertion to choose an external catheter if appropriate.
This quality improvement (QI) project has the support of ICU nursing educator Ashley Putteti and manager Edward Valente. It has been reviewed by my facult advisor, Sue Perique, PhD, clinical associate faculty at SHU.

The investigator must provide summary statements addressing the following points of information. Where indicated, include the protocol page number(s) that contains detailed information. Use supplemental pages if necessary.

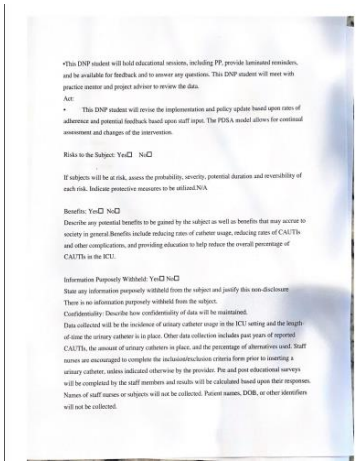
Purpose of the Study: In intensive care unit (ICU) patients (P), were alternative methods and inclusion/exclusion criteria reviewed (I) prior to the insertion of a catheter (C) and does it play a role in the prevalence of urinary catheters in the ICU and increased risk of catheter-associated urinary tract infections (O) within a six-month period (T)?

Characteristic of subject population: Include selection criteria and any age, sex, physical, mental, and health restrictions.Adult patients (ages 18-100) at Griffin Hospital in the intensive care unit, both male and female patients that may or may not require usage of a urinary catheter

Methods and procedures applied to human subjects:
•To implement educational sessions discussing the inclusion and exclusion criteria related to insertion of urinary catheters and alternative options before inserting catheter
• To provide education regarding use of external catheters
•To implement educational sessions monthly regarding urinary catheter protocols, insertion, maintenance, and the discontinuation of catheters



•To decrease the rates of prevalence of urinary catheters in the intensive care unit, thus decreasing risk of developing CAUTI
•Do a pre-education survey and post-education survey among staff members
Methodology used (PDSA)
Plan:
• Meet with key stakeholders and discuss need for decreased usage of urinary catheter insertion
• Create and plan educational sessions for Registered Nurses in Griffin ICU
• Project reviewed by DHCON and IRB and key members at Griffin
Do:
• Pre and post survey of knowledge related to CAUTI incidence in ICU settings
• Education for nurses
• Updated urinary catheter insertion checklist
• Use of alternative options
• Discuss barriers to implementation (revise as needed)
• Compliance of reviewing inclusion/exclusion criteria for alternative methods
• Weekly feedback during implementation phase of project discussing barriers, need for improvement, and modifications
• Reminders posted near the urinary catheter kits and checklist placed with urinary catheters
• Audits to track compliance
Study:
• Aim for 90% adherence to inclusion/exclusion checklist
• Review results of weekly chart audits with staff members, educator, project mentor
• Weekly chart audits
• Determine % of urinary catheters currently in ICU, % of catheters inserted in the ICU, length of urinary catheters in place
• The target rate will be a decrease in usage of urinary catheters by at least 50% within 3-6 months. The target rate for compliance of inclusion/exclusion criteria checklist and appropriateness of catheter usage will be 100% at 6 months.



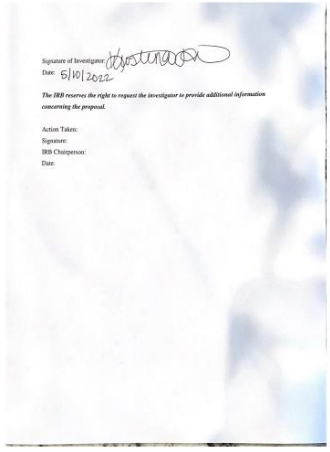
•This DNP student will hold educational sessions, including PP, provide laminated reminders, and be available for feedback and to answer any questions. This DNP student will meet with practice mentor and project advisor to review the data.
Act:
• This DNP student will revise the implementation and policy update based upon rates of adherence and potential feedback based upon staff input. The PDSA model allows for continual assessment and changes of the intervention.

Risks to the Subject: Yes☐ No☐

If subjects will be at risk, assess the probability, severity, potential duration and reversibility of each risk. Indicate protective measures to be utilized.N/A

Benefits: Yes☐ No☐
Describe any potential benefits to be gained by the subject as well as benefits that may accrue to society in general.Benefits include reducing rates of catheter usage, reducing rates of CAUTIs and other complications, and providing education to help reduce the overall percentage of CAUTIs in the ICU.

Information Purposely Withheld: Yes☐ No☐
State any information purposely withheld from the subject and justify this non-disclosure
There is no information purposely withheld from the subject.
Confidentiality: Describe how confidentiality of data will be maintained.
Data collected will be the incidence of urinary catheter usage in the ICU setting and the length of time the urinary catheter is in place. Other data collection includes past years of reported CAUTIs, the amount of urinary catheters in place, and the percentage of alternatives used. Staff nurses are encouraged to complete the inclusion/exclusion criteria form prior to inserting a urinary catheter, unless indicated otherwise by the provider. Pre and post educational surveys will be completed by the staff members and results will be calculated based upon their responses. Names of staff nurses or subjects will not be collected. Patient names, DOB, or other identifiers will not be collected.



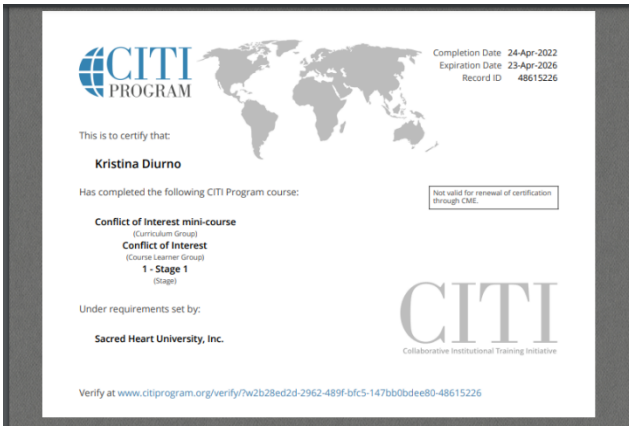
Signature of Investigator:
Date: 5/10/2022

The IRB reserves the right to request the investigator to provide additional information concerning the proposal.

Action Taken:
Signature:
IRB Chairperson:
Date:

Appendix G

CITI Certificates



CITI PROGRAM

Completion Date 24-Apr-2022
Expiration Date 23-Apr-2026
Record ID 48615226

This is to certify that:

Kristina Diurno

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Conflict of Interest mini-course
(Curriculum Group)
Conflict of Interest
(Course Learner Group)
1 - Stage 1
(Stage)

Under requirements set by:

Sacred Heart University, Inc.

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w2b28ed2d-2962-489f-bfc5-147bb0bdee80-48615226

CITI PROGRAM

Completion Date 03-May-2022
Expiration Date 02-May-2025
Record ID 48748712

This is to certify that:

Kristina Diurno

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

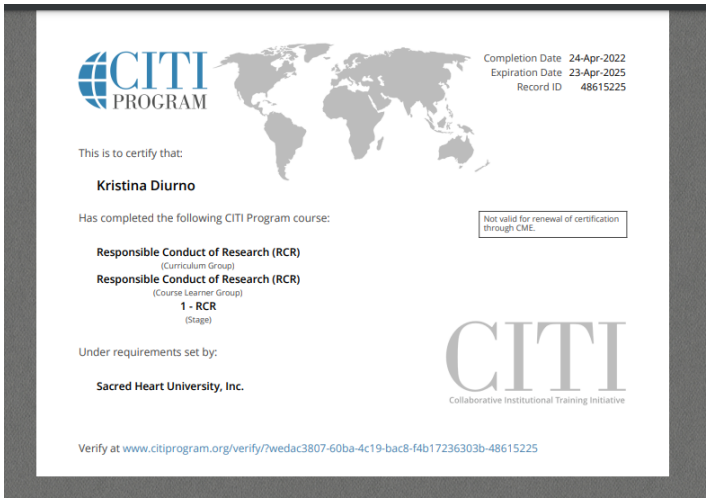
Social & Behavioral Research - Basic/Refresher
(Curriculum Group)
Social & Behavioral Research - Basic/Refresher
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Sacred Heart University, Inc.

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w43764bf6-44e4-4e5c-a2ac-586648a7aceb-48748712



CITI PROGRAM

Completion Date 24-Apr-2022
Expiration Date 23-Apr-2025
Record ID 48615225

This is to certify that:

Kristina Diurno

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Responsible Conduct of Research (RCR)
(Curriculum Group)
Responsible Conduct of Research (RCR)
(Course Learner Group)
1 - RCR
(Stage)

Under requirements set by:

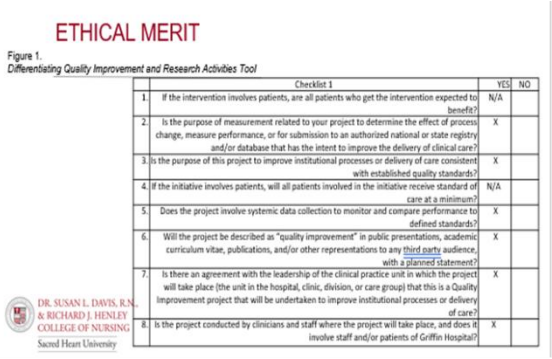
Sacred Heart University, Inc.

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wedac3807-60ba-4c19-bac8-f4b1723630 3b-48615225

Appendix H

Ethical Merit

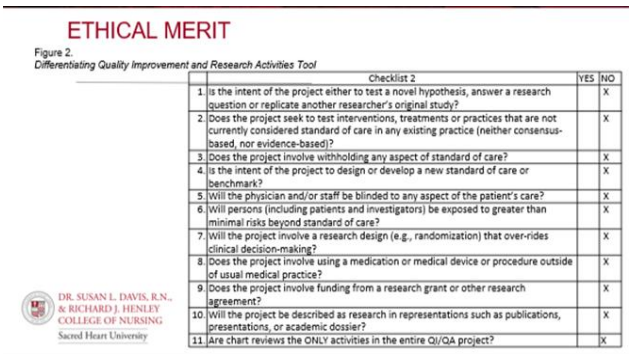


ETHICAL MERIT

Figure 1.
Differentiating Quality Improvement and Research Activities Tool

	Checklist 1	YES	NO
1.	If the intervention involves patients, are all patients who get the intervention expected to benefit?	N/A	
2.	Is the purpose of measurement related to your project to determine the effect of process change, measure performance, or for submission to an authorized national or state registry and/or database that has the intent to improve the delivery of clinical care?	X	
3.	Is the purpose of this project to improve institutional processes or delivery of care consistent with established quality standards?	X	
4.	If the initiative involves patients, will all patients involved in the initiative receive standard of care at a minimum?	N/A	
5.	Does the project involve systemic data collection to monitor and compare performance to defined standards?	X	
6.	Will the project be described as "quality improvement" in public presentations, academic curriculum vitae, publications, and/or other representations to any third party audience, with a planned statement?	X	
7.	Is there an agreement with the leadership of the clinical practice unit in which the project will take place (the unit in the hospital, clinic, division, or care group) that this is a Quality Improvement project that will be undertaken to improve institutional processes or delivery of care?	X	
8.	Is the project conducted by clinicians and staff where the project will take place, and does it involve staff and/or patients of Griffin Hospital?	X	

DR. SUSAN L. DAVIS, R.N., & RICHARD J. HENLEY COLLEGE OF NURSING
Sacred Heart University



ETHICAL MERIT

Figure 2.
Differentiating Quality Improvement and Research Activities Tool

	Checklist 2	YES	NO
1.	Is the intent of the project either to test a novel hypothesis, answer a research question or replicate another researcher's original study?		X
2.	Does the project seek to test interventions, treatments or practices that are not currently considered standard of care in any existing practice (neither consensus-based, nor evidence-based)?		X
3.	Does the project involve withholding any aspect of standard of care?		X
4.	Is the intent of the project to design or develop a new standard of care or benchmark?		X
5.	Will the physician and/or staff be blinded to any aspect of the patient's care?		X
6.	Will persons (including patients and investigators) be exposed to greater than minimal risks beyond standard of care?		X
7.	Will the project involve a research design (e.g., randomization) that over-rides clinical decision-making?		X
8.	Does the project involve using a medication or medical device or procedure outside of usual medical practice?		X
9.	Does the project involve funding from a research grant or other research agreement?		X
10.	Will the project be described as research in representations such as publications, presentations, or academic dossier?		X
11.	Are chart reviews the ONLY activities in the entire QI/QA project?		X

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Sacred Heart University

Appendix I

Staff Nurse Questionnaire (pre-intervention)

Figure I1

Urinary Catheter Assessment Pre-Intervention
1. Do you feel that a patient having a urinary catheter makes it "easier" for you? Yes or No
2. Do you ever feel that a patient has a urinary catheter in place, but doesn't necessarily meet criteria for it? Yes or No
3. How often do you think we should assess if removal is indicated?
4. Do you find yourself assessing at least once per shift if you can remove the catheter? Yes or No
5. Do you feel that a patient having a urinary catheter prevents skin breakdown? Yes or No
6. Do you often wait for the physician to put an order in to remove the urinary catheter before you even consider removing it? Yes or No
7. Would it be helpful to you if there was a reminder on assessing the need for continued use of a urinary catheter? Yes or No
8. Do you feel that a catheter prevents the patient from being mobilized? Yes or No
9. Do you ever have a patient who you do not feel needs a urinary catheter in place? Yes or No
10. Incontinence is not a reason for an indwelling urinary catheter. True or False?
11. Are you ever reluctant to remove a urinary catheter because there is not enough staff or resources to help change an incontinent patient? Yes or No
12. If a patient has a urinary catheter, do you still turn and reposition them as frequently as directed (q2h)? Yes or No
13. Do you ever feel there are not enough staff to help turn and reposition the patient at least every two hours? Yes or No
14. Do you think we should be waiting until the patient transfers out of the ICU to remove a catheter? Yes or No
15. If a patient is downgraded from ICU status, do you assess at that time if removing the catheter is appropriate? Yes or No
16. List appropriate indications for use of a urinary catheter
17. When inserting a catheter, do you feel you always maintain sterile technique? Yes or No
18. Do you think having a second person with you upon insertion would be helpful in maintaining sterile technique? Yes or No
19. Do you remember to send a urine culture when placing a urinary catheter? Yes or No
20. When giving or getting a report, do you and the nurse discuss the continued need for a catheter? Yes or No
21. Do you always remember to provide catheter care with the appropriate wipe kit? Yes or No
22. Do you feel that external catheters are useful in place of an indwelling catheter? Yes or No
23. Do you think that a patient having a catheter reduces rates of falls? Yes or No
24. Are foley catheters typically removed on night shift or day shift?
25. Do you think foleys can be removed at any time of the day? Yes or No

Open ended area for suggestions or barriers you encounter.

Appendix J

Post-intervention/Education Survey

Utilizing a scale of 1-5, with 1 being the least likely and 5 being the most likely, answer the following questions

1) How likely are you to consider removing a catheter at a more regular interval utilizing the algorithm after the intervention?

   1 2 3 4 5

2) How likely are you to consider removing a catheter prior to the patient transferring out of the ICU?

   1 2 3 4 5

3) How likely are you to consider removing the catheter on night shift or prior to day shift beginning at 0700?

   1 2 3 4 5

4) How likely are you to speak with the physician regarding removing a catheter and discussing the criteria for continued need?

   1 2 3 4 5

5) How likely are you to utilize an alternative method (external catheter) prior to considering inserting a catheter?

   1 2 3 4 5

6) How likely are you going to try to discuss the option of a nurse-driven protocol, when appropriate?

1 2 3 4 5

Appendix K

PureWick Guidelines

Purewick Guidelines: External Female Urinary Device

Criteria

- Female patient
- Need to keep track of I&Os
- Reduce risk of CAUTI/days a urinary catheter is kept in place
- Not to be used on an independent patient
- Patient with urinary incontinence
- If bedrest is ordered
- Immobility after surgery or procedure
- Patients with pressure injuries, reducing incontinence episodes

Contraindications

- Urinary Retention
- Independent patients
- Patients who need a urinary catheter for stricter I&Os (critically ill, doctor's order)
- Agitated, combative, or uncooperative patients who may remove catheter
- Frequent episodes of bowel incontinence
- Pre-existing skin breakdown at place of purewick insertion
- Moderate/heavy menstruation
- Patients able to ambulate (we want to move our patients!!!)
- Recent external urogenital tract surgery
- Latex allergy

Precautions

- Not recommended for agitated, combative, uncooperative patients who may remove the device.
- Not recommended with frequent bowel incontinence without fecal management.
- Not recommended with skin breakdown, irritation, or menstruation.
- Do not use a barrier cream on the perineum, as it may impede suction.

- Not recommended for patients with known latex allergy.
- Use caution with patients who have had recent external urogenital tract surgery.
- Maintain suction until fully removed to avoid urine backflow.

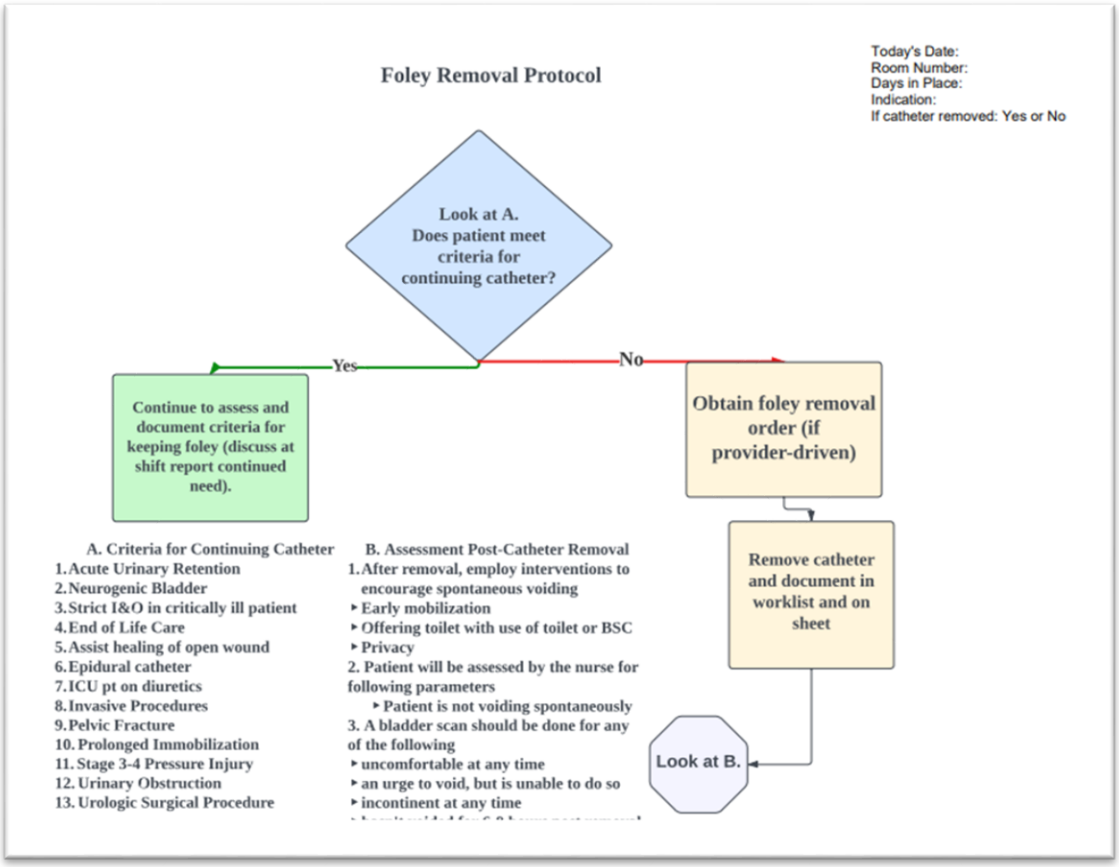
Recommendations

- Replace every 8-12 hours or when soiled with feces or blood.
- Suction of at least 40 mmHg, maximum suction of 80 mm (about 3.15 in) Hg.
- When ambulating a patient, you can place the purewick in a glove to keep it "clean."
- Reposition the purewick q2h.
- Watch for signs of irritation in the peri-area.
- Sometimes, the purewick does not fully suction all the urine, use incontinence pads, and still check your patient regularly for wet incontinent pad.

Appendix L

Algorithm for Foley Removal

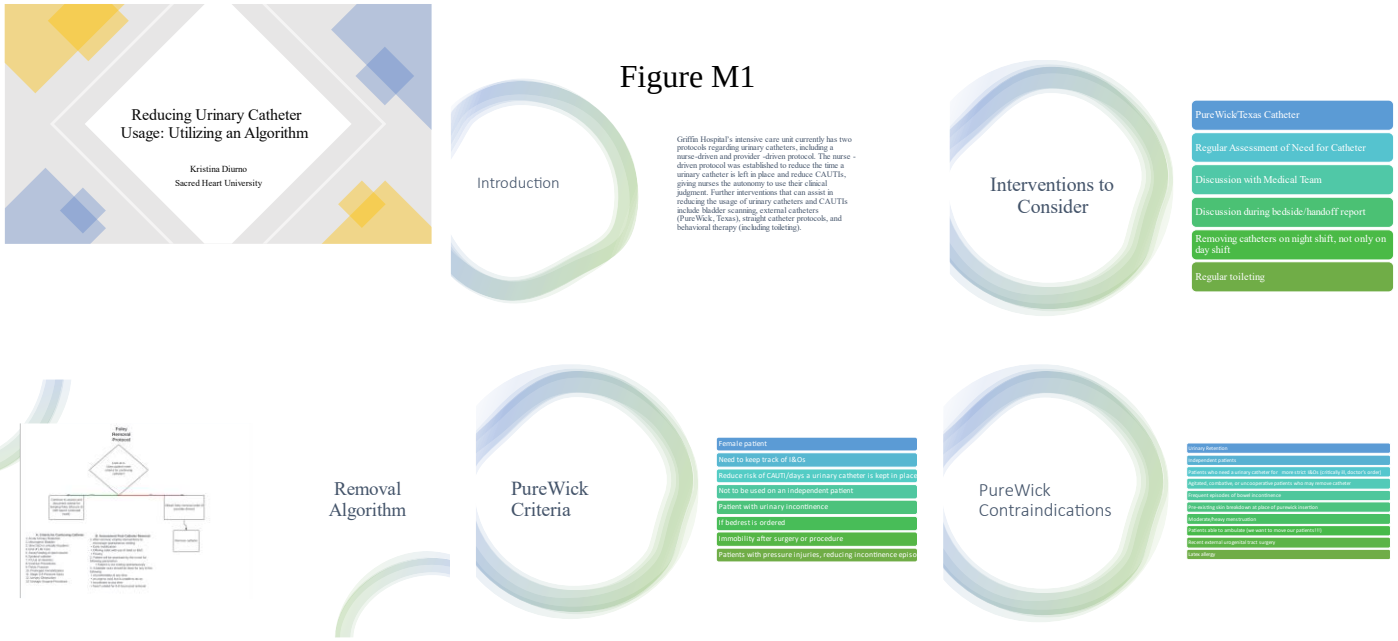
Figure L1

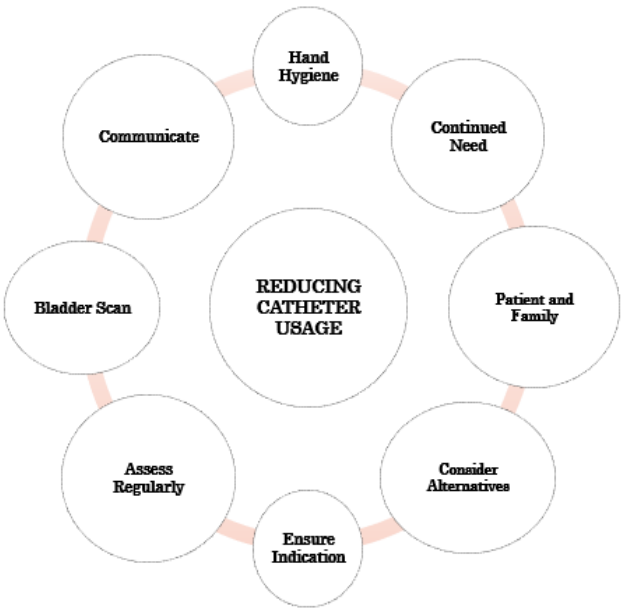


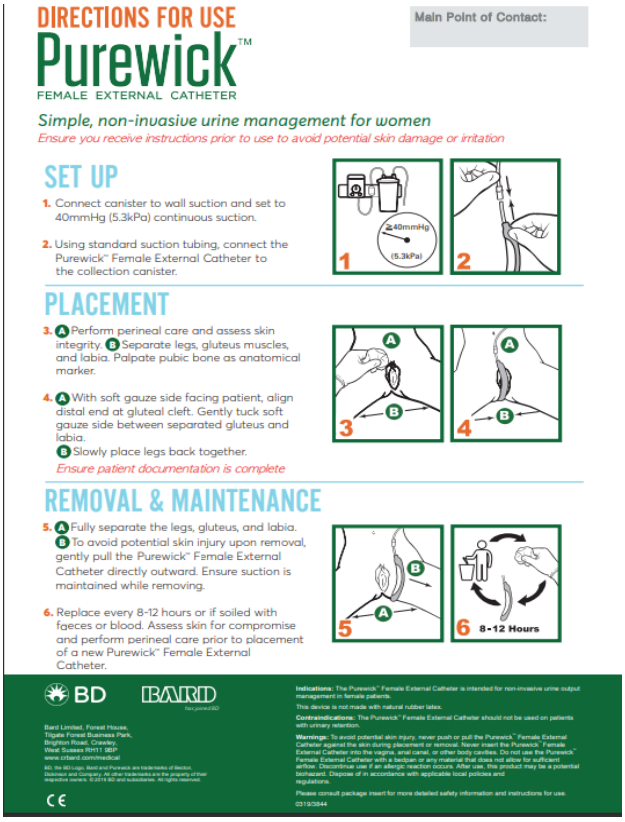
Appendix M

PowerPoint Pre-Intervention Education

Figure M1







DIRECTIONS FOR USE

Purewick™

FEMALE EXTERNAL CATHETER

Main Point of Contact:

Simple, non-invasive urine management for women

Ensure you receive instructions prior to use to avoid potential skin damage or irritation

SET UP

1. Connect canister to wall suction and set to 40mmHg (5.3kPa) continuous suction.
2. Using standard suction tubing, connect the Purewick™ Female External Catheter to the collection canister.

PLACEMENT

3. A Perform perineal care and assess skin integrity. B Separate legs, gluteus muscles, and labia. Palpate pubic bone as anatomical marker.
4. A With soft gauze side facing patient, align distal end at gluteal cleft. Gently tuck soft gauze side between separated gluteus and labia.
   B Slowly place legs back together.

Ensure patient documentation is complete

REMOVAL & MAINTENANCE

5. A Fully separate the legs, gluteus, and labia.
   B To avoid potential skin injury upon removal, gently pull the Purewick™ Female External Catheter directly outward. Ensure suction is maintained while removing.
6. Replace every 8-12 hours or if soiled with faeces or blood. Assess skin for compromise and perform perineal care prior to placement of a new Purewick™ Female External Catheter.

BD BARD

Bard Limited, Forest House, Tilgate Forest Business Park, Brighton Road, Crawley, West Sussex RH11 9BP

www.crbard.com/medical

CE

Indications: The Purewick™ Female External Catheter is intended for non-invasive urine output management in female patients.

This device is not made with natural rubber latex.

Contraindications: The Purewick™ Female External Catheter should not be used on patients with urinary retention.

Warnings: To avoid potential skin injury, never push or pull the Purewick™ Female External Catheter against the skin during placement or removal. Never insert the Purewick™ Female External Catheter into the vagina, anal canal, or other body cavities. Do not use the Purewick™ Female External Catheter with a bedpan or any material that does not allow for sufficient airflow. Discontinue use if an allergic reaction occurs. After use, this product may be a potential biohazard. Dispose of in accordance with applicable local policies and regulations.

Please consult package insert for more detailed safety information and instructions for use.

0319/3844

Appendix N

Reduce Inappropriate and prolonged catheter use!

C: Is it crucial?
A: Are there alternative methods?
U: Updated documentation of continued need
T: Take out, remove if not indicated
I:What is the clinical indication?
S: Is there a statlock in place?

(Buckley et al., 2015)

Appendix O

Executive Summary

Catheter-associated urinary tract infections (CAUTIs) are common but preventable hospital-associated infections. The inappropriate and prolonged use of indwelling urinary catheters can pose a significant issue for patients and healthcare organizations. Raising awareness of the unjustified use of an indwelling catheter can lead to better health outcomes. This DNP project assessed the barriers to removing indwelling catheters in an Intensive Care Unit while providing educational sessions on prompt removal. Staff nurses were encouraged to utilize an algorithm to decrease the number of foley catheter days and the number of catheters utilized. Substantial evidence supports the need for reducing urinary catheter usage.

For this project, the PDSA cycle (Plan, Do, Study, Act) was implemented to help encourage staff nurses in the Intensive Care Unit to reduce the usage of indwelling catheters. The Plan phase helped identify an area for improvement, which included decreasing the number of foley catheters and days in place. The Do phase included educational sessions and a pre-intervention questionnaire to help better identify barriers associated with prompt removal. Also, in the Do phase, nurses were encouraged to complete an algorithm every shift related to an indwelling catheter. Doing so helped raise awareness of the number of instances a catheter may remain in place when no longer clinically indicated. In the Study phase, data were obtained on compliance with educational sessions, algorithm sheets, indwelling catheter occurrences, and the number of days a catheter remained in place. In the Act phase, the data was presented to the staff nurses, which included the first phase of bringing awareness to the prolonged use of catheterizations.

A pre-intervention survey discussed barriers, beliefs, and practices related to promptly removing an indwelling catheter. Thirty nurses (N=30) completed the survey. According to the results, 66.6% of nurses stated that they waited for an order to be placed for the patient to be downgraded before considering removing a catheter, while 23.3% said they did not wait, and 10% said it depended or maybe depended on the situation. 60% of nurses waited for a physician order before thinking about removal, even if the order was a nurse-driven one, while 20% said they did not wait, and 20% said they would maybe wait, depending on their assignment and the patient with the catheter. 100% of nurses agreed that convenience plays a significant role in keeping an indwelling catheter.

100% of nurses agreed that they have instances where a foley is in place, but the continuing criteria are not met. Therefore, it is an unjustified catheter. 73.3% of nurses think that inadequate staffing plays a role in the desire to keep a foley catheter in place longer than clinically necessary, while 16.7% did not believe it was an issue, and 10% were neutral about it.

During the intervention phase, 102 incidences of an indwelling urinary catheter were documented, a 20.3% decrease from pre-intervention data. The number of foley days decreased by 9.7%. Several factors can alter the average number of catheter days, including the census in the ICU, the turnover rate in the ICU, the prolonged stay of patients in the ICU with an indwelling catheter, and the reason for admission (ex, if a patient was admitted for severe sepsis vs. a surgical procedure with a faster recovery).

There were several barriers related to compliance with the algorithm, acuity of patients, and other unforeseeable circumstances that can occur in an intensive care unit. However, based on the results, there was a decrease in the total number of indwelling catheters and the length of time a catheter remained in place. In summary, implementing educational sessions and utilizing

an algorithm to raise awareness of the prolonged use of catheters can assist with prompt removal, especially with good compliance. This study also helped understand barriers and preconceived notions about catheter use in the ICU, which is helpful for future quality improvement projects.

Appendix P

DNP Project Poster