Reducing Catheter-Associated Urinary Tract Infections: Beyond the Bundle

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DOI: https://doi.org/10.46409/sr.VJWP6835

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Recommended Citation
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Reducing Catheter-Associated Urinary Tract Infections: Beyond the Bundle

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This Manuscript Partially Fulfills the Requirements for the

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March 28, 2022
University of St. Augustine for Health Sciences  
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Abstract

Practice Problem: Catheter-associated urinary tract infections (CAUTIs) are preventable but are still the most common healthcare-associated infection (HAI) worldwide, encumbering the health of patients and escalating financial burden on society (CDC, 2021; Shadle, 2021).

PICOT: In adult patients with spinal cord injury, does direct observation of urinary catheter insertion, compared to the standard of care, reduce the rate of catheter-associated urinary tract infections, within ten weeks of implementation?

Evidence: Multiple factors contribute to Healthcare-Associated Infections (HAIs), but hand hygiene is the most important prevention measure to decrease contact transmission (Gould et al., 2017). The Centers for Disease Control (CDC) clinical guidelines stressed the importance of hand hygiene before urinary catheter insertion, along with maintaining aseptic technique during insertion (HICPAC, 2019).

Intervention: A two-person catheter insertion protocol utilizing a standardized checklist was implemented to increase compliance with CAUTI infection prevention measures and to validate that hand hygiene and aseptic technique were performed before and maintained during catheter insertion.

Outcome: There was no change in CAUTI rates after implementing the two-person insertion protocol. Rates reported two months before the intervention were zero and remained zero for the two-month implementation period. It can be noted that the intervention bared no negative effects on the CAUTI rates. The outcomes warrant further monitoring as the sample size was small and the implementation period was limited to ten weeks.
Conclusion: A two-person catheter insertion protocol utilizing a standardized checklist proved to be clinically significant as it caused no adverse effects on CAUTI rates and may have attributed to decreasing the risk of CAUTI infections upon insertion.
Reducing CAUTI: Beyond the Bundle

Catheter-associated urinary tract infections (CAUTIs) are the most common healthcare associated infections (HAI) worldwide (CDC, 2021). These infections burden the health of patients and result in a high financial cost to society (Shadle et al., 2021). The endeavor to decrease CAUTIs has been a healthcare priority for over a decade, and regulatory bodies like The Joint Commission and Centers for Medicaid & Medicare (CMS) have been holding healthcare facilities accountable to prevention (Rhone et al., 2017).

Clinical practice guidelines aimed at CAUTI prevention outline multiple catheter management strategies, referred to as bundles, to reduce CAUTI risks. These guidelines focus heavily on clinical indication, early removal, and catheter maintenance to prevent the risk for CAUTIs. Institutions nationwide have implemented bundles based on the latest clinical practice guidelines in an effort to prevent and reduce catheter associated infections. Despite these efforts to reduce CAUTIs, they are still the most prevalent and preventable HAI today (AHRQ, 2021).

The purpose of this project was to go beyond the CDC-recommended CAUTI bundle that is currently in place at the practicum site by implementing a two-person direct observation protocol to validate healthcare workers' accountability to maintaining CAUTI infection prevention measures before and during the strict aseptic catheterization process.

Significance of the Practice Problem

Improving infection prevention and control measures is crucial to minimizing the spread of disease, particularly in the healthcare setting. According to the Centers for Disease Control, (2021) urinary tract infections (UTIs) are the most frequently reported healthcare associated infection (HAI) in the United States, and 75% of these infections are associated with urinary catheterization during a hospital stay. The burden of urinary tract infection is not limited to the
United States alone, it is the number one infectious disease in healthcare, worldwide (Hariati et al., 2019). Catheter associated infections are preventable but account for exorbitant healthcare costs estimated up to 345 million United States dollars per year in infections (McAlearney et al., 2017). Urinary tract infections increase morbidity, mortality, length of stay (LOS) and raise healthcare costs (Hariati et al., 2019).

**Significance of CAUTI in Spinal Cord Injury**

UTIs are the most prevalent infection in the spinal cord injury (SCI) population, and contributes to approximately 2.5 infections per patient, per year (Linsenmeyer, 2018). The current CDC CAUTI prevention guidelines focus on clinical indications for use and early removal to prevent infection in the average patient population. These general guidelines contradict the guidelines published by the Consortium for Spinal Cord Medicine (2006) which considered the complex issues of spinal cord injury patients including quality of life and patient preference regarding indwelling catheterization (Davis, 2019). Many individuals with spinal cord injury suffer from neurogenic bladder, and an indwelling urinary catheter is essential for supporting bladder management in this population. Avoiding indwelling catheter use for bladder management is often not possible with this population.

Indwelling catheters allow disabled individuals to have improved independence and the catheters are often the preferred method of bladder management of spinal cord injury patients. The choice of this independence may lead to a longer length of stay, and delays in rehabilitation (Linsenmeyer, 2019).

**CAUTI Prevention in SCI**

According to the Healthcare Infection Control Practices Advisory Committee (HICPAC) (2019), highly recommended actions for CAUTI prevention in spinal cord injury patients include
proper technique for catheter insertion, focusing on hand hygiene, sterile equipment, and aseptic technique by highly trained and competent individuals. Hand hygiene is regarded as the number one intervention to reduce HAIs. However, maintaining healthcare worker compliance in the fast-paced inpatient setting is challenging (Neo et al., 2021). It is assumed that hand hygiene and aseptic technique during urinary catheter insertion is routinely applied 100% of the time among healthcare workers in acute care, but this is not an accurate assumption. According to the CDC (2021) healthcare workers perform hand hygiene only 50% of the time to reduce the spread of infection. Furthermore, a study by Carter et al. (2016) concluded that healthcare workers identified poor urinary catheter insertion techniques as a perceived risk of CAUTIs.

**PICOT Question**

The PICOT question that guided this project was “In adult patients with SCI, does direct observation of urinary catheter insertion, compared to the standard of care, reduce the rate of CAUTI, within ten weeks of implementation?” The population in this study included Veterans over the age of 18, all male, who sustained a spinal cord injury and required indwelling catheter use during their stay in an acute care setting. The intervention included a protocol for direct observation by a second nurse trained in catheter insertion to validate infection control measures, including hand hygiene and aseptic during urinary catheter insertion. Indwelling catheters were inserted by one registered nurse at this practicum site. A standard CAUTI bundle policy that followed the latest CDC clinical practice guidelines for insertion appropriateness, catheter maintenance, and surveillance was already in place at this site.

**Evidence-Based Practice Framework & Change Theory.**

The practicum site identified the John’s Hopkins Evidence-Based Practice (JHNEBP) framework as the preferred structure for guiding evidenced-based practice projects. This
framework was utilized as a problem-solving approach; to identify the practice problem, evaluate and grade the evidence, and translate the findings into clinical practice (Dang & Dearholt, 2017).

The nursing change theory that guided this behavioral practice change was Lewin’s “Three-Step Change Model” which involves the process of unfreezing current practice, change or movement toward new practice, and refreezing the transformation once the goal was met (Lewin, 2012). Lewin believed that behavior derives from an individual and their environment and that opportunity can initiate change while barriers can hinder people from obtaining their goals (Lewin, 2012, p. 220). In the unfreezing stage of this practice change, barriers to practice improvement were identified, and a plan to overcome these barriers was created. Staff behavior was modified during the change stage through the implementation of the new practice. The new practice became normal behavior, and the new practice was frozen in place once the goal was achieved.

**Evidence Search Strategy**

The author conducted a review of the literature using PubMed, CINHAL, and Search USA databases. The Boolean factors “AND” and “OR” were used with search terms. CAUTI prevention was the main search term followed by terms “two-person insertion” “2-person insertion” and “direct observation”. The search was limited to peer-reviewed; English language, academic journal articles published from 2014-to 2021. PubMed and CINHAL were searched utilizing MESH phrases “catheter-associated urinary tract infection and direct observation” and “catheter-associated urinary tract infection and two-person insertion.” The search was limited to peer-reviewed; English language, academic journal articles published from 2014-2021. Inclusion criteria included CAUTI improvement strategies to maintain sterility and infection control practices during catheter insertion through direct observation or a two-person catheter insertion
procedure on adult patients in an acute care setting. Exclusion criteria existed of articles that implemented standard CAUTI bundled prevention measures following the latest clinical practice guidelines such as catheter indication, nurse-driven catheter removal protocols, indwelling catheter maintenance, and surveillance. The CDC standard CAUTI bundle policy already existed at this facility. The goal of this project was to implement strategies that went beyond the standard CAUTI bundle. The Cochrane Library and Joanna Briggs Institute EBP Database were searched by the author for systematic reviews relevant to CAUTI prevention and HAI compliance. Search terms used were “Direct Observation,” “Audit and Feedback,” “CAUTI,” and “HAI.” The search criteria were limited to systematic reviews published within the past five years. Reviews that did not address CAUTI prevention or HAI compliance were excluded.

**Evidence Search Results**

The search generated 126 results (see Figure 1). Articles that included measures containing a form of observation during catheter insertion to validate that aseptic technique was maintained during catheter insertion were evaluated. Two articles were identified as secondary sources and were searched directly by title.

Sixteen articles were evaluated utilizing The Johns Hopkins Nursing Evidence-Based Practice: Model and Guidelines (see Figure 2). The literature evaluated included one expert opinion piece, six practice improvement projects, a qualitative study, a quantitative study, and seven systematic reviews. The John Hopkins assessment implies Level I as the highest level of evidence and level V as the lowest. The quality of evidence ranged from low, too good, and high quality which contains clear objectives; consistent results across various settings, conclusive assumptions, and consistent recommendations thoroughly referencing scientific indication (Dang & Dearholt, 2017).
One consensus piece was evaluated as a Level IV. Six individual studies were evaluated at a level V. They consisted of quality improvement projects, implemented in acute care facilities, and vary in level of quality from low to good. One of the 16 studies was qualitative and graded as a level III, good quality study. This study ascertained that breaches in aseptic technique during urinary catheterization were highly likely to occur according to staff nurses’ perceptions (Carter et al., 2016). Another promising study by Galiczewski and Shurpin (2017) was graded as level III evidence. This quasi-experimental study lacked randomization with a control group but included all other elements of high-quality evidence and concluded that CAUTI rates decreased from 2.24 to 0 per 1000 catheter days after implementing a direct peer observation urinary catheter protocol. See Appendix A for a summary of primary research evidence.

A high-quality systematic review of randomized control trials (RTCs) by Gould et al. (2017) identified performance feedback as a strategy to increase compliance with hand hygiene and infection control measures to reduce the risk of HAIs. A level II grade C systematic review on the effectiveness of behavioral interventions to reduce CAUTIs by Jones et al. (2019) suggested that performance feedback used alone or with other interventions such as education and auditing was likely to be effective in reducing the rates of CAUTI. A level II grade C systematic review of RTCs and non RTCs inquiring on “how to improve adherence to standard precautions to control HAIs” by Moralejo et al. (2021) identified that peer evaluation could increase healthcare worker compliance to standard precautions. Marin (2021) conducted a systematic review questioning best strategies to improve adherence to infection control guidelines and identified a multi-modal approach including improving safety culture and audit and feedback to improve compliance. Atkins et al. (2020) identified observation of IPC protocols
and feedback as a facilitator to CAUTI prevention in a Level II grade C systematic review of qualitative and quantitative studies. Ishaque (2021) suggested that Audit and feedback were recommended to facilitate practice change or improvement in Level II grade C through the review of systematic reviews and RTCs. See Appendix B for a summary of systematic reviews.

**Themes with Practice Recommendations**

Several themes emerged during this literature review including HAI compliance, direct observation, and socioadapted or behavioral approaches to decrease CAUTI. See Appendix C for emerging themes.

**HAI Compliance**

CAUTI is a common HAI and is a major cause of morbidity and mortality in healthcare (CDC, 2021). Multiple factors contribute to HAIs, but hand hygiene is regarded as the most important prevention measure to decrease contact transmission (Gould et al., 2017). Due to time-sensitive demands and the stressful environment in acute care, hand hygiene compliance by healthcare staff is poor (Neo et al., 2021). Clinical guidelines for CAUTI stress the importance of hand hygiene pre-insertion and upon manipulation of an indwelling urinary catheter, along with asepsis technique during insertion (HICPAC, 2019). A high-quality systematic review by Guold et al. (2017) identified direct observation as an intervention to improve hand hygiene compliance in the healthcare setting. A high-quality integrated review identified education, evaluation, mentoring, and direct feedback as effective strategies to increase HAI compliance (Neo, 2021). The evidence showed that direct observation, a form of live auditing and evaluation, is a means to hold nursing staff accountable for complying with infection control and prevention measures. According to the literature, implementing a two-person catheter insertion protocol utilizing a
standardized checklist may increase HAI compliance and decrease the risk of CAUTI through transmission and contamination.

**Direct Observation**

Direct observation is an active assessment process that can foster accountability to practice. Direct observation allows the auditor to provide performance feedback. In a qualitative comparative study by Carter et al. (2016) poor catheter insertion technique was identified among healthcare workers in an Emergency Room as a risk factor to CAUTIs. Three-level V quality improvement studies identified successful outcomes of clinical significance after implementation of a two-person urinary catheter insertion protocol that utilized a standardized checklist to validate that infection prevention measures were maintained during catheterization (Carter et al., 2014; Fletcher-Gutowski & Cecil, 2019; Rhone et al., 2017). A level III, high-quality case-control study conducted by Galiczewski and Shurpin (2017) demonstrated that CAUTI rates decreased from 2.24 to 0 per 1000 catheter days after implementing a direct observation protocol with a checklist was added to the catheter insertion procedure. A high-quality systematic review by Gould et al. (2017) indicated that performance feedback improved hand hygiene compliance in acute care facilities.

**Socioadaptive Interventions**

The Agency for Healthcare Research and Quality (2021) Comprehensive Unit-Based Safety Project (CUSP) national initiative is focused on decreasing CAUTIs in the United States, through both technical and socioadaptive changes applied in acute care. These changes are centered around improving processes, promoting a culture of safety, and encouraging communication through team-based care. The CUSP program identifies accountability and peer-to-peer coaching as integral elements to promote patient safety and teamwork at the unit level.
Three-level V, quality improvement projects identified the CUSP initiative as the framework to reduce CAUTIs and introduce protocols requiring two registered nurses for urinary catheter insertion (Carter et al., 2014; Rhone et al., 2017; Saint et al., 2016).

**Recommendation**

Based on a thorough and rigorous review of the literature, the body of evidence answered the PICOT question and supported the intervention of a two-person catheter insertion protocol utilizing a standardized checklist to increase compliance with proven CAUTI infection prevention measures and to validate that hand hygiene was performed and that aseptic technique was maintained during catheter insertion. This intervention aligns with the CDC (2019) Guideline for Prevention of CAUTI and the AHRQ (2021) CUSP method initiative. The DNP Project Lead created a 13-item standardized checklist (Appendix G) which concurred with the CDC (2019) clinical practice guidelines and the facility's catheter insertion policy & procedure, which aided in establishing validity on the evidence-based steps outlined in the checklist. Use of the checklist was piloted by four nurses during annual catheter insertion competency validation. Interviews and results were compared to identify weaknesses in the checklist which further established validity.

**Setting, Stakeholders, and Systems Change**

This DNP scholarly project took place on an adult, spinal cord injury (SCI) acute care unit comprised primarily of male patients. All the patients in this unit required catheterization due to a neurogenic bladder. The practice site promotes and supports a culture of safety. A safety culture can be identified and measured and has been associated with reductions in errors (Patient Safety Network, 2021). The vision of the practice sight is to provide world-class service to Veterans through integrity, commitment, advocacy, respect, and excellence (U.S. Department of
Veteran Affairs, 2021). The practice site aspires to be a High-Reliability Organization (HRO) and aims to achieve zero patient harm. The organizational need for this project was established through CAUTI surveillance by the Infection Control and Prevention Department (ICPD). Inpatient Evaluation Center (IPEC) data reflects the number of infections per 1000 catheter days. This data was used to determine the need for CAUTI reduction in the SCI unit as rates were elevated compared to all other acute inpatient units at this site.

**Interprofessional Stakeholders**

The stakeholders included the ICPD, SCI Chief and Deputy Chief, SCI Manager, assistant manager, educator, and the SCI nursing staff. An initial meeting with the ICPD established the need for an intervention to reduce a rise in CAUTI infections in the SCI unit. The author was introduced to the Deputy Chief of SCI and proposed to take on the project to reduce CAUTI rates within the unit; the Deputy Chief obliged the proposal and committed support of the SCI team. An introductory meeting with the SCI manager, assisting manager, and educator took place to begin collaboration. SCI nursing staff support, and engagement were essential to the success of this project.

A Strength, Weakness, Opportunities, and Threats Analysis (SWOT) was conducted (see Appendix I). The strengths of this project included a culture of safety that is already established within the organization along with committed organizational support. Weaknesses included the patient population that often requires long-term catheterization which increases the risk of CAUTI infection. Deficiencies in infection prevention practices were identified in the SCI unit, by the ICPD. These deficiencies included observations of staff not performing hand hygiene upon exiting patient rooms and not wearing appropriate PPE when providing patient care. Opportunities for improvement in infection control practices existed along with the opportunity
to improve communication, teamwork, and collaboration within the unit. The possible threats include staff resistance and lack of engagement in the proposed practice change.

**System Change**

Organizational change can be affective at the micro-level; involving a team or unit, at the meso level, involving an organization or at a macro level involving an entire system (Belrhiti et al., 2018). The project affected the organization at the micro-level. A two-person direct observation protocol for urinary catheterization that utilized a standardized checklist was implemented in the SCI unit to reduce the risk of CAUTI on insertion. This unit-based practice improvement project affected one group of 24 nurses and approximately 30 inpatients, in one unit of an acute care facility.

**Implementation Plan with Timeline and Budget**

**Objective**

Project approval was obtained by the University of St. Augustine faculty EPRC Committee. An institutional review board (IRB) proposal was submitted to the practicum site, was reviewed, and approval was obtained prior to the project implementation. The main objective of this project was to decrease CAUTI rates in the SCI unit, within ten weeks, through the implementation of a two-person observation urinary catheter insertion protocol that utilized a standardized checklist. A second nurse observer utilized a standardized checklist to validate that all infection control measures were maintained prior, during, and directly after urinary catheter insertion. The CAUTI rate was calculated by dividing the number of new infections by the number of urinary catheter days and multiplying by 1000 (Galiczewski & Shurpin, 2017). The rate during the project period was compared to the previous ten weeks.
The second objective of this project was to have 100% staff compliance using the two-person observation protocol and standardized checklist for each urinary catheter insertion, for ten weeks. Because the outcome of this project could be adversely affected by low compliance rates, the project manager monitored compliance, and a compliance rate was generated by dividing the number of completed checklists by the number of catheterizations within the project period and multiplying by 100.

The third objective was sustainability. Once the project was complete, the two-person insertion protocol was added to the CAUTI Prevention policy. Sustainability will continue to be monitored through weekly audits by the unit manager. The two-person protocol has been added to the unit's Foley Catheter Maintenance Bundle Audit Tool (see Appendix F). Sustainability will be generated by dividing the number of completed audits by the number of times the two-person insertion method was completed and multiplying by 100.

**Project Details**

The JHEBP Model was used as a problem-solving approach to apply this evidenced-based practice intervention (Dang & Dearholt, 2017). The practice question, evidence, and translation process (PET) guided this project (Upstate University, 2021). A practice problem was identified at the site, a systematic literature review was conducted, the strength of the evidence was rated utilizing the JHEBP tool kit, and the intervention was translated from the evidence and implemented into practice.

Lewin's three stages of change; unfreezing, changing, and refreezing set the foundation for the practice project (Lewin, 2012, p. 220). The unfreezing stage began once the practice problem was identified with the notion to undo the facility's current practice. The change stage was commenced at the implementation of the project and newly desired practice change, and
refreezing occurred once sustainment was achieved, and the protocol was implemented into the site’s CAUTI Prevention Policy. Lewin’s three stages of change are correlated to the project details below. The project timeline can be viewed in Appendix D.

**Unfreezing**

Prior to IRB submission, project approval was obtained from the University of St. Augustine faculty EPRC Committee. An internal review board (IRB) proposal was submitted through the practicum site, reviewed, and approved before the project's start. Key stakeholders of the planned change were recognized early on, and a team meeting took place to identify roles and responsibilities. The DNP Project Lead created protocol training with the collaboration of the SCI education team. Staff in-service training took place during the Daily Management System DMS huddle over two weeks prior to project implementation. The DNP Project Lead introduced the project’s purpose with a presentation, delivered a review of the facility's catheter insertion procedure via handout, and provide instruction for use of the standardized checklist during five DMS huddles (see Appendix K, J & G). A practice change alert (see Appendix H) was posted on the DMS board. Urinary catheter insertion training was not required as the SCI nursing staff members were assessed and validated competent between July and August 2021 by the SCI unit educators, during the annual competency evaluation.

**Change**

The pilot project of a two-person direct observation protocol using a standardized checklist took place over ten weeks. The DNP Project Lead was on-site to oversee the project’s initiation and to answer all questions and concerns for the first week of implementation. Data collection and auditing took place every Friday after the first week the project began. The DNP Project Lead collected the completed standardized checklists (see Appendix G) and audited
charts once a week using the chart audit tool (see Appendix E). Communication was provided in person and via email to all stakeholders once a week throughout the project implementation. The nursing staff was remediated or educated as needed. Data was analyzed and the DNP Project Lead evaluated the intervention for effectiveness or improvement. A summary of the outcomes was finalized and shared with all stakeholders in SCI. Staff resistance to change, time constraints due to patient census, and acuity of care were potential barriers to this project. Improvements were considered throughout the project but not required.

**Refreeze**

The two-person observation protocol was “frozen” into practice and sustainability was achieved by adding the new protocol into the facility's current CAUTI prevention policy. Policy compliance will continue to be tracked by the unit managers through the collection of the Catheter Insertion Direct Observation Checklist (Appendix G) until it proves to be encultured into practice and becomes the practiced norm at the facility.

After completion, the DNP Project Lead disseminated the project findings to the SCI unit and throughout the practicum site.

**Leading Role**

The DNP Project Lead managed the evidenced-based practice change with the collaborative efforts of the SCI Manager, Assistant Manager, and unit Educator. The DNP Project Lead completed the evidence evaluation to support the project and suggested the intervention to reduce CAUTI incidences in the SCI unit. The SCI Manager and Assistant Manager showed continuous support for the intervention and imposed compliance to the protocol. The unit Educator assisted in protocol training and use of the standardized checklist. The project lead collected, analyzed, and disseminated the data. Project management skills are
vital to project implementation and include organization, time management, problem-solving, team management, and emotional intelligence.

**Budget**

Expenses for this project were minimal. The DNP Project Lead provided in-service protocol training. Additional staffing was not required to implement this protocol. Equipment was budgeted in the event nurses require remedial training in foley catheter insertion. Handouts and a statistician accrued minor costs (see Table 1).

**Results**

The Intellectus Statistics (2021) program was used to analyze descriptive and statistical data for this project. Project participants included adult patients, 18 years and older, in the SCI unit that met the predetermined criteria for indwelling catheterization according to the current Foley-In policy. Exclusion of participants included those with a diagnosis of UTI infection before catheterization, those diagnosed with symptomatic Bacteriuria prior to catheterization, and those who had “urology insertion only” catheter orders. Population demographics of participants were collected during the intervention period and included age, and gender. The most frequently observed Gender category was Male (n = 14, 100.00%) see Table 2. The observations for patient age ranged from 35 to 82 and demonstrated a mean of age of 69.71 (see Table 3).

**CAUTI Measure**

The primary outcome measure of the project included the evaluation of the percentage rate of CAUTI infections in the SCI unit. According to the Centers for Medicare & Medicaid Services (CMS), the national benchmark for Catheter-associated urinary tract infections in ICUs and select wards is 1.000 (CMS, 2022). This rate is measured by the number of CAUTI
infections reported within the project period divided by the number of patients indwelling catheter days times 1000. For October, the pre CAUTI rate was 178 indwelling catheter days with zero CAUTIs (n = 0%). The November rates were 277 indwelling catheter days with zero CAUTIs (n = 0%). Post-implementation rates for December were 286 indwelling catheter days with zero CAUTIs (n = 0%) and January resulted in 316 catheter days and again CAUTIs (n = 0%). Even with an increase in catheter days, the CAUTI rate remained zero. Statistical analysis with the repeated variable of zero percent CAUTI rates is not possible.

**Catheter Days**

The result of the two-tailed paired samples t-test comparing catheter days pre and post implementation was not significant based on an alpha value of .05, \(t(1) = -2.13, p = .279\), indicating the null hypothesis cannot be rejected. This finding suggests the difference in the mean of preintervention catheter days and the mean of postintervention catheter days was not significantly different. (see Table 4).

**Compliance Measure**

The compliance measure of this process was concluded by dividing the number of completed direct observation checklists collected during the implementation period, by the number of opportunities for catheter insertion in the SCI unit. The total number of catheter insertion opportunities was (n = 44) during the ten-week implementation period. Frequencies and percentages were calculated for the direct observation checklist utilization. The direct observation checklist was utilized for 59.9% of the catheterization’s conducted on the unit (n = 26, 59.09%) see Table 5. This compliance measure provided the opportunity to evaluate compliance with the new protocol. This measurement represents a lower-than-expected compliance rate but did not affect the outcome of this project.
**Sustainability**

Sustainability will continue to be monitored by the manager through weekly audits moving forward. The two-person protocol has been added into the units Foley Catheter Maintenance Bundle Audit Tool (see Appendix F). Sustainability was calculated by dividing the number of completed direct observation checklists by the number of catheter insertion opportunities. Sustainability was calculated by dividing \((n = 26)\) by \((n = 44)\) and multiplying by 100 \((n = 59.9\%).

Unit leaders can impact practice improvement sustainability through evaluation methods such as weekly auditing with feedback (Fleiszer et al, 2016).

**Nursing Perceptions**

The SCI manager requested that the DNP Project Lead identify nursing perceptions and satisfaction of using the two-person protocol, which led to incidental findings. The lead created a post implementation survey that was not part of the original IRB submission to measure nursing satisfaction. Ten surveys were handed out on the day shift and ten on the night shift. Of the twenty surveys, eighteen were returned completed totaling a 90% response rate. The survey included six questions with a 5-point Likert scale response (see Table 6). Of the voluntary respondents, 72% either agreed or totally agreed that the protocol improved infection prevention compliance, was a benefit to practice, is sustainable, and would like to continue the practice. Sixty-six percent of respondents either agreed or totally agreed that the protocol improved collaboration and contributed to the decrease in CAUTI rates. These results correlated to the sustainability measure outcomes and contributed to the likelihood of sustainability of this project.
Clinical Significance

Even though the facility was practicing at peak performance and maintaining CAUTI rates of zero before the project, zero CAUTI rates were maintained during this practice change. The implementation of a two-person insertion protocol utilizing a standardized checklist did not pose negative implications to already perfect CAUTI rates. While statistical significance plays a key role in research it often does not portray the big picture; an outcome can still be clinically meaningful without statistical significance (Johnson et al., 2020).

Data Security

The data was collected, by the DNP Project Lead, utilizing a chart audit tool, and starting the first Friday after the project started (see Appendix E). Confidentiality for data collection was addressed by assembling the initial participant pool from a purposive sample. A potential breach of healthcare data can lead to a patient rights violation. This major concern aligns with HIPAA regulations. All health information is considered highly protected in the healthcare environment (Sederstrom, 2018). Data was extracted through electronic health records review by the DNP Project Lead to avoid a data breach, and was made unidentifiable. The data collection tool was stored within the facility's restricted computer network, where access was restricted to individuals with microchipped ID cards and a PIN.

Impact

This project was meant to decrease CAUTI rates during catheter insertion through the use of a two-person direct observation protocol using a standardized checklist. The new protocol required two nurses to complete a procedure that was formerly completed by one nurse. CAUTI rates were zero for the two months prior to the project implementation and zero during the project implementation period.
Concerns related to the new practice change included protocol compliance, limited staff to assist with the procedure, and perceived extra work for staff nurses. Education for this practice change was provided by the DNP Project Lead and included an overview of the evidenced-based project, a review of the current Foley catheter policy and procedure, and directions on the use of the standardized checklist. Additional funding or budgeting was not necessary to implement this practice change. This project was a pilot and will continue to be implemented and monitored in the SCI unit.

Several limitations to this project were identified. This study was conducted in an SCI unit where the indication of catheterization was neurogenic bladder for all participants. The sample of this project included all male patients; no female patients were represented. Both factors affect the generalizability of the results of this project. Another limitation of this study was that there were no clear criteria to differentiate whether a CAUTI occurred from insertion or maintenance-related factors.

Confounding factors that occurred within this project included an intervention of bi-weekly catheter maintenance audits with feedback that was implemented three months prior to this project to improve CAUTI rates in the SCI unit. Because this facility is an HRO they addressed the increase in CAUTI rates before the DNP Project Lead project began.

Future considerations may include measuring the impact that the direct observation protocol had on nursing satisfaction or patient satisfaction. Several nurses in the unit expressed positive comments regarding the practice change stating that the extra set of hands to prepare and position the patient were helpful.

Compliance with the procedure was much lower than expected. A barrier to optimal compliance may have been that the DNP Project Lead visited the facility only once a week to
collect data, engage with staff, and answer questions. Employee engagement may also have been a barrier to optimal compliance. To maintain sustainability, monitoring of compliance would need to continue through daily audits by management.

**Dissemination**

The project outcomes were disseminated to the SCI leadership team through a Teams virtual PowerPoint presentation. The outcomes were also shared within the SCI unit via a poster presentation during the DMS morning huddle. Day and night shift nursing staff were in attendance. The poster was left in the computer charting room, so all staff had the opportunity to review the outcomes. Disseminating and celebrating improved outcomes with the frontline staff can invoke the staff's efforts to continue and sustain the practice change.

The DNP Project Lead was required to submit an oral poster presentation through the University of St. Augustine. The manuscript will also be submitted for publication to The Scholarship and Open Access Repository housed by the University of St. Augustine for Health Sciences Library.

The Journal of Infection Prevention will be a useful resource for submitting a manuscript as CAUTIs are the most prevalent HAIs and are always a hot topic in healthcare. When submitting an abstract for peer review, facility identifiers will be withheld to eliminate potential bias. An abstract may also be submitted to an applicable association for an opportunity to present findings at a local conference.

**Conclusion**

Increased CAUTI rates in an SCI unit were identified as a practice problem. CAUTI infections are preventable but, are still the most common healthcare-acquired infections in hospitals. Results of the literature indicated that a two-person protocol utilizing a standardized
checklist was an effective practice in reducing CAUTI rates in the acute care setting. The goal to decrease CAUTI infection rates was attempted by implementing a two-person direct observation protocol utilizing a standardized checklist during patient indwelling catheterization. The protocol required a second registered nurse observer to validate that infection control measures were maintained prior to and during catheterization utilizing a standardized checklist. The pre-implementation period CAUTI rates were at an all-time low, of zero percent before the improvement and remained at zero percent during the implementation phase. The results of this EBP project are deemed inconclusive but the lead assumes that heightened awareness and efforts focused on CAUTI prevention may have increased staff engagement and improved outcomes. The findings will be disseminated throughout the organization.
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Table 1

Budget

| Expenses                      | Revenue |
|-------------------------------|---------|
| Direct Cost                   |         |
| RN Salary                     | $0.00   |
| Handouts                      | $150.00 |
| Catheter tray x 5             | $100.00 |
| Statistician Consult          | $100.00 |
| Total Expense                 | $350.00 |
| Total Revenue                 | 0       |
| Net Balance                   | $350.00 |

Table 2

*Frequency Table for Nominal Variables*

| Variable | n  | %      |
|----------|----|--------|
| Gender   |    |        |
| Male     | 14 | 100.00 |
| Female   | 0  | 0.00   |

*Note.* Due to rounding errors, percentages may not equal 100%.
Table 3

Summary Statistics Table for Interval and Ratio Variables

| Variable   | $M$  | $SD$ | $n$  | $SE_M$ | Min  | Max  | Skewness | Kurtosis |
|------------|------|------|------|--------|------|------|----------|----------|
| AGE        | 69.71| 11.61| 14   | 3.10   | 35.00| 82.00| -1.98    | 3.86     |

Note. indicates the statistic is undefined due to constant data or an insufficient sample size.

Table 4

Two-Tailed Paired Samples $t$-Test for the Difference Between Foley Catheter Days Preintervention and Postintervention

| Cath Days Preintervention | Cath Days Postintervention | $M$  | $SD$ | $M$  | $SD$ | $t$  | $p$   | $d$   |
|---------------------------|---------------------------|------|------|------|------|------|-------|-------|
| 227.50                    | 301.00                    | 70.00| 21.21| -2.13| .279 | 1.51 |

Note. $N = 2$. Degrees of Freedom for the $t$-statistic = 1. $d$ represents Cohen's $d$.

Table 5

Frequency Table for Nominal Variables

| Variable                  | $n$  | %    |
|---------------------------|------|------|
| Direct Observation Tool Utilization |      |      |
| No                        | 18   | 40.91|
| Yes                       | 26   | 59.09|

Note. Due to rounding errors, percentages may not equal 100%.
Table 6

Nursing Satisfaction Survey

|                                                                                                      | Totally Disagree | Disagree | Neutral | Agree | Totally Agree | Agreed or Totally Agreed |
|------------------------------------------------------------------------------------------------------|------------------|----------|---------|-------|---------------|--------------------------|
| I feel the 2-person insertion protocol improved compliance with infection prevention measures during Foley catheter insertion. | 0.00             | 1.00     | 4.00    | 9.00  | 4.00          | 72%                      |
| I feel that the 2-person insertion protocol was beneficial to my practice.                           | 0.00             | 1.00     | 4.00    | 9.00  | 4.00          | 72%                      |
| I feel the 2-person insertion protocol improved collaboration within the unit.                       | 0.00             | 1.00     | 5.00    | 8.00  | 4.00          | 66%                      |
| I feel the 2-person insertion protocol contributed to the decrease in CAUTI rates.                    | 0.00             | 1.00     | 4.00    | 8.00  | 4.00          | 66%                      |
| I feel that the 2-person insertion protocol is a sustainable practice.                                | 0.00             | 1.00     | 3.00    | 9.00  | 4.00          | 72%                      |
| I would like to continue using the 2-person protocol in my practice to reduce CAUTI rates.          | 0.00             | 1.00     | 3.00    | 9.00  | 4.00          | 72%                      |

Note. Respondants 18/20 = 90% response rate
Figure 1

PRISMA Literature search Strategy Diagram

Note. Prisma flow chart diagram from “Preferred Reporting Items for Systematic Reviews and Meta-analyses: The PRISMA Statement,” by D. Moher, A. Liberati, J. Tetzlaff, & D. G. Altman, 2009, Annals of Internal Medicine, 151(4), p. 267 (http://dx.doi.org/10.7326/0003-4819-151-4-200908180-00135). Copyright 2009 by The American College of Physicians.
Figure 2

*The Johns Hopkins Nursing Evidence-Based Practice Strength Rating*

| Level | Description |
|-------|-------------|
| I     | Highest strength of evidence |
| II    | Level II |
| III   | Level III |
| IV    | Level IV |
| V     | Level V – expert opinion, lowest strength |

| Quality | Description |
|---------|-------------|
| Low     | Low Quality |
| Good    | Good Quality |
| High    | High Quality |

*Note.* Adapted from: Dang, D., & Dearholt, S. (2017). *Johns Hopkins nursing evidence-based practice: Model and guidelines* (3rd ed.). Sigma Theta Tau International
## Appendix A

### Summary of Primary Research Evidence

| Citation                          | Design Level Quality Grade | Sample                  | Intervention Comparison                                      | Theoretical Foundation     | Outcome Definition                                                                 | Usefulness Results Key Findings |
|----------------------------------|----------------------------|-------------------------|----------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------|---------------------------------|
| American Nurses Association (2021, July) | Expert Opinion Level IV    | Streamlined Evidence-Based RN Tool: Catheter Associated Urinary Tract Infection (CAUTI) Prevention Checklist | Not identified             | CAUTI rates decreased from 6.7 cases per 1000 to 4.11 cases per 1000 six months after intervention Decreased rate of 39% CAUTI | Checklist includes procuring 2nd RN to verify insertion procedure |
| Belizario (2015)                 | Organizational Experience pre-post comparative design Level V Grade C low quality | Med surge unit Sample size not clearly defined | Two RNs present during catheter insertion to observe and alert to breaks in aseptic technique | Not identified | CAUTI rates decreased from 6.7 cases per 1000 to 4.11 cases per 1000 six months after intervention Decreased rate of 39% CAUTI | Two-person insertion increased competence of staff and improved aseptic insertion |
| Carter et al. (2016)             | Qualitative comparative case study Level III Grade B low quality | 6 emergency department s varied in location 102 study participants Semi structured interview | Insertion audits 2-person insertion Designated inserters Delayed insertion | Not identified | Bundled approaches required to reduce CAUTI rates | Poor catheter insertion technique was perceived by study participants as a risk for CAUTI |
| Study                                      | Design                          | Setting                                                                 | Pre-Post Level | Grade | Interventions                                                                 | CAUTI Rates Decreased |
|-------------------------------------------|---------------------------------|--------------------------------------------------------------------------|----------------|-------|-------------------------------------------------------------------------------|-----------------------|
| Carter et al. (2014)                      | Organizational Experience       | 28 bed telemetry unit                                                   | V              | C     | Bundled interventions; competency training, verification of appropriate use,  | Not Identified Bundled approach to reduce CAUTI rates |
|                                           | Comparative                     |                                                                          |                |       | two-person insertion technique with checklist, strict maintenance & early removal, |                       |
|                                           | Pre -Post                       |                                                                          |                |       |                                                                                |                       |
|                                           | Level V                         |                                                                          |                |       |                                                                                |                       |
|                                           | Grade C                         |                                                                          |                |       |                                                                                |                       |
| Fletcher-Gutowski et al. (2019)           | Organizational Experience       | Pulmonary & progressive care unit                                       | V              | B     | Education & two-person insertion technique with checklist                      | 53 completed checklists with 98.1% compliance |
|                                           | Comparative                     |                                                                          |                |       | 4 Es of implementation science was the stated framework to guide the project   |                       |
|                                           | Pre -Post                       |                                                                          |                |       |                                                                                |                       |
|                                           | Level V                         |                                                                          |                |       |                                                                                |                       |
|                                           | Grade B                         |                                                                          |                |       |                                                                                |                       |
| Galiczewski et al. (2017)                 | Quasi-experimental case control | Medical ICU Sample size 140 patients                                    | III            | A.    | Direct observation of catheter insertion by an educated observer with validity | CAUTI rates decreased from 2.24 to zero per 1000 catheter days |
|                                           | case control comparative        |                                                                          |                | good  | checklist.                                                                     |                       |
|                                           | pre-post                         |                                                                          |                | quality |                                                                                |                       |
|                                           | Level III                       |                                                                          |                |       | The chain of infection theory based on the principals of epidemiology were used to guide this study. |                       |
|                                           | Grade A. good quality           |                                                                          |                |       |                                                                                |                       |
| Maxwell et al. (2018)                     | Organizational Experience       | 24 bed ICU Bundle including 2 RNs present during insertion; specimen    | V              | B     | Decrease of foley utilization ratio from 57% to 48% after implementation. Defined as the # of urinary catheter days divided by the # of | Shift in unit culture was a major focus in this project |
|                                           | Comparative                     | collection from                                                          |                |       |                                                                                |                       |
|                                           | Pre -Post                       |                                                                          |                |       |                                                                                |                       |
|                                           | Level V                         |                                                                          |                |       |                                                                                |                       |
|                                           | Grade B                         |                                                                          |                |       |                                                                                |                       |
| Study | Setting | Level | Grade | Intervention Strategies | Evidence Level | Patient Outcomes | Findings |
|-------|---------|-------|-------|-------------------------|----------------|----------------|----------|
| Rhone et al. (2017) | Organizational Experience | ED, Level 1 Trauma Center | Intervention required two licensed personnel for catheter insertion and a checklist for validation | 4 E model used to guide project engage, educate, execute, and evaluate | 75% decrease in CATI rates post intervention and sustained for 1 year | Socio-adaptive and technical changes through 2-person catheter insertion led to significant and sustainable decreases in CAUTI rates. |
| Saint et al. (2016) | National Organizational Prevention Program | Multiple Hospitals Multiple Units | Implemented AHRQ CUSP Technical & socio-adaptive factors | Not Identified | A National Prevention Program appears to reduce CAUTI rates in non-ICUs | Socio-adaptive and technical measures used such as training and insertion competency assessments by direct observation audits in clinical setting. |

**Note.** Levels and quality of evidence were measured using John Hopkins Evidenced Based Nursing Evidence Level and Quality Grid (Dang & Dearholt. 2017)
### Summary of Systematic Reviews (SR)

| Citation                  | Quality Grade | Question                                                                 | Search Strategy                              | Inclusion/Exclusion Criteria | Data Extraction and Analysis | Key Findings                                                                 | Recommendation Implications                                                                 |
|---------------------------|---------------|--------------------------------------------------------------------------|----------------------------------------------|------------------------------|------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Atkins et al. (2020)      | II B          | Identify barriers and facilitators to CAUTI related behaviors in HCPs. Describe the content of nationally adapted interventions in England to reduce CAUTIs | A systematic review using PRIZMA guidelines. | Qualitative and quantitative research or systematic reviews were included. | Data collected using a three-step framework using thematic analysis | Most frequent interventions included education or training. Several studies studied observation of IPC protocols and feedback | Intervention focused on knowledge obtainment rather than social, motivational, or environmental influences. |
| Ishaque (2021)            | II B          | What is the best evidence on audit and feedback to improve professional practice? | Systematic review. Systematic reviews and RTCs | Not Defined                  | Not defined                  | Behavior change theories suggest that feedback may work by changing recipients’ awareness and beliefs about current practice, clinical consequences, changing perceived social norms, affecting self-efficacy, and by directing attention to specific set of tasks. | Contextual designed Audits and feedback is recommended to improve healthcare practice and patient outcomes |
| Jones et al. (2019)       | Level II C    | How effective are interventions at reducing symptomatic urinary tract | Systematic review with highly detailed search strategy | Inclusion criteria: All studies evaluating behavioral interventions to | Not described | Interventions included education, audit and feedback, checklists. | This study suggests that feedback should be included with any other interventions as all studies including feedback saw |
| Citation      | Quality Grade | Question                                                                 | Search Strategy       | Inclusion/Exclusion Criteria                                                                 | Data Extraction and Analysis | Key Findings                                                                 | Recommendation Implications |
|--------------|---------------|--------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------|----------------------------|
| Marin (2021) | II C          | What are the best strategies to improve healthcare workers adherence to infection control guidelines? | Systematic review     | Studies included reported adherence to infection related guidelines along with interventions related to prevention in acute care acquired infections | Not identified              | Significant decreases in CAUTI rates                                          | Behavior change may be effective for decreasing CAUTI. |
| Moralejo (2021) | II B          | What Interventions target healthcare workers to improve adherence to standard precautions in healthcare | Searched Cochrane database & Database of Abstract Reviews for related systematic reviews and Emtree | Inclusion criteria: Studies that evaluated one component of standard precautions Studies that met primary outcomes were selected. | Standard data extraction method by two authors, conclusive review by third. | Interventions identified: educational programs, training, peer evaluation, Education may improve healthcare workers compliance to standard precautions. Peer evaluation improve healthcare workers compliance to standard precautions. |
| Citation                  | Quality Grade | Question                                                                 | Search Strategy                                                                 | Inclusion/Exclusion Criteria                                                                 | Data Extraction and Analysis | Key Findings                                                                 | Recommendation Implications |
|--------------------------|---------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------------------------------|--------------------------------|
| Gould et al. (2017)      | II C          | What are successful strategies to improve compliance to recommendations for hand hygiene and to determine if an increase in hand hygiene compliance can reduce rates of hospital associated infections. | Electronic search included RCT, non RCT, before and after studies, interrupted time series, | Inclusion criteria: any intervention that evaluated hand hygiene with soap and water or alcohol hand rub or both. | Data extraction by two reviewers evidence analyzed by GRADE meta-analysis not possible due to study diversity. | Key findings: Interventions included multimodal campaigns including complex interventions, Education, visual ques, performance feedback. | WHO guidelines recommend direct observation to monitor hand hygiene and multiple studies evaluating direct observation were included in this synthesis. Multimodal approach that includes WHO's recommendations may slightly improve infection rates. Improved research with limited bias is required. |

**Note.** Levels and quality of evidence were measured using John Hopkins Evidenced Based Nursing Evidence Level and Quality Grid (Dang & Dearholt. 2017)

Legend:
## Appendix C

### Study Themes

| Theme                      | (ANA, 2021) | (Belizario, 2015) | (Carter et al., 2016) | (Carter et al., 2014) | (Fletcher-Ginnovski & Cecil, 2019) | (Galiczewska & Sharpin, 2017) | (Maxwell et al., 2018) | (Rhone et al., 2017) | (Saint et al., 2016) | (Akins et al., 2020) | (Ishaque, 2021) | (Jones et al., 2019) | (Marín, 2021) | (Moralejo et al., 2021) | (Gould et al., 2017) |
|----------------------------|-------------|-------------------|-----------------------|-----------------------|------------------------------------|-------------------------------|---------------------|---------------------|---------------------|---------------------|-------------------|---------------------|-------------------|---------------------|---------------------|
| HAI Compliance             | x           |                   | x                     | x                     | x                                  |                               | x                   | x                   | x                   | x                   | x                 | x                   | x                 | x                   | x                   |
| Direct Observation         | x           | x                 | x                     | x                     | x                                  |                               |                     | x                   | x                   |                     |                   | x                   |                   |                     |                     |
| Socioadaptive Intervention| x           |                   | x                     | x                     | x                                  |                               |                     | x                   | x                   | x                   | x                 |                   |                   |                     |                     |
Appendix D

Project Timeline

| Task | Responsible Party | Week | Start   | End   |
|------|-------------------|------|---------|-------|
| Term 1 |                    |      | January | February | March | April | May | June | July | August | September | October | November |
| Refine Problem Statement & Research Questions | Project Manager | 1-2  | 1/4/2021 | 1/22/2021 |
| Organizational Assessment | Project Manager | 4   | 1/25/2021 | 2/10/2021 |
| Project Approval | Chief Nurse SCI | 5   | 2/23/2021 | 3/5/2021 |
| Identify Key Stakeholders Meeting | Communications Manager/Project Co | 7   | 2/28/2021 | 3/7/2021 |
| Key Stakeholders Meeting/Preparation | Project Manager | 8   | 3/3/2021 | 3/18/2021 |
| Team Meeting | Stakeholders | 9   | 3/10/2021 | 3/23/2021 |
| Prepare IRB protocol | Project Manager | 11  | 3/30/2021 | 4/22/2021 |
| Proposal Review & Approval | Project Co | 14  | 4/5/2021 | 4/30/2021 |
| Proposal Review & Approval | USA | 11  | 4/23/2021 | 4/30/2021 |
| Term 2 |                    |      | January | February | March | April | May | June | July | August | September | October | November |
| Proposal submission to IRB | Project Manager | 11  | 5/10/2021 | 5/14/2021 |
| Meet with OD, Chief Manager, Assistant Manager & Educators | Project Manager | 11  | 5/14/2021 | 5/19/2021 |
| Develop staff education | PM & SD Educator | 11  | 5/20/2021 | 6/25/2021 |
| SCHColl Meeting & Education | Manager & MT | 11  | 6/20/2021 | 7/1/2021 |
| Implement Project Intervention | Project Manager | 10   | 7/5/2021 | 7/30/2021 |
| Communication to Key Stakeholders | Project Co | 11  | 7/23/2021 | 8/1/2021 |
| Early intervention/Additional sessions to high risk | Project Manager | 11  | 8/1/2021 | 8/15/2021 |
| Add alternate screening/complete staff education | PM & SD Educator | 11  | 8/15/2021 | 9/30/2021 |
| Collect/Assess data | Infection Prevention & PM | 11  | 9/15/2021 | 10/15/2021 |
| Grant Request | Quality Leader & FNM | 11  | 10/15/2021 | 11/15/2021 |
| Term 3 |                    |      | January | February | March | April | May | June | July | August | September | October | November |
| Collect/Assess data | Infection Prevention & PM | 11  | 10/15/2021 | 11/15/2021 |
| Grant Request | Quality Leader & FNM | 11  | 11/15/2021 | 12/15/2021 |
| Data Analysis & Evaluation | PM & Quality Leader | 11  | 12/15/2021 | 1/1/2022 |
| Outreach: Patients (Evening/Disenfranchised, other groups | Project Manager | 11  | 1/1/2022 | 1/29/2022 |
| Survey outcome feedback Square 2.0 | Project Manager | 11  | 1/1/2022 | 1/29/2022 |
| Communication to Key Stakeholders | Project Co | 11  | 1/1/2022 | 1/29/2022 |
| Outreach: Patients (Remote) | Project Manager | 11  | 1/1/2022 | 1/29/2022 |
| Disseminate findings internally | Project Manager | 11  | 1/1/2022 | 1/29/2022 |
| Disseminate findings externally | Project Manager | 11  | 1/1/2022 | 1/29/2022 |
| Celebrate | | 11  | 11/1/2021 | 1/1/2022 |
Appendix E

Chart Auditing Tool

| Room # | Gender | Age | Date of Last catheter Insertion | Insertion Tool Utilized | Signed by two nurses | Yes/No |
|--------|--------|-----|---------------------------------|-------------------------|----------------------|--------|
|        |        |     |                                 |                         |                      |        |
|        |        |     |                                 |                         |                      |        |
|        |        |     |                                 |                         |                      |        |
|        |        |     |                                 |                         |                      |        |
|        |        |     |                                 |                         |                      |        |
|        |        |     |                                 |                         |                      |        |
|        |        |     |                                 |                         |                      |        |
|        |        |     |                                 |                         |                      |        |
|        |        |     |                                 |                         |                      |        |
|        |        |     |                                 |                         |                      |        |
|        |        |     |                                 |                         |                      |        |
# Appendix F

Foley Catheter Maintenance Bundle Audit Tool

| Room #: | Date of Insertion: | Unit Inserted: SCI: V1 V2 T1 T2 ED | Order present: Yes No | Auditor: | Audit Date: |
|---------|--------------------|-------------------------------------|------------------------|----------|-------------|
|         |                    |                                     |                        |          |             |

Circle the applicable response to each standard below

| 2-person insertion utilized | Catheter Type | Tamper Seals intact | Catheter Secured | Drainage Tubing Looped or Kinked | Sheeting Clip in use | Drain tubing and bag below bladder | Bag off floor (Not touching floor) | Bag label present with time & date | Clean urine drainage container labeled (1 per patient) |
|----------------------------|---------------|---------------------|------------------|----------------------------------|---------------------|-----------------------------------|---------------------------------|-----------------------------------|--------------------------------------------------|
| Yes                        | Bard Standard | Yes                 | Yes              | Yes                              | Yes                 | Yes                               | Yes                             | Yes                               | Yes                               |
| No                         | Bard Silver   | No                  | No               | No                               | No                  | No                                | No                              | No                                | No                                |
| Other:                     | Other:        |                     |                  |                                  |                     |                                   |                                 |                                   |                                   |
|                            | Other:        |                     |                  |                                  |                     |                                   |                                 |                                   |                                   |

Comments: ___________________________________________________________
Appendix G
Catheter Insertion Direct Observation Checklist

Instructions for use:
1. The nurse observer places a check mark in the yes column if the step was completed or a check mark in the yes with reminder column if a prompt was required to perform the step.
2. The nurse observer calls “time-out” if a step is not completed or a break in asepsis is observed during the process and documents the course of action in the comment section.
3. A new catheter is required if a break in aseptic technique is observed.

| Evidenced based steps prior to entering room | Yes | Yes, with Reminder | Comment: |
|---------------------------------------------|-----|--------------------|----------|
| Two nurses are present for procedure        |     |                    |          |
| Patient meets Foley-In criteria for indwelling urinary catheter Insertion: |     |                    |          |
| Smallest french catheter is selected, unless ordered otherwise. |     |                    | Size:    |
| Hand Hygiene was performed and proper PPE on Insertion |     |                    |          |
| Peri care was performed |     |                    |          |
| Hand hygiene performed again |     |                    |          |
| Aseptic technique was maintained throughout the procedure. |     |                    |          |
| • Sterile gloves and equipment - established and maintained sterile field. |     |                    |          |
| • The balloon was not pre-inflated to test it, as this is not recommended. |     |                    |          |
| Catheter inserted to appropriate length and urine flow checked before balloon inflation to prevent urethral trauma. |     |                    |          |
| • In males, insert fully to the IUC “y” connection, or in females, advance ~1 inch or 2.5 cm beyond point of urine flow |     |                    |          |
| Catheter balloon inflated correctly: 10cc or per manufacturer’s instructions. |     |                    |          |

| Directly after insertion | Yes | NO | Comments |
|--------------------------|-----|----|----------|
| Secured catheter to leg to prevent irritation |     | NO | Circle One: Stat lock / Band |
| Position drainage bag below bladder using green clip (but not touching floor) |     |    |          |
| Checked for closed connections and no obstructions or kinks |     |    |          |
| Catheter dated |     |    |          |
| Document In CPRS |     |    |          |

Date: _______________ Patient Identifiers: __________________________
Signature of RN who inserted catheter: ______________________________
Signature of Second RN witness: ______________________________
Purpose: The purpose of this practice change is to decrease the rate of CAUTIs in
the SCI unit utilizing a two-person insertion protocol.

Practice Change: A direct observation of urinary catheter insertion protocol will be
implemented starting on 0/00/0000.

- This protocol requires two nurses to be present during every urinary catheter
  insertion on the unit.

- The patients primary care nurse will insert the catheter while the second
  nurse observes and validates compliance with the procedure utilizing a
  standardized Direct Observation Checklist. (Found in the yellow CAUTI
  binder at the nurse’s station)

- Both nurses will sign the checklist and return the completed checklist to the
  binder.

For questions, please contact Deana Cirillo via email d.cirillo@usa.edu
Appendix I

SWOT Analysis

**Strengths**
- culture of safety
- organizational support
- facility goal to achieve “zero harm”
- CAUTI policy aligned with current clinical practice guidelines in place

**Weakness**
- population requires long term Catheterization
- deficiencies in PPE compliance and IC practices identified in SCI units
- SCI not staffed according to directive

**Opportunities**
- improved infection control practices
- improved teamwork & collaboration
- Improve aseptic technique
- Improve unit culture

**Threats**
- staff resistance to change
- staff lack of engagement
- Increased census/decreased staff due to COVID variant
Appendix J

Institutions Urinary Catheter Insertion Procedure

| Indwelling Catheter Insertion Competency | S | U | NP | Comments |
|-----------------------------------------|---|---|----|---------|
| **Objectives:**                          |   |   |    |         |
| 1. Clinician will demonstrate the proper insertion of an indwelling urinary catheter. |   |   |    |         |
| **New Protocol:**                        |   |   |    |         |
| *Secure a second RN for direct observation utilizing the ANA checklist* |   |   |    |         |

| Indwelling Urinary Catheter Insertion |
|---------------------------------------|
| **I. Confirm patient meets the CDC guidelines for Appropriate Indications for indwelling Urethral Catheter Use.** |
| o Patient has acute urinary retention or bladder outlet obstruction |
| o Need to accurate urine measurements |
| o Use of selected surgical procedures |
| o To assist in healing of open sacral or perineal wounds |
| o Patient requires prolonged immobilization |
| o To improve comfort for end-of-life care |
| o Select the smallest foley catheter possible, consistent with good drainage |

| **II. Preparation** |
|---------------------|
| 1) Verify provider order and check patient ID using two identifiers. |
| 2) Perform hand hygiene and don clean gloves before patient contact |
| 3) Introduce yourself and explain the procedure to patient |
| 4) Adjust bed to appropriate working height. |
| 5) Assess the patients’ bladder for fullness or use a bladder scanner. |
| 6) Open the outer packaging of the foley tray and place it in between patients’ leg and orient arrows towards insertion site |
| 7) Remove the label, directions for use brochure, and orange sticker sheet and set aside |
| 8) Position the patient appropriately and open the peri-care kit |
| 9) Use provided castile soap wipes to cleanse patients’ peri-urethral area |
10) Discard globes. Perform hand hygiene with provided alcohol hand sanitizer gel

III) **Insert the foley catheter using aseptic technique and sterile equipment**

1) Remove the band from around Foley tray. Using proper aseptic technique open CSR wrap

2) CSR wrap: first open away from self, then left/right sides, lastly towards self

3) Pick up packet of sterile globes and place off the sterile fields

4) If applicable, aseptically drop any specialized catheters (silicone, silastic or supplies: examples sterile lidocaine jelly on sterile field)

5) Maintain aseptic technique and done sterile globes

6) Place under pad beneath patient, plastic “shiny” side down. Take caution not to contaminate sterile globes

7) Position fenestrated drape on patient appropriately

8) Open the povidone iodine packet and pour the solution onto three foam swab sticks to saturate it

9) Attach the water field syringe to the inflation port (Note: It is not necessary to pre-test the foley catheter balloon)

10) Use the syringe with a green plunger to deposit lubricant into the tray

11) Remove foley catheter from the wrap and place catheter in the lubricant

12) Maintain position of non-dominant hand throughout the procedure

13) Prepare the patient with the povidone-iodine saturated foam swab sticks.

*Female patient:*

*(Use Sterile dominant hand)*

Gently twist the iodine saturated swab sticks to remove it from the tray.

*(Use Non-dominant hand)*

Locate and hold the labia minora and gently spread the urethral meatus

If unable to visualize the meatus, have an assistant use a flashlight

*(Dominant hand)*

With downward stroke cleanse the right labia minora and discard the swab. Do the same in the left side of labia minora. With last swab stick cleanse, the middle area between the labia minora and discard the swab stick after one stroke each time.

*Male patient:*
**(Use non-dominant hand)**
Grasp the penis at the shaft just below the glans

**Use dominant hand**
Cleanse the glans penis in a circular motion starting at the urethral meatus and work outward down to base of the glans.

**(If the penis is not circumcised, retract the foreskin)**

---

|   |   |
|---|---|
| 14) Proceed with catheterization until urine flowed through the tubing and visible in the drainage tube **using dominant hand.**  
**Female patient:**  
Advance catheter 2-3 inches from catheter tip until urine flow is visualized and advance catheter for another 1-2 inches  
**Male patient:**  
Advance catheter to the bifurcation of the tubing.  
Stop catheterization and contact Independent Licensed Practitioner (ILP) if extreme resistant is met and or if the patient complains of extreme pain  
**15) (If using a Coud’e catheter for insertion):**  
Lift the penis perpendicular to the patients’ body and insert the catheter with the curved tip upward  
Advance the catheter until the urine flowed through the catheter tubing)  
16) Inflate the catheter balloon by pushing the pre-filled syringe containing 10 ml. of sterile water  
17) Once the balloon is fully inflated, gently pull the catheter until the balloon is snug against the bladder neck  
18) If improper catheterization is not accomplished, use new catheter for future attempts  
**IV. Post insertion and catheter stabilization**  
1) Secure the foley catheter to the patient using STATLOCK a Foley stabilization device or secure the foley with a Velcro leg strap  
2) Position drainage bag below the bladder but not touching floor) and ensure absence of kinks and/or dependent loops (use green sheet clip).  
3) Check system for closed connections and no obstructions/kinks  
4) Discard supplies, remove gloves, and perform hand hygiene.  
**V. Documentation Process**  
1) Document the procedure in CPRS template “FOLEY INSERTION/REMOVAL AND MAINTENANCE.”  

---

|   |   |
|---|---|
| **Staff Signature:** |   |
| **Job Title:** |   |
| **Date:** |   |
| **Evaluator:** |   |
| **Evaluator’s Name:** |   |
| **Evaluator’s Signature:** |   |
## Appendix K

### Training of Two-Person Insertion Protocol

**CAUTI Prevention Two-Person Insertion Protocol**

**DEANA CIRILLO MSN, RN, NPD-BC**

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### Outcomes

At the end of this presentation, the learner will be able to:

| Identify | Summarize | Apply | Use | Appraise |
|----------|-----------|-------|-----|----------|
| Identify the most common Hospital Associated Infection | Summarize measures that decrease the risk for CAUTIs | Apply the two-person insertion protocol | Use the standardized checklist | Appraise the two-person protocol and use of the standardized checklist for improved process, enhanced teamwork & better care outcomes |
Catheter Associated Urinary Tract Infection (CAUTI)

Catheter associated urinary tract infections (CAUTIs) are the most common healthcare associated infection (HAI) and it’s estimated that 69% of CAUTIs may be preventable when recommended infection control measures are followed (CDC, 2021).

Measures That Decrease the Risk According to the CDC (2019)

- Orders should be based on appropriate indications and catheters should be removed ASAP
- Hand hygiene is the number one way to reduce healthcare associated infections and should be performed before and after insertion or manipulation of a catheter device
- Aseptic Technique and sterile equipment must be used in the healthcare setting
- Apply proper techniques for catheter maintenance (follow bundle)
- Perform surveillance and provide feedback
### Why the Two-Person Protocol?

#### Breaks in Sterility During Insertion

| Contamination of  | Frequency | Examples                                                      |
|-------------------|-----------|----------------------------------------------------------------|
| Sterile field     | 27%       | - Nurse touched item on sterile field with bare hand          |
|                   |           | - Stethoscope/garment/badge touched sterile field             |
| Catheter          | 31%       | - Catheter touched genitalia before entering urethra           |
|                   |           | - Contaminated gloved hand touched catheter during insertion  |
| Sterile barrier   | 38%       | - Sterile glove ripped but nurse continued insertion          |
|                   |           | - Cleaning swabs placed on sterile tray                       |

(Adapted from [Gard et al., 2013](#))
Two-Person Protocol

1. This protocol requires two nurses to be present during every urinary catheter insertion on the unit.

2. The patient’s primary care nurse will insert the catheter while the second nurse observes and validates
   compliance with the procedure utilizing the standardized Direct Observation Checklist.

3. Both nurses will sign the checklist and return the completed checklist to the binder.

Important:
* If a breach in sterility occurs and any time during insertion “stop the line” a new sterile catheter set is required to continue.

The Standardized Checklist

1. Use a checklist for every foley catheter insertion

2. The nurse observer places a check mark in the yes column if the step was completed or a check mark in the yes with
   reminder column if a prompt was required to perform the step.

3. The nurse observer “stops the line” if a step is not completed or a break in asepsis is observed during the process and
   documents the course of action in the comment section.

4. A new catheter is required if a break in asepsis technique is observed.
Value Added

THE 2ND NURSE
Can assist
Provide direct feedback
“Stop the line”
Mentor or Teach
Provide support

THIS PROTOCOL MAY:
Encourage Teamwork
Increase Collaboration
Promote a Culture of Safety
Decrease CAUTIs
Improve patient outcomes

Any Questions?

References

Centers for Disease Control and Prevention. (2021, May). Catheter-associated urinary tract infections (CAUTI). https://www.cdc.gov/hai/ca_uti/uti.html

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