THE IMPACT OF CHAMPION TRAINING ON A TWO-CLINICIAN INDWELLING URINARY CATHETER INSERTION TECHNIQUE TO PREVENT CATHETER ASSOCIATED URINARY TRACT INFECTION (CAUTI)

A Scholarly Project

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

By

Punitha Stevenson

Liberty University

Lynchburg, VA

April 09, 2023

Scholarly Project Chair Approval:

Dr. Candi M. Payne, DNP, MSN, CMSRN Date

Table of Contents

Abstract

Catheter-associated urinary tract infections are a most common and preventable health care associated infection. Approximately 15% to 25% of hospitalized patients receive a urinary catheter during their hospital stay. The PICOT question that guided this quality improvement project was: How does a two-clinician indwelling urinary catheter insertion technique affect the CAUTI rate over one month in one unit? To answer the question, 19 high-quality studies that met the inclusion and exclusion criteria were reviewed. These articles recommended using CAUTI bundle and champion training by the Centers for Disease Control and Prevention to reduce CAUTIs and catheter days. This evidence-based intervention involved the implementation of a two-clinician indwelling urinary catheter insertion technique. The intervention included registered nurse champion training, use of a catheter insertion and maintenance bundle, daily rounding, and maintenance of logbook. In 2022, the national benchmark for CAUTI rate was 0.80 per thousand calendar days, and the facility's rate was 2.3%. The intervention resulted in a reduction in the CAUTI rate from two in September 2022 to zero 30 days after project implementation in mid-January to mid-February 2023. The number of catheter days reduced from 220 to 140 after project implementation. The implementation of a champion training successfully reduced CAUTI rate and catheter days.

Keywords: catheter-associated urinary tract infection, two-person urinary catheter insertion, CAUTI bundle, indwelling urinary catheter insertion technique

Scholarly Project: Proposal Introduction and Literature Review

Urinary tract infections (UTI) are the most common health care–associated infections (HAI). Approximately 75% of UTIs are associated with a urinary catheter. Approximately 15% to 25% of hospitalized patients receive urinary catheters during their stay in the hospital. UTIs associated with urinary catheters are known as catheter-associated urinary tract infections (CAUTIs). More than 560,000 patients develop CAUTIs annually, leading to extended stays in the hospital, increased health care costs, and increased mortality and morbidity rates. Approximately 33 billion dollars are spent each year to treat patients with HAIs, and 75% of HAIs are CAUTIs (American Nurses Association [ANA, 2015). Most CAUTIs are preventable. Since 2008, the Centers for Medicare and Medicaid has not reimbursed costs associated with CAUTI associated with hospital admissions (Peasah et al., 2013).

The [redacted] CAUTI rate was 1.62 per 1,000 catheter days compared to national average of 0.80 per 1,000 catheter days in the year 2022. The guidelines of Centers for Disease Control and Prevention (CDC, 2017) prescribe careful attention to techniques for indwelling urinary catheter insertion, maintenance and removal, staff education, and monitoring of CAUTI incidence. The CDC also recommends audit and feedback, indwelling urinary catheter insertion and indwelling urinary catheter maintenance bundles, clinical support, practice guidelines, policies and procedures, and the use of dashboards to reduce the rate of CAUTIs.

The purpose of this quasi-experimental quality improvement project is to determine if the implementation of a two-clinician indwelling urinary catheter insertion technique by the organization's CAUTI prevention champions would reduce CAUTI rates among adult patients in Spinal Cord Injury (SCI) Unit in an acute care hospital for one month. The two-clinician indwelling urinary insertion technique is safe, transparent, cost-effective, and efficient, and it

meets the organization's expectations regarding CAUTIs. The Indwelling Urinary Catheter Insertion and Indwelling Urinary Catheter Maintenance Bundles are a structured way of improving the process of care and patient outcomes (White et al., 2019). The indwelling urinary catheter insertion technique and indwelling urinary catheter maintenance bundles are evidence-based interventions that will be used to collect data to assess if complications of CAUTI decrease. These bundles prevent complications like CAUTIs. Each unit will have designated CAUTI champions. The champions are trained by this project's manager, and the champions will train rest of the nursing staff using the two-clinician indwelling urinary catheter insertion competency checklist (Table 1). Champions will be responsible for completing the Indwelling Urinary Catheter Insertion & Indwelling Urinary Catheter Maintenance Bundles each month. The bundles are Excel spreadsheets that reflect the Infection Prevention and Control (IP&C)'s data entry form. The completed forms will be faxed or emailed to the Infection Control department through organizational email by the 7th of the following month.

Background of the Project

The United States spends more on health care services than any other country in the world. The expenditures are financed by public payers such as Medicare, Medicaid, and local governments, private insurance, and individual payments. Urinary tract infection account for more than 30% of infections reported by hospitals. Approximately 15% to 30% of hospitalized patients receive an indwelling urinary catheter, and 35% of patients with urinary catheter insertion will have experience of a catheter associated urinary tract infection (CDC, 2017). CAUTIs were the second major problem identified by The Joint Commission in 2019. Expenses related to CAUTIs are estimated to be 340 billion dollars annually in the United States (Jones et al., 2021). CAUTIs lead to unnecessary use of antimicrobials, and the genitourinary system is

considered a reservoir for multidrug-resistant bacteria. An estimated 17% to 69% of CAUTIs are preventable when recommended practices and guidelines are followed. Implementing CAUTI prevention measures can prevent up to 380,000 infections and 9,000 deaths related to CAUTIs per year (CDC, 2017). Since October 2008, the Centers for Medicare & Medicaid Services have not reimbursed costs associated with CAUTIs. After implementation of this non reimbursement policy, the incidence of CAUTIs decreased by approximately 50% (Agency for Healthcare Research and Quality [AHRQ], 2015). Evidence-based guidelines explain that CAUTIs may be prevented by using the proper technique for insertion of a indwelling urinary catheter, avoiding unnecessary and improperly used urinary catheter, maintaining awareness of CAUTI, properly caring for the catheter are the preventive measures of CAUTI. The CDC is committed to protecting patients and clinicians from HAIs. The CDC's (2017) mission is to track infections, respond to outbreaks, provide infection prevention expertise and guidance, and implement preventative interventions in collaboration with partners.

Problem Statement

CAUTIs are one of the most common HAIs. Although regulatory bodies like the CDC and AHRQ have implemented preventive guidelines, CAUTIs remain a top concern. The complications associated with CAUTIs are increased mortality and morbidity, increased length of stay, and an additional cost to the hospitals (AHRQ, 2015). The [redacted] is using Indwelling Urinary Catheter Insertion and Indwelling Urinary Catheter Maintenance Bundles; however, there has been no reduction in CAUTI rate since the bundles were adopted. The hospital wide CAUTI rate for third quarter of 2022 was 7.3, the national benchmark was 0.80, and the goal of [redacted] the hospital was ≤1.25. Implementing a two-person indwelling urinary

insertion technique is an evidence-based intervention that has been shown to reduce the rate of CAUTIs.

Purpose of the Project

The purpose of the project is to implement an evidence-based catheter bundle and analyze if there is a decreased incidence of CAUTI when a two-clinician urinary catheter insertion technique is implemented, and champion training is conducted.

Clinical Question

The patient/population/problem, intervention, comparison, outcome, and time (PICOT) question that guided this project is: How does one clinician versus two two-clinician indwelling urinary catheter insertion technique affect the CAUTI rate over a month in one unit? The evidence-based intervention included a protocol for direct observation by a second clinician trained in indwelling urinary catheter insertion to validate infection control measures that includes hand hygiene and aseptic technique during insertion of indwelling urinary catheter. Standard Indwelling Urinary Catheter Insertion and Indwelling Urinary Catheter Maintenance Bundles were used to evaluate competency.

Section Two: Literature Review

Based on the findings from literature search and outcomes from previous peer-reviewed studies, it was recommended that a two-clinician indwelling urinary catheter insertion technique be implemented as this evidence-based intervention has been shown in studies to reduce the CAUTI rate (Fletcher-Gutowski & Cecil, 2019). Several acute care hospitals practice and recommend a two-clinician technique, also known as a buddy system, for indwelling urinary catheter insertion, as well as the use of competency checklist. Studies have shown that

implementation of a two-person indwelling urinary insertion technique and proper staff education have decreased the CAUTI rate (Barry et al., 2017; Ekert et al., 2018).

The purpose of this quasi-experimental quality improvement project is to collect and analyze data to determine if a two-clinician indwelling urinary insertion technique decreases CAUTI rates. A competency checklist was created using guidelines from the CDC (2017), and the practice was implemented by all inpatient care unit clinicians. The project is supported by a literature review of peer-reviewed articles published in academic journals on best practices to prevent CAUTIs in acute care hospitals. The literature review includes the following sections: Search Strategy, Critical Appraisal and Synthesis of the Literature.

Search Strategy

The project manager conducted a review of literature using PubMed, CINAHL, Google Scholar, and other United States databases such as the Cochrane Library and the Joanna Briggs Institute database. The Boolean operators AND/OR were used with search terms. *CAUTI prevention* was the main search term; the terms *two-person catheter insertion, two-person indwelling urinary insertion* and *indwelling urinary insertion technique* were also used. The search was limited to articles published in the English language, peer-reviewed articles, articles published within the last five years. CINAHL was searched utilizing MESH phrases such as *CAUTI* and *prevention*, *CAUTI* and *two-person indwelling urinary insertion protocol,* and *CAUTI rates* and *preventing measures*. Only studies that focused on CAUTI improvement strategies to maintain aseptic technique and infection control measures during indwelling urinary insertion through direct observation or a two-person indwelling urinary insertion technique for adult patients in an acute care setting were included in the study. Excluded from the study were peer-reviewed articles that not focused on a standard CAUTI bundled prevention protocol

implemented following the most current clinical practice guidelines, such as studies on indication for indwelling urinary insertion, nurse-driven catheter removal protocol, Indwelling Urinary Catheter Insertion, and Indwelling Urinary Catheter Maintenance Bundles, reducing CAUTI rates, and surveillance. A total of 296 peer-reviewed articles were obtained, and over 80 articles were reviewed for relevant information for this project. Although several studies have been conducted on CAUTI preventive measures in acute care hospitals, there are limited studies have been published on the two-clinician catheter insertion technique.

Critical Appraisal

Use of a two-clinician indwelling urinary insertion technique, staff training, and use of a competency checklist decrease CAUTIs and improve patient outcomes (Fletcher-Gutowski & Cecil, 2019). Indwelling Urinary Catheter Insertion and Indwelling Urinary Catheter Maintenance Bundles increase the compliance rate, improve quality of care, and decrease CAUTIs (Jones et al., 2021). A study by Barry et al., 2017, revealed training and monitoring sterile technique by a trained clinician on indwelling urinary insertion technique reduces risk of contamination. A table of evidence is provided (Appendix A).

Synthesis

The reviewed articles answered the PICOT question by providing evidence related to the implementation of recommended practices to reduce CAUTIs. Three out of 12 studies recommended staff education and training. The evidence and themes strongly support the implementation of Indwelling Urinary Catheter Insertion and Indwelling Urinary Catheter Maintenance Bundles to reduce cost and length of stay in the hospital (Al Hameed et al., 2018; Barry et al., 2017; Fletcher-Gutowski & Cecil, 2019). All reviewed studies were conducted in acute care hospitals in the United States using guidelines and recommendations from the CDC,

ANA, and AHRQ. All hospitals reported a significant reduction in CAUTI rate, improved staff knowledge, change of practice, and better patient outcomes. All five out of 12 studies involved the implementation of a two-person catheter insertion protocol. Reviewed studies revealed that staff training on insertion of indwelling urinary catheter with proper technique and two-person catheter insertion protocol changed practice, reduced hospital costs, increased staff knowledge, and improved patient outcomes (Barry et al., 2017; Fletcher-Gutowski & Cecil, 2019). Developing and implementing Urinary Catheter Insertion and Indwelling Urinary Catheter Maintenance Bundles as recommended by ANA and CDC have brought a significant change in the CAUTI rate (Al-Hameed et al., 2018; Fletcher-Gutowski & Cecil, 2019). A two-clinician indwelling urinary catheter insertion technique is recommended for practice. The evidence consisted of different levels, but they are of high quality, validity, and reliability.

Conceptual Framework

The nursing profession is moving from nonevidence-based routines to evidence-based practice (EBP). EBP is sensible and adopted easily by care providers to improve practice. EBP combines research evidence with clinical expertise and values of the patient. To apply EBP skillfully, nurses need to have current research knowledge and the ability to interpret findings and implement the knowledge in nursing practice. The Iowa Model of EBP is designed to improve quality of care, and the model is used by many larger health care facilities. The Iowa Model of EBP was developed by the University of Iowa Hospitals and Clinics in 1990 to help clinicians use nursing research findings to improve the quality of patient care. The Iowa Model is also used as a framework for articulating knowledge for nursing administration, research, and education. The first step in Iowa Model is to identify if the trigger is problem focused or new knowledge focused. These triggers enable the nurse to formulate a PICOT question. After

formulating a question, the nurse will determine if the topic is a priority for the unit and if it aligns with the strategic goals of the organization. If the topic is a priority, the next step would be to form a team and assemble, appraise, and synthesize the body of evidence. The following are the questions that need to be addressed prior to changing practice:

- Is there sufficient evidence to change practice?
- Are findings consistent across studies?
- Are the type and quality of findings sufficient?
- Is there clinical relevance?
- Are these findings appropriate for the population involved in the change of practice?
- Is the clinical change feasible?
- Is there an appropriate risk-benefit ratio to make the practice change?

The PICOT question for this scholarly project was, "How does two-clinician indwelling urinary catheter insertion affect CAUTI rates over one month in one unit?"

Once it is determined that the evidence does support a practice change, the next step is to design and pilot the change. The Iowa Model emphasizes the use of pilot testing prior to full-scale change implementation. After the change is integrated, the results are disseminated.

The increase in the rate of CAUTIs has been identified as problem at the [redacted] hospital, and reducing CAUTIs is one of the top priorities of the hospital. The goal of the hospital is to keep the CAUTI rate equal to or below the national benchmark. Prior to implementation of this project, the hospital's CAUTI rate was above national benchmark. The national benchmark is 0.80 per thousand urinary catheter days, and the hospital's CAUTI rate is 2.53. Upon the request of nursing leadership, the project manager formulated a PICOT question. The CAUTI prevention

team was formed and included the project manager, infection control and preventionists, nurse manager, chief nurse of the unit, physicians, nurse educator, and front-line nurses.

Theoretical Framework: Relationship-Based Care Model

Acute care hospitals seek ways to provide safe and quality care to the population they serve. Employee participation and engagement can improve patient outcomes through shared decision-making (Leask Capitulo & Olender, 2019). One of the theories that guides interprofessional practice is Watson's theory of human caring. Watson's theory is a relation-based care model (Escobar, 2020). Transpersonal caring and healing relationships among staff, patients, and their families result in caring and connectivity. Three types of relationship fall under this care model:

- Relationship with self involves self-awareness of providing quality care and nursing practice consistent with EBP and protocol to maintain competence in urinary catheter insertion and enhance professional growth.
- Relationships with colleagues enhance teamwork, communication, and collaboration among nurses utilizing a two-clinician indwelling urinary catheter insertion technique. Being open to providing and receiving constructive feedback to improve practice is key to relationships with colleagues.
- Relationships with patient and families involves nurses realizing the value of CAUTI prevention to reduce harm to patients. In this relationship, ethical standards drive practice. Patient-centered care promotes patient trust in clinicians, which leads to increase patient satisfaction.

Summary

The two-clinician indwelling urinary catheter insertion technique is one of the most effective interventions found in the high-quality level studies (Al Hameed et al., 2018; Barry et al., 2017; Fletcher-Gutowski & Cecil, 2019). A two-person urinary catheter insertion protocol has been implemented in some acute care hospitals, long-term care facilities, and rehabilitation centers. This EBP has been proven to decrease the CAUTI rate in every facility it was implemented in. Creating and implementing education on CAUTI prevention measures for direct care–providing clinicians is one of the most effective ways to reduce CAUTIs and provide safe care. The Joint Commission, CDC (2015), AHRQ, and ANA highly recommend using the CAUTI prevention bundle, CAUTI champion bundle, and Urinary Catheter Insertion and Indwelling Urinary Catheter Maintenance Bundles to reduce CAUTI, decrease health care costs and increase quality of care to patients.

Section Three: Methodology

The clinical question that guided this quasi-experimental quality improvement project is: How does a two-clinician indwelling urinary catheter insertion affect CAUTI rates over one month in one unit? The dependent variable is CAUTI rate, which was calculated by using National Healthcare Safety Network (CDC, 2015). The independent variable is teaching a two-clinician indwelling urinary catheter insertion technique to CAUTI prevention champions.

Design

The two-clinician indwelling urinary catheter insertion technique was implemented on January 17, 2023. Patients with an indwelling urinary catheter were monitored for 30 days (from January 18, 2023, to February 16, 2023). The primary aim was to reduce the incidence of CAUTIs among a population of adult [redacted] (Elkbuli et al., 2018). The independent variable

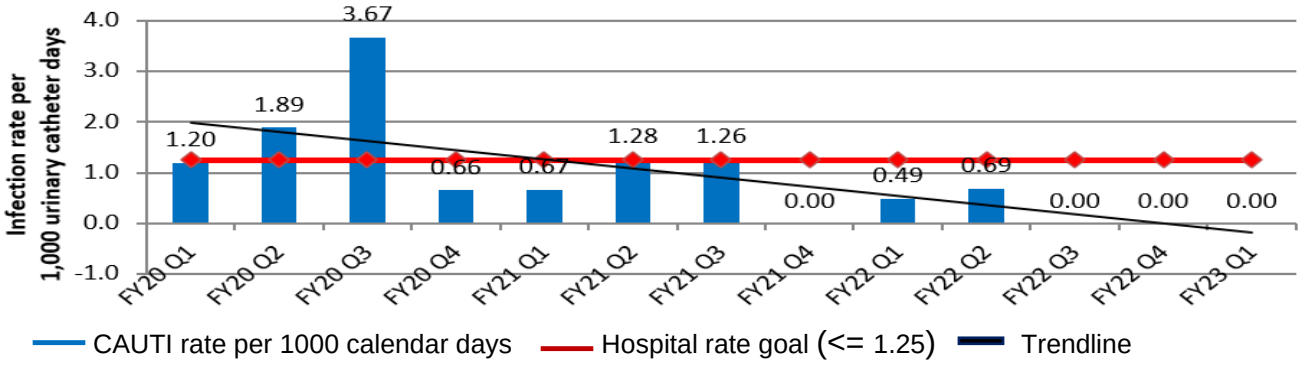
for this quasi-experimental study is two-clinician indwelling urinary catheter insertion technique. The purpose of the study is to determine if this technique can reduce the CAUTI rate, which is the dependent variable. This pilot study answered the clinical question and addressed the problem statement. The design allowed for the measurement of the CAUTI rate pre- and post-intervention. The pre-post intervention method was used for data collection as recommended for an evidence-based project (Campbell, 2020).

Measurable Outcomes

The goal of the SCI unit at the hospital is to have a CAUTI rate below the national benchmark. The national benchmark for CAUTI in year 2022 was 0.80 per thousand indwelling urinary catheter days. In 2020 and 2021, six CAUTI cases were identified hospital wide each year; in the third quarter of 2022, five cases were identified (see Figure 1). The main goal of this project is to decrease the incidence of CAUTIs in the SCI unit in the [redacted] The goal for the SCI Unit is to keep the CAUTI rate ≤ 1.25. The rate of CAUTIs for the third quarter of fiscal year 2022 was 7.3, means the facility's goal for CAUTI is not met.

Figure 1

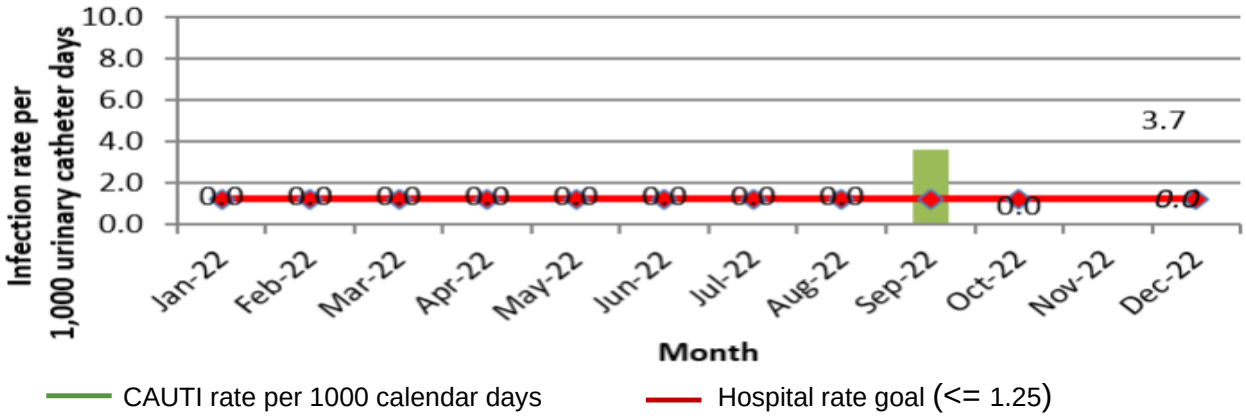
CAUTI Rate Hospital Wide for Fiscal Year 2020 to Third Quarter 2022



In 2020, the number of CAUTIs in SCI unit was one; in 2021, there were zero CAUTIs. However, in 2022, by fourth quarter the number of CAUTIs were five, and in third quarter, there was one CAUTI (Figure 2). The goal for the unit for 2022 was zero. The hospital's goal was to have a CAUTI rate below national benchmark, which was ≤ 0.80. The CAUTI rate in the hospital fluctuates from month to month. Quarterly monitoring allows for the possible cause of the increase in the CAUTI rate in each unit to be identified.

Figure 2

CAUTI Rate in the *SCI Unit in Fiscal Year 2022 by Month*



Setting

The project was implemented in an 800-bed hospital system, the [redacted] The facility serves over 67,000 enrolled [redacted] per year in northern and central California, Nevada, Hawaii, and the Philippines. The organization is a Level 1 teaching hospital, providing full range of patient care services with state-of-the-art technology as well as education and research. The hospital is one of the largest integrated health care systems. The hospital provides comprehensive health care through primary, tertiary, and long-term care in areas of medicine, surgery, psychiatry, physical medicine, rehabilitation, neurology, oncology, dentistry,

geriatrics, and extended care. The approval letter from the facility was received before the project was implemented (Appendix E).

Population

A convenience sampling technique was utilized to select a sample of all patients with an indwelling urinary catheter in the SCI unit. Excluded from the study were all patients at the hospital with no indwelling urinary catheter. The convenience sampling technique is beneficial because it is inexpensive and easy to implement. An informed consent was not required for data collection. The convenience sampling technique was also used to select registered nurses at the hospital as CAUTI champions, as this method is cost effective and easy to use (Jager et al., 2017). The nurse manager of the unit selected 10 CAUTI champions to be trained. The selection was made based upon the number of patients and number of nurses on duty so that the [redacted] received proper care.

Ethical Considerations

The ethical issues related to the project were considered to ensure the safety and privacy of all participants. This quality improvement project was approved by the hospital's EBP coordinator, director, and quality improvement project coordinator. The ethical principles of veracity, beneficence, and non-maleficence were strictly adhered to make sure full disclosure was provided to all participants. The plan for implementing this project was discussed with nurse manager, chief of the unit, IP&C coordinator, chair of practice council in shared governance, and chair of CAUTI prevention. The guidelines for CAUTI prevention from the CDC were used to train champions. Anonymity and confidentiality were ensured throughout the project. The data from IP&C's intranet SharePoint were stored on a password-protected computer in the project manager's locked office. The project will also be guided by the ANA's (2015) Code of Ethics

Provision of Professional Responsibility in Promoting a Culture of Safety. The CAUTI prevention committee is composed of the project manager, infection control and preventionists, nurse manager, chief nurse of the unit, physicians, nurse educator, and front-line nurses. The project is supported by Doctor of Nursing Practice (DNP) essential elements of interprofessional collaboration for improving patient's health condition using EBP (American Association of Colleges of Nursing, 2006). The project also aligns with Liberty University's mission. The mission of the university is to develop Christ-centered men and women with the values, knowledge, and skills essential to impact the world (Liberty University, n.d.). The Bible encourages health care providers to care for all those who are sick and weak: "Do to others whatever you would want others to do to you" (*New King James Bible*, 1975/2017, Ex 15:26). The DNP project team (student and project chair) completed research ethics training to ensure protection of human subjects. The DNP student completed Collaborative Institutional Training Initiative (CITI) training (Appendix C) and received an IRB approval letter (Appendix D).

The CDC guidelines were followed for prevention of CAUTI. Provider's orders were obtained for indwelling urinary catheter insertion. Catheters were inserted for appropriate indications. Properly trained registered nurses (RN) were allowed to insert and remove catheters. Catheters were inserted using aseptic technique, and a closed drainage system was maintained. Indwelling urinary catheters were inserted by two RNs. The primary RN inserted catheter and the second RN ensured guidelines were followed correctly. An unobstructed urine flow was maintained. The drainage bag was kept below the level of the bladder. The process and outcome were reported to the local IP&C department, unit manager, chief nurse of SCI Unit, and attending physician. Compliance with education program was maintained, calculated, and reported. The number of RNs trained on a two-clinician indwelling urinary insertion technique were 10. Compliance with

documentation of catheter insertion and removal were monitored. Random chart auditing was conducted (CDC, 2015).

Data Collection

The approval for data collection was obtained from Liberty University's Institutional Review Board (IRB) before data were collected. After obtaining approval from university, the project manager collaborated with the nursing leadership to select CAUTI champions. Data on CAUTI rates, catheter days, patient days, and the device utilization ratio were obtained from the hospital's infection control SharePoint. The following data were collected:

- the total number of patients with indwelling urinary catheters in the hospital
- the total number of patients with indwelling urinary catheter in SCI unit
- the total number of CAUTIs hospital wide every quarter in 2020, 2021, and 2022
- the total number of CAUTIs in the SCI unit every quarter in the year 2020, 2021, and 2022 and after implementation of the project

Tools

The CAUTI prevention tool by ANA (2015) provides evidence-based guidelines that describe multiple levers such as safety culture, nurse-driven catheter removal and incorporation of health information technology. The tool was developed by leading nursing experts. ANA has partnered with the Centers for Medicare and Medicaid Services to reduce CAUTIs. CAUTI prevention is one of the priorities of the ANA (2015). Nurse consultants from the partnership for patients' team and representatives from CDC were included in the ANA's CAUTI prevention panel. The panel reviewed CAUTI reduction tools and conducted a focused review of the of the literature before developing a two-part multifactorial CAUTI reduction tool. The ANA encourages nurses to be part of CAUTI reduction program through effective use of an

innovative, streamlined, and evidence-based clinical tool. The tool determines if a urinary catheter is appropriate based on a nursing assessment, provides alternatives for retention and incontinence, and timely removal (ANA, 2015).

The unit has designated CAUTI champions who were chosen by unit nurse manager. The champions were trained by project manager with the support of the IP&C team. The tools used for training champions were the Indwelling Urinary Catheter Insertion (Figure 3) and Indwelling Urinary Catheter Maintenance Bundles (Figure 4), posters, demonstration by project manager and return demonstration by trainees (See Table 1) prepared per the guidelines of the CDC, a video clip on proper techniques used for insertion and collection of urine sample for culture, a PowerPoint presentation to review protocol, and the hospital's policy on insertion and removal of indwelling urinary catheter (Appendix B).

Figure 3

Indwelling Urinary Catheter Insertion Bundle

Indwelling Urinary Catheter Insertion Bundle Compliance Checklist

Unit: Month:

Please use Y or N for compliance/non-compliance. Exclude straight, condom and suprapubic catheters.

Observation Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Order written with indication on day of insertion by provider.																				
Hands washed by inserter																				
Sterile peri-urethral cleaning																				
Catheter properly secured by inserter																				
Total Number of (indwelling) foley catheters inserted in the unit for the month (optional):																				

Figure 4

Indwelling Urinary Catheter Maintenance Bundle

Indwelling Urinary Catheter Maintenance Bundle Compliance Checklist

Unit: _____ Month: _____

Please use Y or N for compliance/non-compliance. Exclude straight, condom and suprapubic catheters.

Observation Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Drainage system was sterile and continuously closed.																				
Catheter properly secured.																				
Collection bag below the level of the bladder.																				
Unobstructed urine flow.																				
Clinical indication written for continuance of indwelling catheter.																				
Daily Hygiene care is documented or observed.																				

Urinary Tract Infection Criteria

A patient must meet at least one of the following criteria:

1. Patient had an indwelling urinary catheter that had been in place for more than two consecutive days in an inpatient location on the date of event and was either present for any portion of the calendar day on the date of event or was removed the day before the date of event.
2. Patient has at least one of the following signs or symptoms:
    - fever more than 38 degree Celsius
    - suprapubic tenderness
    - costovertebral angle pain or tenderness
    - urinary urgency
    - urinary frequency
    - dysuria

3. Patient has a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of ≥ 105 CFU/ml.

All elements of the symptoms of urinary tract infection criterion must occur during the infection window period.

Intervention

Prevention of inappropriate short-term catheter use, nurse-driven timely removal of urinary catheter, and urinary catheter care during placement are three areas to improve EBP to reduce the CAUTI rate (ANA, 2015). Registered nurses can play major role in reducing the CAUTI rate. The following standard of practice on the two-person indwelling urinary insertion technique was implemented in the [redacted] As part of this technique, licensed nurses who are formally trained and deemed competent in urinary catheter insertion ask a second licensed nurse with the same level of training, called an indwelling urinary buddy, to observe when he or she is inserting a urinary catheter (Richards, 2017). This procedure applies to both male and female [redacted] and both indwelling and straight catheterization procedures. The primary nurse is responsible for the catheter insertion procedure, while the indwelling urinary buddy observes to ensure that the primary nurse follows a sterile technique and performs the procedure correctly by using a checklist (Table 1). The indwelling urinary buddy can assist the primary nurse in the cleaning and positioning of the patient when necessary. The indwelling urinary buddy is empowered to stop the procedure if sterile technique is broken at any point during the insertion procedure. The name of the second nurse needs to be entered in the documentation template in computerized patient record system and added as an additional signer.

Urology must be consulted for insertion of indwelling urinary catheter if the patient has a history of previous difficult catheterization, urethral stricture, or artificial urinary sphincter. The

patient must be assessed for any urological device or implant, especially artificial urinary sphincter prior to insertion. The catheter's balloon was not checked for leaking prior to insertion. A standard 16 French catheter is used unless otherwise instructed by the provider. For male patients, the catheter should go in all the way to the hub of the catheter. If resistance is experienced, stop, remove the catheter, and consult urology. For female patients, the catheter is inserted until two to three centimeters after the nurse sees urine, and then the nurse inflates he balloon. A closed drainage system is maintained. If a break in aseptic technique, disconnection, or leakage occurs, the nurse must replace the catheter and collecting system using aseptic and sterile technique (see Table 1).

Clinical necessity of indwelling urinary catheter and removal was assessed daily. After the insertion, the catheter was properly secured with a facility approved securing device. Maintained an unobstructed urine flow by keeping the catheter and collecting tube from kinking. Prevented dependent loop in the catheter drainage system. The drainage bag was kept below the level of the bladder in a dependent position and on the same side as the securing device in such a way that there is no tension on the catheter. The bag was emptied at regular intervals using a separate clean collecting container for each patient, avoid splashing, and prevent contact of the drainage spout with the nonsterile collection container.

Timeline

First month, the organization's goal was identified, collected data CAUTI and catheter days in SCI Unit, Training plan was created to meet the goals. The project plan was prepared and the method of implementing the plan was sent to the unit's manager, chief nurse, executive leadership, IP&C and clinical nurse specialist. Project approval obtained from project location and Liberty University's IRB. The goals and objectives for the project were created. The

stakeholders were identified, and the project team was formed. Training materials were prepared by using guidelines from ANA, CDC, AHRQ, and The Joint Commission. The CAUTI prevention champions were selected by working collaboratively with unit manager and clinical nurse specialist. Second month training room was booked, and supplies needed for training were requested and received. Ten champions were trained on January 17, 2023. Each training session had two champions, and each session was scheduled to last one hour. The champions were chosen from the morning and evening shifts. Knowledge and competency levels were evaluated pre- and post-training using the competency checklist. The champions were observed in their practice area for compliance from January 18 to February 16, 2023. Daily rounds were done by the nurse educator. The data were collected daily and entered in the IP&C SharePoint.

Data Summary

The data for this quality improvement project were used to measure the success of the project. The data collected for this project were:

- The total number of new CAUTI events in the unit
- The number of catheter days
- The total number of registered nurses who completed the champion training.

The independent variable for this project was the implementation of an evidence-based champion training that positively affected the CAUTI rate in the SCI Unit. Use of the proper catheter technique by staff was the dependent variable. In 2022, the SCI Unit's CAUTI rate was 7.3 per 1000 calendar days, the facility's goal was ≥ 1.25, and the national benchmark was 0.80. The outcome affects the organization's clinical and financial well-being (Institute for Healthcare Improvement, 2020). The primary goal of this quality improvement project was to reduce CAUTI rate to zero in the SCI unit. In September 2022, there were two CAUTIs in the SCI Unit.

In January 2023 before the implementation of project, there was one CAUTI (see Figure 5). The project was implemented in mid-January. From mid-January 2023 to mid-February 2023, the CAUTI rate was zero.

Figure 5

Rate of CAUTIs in the SCI Unit

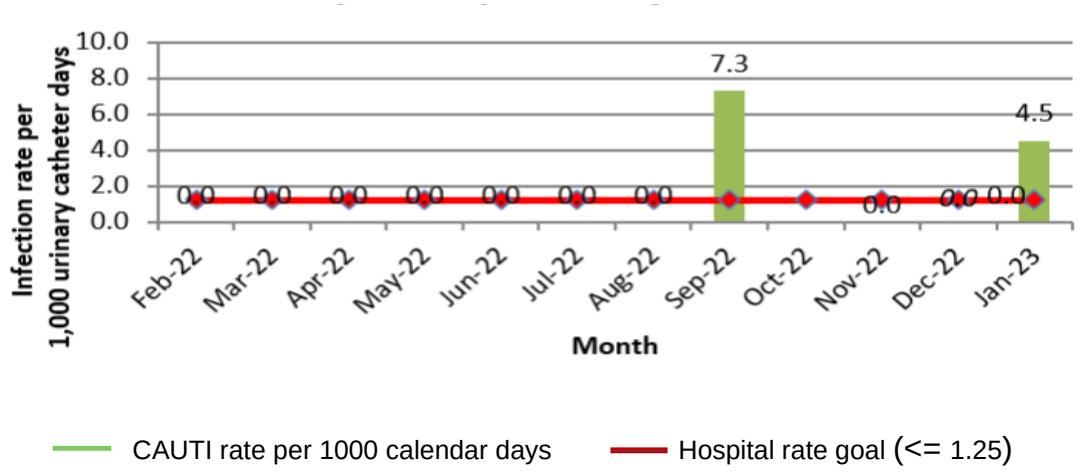
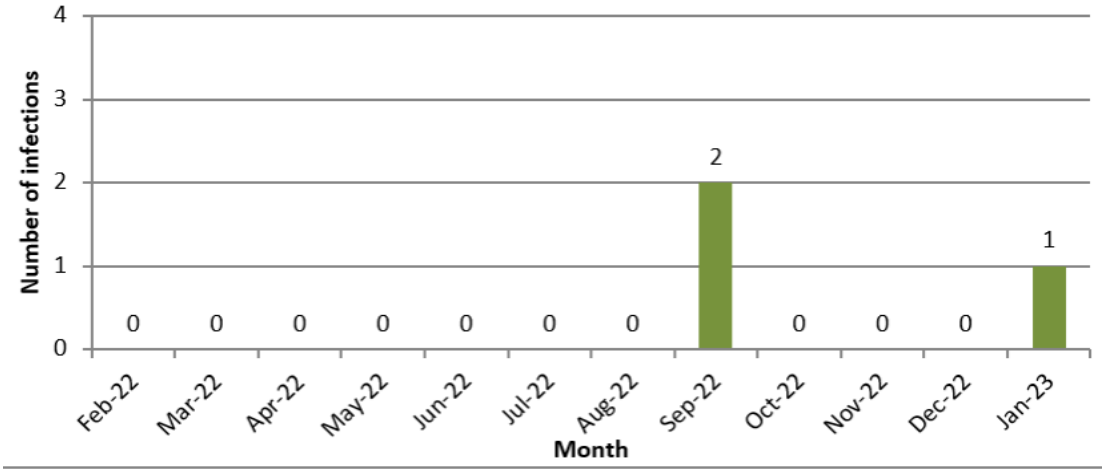


Figure 6

Number of CAUTIs in the SCI Unit



Data Analysis

The purpose of this quasi-experimental quality improvement project was to collect and analyze data to determine if there would be a clinically significant decrease in CAUTI rates when a two-clinician indwelling urinary insertion technique was implemented based on guidelines from the CDC, ANA, and AHRQ (2015). Though the hospital has already implemented CDC guidelines to reduce the CAUTI rate, the increase of CAUTI rate in SCI Unit in 2022 was a concern. The nursing leadership requested to escalate this safety issue among patients in SCI Unit where the project took place. The clinical question that guided this quality improvement project was: For patients requiring an indwelling urinary catheter, how a two-clinician indwelling urinary insertion technique affect the CAUTI rate over one month? The project used aggregate CAUTI rates and a device utilization ratio for a month before and after the implementation of a two-clinician indwelling urinary catheter insertion technique. The data on the CAUTI rate and catheter days for this project were collected by the project manager from IP&C's SharePoint. Data collected and analyzed were using an Excel spreadsheet. The results

were displayed using tables and graphs. The sample of all patients with indwelling urinary catheter was collected by the project manager. The CAUTI rate was calculated as the number of CAUTIs in the unit divided by catheter days and multiplied by 1,000 days. The catheter days are the number of urinary catheter days for all patients in the unit with an indwelling urinary catheter. The catheter utilization ratio is the number of catheter days divided by patient days (CDC, 2015. The number of patients with an indwelling urinary catheter were 220 for the 30 days after implementation of the project. The numerical data were analyzed; descriptive statistics provide a summary of the data (see Table 2).

Statistical Analysis

The statistical analysis was a collaborative effort between the project leader and a statistician who assisted with analyzing and interpreting the data. The Statistical Package for Social Sciences (SPSS) version 26 software program was used to compare the pre- and post-intervention data. The SPSS was also used to determine statistical significance of the newly implemented EBP (Tables 4 and 5). The primary data consisted of pre- and post-intervention catheter days, new number of CAUTIs, and the number of registered nurses who received champion training. The descriptive statistics include measures of control tendency such as mean and median. The effectiveness of training was monitored using the daily catheter maintenance compliance bundle. There were two CAUTIs in the SCI Unit in the month of September in 2022. The possible risk factors identified were improper technique used for catheter insertion and non-compliance with the use of the daily maintenance bundle. There were zero incidents of CAUTI during and 30 days after the project implementation. The results also show there was a significant reduction in catheter days. The CAUTI prevention committee recommended more champions be trained using the evidence-based intervention on the two-clinician urinary catheter insertion technique and daily urinary catheter maintenance bundle.

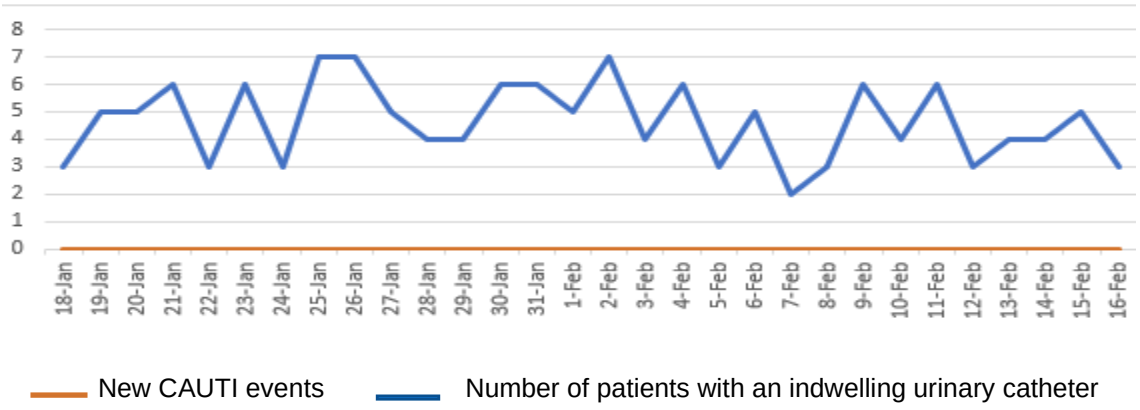
Outcome Measures

Measures are an important aspect of implementing and evaluating a change in practice. The outcome measures affect the organization's clinical and financial well-being (Institute for Healthcare Improvement, 2020). The primary goal of this quality improvement project was to reduce the CAUTI rate to zero in the SCI unit. In September 2022, the total number of CAUTIs was two. In January 2023 before the implementation of the project, there was one CAUTI in the unit. From mid-January 2023 to mid-February 2023 and after implementation of project, the

CAUTI rate was zero (Girio-Herrera et al., 2019). The secondary goal of this project was to reduce catheter days. In September 2022, the total number of catheter days was 220 and, after implementing the project, the number of catheter days was reduced to 140 (Table 6).

Figure 7

CAUTI Rate in SCI Unit After Project Implementation



Evaluation

Several tools were used to evaluate the success of the project, including the indwelling urinary catheter maintenance bundle compliance checklist, daily rounds with the CAUTI prevention team, data dashboard, electronic medical record, organization's goal, and national benchmark. The summative valuations were completed at the end of the project. The project leader completed the summative evaluation by analyzing the outcome of the project, findings, impact of the intervention, and potential future implications.

Implications

Implementing a two-clinician indwelling catheter insertion technique through this DNP project was clinically significant because it decreased the CAUTI rate and catheter days in the SCI Unit. Before the project was implemented, the SCI Unit did not have champions. Use of the proper technique in inserting indwelling urinary catheter reduced the CAUTI rate and catheter

days. The limitations of this project are that the sample size was small, it was implemented in only one unit, and only 10 registered nurse champions were trained. There were no barriers to project implementation; however, because of staffing issues, the training was conducted with two champions per session and each session was scheduled for an hour. The methods of training were PowerPoint presentation and demonstration. The champions' competency level was evaluated by return demonstration of catheter insertion technique, observation, and discussion. The project leader recommends the practice change be integrated into new nursing employee orientation and champions be trained in other inpatient units. The implications of the process measures include maintaining CAUTI logbook, continuing daily rounding, and training new registered nurses in the unit by champion. The involvement of frontline nurses is important for the change of practice in the unit. The initiation of a two-clinician indwelling urinary catheter insertion, and maintenance bundles will reduce the CAUTI rate and catheter days, improve patient outcomes and culture of safety, make the hospital a high-reliability organization, and support the hospital's mission and policy that encourage zero harm to patient (Rahmawati et al., 2021). Educational training sessions following the guidelines from the CDC, AHRQ, ANA (2015) and The Joint Commission (n.d.) will help inform the staff on the current EBP and national requirements. The project will improve patient outcomes and increase the culture of safety, which aligns with the mission of the hospital. Readiness for the change by stakeholders like the frontline nurses, unit manager, care providers, and executive leadership, EBP-based guidelines, and inclusion of an innovative nurse leader, are important to sustain the change process.

Sustainability Measures

To ensure the sustained use of the CAUTI insertion and maintenance bundles, the change of practice will be incorporated into the new nurse employee orientation program. The project

manager will demonstrate the two-clinician indwelling urinary catheter insertion technique to new nurse employees during their orientation. The CAUTI prevention tools were laminated and are stored in the daily rounding logbook as a reminder. The lessons learned during pilot study were that lack of knowledge is the reason nurses do not follow right practice and that it was hard for experienced nurses to adopt a new technique. However, after the training, they were appreciative of the change of practice. There was 100% acceptance for the change of practice.

Dissemination

The results, analysis, strengths, and limitations of the project were reviewed by the preceptor, chief nurse, and manager of SCI Unit, EBP coordinator, chair of CAUTI prevention council, clinical nurse specialist of the unit, and course chair. The results of the project were shared verbally with the unit manager and in the staff huddle in SCI Unit. Flyers and visual charts will be created to depict the results of the project implementation. The results of the project will be presented to the organization's leaders with visual aids. The closing statement will discuss the availability of training and additional resources needed to sustain the practice change. The data and findings will also be shared externally to the facility's divisions and local hospitals, long-term care facilities, and nursing schools to support the quality improvement project. The presentation will include training materials, timelines, and outcomes. The results of the project will be shared in national conferences and seminars. The project manager will submit this study for publication in the *American Journal of Infection Control* and *American Journal of Nursing*. This doctoral project will be submitted in full text for dissemination through CINAHL Plus with Full Text, JBI EBP Database, and ClinicalKey Nursing.

Conclusion

In today's health care world, safety and quality are given top priority. Preventive measures are much less expensive and easier to implement than a practice change. CAUTI remains a top concern because it increases mortality and morbidity, increases length of stay in the hospital, and results in additional cost to the hospital. Implementing CAUTI prevention measures can save lives and money for health care facilities and the nation. [redacted] had been using indwelling urinary catheter insertion and daily catheter maintenance bundles, but there had been no reduction in the CAUTI rate. The purpose of this quality improvement project was to reduce the CAUTI rate and indwelling urinary catheter days in the SCI unit. CAUTI is one of the leading preventable HAIs. The Bible encourages health care providers to care for all those who are sick and weak: "Do to others whatever you would want others to do to you" (*New King James Bible*, 1975/2017, Ex. 15:26). Expenses related to CAUTIs are estimated to be 340 billion dollars annually in the United States (Jones et al., 2021). CAUTIs are the second major problem identified by The Joint Commission in 2019. The Bible says,

> If you listen carefully to the Lord your God and do what is right in His eyes and pay attention to His commands and keep all His decrees, I will not bring on you any of the diseases I brought on the Egyptians, for I am the Lord, who heals you. (*New King James Bible*, 1975/2017, Ex. 15:26)

References

Agency for Healthcare Research and Quality. (n.d.). *Catheter-associated urinary tract infection (CAUTI)*. Retrieved September 17, 2022, from https://www.ahrq.gov/topics/catheter-associated-urinary-tract-infection-cauti.html

Agency for Healthcare Research and Quality. (2015). *Toolkit for reducing catheter-associated urinary tract infections in hospital units: Implementation guide.* https://www.ahrq.gov/hai/cauti-tools/guides/implguide-pt1.html

American Association of Colleges of Nursing. (2006). *The essentials of doctoral education for advanced nursing practice.* https://www.aacnnursing.org/Portals/42/Publications/DNPEssentials.pdf

American Nurses Association. (2015). *ANA CAUTI Prevention Tool*. Retrieved September 17, 2022, from https://www.nursingworld.org/practice-policy/work-environment/health-safety/infection-prevention/ana-cauti-prevention-tool/

Barry, J., Allen, C., Chlebeck, M., Siebenaler, R., Wick, K., & Gunderson, W. (2017). Implementing a two person insertion technique and indwelling urinary catheter insertion competency assessment to reduce catheter associated urinary tract infections. *American Journal of Infection Control*, *45*(6), S60. https://doi.org/10.1016/j.ajic.2017.04.094

Campbell, B. J. (2020). *Improving patient outcomes through implementation of a nurse directed protocol for urinary catheter removal* (Publication No. 27741911) [Doctoral dissertation, Grand Canyon University]. ProQuest Dissertations & Theses Global.

Centers for Disease Control and Prevention. (2017). *Current HAI Progress Report.* U.S. Department of Health & Human Services. Retrieved September 17, 2022, from https://www.cdc.gov/hai/data/portal/progress-report.html

Ekert, B., Patterson, J., Lawrence, D., Qualters, K., McCormick, M., & Miale-Mayer, D. (2018). *Improving patient outcomes with the implementation of the "buddy system."* ONS 43rd Annual Congress, Washington, DC, United States.

Elkbuli, A., Miller, A., Boneva, D., Puyana, S., Bernal, E., Hai, S., & McKenney, M. (2018, November). Targeting catheter-associated urinary tract infections in a trauma population: A 5-S bundle preventive approach. *Journal of Trauma Nursing*, *25*(6), 366–373. https://doi.org/10.1097/jtn.0000000000000403

Escobar, S. (2020). *Aiming for Zero: Creating a Culture of Safety and Improving CAUTI Outcomes in the Microsystem*. USF Scholarship: A Digital Repository @ Gleeson Library | Geschke Center. https://repository.usfca.edu/capstone/1123

Fletcher-Gutowski, S., & Cecil, J. (2019). Is 2-person urinary catheter insertion effective in reducing CAUTI? *American Journal Infection Control*, *47*(12), 1508–1509. https://doi.org/10.1016/j.ajic.2019.05.014

Girio-Herrera, L., Clay, C. M., Younus, F., Ahmed, Z., & Zimand, P. (2019). Journey to zero harm: Eliminating catheter-associated urinary tract infections (CAUTIs) for 12 consecutive months at two community hospitals. *Open Forum Infectious Diseases, 6*(Suppl 2), S30. https://doi.org/10.1093/ofid/ofz359.066

Institute for Healthcare Improvement. (2020). *IHI improvement capability self-assessment tool*. https://app.ihi.org/facultydocument/events/event-2354/presentation-9119/document-7406.L2_improvement_tool.pdf

Jager, J., Putnick, D. L., & Bornstein, M. H. (2017). More than just convenient: The scientific merits of homogeneous convenience samples. *Monographs of the Society for Research in Child Development, 82*(2), 13–30.

Jones, K. M., Mantey, J., & Mody, L. (2021). Current practices in infection prevention: A 3-year survey of Michigan nursing homes urinary tract infection prevention strategies. *American Journal of Infection Control*, *49*(6), S7.

Leask Capitulo, K., & Olender, L. (2019). Interprofessional shared governance and relationship-based care: implementation and lessons learned. *Nursing Management*, *26*(5), 28–34. https://doi.org/10.7748/nm.2019.e1854

Liberty University. (n.d.). *What we believe: Liberty University's mission*. Retrieved September 25, 2022, from https://www.liberty.edu/residential/what-we-believe/

New King James Bible. (2019). BibleGateway.com. http://www.biblegateway.com/versions/New-King-James-Version-NKJV-Bible (Original work published 1975)

Peasah, S. K., McKay, N. L., Harman, J. S., Al-Amin, M., & Cook, R. L. (2013). Medicare non payment of hospital-acquired infections: Infection rates three years post implementation. *Medicare & Medicaid Research Review, 3*(3). https://doi.org/10.5600/mmrr.003.03.a08

Rahmawati, L., Mariana Tamaela, J., Anika, L., & Wicaksana, A. L. (2021). The two-person catheter insertion procedure reduces catheter-associated urinary tract infections. *Enfermería Clínica*, *31,* 478–482. https://doi.org/10.1016/j.enfcli.2020.10.047

Richards, D. E. (2017). Catheter associated urinary tract infection (CAUTI) targeted assessment for prevention (TAP) effective practices. *American Journal of Infection Control*, *45*(6), S10–S11. https://doi.org/10.1016/j.ajic.2017.04.264

White, K. M., Dudley-Brown, S., & Terhaar, M. F. (2019). *Translation of evidence into nursing and health care.* (3rd ed.). Springer Publishing Company.

Appendix A

Literature Matrix

Article	Study Purpose/ Objective(s)	Design, Sampling Method, &Subjects	LOE*	Intervention & Outcomes	Results	Study Strengths & Limitations
Article 1 (Al-Hameed et al., 2018)	To reduce urinary catheter associated urinary tract infection in intensive care unit (ICU).	Correlational design. The study compared the retrospective data collected from January 1, 2008, to December 31, 2010, with prospective data collected from January 1, 2011, to December 31, 2016.	Level 4: Correlational design	Inservice training provided to staff on importance of using catheter insertion bundle and following the recommended evidence-based practices. Staff's knowledge on CAUTI prevention increased and CAUTI rate decreased.	A significant reduction in the UTI rate per 1000 Urinary catheter days; from 2.3 in 2010 to 0.3 in 2011 and it was sustained through 2016.	Conducted in one hospital ICU unit. Implementing nursing care interventions, educate staff on importance of CAUTI care bundle were recommended by investigators.
Barry, J., Allen, C., Chlebeck, M., Siebenaler, R., Wick, K., & Gunderson, W. (2017). Implementing a two person insertion technique and indwelling urinary catheter insertion competency	To reduce HAI	The study was conducted in 350-bed academic hospital in Oregon. Beginning in September 2014, the CAUTI bundle was launched following review of infection data, IUC insertion audits, and a review of the literature. Super Users were trained to become CAUTI experts and	Level 6: Electronic case review	Training and education were provided to nurses regarding indwelling catheter insertion and preventive measures.	CAUTI incidence dropped house wide following implementation of the CAUTI bundle, with only two CAUTIs during the bundle rollout timeframe. There was a 58% decrease in CAUTI house wide, with a 73% reduction on non-	Yes, the study is providing key measures to prevent CAUTI and reduce catheter days and importance of implementing daily catheter care bundle.

assessment to reduce catheter associated urinary tract infections. *American Journal of Infection Control*, *45*(6), S60. https://doi.org/10.1016/j.ajic.2017.04.094		were tasked with educating nursing staff on CAUTI prevention essentials and assessing competency with IUC insertions using a return demonstration technique on manikins. Prevention tactics included performing peri-care three times per day and assessing need of ICU during every shift.			intensive care units.	
Fletcher-Gutowski, S., & Cecil, J. (2019). Is 2-person urinary catheter insertion effective in reducing CAUTI? *American Journal Infection Control*, *47*(12), 1508–1509. https://doi.org/10.1016/j.ajic.2019.05.014	Reduce CAUTI rates by implementing two-person urinary catheter insertion protocol	330-bed community teaching hospital in Livonia, MI. The data were collected quarterly from October 2016 to June 2017. The 4 E's implementation science from Pronovost was used.	Level 2: RCT experimental design	53 participants completed the checklists, and they were collected from three different units. 98.1% compliance rate was noted in Units A and 100% noted in unit B compliance and unit C had 92.9% compliance rate.	Implemented a two-person urinary catheter insertion protocol and training provided to nurses on sterile technique and catheter insertion.	Yes, the study is giving positive result and higher implementation rate. This study can be used as a guide for this scholarly project. CDC guidelines states two -person foley insertion decreases CAUTI rate (CDC, 2019)

Girio-Herrera, L., Clay, C. M., Younus, F., Ahmed, Z., & Zimand, P. (2019). 964. Journey to zero harm: Eliminating catheter-associated urinary tract infections (CAUTIs) for 12 Consecutive Months at Two Community Hospitals. *Open Forum Infectious Diseases, 6*(Suppl 2), S30. https://doi.org/10.1093/ofid/ofz359.066	To achieve zero CAUTIs in two community hospitals	CAUTI prevention bundles were implemented in two hospitals from April 2015 to March 2017. One hospital has 195 beds, and the other hospital has 128 beds.	Level 2: Quasi-experimental study	The CAUTI prevention bundles included placement of urinary catheters only for approved indications, use of two persons (buddy system) for catheter insertion, nurse driven protocol for catheter removal, and silver-impregnated cloths for perineal care.	Statistically significant decrease in utilization of urinary catheters was observed and both hospitals were CAUTI free for 12 consecutive months	Strength: Positive result achieved the goal of the project. Limitation: The study was conducted only in two hospitals.
Article 4 (Jeyashree et al., 2020)	Reduce CAUTI rate	Study was conducted in ICU of a tertiary care teaching hospital in South India over the period of nine months from April to December 2017. The targeted population was adult	Level 4: Prospective interventional study before and after trial.	Statistically significant reduction was found in the incidence of CAUTI (60%—from 10.7 to 4.5 per 1,000 catheter days). The holistic approach lowered the rate of	Comparative study/the prospective interventional study result shows reduction in CAUTI rate.	No true control groups. Procedural bundle was done successfully. This study can be used as guide, but the limitations are major issues, and the care bundle has got two

		ICU patients. A total of 1,233 patients were included in the study.		CAUTI (CDC, 2019).		parts: procedural and maintenance both are difficult to evaluate for all patients.
Article 5 (Jain et al., 2020)	To reduce catheter associated urinary tract infection (CAUTI)	Interdisciplinary team that included registered nurse (RN, charge nurse, unit manager, infection preventionist, an advanced practice registered nurse (APRN), pharmacist and physician.	Level 2: RCT Experimental Design A multidisciplinary approach	CAUTI team was formed with interprofessional.	Interventions have shown a reduction in the rate of CAUTIs, Foley catheter days, and institutional cost.	Conducted in only one hospital. Article is providing lot of information for the scholarly project. The interventions to reduce CAUTI has brought positive outcome.
Article 6 (Leontie, 2021)	This Quality Improvement (QI) project was introduced to determine if implementing a 'Fight the Foley' bundle would reduce DUR of indwelling urinary catheters and reduce the rate of CAUTI.	Use of daily huddle to decrease CAUTI rate. The project was completed in a 238-bed not-for-profit hospital. The data was collected for12 months. Pre and post-comparison was completed on CAUTI infections, CAUTI rate, and device utilization rate (DUR).	Level 4: Correlational design QI project. A literature review of peer-reviewed articles within five years.	Pre and post intervention data showed CAUTI rate reduction, and significant reduction in DUR.	The study showed reduction in CAUTI rate.	Collaboration from interprofessional team is necessary. Compliance with daily huddle is needed. This QI project can be used as reference for the project because daily huddle, two-person foley catheter insertion and auditing of nursing documentation and physician orders are

						useful tools to reduce CAUTI rate.
Rahmawati, L., Mariana Tamaela, J., Anika, L., & Wicaksana, A. L. (2021). The two-person catheter insertion procedure reduces catheter-associated urinary tract infections. *Enfermería Clínica*, *31,* 478–482. https://doi.org/10.1016/j.enfcli.2020.10.047	To identify effect of two-person catheter insertion procedure on CAUTI	Literature review was performed on original articles published in PubMed and Science Direct databases. Joanna Briggs Institute critical appraisal tools were used to assess the quality of the studies	Level 2: Literature review	Out of 24 articles, only two articles fitted the criteria, and they were included in the analysis.	The investigators found out that there was no difference before and after the implementation of two-person catheter insertion procedure, but the studies found out CAUTI rate reduced after the implementation.	Only 24 articles were reviewed. The study was conducted with two articles that met the criteria. The regulatory bodies like The Joint Commission, World Health Organization, CDC, and ANA are working hard to implement protocols to reduce and prevent CAUTI. According to TJC, CAUTI rate was very high in 2019 nationwide. So, the regulatory bodies came up with two-person foley insertion, CAUTI bundles, tool, protocol, daily rounding etc., in 2019 (ANA, 2020). The reduction in CAUTI rate was identified in 2020, after implementing the above

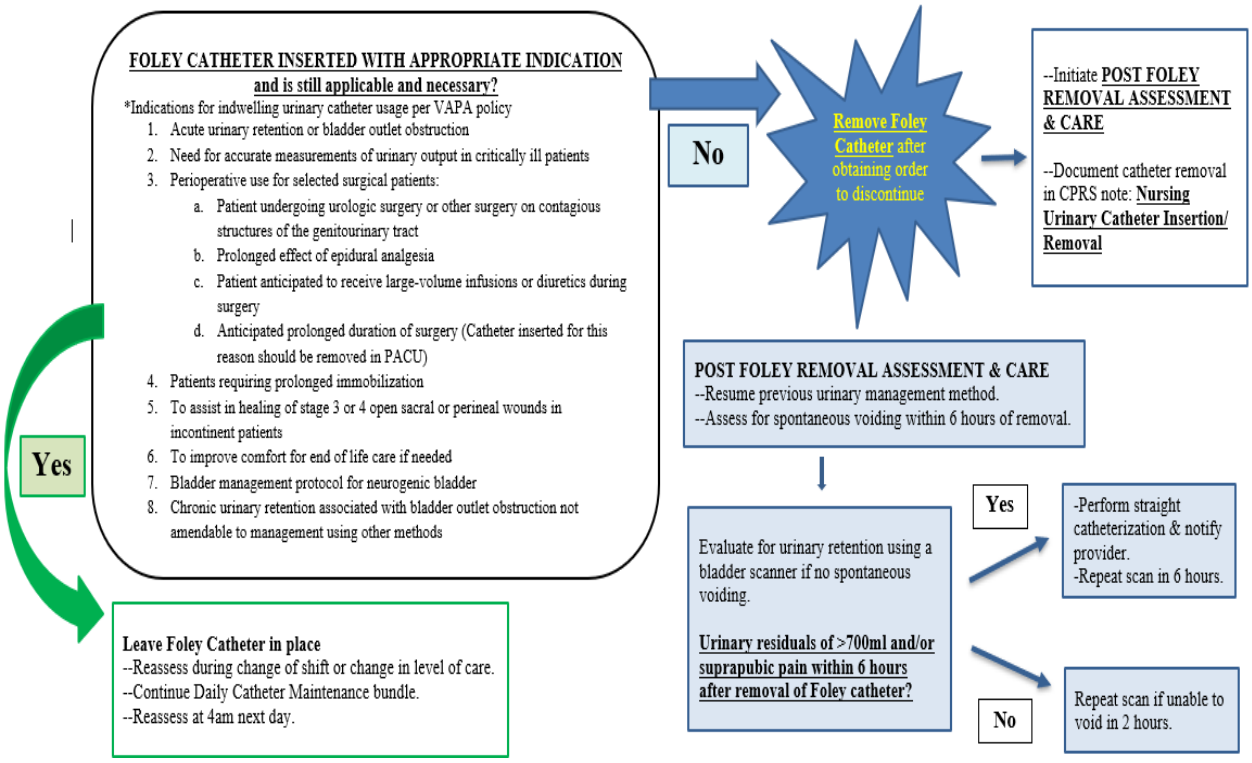
						interventions (CDC, 2020)
Richards, D. E. (2017). Catheter associated urinary tract infection (CAUTI) targeted assessment for prevention (TAP) effective practices. *American Journal of Infection Control*, *45*(6), S10–S11. https://doi.org/10.1016/j.ajic.2017.04.264	To determine which practice had the greatest likelihood of preventing CAUTI.	The project was conducted in Wisconsin. 40 surveys were collected from 21 hospitals from September 2015 to January 2016. 48 survey questions related to CAUTI were in the survey to be completed by nurses. One of the questions were two-person catheter insertion.	Level 5: Survey	Nurses were asked to complete 48 questions with different practices to prevent CAUTI. The plan was to prevent CAUTI with higher score.	Five questions received stronger correlation values. The top two practices recommended are two-person catheter insertion and antibiotic stewardship.	Involving nurses in the project gives them empowerment and decision-making capacity which leads to cooperation and teamwork. The study was conducted with small group of people from 21 different hospitals so there is more chance for bias.
Article 9 (Shadle, 2021).	Reduce CAUTI rate, catheter days, and to increase compliance with documentation of CAUTI.	28-bedded intensive care unit in a 224-bedded rural medical center.	Level 4: Correlational design. A bundle-cased approach.	Pre and post design. The targeted population was patients aged 18 and older who were admitted in ICU. No CAUTI was reported during the intervention period, reducing rate by 1.33	The targeted service population consisted of critically ill medical-surgical, trauma, neurological, and cardiothoracic surgical patients aged 18 years or	Generalizability of the finding were limited. Sample size was small. The study duration was short. Nurse-drive removal protocol was not tracked.

				per 1000 catheter days. Using daily checklists and algorithm-based nurse-driven protocols for catheter removal has been found to reduce CAUTI rates.	older who were admitted to the ICU project had a typical pre-post design. Preintervention data were collected and compared with data collected throughout the intervention phase. This process occurred over 2 consecutive 4-month periods. Data were then statistically analyzed and interpreted to determine efficacy.	
Article 10 (Tyson, 2018)	To decrease CAUTI by implementing two-person urinary catheter insertion protocol.	The study was conducted in St. Mary Mercy Hospital at Livonia, MI.	Level 3: Retrospective and cohort study	Registered Nurses (RNs) and staff trained on sterile technique by education specialist and checklist was implemented and completed by nurses for three months.	Decreased CAUTI rates and increased awareness of CAUTI among RNs in the units (ANA, 2020).	Conducted in one unit for three months only. The study provides positive outcome so the writer will use this as evidence for the project. Nurse-driven protocol gives

						empowerment to nurses (DePuccio, 2020).
Article 11 (Want et al., 2020)	To identify how national interventions could be optimized in reducing CAUTI rate.	The study was conducted in three home care settings in England and included 37 effective research interventions, mostly conducted in United States secondary care. A behavioral analysis of these interventions identified 39 intervention components as possible ways to optimize national interventions like checklists, guidelines, bladder scanners, training staff on EBP and catheter training audit were conducted.	Level 2: Literature review/descriptive study.	23 stakeholders invited, 14 (60%) completed the survey. Participants had expertise in secondary care (*n* = 5), primary, community care (*n* = 5) and care homes (*n* = 6). Two non-respondents represented secondary care: three represented primary/community care and one represented care homes.	Seven out of 20 intervention components met the prioritization criteria. For primary/community care 3/16 components were prioritized, 6/18 for secondary care and 4/14 for care homes.	The study did not gather feedback from patients and care givers. The response rate from all three settings were 60%. The barriers discussed here are based on evidence from secondary care and the US and there was limited to no evidence on whether the same influences on behavior are present in primary, community care and care home settings.

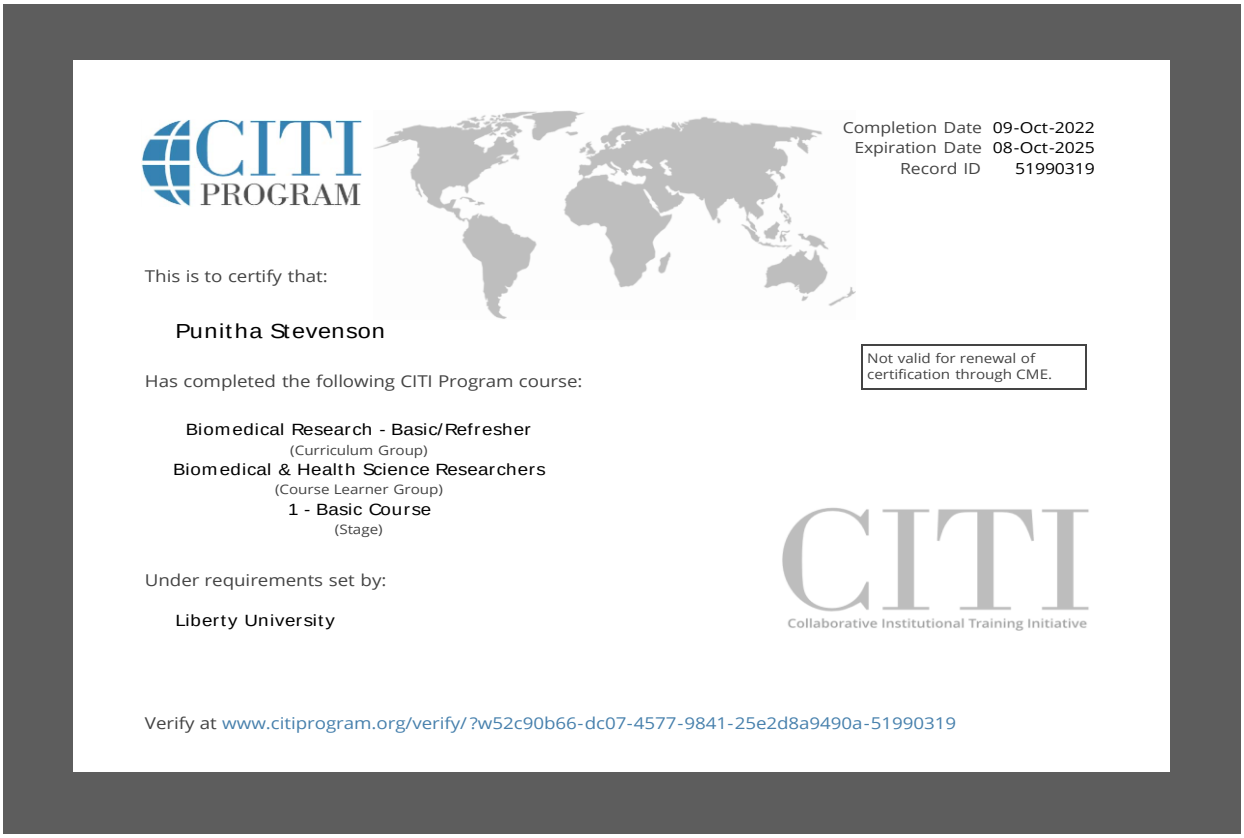
Appendix B

Indwelling Urinary Catheter Insertion and Removal Protocol



Appendix C

Certificate of CITI Training Completion



CITI PROGRAM

Completion Date 09-Oct-2022
Expiration Date 08-Oct-2025
Record ID 51990319

This is to certify that:

Punitha Stevenson

Not valid for renewal of certification through CME.

Has completed the following CITI Program course:

Biomedical Research - Basic/Refresher
(Curriculum Group)
Biomedical & Health Science Researchers
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

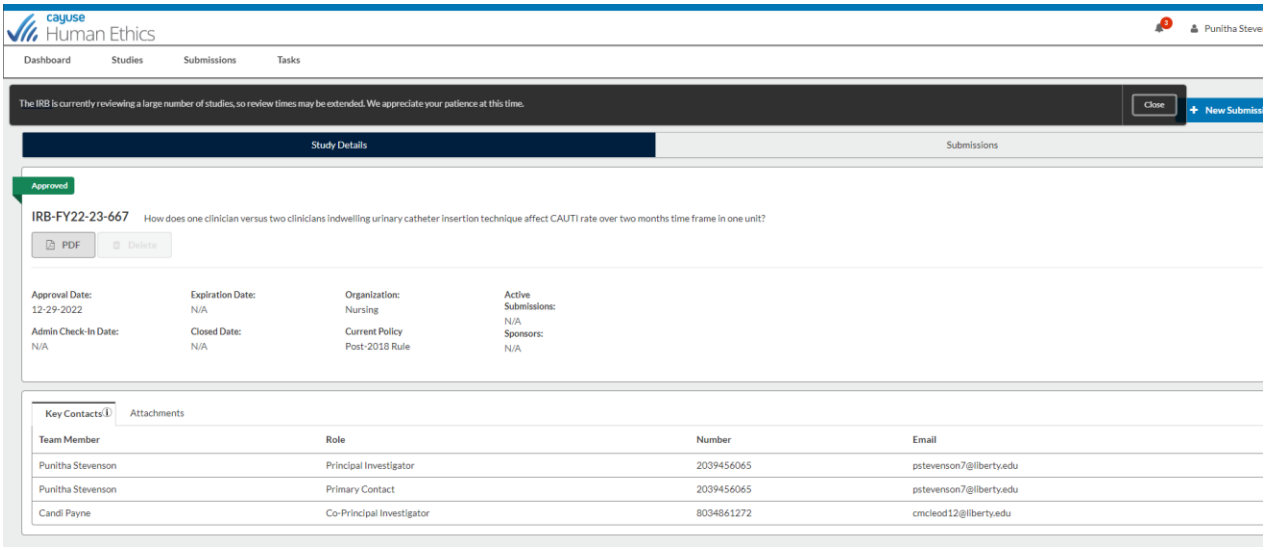
Liberty University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w52c90b66-dc07-4577-9841-25e2d8a9490a-51990319

Appendix D

Institutional Review Board Approval Letter



cayuse Human Ethics

Punitha Steve

Dashboard Studies Submissions Tasks

The IRB is currently reviewing a large number of studies, so review times may be extended. We appreciate your patience at this time. Close + New Submiss

Study Details Submissions

Approved

IRB-FY22-23-667 How does one clinician versus two clinicians indwelling urinary catheter insertion technique affect CAUTI rate over two months time frame in one unit?

PDF Delete

Approval Date: 12-29-2022	Expiration Date: N/A	Organization: Nursing	Active Submissions: N/A
Admin Check-In Date: N/A	Closed Date: N/A	Current Policy Post-2018 Rule	Sponsors: N/A

Key Contacts Attachments

Team Member	Role	Number	Email
Punitha Stevenson	Principal Investigator	2039456065	pstevenson7@liberty.edu
Punitha Stevenson	Primary Contact	2039456065	pstevenson7@liberty.edu
Candi Payne	Co-Principal Investigator	8034861272	cmcleod12@liberty.edu

Appendix E

Approval to use ANA CAUTI Tool

The CAUTI prevention tool by ANA is an evidence-based guideline that describes multiple levers and it is developed by leading nursing experts. ANA has partnered with the Centers for Medicare and Medicaid Services (CMS) to reduce CAUTI. CAUTI prevention is one of the priorities for ANA. Nurse consultants from partnership for patients PfP) team and representatives from CDC are included in the CAUTI prevention panel. The panel reviewed CAUTI reduction tools, and a focused review of the of the literature before developing two-part multi-factorial CAUTI reduction tool. ANA encourages nurses to be part of CAUTI reduction program through effective use of an innovative, streamlined, and evidence-based clinical tool. The tool determines if an urinary catheter is appropriate based on nursing assessment as well as alternatives for retention and incontinence, and timely removal (*ANA CAUTI Prevention Tool*, 2017)

DOWNLOADS
If any downloads are purposely made available to you through the Website, you may use such downloaded materials, provided that such use is for personal and not for commercial use; that you do not remove any proprietary notices on such materials, if any; that you do not copy or post such materials on any computer, website, or broadcast medium; that you make no changes to such materials; that you do not distribute such materials to any third parties; and that you do not attempt to electronically reproduce such materials and that you follow any other restrictions posted or present about or on such downloaded materials ((*ANA Enterprise Terms of Use | ANA Enterprise*, 2017)

Tools: This section will present the project tool(s) used to evaluate the phenomena of interest. A description of the tool, the content, origin, and appropriateness and rationale for using the tool are discussed. The reliability and validity of the tool(s) are noted. A discussion of the tool measurements, scoring, interpretation, administration (method and time to complete) is completed. Includes evidence of permission to use the tool(s) are discussed and copy of permission(s) are included in the appendix.

One question on the tool--is there reliability or validity mentioned for its use? I would mention this in the section if so.

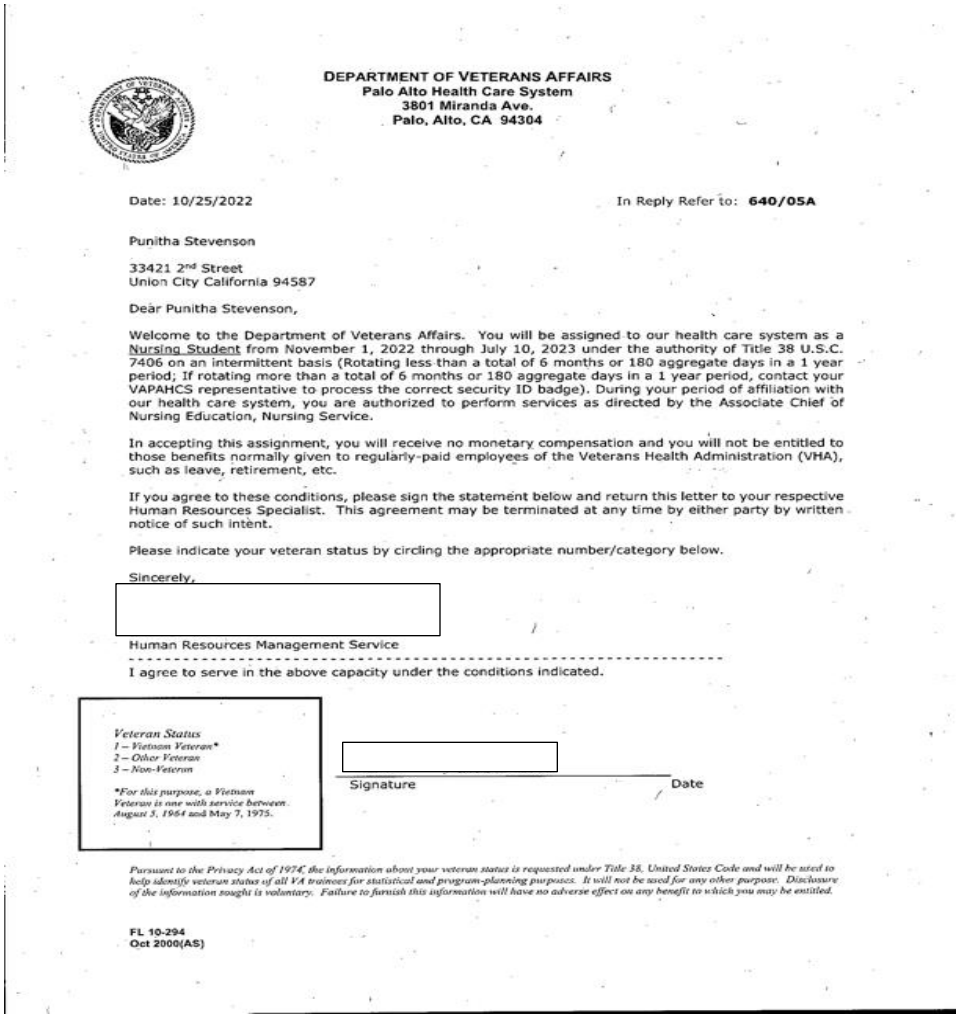
Reference

ANA Enterprise Terms of Use | ANA Enterprise. (2017). ANA. https://www.nursingworld.org/legal/

ANA CAUTI Prevention Tool. (2017, November 7). ANA. https://www.nursingworld.org/practice-policy/work-environment/health-safety/infection-prevention/ana-cauti-prevention-tool/

Appendix E

Letter of Support From Organization



DEPARTMENT OF VETERANS AFFAIRS
Palo Alto Health Care System
3801 Miranda Ave.
Palo, Alto, CA 94304

Date: 10/25/2022 In Reply Refer to: **640/05A**

Punitha Stevenson

33421 2nd Street
Union City California 94587

Dear Punitha Stevenson,

Welcome to the Department of Veterans Affairs. You will be assigned to our health care system as a Nursing Student from November 1, 2022 through July 10, 2023 under the authority of Title 38 U.S.C. 7406 on an intermittent basis (Rotating less than a total of 6 months or 180 aggregate days in a 1 year period; If rotating more than a total of 6 months or 180 aggregate days in a 1 year period, contact your VAPAHCS representative to process the correct security ID badge). During your period of affiliation with our health care system, you are authorized to perform services as directed by the Associate Chief of Nursing Education, Nursing Service.

In accepting this assignment, you will receive no monetary compensation and you will not be entitled to those benefits normally given to regularly-paid employees of the Veterans Health Administration (VHA), such as leave, retirement, etc.

If you agree to these conditions, please sign the statement below and return this letter to your respective Human Resources Specialist. This agreement may be terminated at any time by either party by written notice of such intent.

Please indicate your veteran status by circling the appropriate number/category below.

Sincerely,

Human Resources Management Service

I agree to serve in the above capacity under the conditions indicated.

Veteran Status
*1 – Vietnam Veteran**
2 – Other Veteran
3 – Non-Veteran

**For this purpose, a Vietnam Veteran is one with service between August 5, 1964 and May 7, 1975.*

Signature Date

Pursuant to the Privacy Act of 1974, the information about your veteran status is requested under Title 38, United States Code and will be used to help identify veteran status of all VA trainees for statistical and program-planning purposes. It will not be used for any other purpose. Disclosure of the information sought is voluntary. Failure to furnish this information will have no adverse effect on any benefit to which you may be entitled.

FL 10-294
Oct 2000(AS)

Appendix F

Tables

Table 1

Competency Checklist for Two-Clinician Indwelling Urinary Insertion Technique

Step	Satisfied	Unsatisfied	Need Practice
Performed hand hygiene before patient contact Introduced self to the patient.			
Verified the correct patient using two identifiers.			
Reviewed the patient's record for any pathologic condition that may impair passage of the catheter.			
Assessed the patient's clinical status.			
Assessed the patient's bladder for fullness or used a bladder scanner.			
Performed hand hygiene and donned gloves.			
Assessed the perineal anatomic landmarks and evaluated the region for erythema, drainage, and odor.			
Removed gloves and performed hand hygiene.			
Arranged for extra health care personnel to assist catheter Insertion.			
Raised the bed to an appropriate working height.			
Facing the patient, stood on the left side of the bed if right-handed and on the right side if left-handed.			
If side rails were being used, lowered the side rail on the working side of the bed and raised the side rail on the opposite side.			
Placed a waterproof pad under the patient.			

Positioned the patient.	
Assisted the patient to a dorsal recumbent position (supine with knees flexed). Asked the patient to relax her thighs to externally rotate the hip joints.	
If the patient could not be supine, positioned her in a side-lying (Sims) position with her upper leg flexed at knee and hip. Took extra precautions to cover the rectal area with a drape during the procedure to reduce the risk of cross contamination. Supported the patient with pillows, if necessary, to maintain her position.	
Covered the patient with a bath blanket or sheet.	
Washed the perineal area with soap and water, located the urinary meatus, and dried the area.	
Had an assistant hold an alternative light source to illuminate the perineum as needed.	
Discarded used supplies, removed gloves, and performed hand hygiene.	
Obtained an indwelling catheterization kit as instructed.	
Opened the sterile inner package containing the catheter supplies using sterile technique.	
Positioned patient and maintained the position of the nondominant hand throughout the procedure.	
Don sterile gloves.	
Draped aseptically and maintains sterility throughout the procedure.	
Prepared items for an indwelling catheter with a preassembled closed urine drainage system.	
Had an assistant use a flashlight to view the meatus.	

Inserted indwelling urinary catheter according to the guidelines.
Secured the drainage bag and tubing below the level of the bladder.
Discarded supplies, removed gloves, and performed hand hygiene
Documented the procedure in the patient's record.

Table 2

Descriptive Statistics Pre- and Post Implementation

							Skewness		Kurtosis	
Phase	*N*	Min.	Max.	Sum	*M*	*SD*	Statistic	*SE*	Statistic	*SE*
Pre	30	5	10	220	7.33	1.373	.032	.427	-0.541	.833
Post	30	2	7	140	4.67	1.422	.023	.427	-1.089	.833

Table 3

Statistics Table

	Before project implementation	After project implementation
N Valid	30	30
Missing	0	0

Table 4

Frequency Table Prior to Project Implementation

Valid	Frequency	%	Valid %	Cumulative %
5	3	10.0	10.0	10.0
6	6	20.0	2.0	30.0
7	6	20.0	20.0	50.0
8	10	33.3	33.3	83.3
9	3	10.0	10.0	93.3
10	2	6.7	6.7	100.0
Total	30	100.0	100.0	

Table 5

Frequency Table After Project Implementation

	Frequency	%	Valid %	Cumulative %
Valid 2	1	3.3	3.3	3.3
3	7	23.3	23.3	26.7
4	6	20.0	20.0	46.7
5	6	20.0	20.0	66.7
6	7	23.3	23.3	90.0
7	3	10.0	10.0	100.0
Total	30	100.0	100.0	

Table 6

CAUTI Rate After Project Implementation – 7 SCI Unit

Date	Number of patients with an indwelling urinary catheter	New CAUTI events
18 Jan	3	0
19 Jan	5	0
20 Jan	5	0
21 Jan	6	0
22 Jan	3	0
23 Jan	6	0
24 Jan	3	0
25 Jan	7	0
26 Jan	7	0
27 Jan	5	0
28 Jan	4	0
29 Jan	4	0
30 Jan	6	0
31 Jan	6	0
01 Feb	5	0
02 Feb	7	0
03 Feb	4	0
04 Feb	6	0
05 Feb	3	0
06 Feb	5	0
07 Feb	2	0
08 Feb	3	0
09 Feb	6	0
10 Feb	4	0
11 Feb	6	0
12 Feb	3	0
13 Feb	4	0
14 Feb	4	0
15 Feb	5	0
16 Feb	3	0