

CAUTI Elimination: A Systematic Elimination of CAUTI in Long-Term Care Facility

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ABSTRACT

Catheter-associated urinary tract infection (CAUTI) in nursing-home residents is commonly associated with multiple problems. Lack of proper intervention to prevent CAUTI in the elderly and frail nursing-home residents leads to sepsis, hospitalization, and antimicrobial use, ultimately causing the colonization with multidrug-resistant organisms (MDROs). Furthermore, it inflates the costs. The project aims to systematically determine an approach to eliminate CAUTI in long-term care facilities. There, the establishment of antibiotic stewardship is at its infancy stage. The CAUTI project contributes significantly to the wide-reaching efforts to reduce the threats posed by antimicrobial-resistant organisms. The crucial element of an impactful strategy is the prevention by utilizing evidence-based bundle of care education and evidence-based urinary catheter protocols (UCP), both funded by the Agency for Healthcare Research and Quality (AHRQ). The CAUTI project's outcome is measured using National Healthcare Safety Network (NHSN) and the symptomatic definition of CAUTI provided by the Centers for Disease Control and Prevention (CDC) to identify and count the cases in the unit; the team uses the NHSN's data for benchmarking. The qualitative and quantitative methodology approaches utilized to implement a CAUTI prevention strategy at Burbank Healthcare Center and Rehabilitation. Thirty participants were selected out of 172 populations during the study for the CAUTI project. The findings indicate that 11 out of 30 participants developed CAUTI, of which three acquired it at the facility and eight at the community. Further, although female participants were fewer than males, females seem to develop a CAUTI with higher frequency than male participants.

Keywords

Catheter-associated urinary tract infection, Prevention, Strategy, Elimination of CAUTI in the nursing home population, Sepsis, Nurse-driven protocol, CAUTI bundles, Quality improvement, Urinary catheter protocol, Healthcare-associated infection, Urinary catheter adverse effects.

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Definition of Terms

Healthcare-associated infections (HAIs) are conditions that a patient develops in a setting while being treated for something else. CAUTI bundles or interventions, also called care bundles, include appropriate catheter use, aseptic insertion, proper maintenance, and timely removal, as well as its cultural and behavioral changes.

Chapter One: Introduction and Overview

Nursing homes often provide institutional long-term care to frail older adults, as well as skilled nursing and rehabilitative care to Medicare beneficiaries following a discharge from acute care hospitals. CDC reported that HAI has been a problem in the healthcare setting, in particular, CAUTI in long-term care facilities. The CDC defines a urinary tract infection (UTI) as an infection involving any part of the urinary system, including the urethra, bladder, ureters, and kidney. Additionally, UTIs are the most common HAIs reported to the NHSN. It is the root cause of multiple infections, mainly CAUTI [1].

CAUTI leads to inappropriate antibiotic use, hospitalization in long-term care facilities, and increased annual healthcare costs. AHRQ reported the cost data from six studies and estimated the extra cost of CAUTI acquired in hospitals to be \$13,793 (95% CI: \$5,019 to \$22,568). Additionally, based on four other studies, the extra mortality was estimated at 0.036 (95% CI: 0.004 to 0.079) per hospital-acquired condition (HAC) case, which indicates 1,000 in-hospital CAUTI patients; 36 additional deaths were reported. However, the progress towards reducing catheter utilization with long-term use is rated between 5% and 8% nationally [2]. Thus, it is essential to maintain optimal level of reduction based on the current knowledge on evidence-based practices (EBP) and apply it in nursing homes to care for catheter insertion and maintenance in long-term care settings. This paper will elaborate on the systematic approach to eliminate CAUTI, evidence-based bundles of care education, utilization of tools and metrics to measure the outcome, the role of professionals and leaders, and the essentials of Doctor of Nursing Practice (DNP) that were integrated into the project.

Purpose

The project aims to systematically determine an approach to eliminate HAIs, mainly CAUTI, and explore the influence of an EBP UCP on CAUTI in long-term care settings through the implementation of an evidence-based bundle of care education to sustain the culture of quality and safe care. CAUTI is a major concern, which leads to multiple problems including hospitalization, inflated costs, antimicrobial use, and mortality and morbidity. Therefore, a collaborative team approach plays an important role in the prevention of CAUTI. The project incorporates a team of professionals and stakeholders engaged in systematically eliminating the HAI CAUTI in the long-term care setting. Further, it measures the outcome based on NHSN benchmark, CAUTI rate count in days, and population rate.

Theoretical Framework: Iowa Model

The evidence-based framework, the Iowa model, was used to guide the CAUTI project in long-term care settings. The Iowa model

is unique, as it emphasizes pilot testing before full-scale change implementation. This allows the team to refine the intervention or process to ensure a successful and sustainable translation. Once the change has been integrated into the organization, it is crucial to disseminate the results. As a seven-step process, the Iowa model assists in organizing, collaborating, and incorporating the research and evidence to guide clinical practice. The DNP student had requested permission to use Iowa model and was granted the same by the University of Iowa Hospital and Clinic. The model uses a linear design and incorporates multiple feedback loops to enable the fluid process of the evidence-based analysis and evaluation at each step [3]. The steps in the framework of Iowa model is illustrated as follows: ask clinical questions in PICOT format; build a team; critically appraise the evidence; grade the evidence; integrate the evidence with clinical expertise, as well as patient preferences and values; evaluate the outcomes of the practice decisions based on evidence; and disseminate the EBP results.

When triggers for the change of CAUTI elimination are identified in the Iowa model, three decision points and feedback loops provide the directions to effectively manage the project. The first decision point involves assessing whether the practice change is a priority for the organization. The “pilot, the change in practice” step in the Iowa model is the focus of this DNP project (see Appendix A). Critical components of this step in the Iowa model include establishing outcome measures, collecting baseline data, and developing, implementing, and evaluating an EBP change. The project, which was piloted at the Nursing Home, was implemented with the outcomes of the Iowa models’ critical steps in mind. The project is implemented as a small-scale project to implement and emphasize the CAUTI prevention strategies through education to reduce the cost of hospitalization, infection, and antibiotic stewardship.

CAUTI in long-term care has been identified to lead to mortality, hospitalization, and increased costs. The most common HAI, CAUTI, changed the healthcare system’s perspective of care and safety culture. Due to the Institute of Medicine (IOM) that mandates safety, the Centers for Medicare & Medicaid Services (CMS) declared that no reimbursement would be possible for HAIs. Based on the evidence-based guideline, AHRQ put together a toolkit and bundle of care education to be implemented to reduce CAUTI. Furthermore, CAUTI increases the cost of healthcare services, length of hospital stays, and number of deaths during and after hospital stay.

About 75% of the UTIs acquired during hospitalization relate to an indwelling urinary catheter [4]. Lack of constancy in infection prevention protocols, which may contribute to the prevalence of CAUTI, is a serious concern. This project includes the seven steps of the Iowa model of EBP mentioned above.

PICOT Questions

Population: Are bundle of care education and unit-based urinary protocols effective prevention methods to prevent the occurrence of CAUTI in adults and elderly clients in long-term care?

Intervention: Formulating a strategic approach to implement CAUTI intervention on bundle of care education and unit-based urinary protocol.

Comparison: Bundle of care education and unit-based protocol and no protocol and no bundle of care education, the CAUTI results are compared for a prospective period of three months’ pre-implementation and three months’ post-implementation and measured against the benchmark.

Outcome: Elimination of CAUTI to zero in the long-term care setting.

Time: Three months’ pre-implementation of bundle of care education and unit-based protocol and post-implementation of bundle CAUTI education and unit-based protocol.

Significance of the Project

The project’s utilization of the unit protocol checklist and CAUTI prevention bundle of care education can be instrumental in determining the barriers and increasing clinicians’ adherence to the evidence-based CAUTI prevention guidelines. The unit protocol checklist incorporates indications for the catheter to determine if it is appropriate for proper maintenance and care. Further, the CAUTI bundle of care education piloting contributes to the practice by identifying the knowledge of staff and assessing the quality of care.

The Project’s Team Members and their Role

The project incorporates team members whose roles include team leader, administrative champion, physician champion, nurse champion, infection prevention champion, and frontline champion. The team leader must track the data and meet the expected goal set. They are also held accountable for the delegated assignment; thus, the CAUTI/HAI education and interventions will be completed. The administrative champion must align the project goals with the organization’s system goals, facilitate progress, remove barriers, meet the senior leadership, and discuss the progress, not to mention, commit time and resources to the project. Physician champions educate peers on EBP regarding CAUTI/HAI and remove physician-related and other barriers that may be present. The nurse champion educates peers on the best practices of HAI/CAUTI prevention. The infection control leader serves as an infection control consultant by assisting in developing and implementing infection control strategies. Frontliners identify and assist in practically standardizing infection prevention practices.

This project’s data collection method comprises identification of actual and potential risk factors for CAUTI. Analyzing the data extracted from electronic health records (EHRs). This routine nursing documentation provides signs and symptoms of UTI, urinalysis, urine culture, and sensitivity results. Additionally, documenting the administered antibiotics in the electronic medical records (EMRs) for UTI and collecting the data of patients transferred to the hospital setting secondary to CAUTI are also done.

Measuring the CAUTI Project Outcome

The project outcome measures including the CAUTI NHSN standardized infection rate (SIR), number of CAUTIs per 1,000 catheter days, and number of indwelling urinary catheter days will be utilized. First, the number of symptomatic CAUTIs attributable to the Burbank healthcare unit for each month is identified, including patients transferred to the hospital setting due to CAUTI. Thus, data on the population with CAUTI cases are collected as a comparison to measure the outcome both before three months and after six months of implementing the project.

Another strategy to measure the outcome utilizes the NHSN benchmark and CDC’s symptomatic definition of CAUTI to identify and count the cases in the unit; the NHSN data is used by the team for benchmarking purposes (see Table 1).

Table 1: The following section describes the various metrics calculated for UTI event surveillance that are generated as part of the reports within the analysis section of NHSN.

Calculated Metrics	Calculations	Comments
Total UTI incidence rate per 1,000 resident-days	$\frac{\text{Total Number of UTI Events}}{\text{Total resident days}} \times 1,000$	Includes: SUTI, CA-SUTI, and ABUTI
<ul style="list-style-type: none"> Percent that are SUTI 	$\frac{\text{Number of SUTI Events}}{\text{Total number of UTI Events}} \times 100$	
<ul style="list-style-type: none"> Percent that are CA-SUTI 	$\frac{\text{Number of CA – SUTI Events}}{\text{Total number of UTI Events}} \times 100$	
SUTI incidence rate per 1,000 non-catheter days	$\frac{\text{Number of SUTI Events}}{\text{Total non – catheter days}} \times 1,000$	Only SUTIs that are NOT catheter-associated will be included in the SUTI incidence rate. Non-catheter days is equal to Resident Days minus Catheter Days
CA-SUTI incidence rate per 1,000 catheter-days	$\frac{\text{Number of CA – SUTI Events}}{\text{Total catheter – days}} \times 1,000$	
Urinary Catheter Utilization Ratio	$\frac{\text{Total urinary catheter – days}}{\text{Total resident – days}}$	
Urine Culture Rate per 1,000 total resident days	$\frac{\text{Number of urine cultures order}}{\text{Total resident – days}} \times 1,000$	

Yet another strategy engages the frontline staff members, displaying the metric measured in days since the last CAUTI metric system. The metric assists the frontline staff to participate in the unit to measure the project success perception as posted in the unit’s nursing station or on a hallway bulletin board. As the number of days since the last CAUTI increases, staff attention and ownership of that success also increase. The different metrics used to measure CAUTI outcomes are compared to show the strength of the evidence. Considering implementation of the CAUTI project in the long-term care setting, the eight DNP essentials will be integrated throughout the paper.

DNP Essentials

The scientific underpinning for practice, the DNP essential 1, integrates the evidence from AHRQ’s safety program for long-term care to reduce CAUTIs in nursing homes. The project integrates the IOM [5] mandates for healthcare improvement such as safety, effectiveness, patient-centered approach, and cost-effectiveness. The implementation takes place by translating science into practice through EBP by reviewing the literature that supports the

best practice. Moreover, the financial cost of treating the infection and hospitalization outweighs the safety implemented in the unit. Therefore, the CMS does not reimburse the care provided for infection acquired in the settings. AHRQ's safety program for long-term care of HAI/CAUTI aims to reduce CAUTIs in nursing homes [6]. HAI has been the hallmark of quality improvement in the ever-changing healthcare environment. The educational bundles of CAUTI in early identification, maintenance, and care insertion technique assist in differentiating CAUTI from asymptomatic bacterial infection [6].

DNP essential 2, organizational and system leadership for quality improvement and system thinking is integrated, as the project aligns with the organization's mission to provide quality, safe, and effective care. The American Association of Colleges of Nursing [7] elaborates the importance of doctoral-prepared nurses' engagement in organizational and system leadership skills to improve patient and healthcare outcomes. The project incorporates population safety by implementing quality indicators that are translated from the AHRQ CAUTI toolkits to guide leadership's involvement in strategic implementations. This "AHRQ safety program in long-term care: HAIs/CAUTI" professional development emphasizes catheter utilization, catheter care and maintenance, and antimicrobial stewardship, along with promoting patient safety culture, team building, and leadership engagement. The anticipated approach that integrates technical and socio-adaptive principles serve as a model for future initiatives to reduce other infections, MDROs, and noninfectious adverse events that are not infectious to nursing-home residents.

DNP Essential 3, clinical scholarship and analytical methods for EBP are integrated into the project by appraising the evidence. The competencies identified explicitly in this essential incorporate the application and translation of research into practice by utilizing EBP [7]. The focus is on building foundations of EBP in advanced nursing and using them to create quality studies that improve patient care and safety [8]. The role of EBP is significant to the mandated application of the IOM domains, including safe, efficient, timely, effective, and patient-centered quality care [5]. Therefore, the doctoral project will utilize the Iowa model as cited by Mateo and Foreman [8]. Research in practice is essential to assess and use research findings to support a safe and effective change to provide systematic processes that help manage EBP quality improvement projects [8]. The project integrates the DNP Essential 3 by implementing evidence-based projects to eliminate catheter-associated infection in the long-term care setting. It utilizes the Iowa model of evidence-based framework in a stepwise approach to implement CAUTI as an evidence-based project by using the AHRQ's guidelines.

DNP Essential 4, collecting data and mitigating errors during data collection to identify problems. The information systems and patient-care technology for the improvement and transformation of healthcare play a crucial role in the project. DNP Essential 4 in the project utilizes EHR and EMR both before and after implementing the project. The lab results will be extracted from the EHR,

including urinalysis results, which indicates infection. The EHR interoperability is utilized to share patient data on antibiotic usage and document vital signs such as elevated temperature and change of condition assessment records. The project team can access the required data in a timely, effective, safe, and patient-centered manner, and the project will utilize the workflow design for the CAUTI team' quality improvement. For the quality improvement team, the project charter outlines the overall goals of the redesigned workflow or quality improvement initiative [9].

DNP Essential 5, is integrated as advocates for the quality care at the micro and macro level. The project involves DNP graduates in committees, boards, and interdisciplinary team groups at the local, state, and national level as experts in policy issues related to complications that arise in the population and contribution of government in funding the resources as a national prevention safety measure. The project advocates for safety culture by implementing a CAUTI bundle to prevent healthcare infection at the organization level by utilizing the evidence-based toolkits from AHRQ, which is a metric that alerts the staff by posting monthly reports of CAUTI rates in the unit and disseminating the project at a national level to change the policy.

DNP Essential 6, inter-professional collaboration to improve patient and population health outcomes; the WHO defines it as multiple health workers with different backgrounds and other professionals who work collaboratively with patients, families, and communities to provide the highest quality of care. The quality improvement project aims to strategically eliminate HAI/CAUTI in long-term care facilities. The project incorporates interprofessional champions and leaders in the respective fields of their professional expertise. The goal is to improve safety culture through a comprehensive unit-based safety program to eliminate CAUTI rates strategically.

DNP Essential 7, clinical prevention and population health is integrated by strategically placing the prevention of HAI/CAUTI and implementing the education bundles of CAUTI that contribute to the global reduction of misuse of antibiotics and antimicrobial resistance.

DNP Essential 8, will be integrated into the CAUTI project when the advanced practice orders the tests and identifies the problem in prevention. Advanced nursing practice identifies the concern of financial cost that CAUTI brings, such as in treating the infection, antibiotics use, multiple urinalysis test orders, asymptomatic urinary tract infection, and hospitalization. The project integrates DNP Essential 8 by the CAUTI bundle implementation and strategically placed intervention with the involvement of inter-professional teams in the unit to significantly impact the safety, cost reduction, and antibiotic stewardship.

Scope

The DNP student project in CAUTI elimination strategically adopts a systematic approach and utilizes EBP CAUTI educational bundles. Several evidence-based guidelines have evaluated the CAUTI preventive strategies and emerging evidence regarding

intervention bundles [10]. The sampling for the CAUTI project will occur in a skilled nursing facility with 188 federally certified beds and an average occupancy rate of 80.53%. The facility is approved by the CMS and participates in Medicare and Medicaid programs. The participants will be approximately 30 to 50 in number. Additionally, the site has a vendor rehabilitation center for patients in the transit care unit, which will also be included in the study. The study will take six months from data collection to data analysis.

Limitation

The findings may apply mostly to a single nursing home. Access may be limited to only a small geographical area, which would not provide an overall response scope. Data analysis methodology could pose a potential limitation as well. The qualitative methods cannot truly be replicated in controlled experimental conditions. Furthermore, the selection method is not randomly selected.

Delimitation

Delimitations are mainly concerned with the study's theoretical background, objectives, research questions, investigated variables, and sample. The DNP student will continue to identify the delimitation in the project mainly during data collection at the specific site. The alternatives to reasons for rejecting or accepting sampling techniques are chosen out of the many available and duly presented to inform the reader.

Chapter Two: Literature Review

The literature review is aligned with the purpose of the project to systematically eliminate HAIs, mainly CAUTI, and explore the influence of EBP UCP on CAUTI in long-term care settings. Multiple databases such as PUBMED, CINAHL, Google Scholar, and Cochrane Library were searched for the review. The national studies on CAUTI prevention, maintenance, and sustainability implemented in the nursing home facility significantly contribute to reducing CAUTI [11]. However, the facilities must follow the CMS requirements in reporting the CAUTI cases. As mandated by the federal law that took effect from October 2012 for CAUTI, a monthly reporting data plan on behalf of the facility to CMS must be included. Facilities must follow the NHSN CAUTI protocol to promptly report exact, and complete the data, as well as make it accurate [12].

According to NHSN [12], the criteria is to report each CAUTI occurrence or to select no CAUTI events if there are none. Additionally, total device days and patient days for selected locations must be reported. The definition of CAUTI in different parts of the world may differ; however, the standard definition must apply for proper assessment (see Appendix C). The description of CAUTI by NHSN/CDC and the Infectious Diseases Society of America (IDSA), CAUTI device utilization ratio, UTI with MDROs, targeted infection prevention (TIP) for CAUTI, comparison study for CAUTI prevention, and the behavioral and strategic approach in preventing CAUTI will be discussed throughout the paper.

The most common description of CAUTI is when a person with an indwelling catheter for more than two days has at least one specific sign, such as fever ($> 38^{\circ}\text{C}$), tenderness, costovertebral angle pain, and urine culture positive, for no more than two microorganisms [12]. Thus, clinicians must assess the patients with indwelling catheter for symptoms of CAUTI and send urine samples for proper identification of the causative organism. CAUTI is one of the most widespread yet preventable HAIs, which mainly arises in patients with indwelling urinary catheters. IDSA clinical practice guidelines describe CAUTI and mentions incorporating patients with a urinary catheter indwelling or non-indwelling having their catheter usage discontinued before any signs and symptoms within 48 hours. The clinical definition of CAUTI specifies a remarkable amount of bacteriuria, ≥ 103 CFU/mL, and manifestations of a UTI without any other identified sources of infection. Moreover, a presentation that may resemble CAUTI includes the new onset of fever, chills, altered mental status, or malaise without significance. The assessment criteria for CAUTI and non-CAUTI will be attached (see Appendix B).

The CDC assesses methods to develop quality metrics to adjust the risk of device utilization ratio to make it potentially compliant with inter-facility juxtaposition. These efforts may also facilitate different locations in developing a target device utilization ratio. The utilization ratio device bestows supplemental techniques to evaluate the population at risk for device-related infection. The current NHSN elaborates that the CAUTI rate utilizes a denominator for the catheter days without distinguishing the facilities that have a low or high device utilization ratio at the same rate. The CAUTI ratio on both high and low device utilization ratio rate is the same despite more CAUTI events. Finally, the device utilization ratio is simply extractable from EMRs; this extraction is unlikely for biased reports. Additionally, the device utilization ratio is patient-centered rather than event-centered, since it can evaluate the overall risks to the patient associated with catheter [13].

In a study by Mody et al. [14] that compares nursing-home residents with chronic indwelling catheters to the residents without catheters, the former were noted as more likely to have UTIs with MDROs. Additionally, the study indicated these residents frequently being colonized with MDROs at other anatomic sites with the potential to transfer them to other residents. Thus, the study incorporated a targeted strategy for CAUTI prevention, urinary catheter use limitation, physician reminder systems, nurse-initiated discontinuation protocols, and automatic stop orders to successfully decrease catheter time. Moreover, if indwelling catheterization is necessary, proper aseptic practices for catheter insertion, maintenance, and a closed catheter collection system are essential to prevent CAUTI. The authors utilized the strategy of bladder bundles and collaboratives to implement CAUTI prevention measures. The criteria for indwelling catheter insertion checklist will be attached (see Appendix E).

CAUTI Prevention Strategies

The multidisciplinary intervention study by Bell et al. [15] includes intensive education efforts involving nurses, residents, attending physicians, and quality improvement staff. The strategic study involved tracking patients with urinary catheters, for whom electronic order entry and stop reminders played a significant role. The study reduced the numbers of CAUTI in the hospital to 25–30%. Further, the insertion rate in the emergency department decreased from 4 to 1 percent [15] and significantly contributed to reducing urinary catheter days in the non-ICU unit. Thus, strategy can implement a quality initiative project in the long-term setting to strengthen the evidence and eliminate CAUTI. The study incorporated computerized physician order entry (CPOE) to improve the patient safety and quality in mitigating errors.

The systematic review by Meddling et al. [16] uses the mnemonic approach for the clinical component, which is mentioned as follows, C: catheter free: Assess the necessity of catheters in any resident; remove the catheter for indication of inappropriate use, as every resident deserves infection-free catheter use. Wash hands aseptically before and after contact with every resident, as well as insertion of indwelling catheters. Utilize the barrier precautions such as gloves and gowns while assisting activities of daily living. U: Use catheters only if needed and indicated after routine assessment of catheter, which is conducted daily in short-stay residents and monthly in long-stay residents. Consider alternatives such as intermittent catheterization and utilization of bladder scan to identify the need for the catheter, and for the incontinent, consider other solutions. The intervention can assist in the training and mentoring of staff and family regarding necessary catheter care by emphasizing key points such as keeping the drainage bag below the bladder, adhering strictly to a closed drainage system, appropriate handling and caring of leg bags, and managing the “kinks” in the tubing. Implementing an incontinence care plan to address individual residents’ challenges and solutions is essential, which can be done by incorporating behavioral interventions such as voiding promptly and timely and prompt utilization of medical management appropriately.

The study incorporated a multimodal targeted infection prevention (TIP) intervention. The results indicate a reduction in the overall MDRO prevalence density and in new methicillin-resistant *S. aureus* acquisitions. Additionally, the study stated clinically defined CAUTI rates as being highly risky in NH residents with indwelling devices. The authors strategically placed the incorporation of TIP intervention, which comprises the anticipatory barrier precautions for MDRO’s active surveillance and infections, data feedback, and education for the nursing home staff about critical infection prevention and hand hygiene promotion. Additionally, the selected control group for the study, NHS, continued their practice according to their infection-prevention policies. The results indicate that the multimodal TIP intervention implementation reduces the overall MDRO abundance density. Furthermore, the study results show the new methicillin-resistant *S. aureus* additions, and CAUTI ranks in the nursing-home residents as high-risk with indwelling devices [14].

A comparative study by Mody et al. [17] elaborates the difference between the veterans’ affairs (VA) and non-VA hospitals in implementing CAUTI prevention. The study findings indicate the dedication of more hours in the VA nursing homes per week to infection prevention-related activities (31 vs. 12 hours, $P < 0.001$). Furthermore, VA hospitals were more likely to have committees that review healthcare-associated diseases. Compared to non-VA facilities, the VA nursing homes reported higher CAUTI tracking rates (94% vs. 66%, $P < 0.001$), greater sharing of CAUTI data with their leadership (94% vs. 70%, $P = 0.014$), and more nursing personnel (85% vs. 56%, $P = 0.003$). However, fewer VA nursing homes were indicated to have a policy on using a catheter appropriately (64% vs. 81%, $P = 0.004$) and policy and procedure in catheter insertion (83% vs. 94%, $P = 0.004$). The study concluded that using different approaches for CAUTI prevention from best practices in both settings assists in creating an optimal infection-prevention program to integrate into the emerging healthcare system [17].

A paper by Atkins et al. [18] utilized a strategic behavioral analysis that applied behavioral science frameworks incorporated to identify the barriers to change and factors leading to CAUTI-related behaviors in primary, community, and secondary care and nursing homes. Moreover, the study describes the content of nationally adopted interventions and assessed the unity of the intervention on the extent to which the intervention content is theoretically congruent with barriers and facilitators. Furthermore, it indicates that there is a need to address the motivational, social, and environmental factors that will produce change, as the focus has mostly been on how to shape knowledge. The study identified 11 interventions that aim to reduce CAUTI. The interventions, which were primarily guidelines that most frequently included education, training, and enablement, included an average of 10, 2.3 functional intervention, 1–5 and six behavior-change techniques (BCTs), 2–11. The most used BCT was “information about health consequences, used in almost all interventions” [18].

One strategy implemented in CAUTI reduction contributes to the national and global decrease in antimicrobial threat. The Kicking CAUTI campaign emphasizes that catheterized patients with asymptomatic bacteriuria (ASB) were often misdiagnosed and treated for CAUTI. The Kicking CAUTI, or the No Knee-Jerk Antibiotics Campaign intervention, reduce overtreatment without bacterial symptoms, thus, dramatically reducing the confusion in distinguishing CAUTI from ASB. It incorporated the primarily placed interventions and emphasized reducing the ordering of urine cultures; hence, positive urine culture indication guides were used for antibiotic use [19]. Furthermore, two key utilized features of the intervention were an actionable algorithm and the case-based audit and feedback to guide this clinical algorithm. Additionally, the study aimed to evaluate the effectiveness of the Kicking CAUTI intervention in reducing inappropriate orders of urine culture, maintenance effect after cessation of active intervention, and impact of prescribing antibiotic for catheter-associated ASB and CAUTI. The public health impact of antimicrobial overuse indicated high costs and increasingly drug-resistant pathogens.

According to the CDC, the unnecessary use of antibiotics is estimated at more than 1.1 million annually in the United States. Furthermore, the illnesses from drug-resistant pathogens due to the overuse of antibiotics annually are two million, and death counts are 23,000 in the United States. Despite solid evidence against screening for or treating ASB in most adults, studies indicated that unnecessary treatment with antibiotics documented in hospital and nursing-home settings includes 20 to 83 percent of patients with ASB. However, translating evidence-based guidelines on ASB and CAUTI into bedside decision-making, the culture of treating infection based on the urinalysis and positive urine culture results can ease healthcare professionals [19].

The Iowa conceptual framework will guide the project to strategically eliminate CAUTI in the nursing home population. The AHRQ model, Comprehensive Unit-Based Safety Program (CUSP), is chosen as a change model to implement the CAUTI project in long-term care settings to improve resident safety. Educational videos and tools must be utilized to understand the science of integrating evidence-based best practice into daily care. Additionally, CUSP brings out the practical knowledge of frontline providers about resident safety risks and provides a mechanism to analyze and reduce the chances of these hazards [20].

Discussion

Although database search indicated multiple literature studies on CAUTI prevention, management, and education bundles, the topic of continuity in care implementation contributes to the safety culture and quality care. Still, there is a limitation in the findings in the individual sites in the states. Site-specific collaborative studies that further the full implementation of quality improvement project at the state level in individualized, respected nursing home sites in the United States can contribute significantly. Evaluation of this initiative was the DNP project's focus. Therefore, an extensive review of the current scholarly literature was conducted to identify methods to evaluate the QI: initiative to ensure meeting the intended outcomes. The key search terms and Boolean phrases were derived from the clinical question to search these databases for clinical practice guidelines, which lead to peer-reviewed journal articles and systematic reviews published within the past five years [8]. For example, the EBSCO academic host search on PubMed and CINHALL search engines on the peer-reviewed articles between 2016 and 2021 revealed multiple articles with utilization of and guidance on theoretical and conceptual frameworks.

The project is progressing in finding the updated evidence-based literature review by navigating multiple studies that utilize the systemic approach to evaluate the quality of evidence and determine the strength of recommendations in the 2009 guidelines of the Healthcare Infection Control Practices Advisory Committee (HICPAC), which guides the U.S. Department of Health and Human Services and CDC. Thus, it includes grade application such as grading recommendations, assessment, development, and evaluation.

The systemic approach that utilizes the conceptual framework of

catheter life cycle elaborated on the lifecycle of the catheter and the cyclical opportunities to reduce CAUTI by intervening the processes, including the insertion, maintenance or care, removals, and reinsertion of the catheter. By placing the catheter life cycle framework as a strategy in the unit, the unit gained awareness on conceptualizing and prioritizing the elimination of CAUTI. Additionally, a three-phase study of CAUTI reduction in VA hospital showed a further decrease of Foley catheter (FC) use between phases II and III, associated with direct involvement of the dedicated FC nurse with daily instead of weekly surveillance and reminders [21]. Further, the study suggested that an authority figure's involvement in inconsistent reinforcement was crucial to initiate and sustain behavioral change. Avoiding unnecessary initial catheter placement is crucial to eliminate CAUTI [16].

Therefore, making decisions based on evidence-based guidelines and utilizing different approaches to disrupt the Stage 2 life cycle of insertion of the catheter is imperative. The clinician writes orders based on the guidelines for the need for inserting indwelling catheter. Postinsertion, in the lifecycle, Stage 3 involves maintaining awareness, as its existence might be forgotten. Thus, interventions can be used, such as electronic reminders in the EHR, a routine assessment of a daily catheter checklist, and assigning a dedicated FC nurse who performs bedside checks. Stage 3 of the catheter's lifecycle, also involves the incorporation of multiple steps, as the healthcare provider recognizes the catheter's presence, the non-necessity of the catheter, orders to remove the catheter, and the nurse's response to the physician's order [21].

Finally, in Stage 4, the reinsertion of a catheter is discussed, and the indwelling catheter's unnecessary reinsertion is avoided through education and protocols and utilization of the nurse-led protocols and urinary retention assessment using bladder ultrasound or straight catheter.

As reflected on week's immersion, I had many exciting experiences. I reviewed the patient's charts to identify if the patient on antibiotics were treated for CAUTI or UTI, and if it met the AHRQ CAUTI guidelines. CAUTI remains a gap in the literature; its risk factors pertain to the effect of catheter dwelling time on CAUTI development and patient comorbidities [22]. I reviewed and located five patients with indwelling FC in place. The order indicates its change as needed, when clogged or soiled or monthly. The criteria outlined in the documentation was to monitor the drainage bag and document it for color, consistency, odor, hematuria, bladder distention, and burning sensation when applying the DNP Essential III to solve the problem through translation of research into practice. The DNP student project incorporates strategic measuring of CAUTI outcome by utilizing the NHSN and symptomatic definition of CAUTI by CDC to identify and count the cases in the unit; the NHSN data will be used for benchmarking.

I consider the DNP essentials as my guide that helps me spread my wings. The organizational and system leadership for quality improvement and system thinking are integrated, as the project aligns with the organization's mission in providing quality, safe,

and effective care. The CMS reported an issue in 2019, which identified that the catheter stayed in longer than it should. As an advanced practice nurse applying DNP Essential VIII, I navigate the progress and intervention to correct the identified deficiency. Besides, the care transparency has increased for consumers of healthcare and other healthcare organizations over time. The CMS now enforces how long-term care facilities establish and maintain quality assurance and performance improvement processes to sustain quality care and improved resident safety for nursing-home residents. Reflecting on Week 3 immersions, multiple thoughts and concepts were discovered to assist the ongoing project. As one of the requirements, the facility involves a wound care nurse regarding indwelling FC maintenance and insertion. The DNP students reviewed with the wound care team in touching base on the weekly checklist for patients on FC and identified the purpose of the indwelling FC insertion.

The DNP student aimed to meet the wound care nurse to assess if the procedure met the AHRQ long-term care evidence-based FC insertion requirements, which are evidence-based best practices, and the IDSA requirements for quality measurement to avoid unnecessary indwelling FC insertion as part of the proposed CAUTI prevention project. The DNP student performed a needs assessment by focusing on the wound and reason for FC insertion and reviewed the chart. The patient's chart review indicates a sacro coccyx UTD, right gluteal fold UTD, right groin abscess wound, and bilateral venous stasis ulcer. I can check the charts independently and use administrator's access while at the site. The DNP student attempted to locate the information that indicates any alert system to stop or order Foley, as this is a targeted strategy for prevention. For example, study by Mody et al. [14] incorporated a targeted strategic approach to prevent CAUTI with limited urinary catheter use, physician reminder systems, nurse-initiated discontinuation protocols, and automatic stop orders to successfully decrease catheter time.

After performing a needs assessment and navigating through the point-of-care EMR for Foley orders, there is a PRN order, as well as monthly change. The purpose of the DNP student project was to intervene utilization of EBP for CAUTI prevention and educational bundles through culture and behavioral change at the site. The facility served residents under the CMS and followed requirements such as creating a monthly report plan or updating CAUTI surveillance in all locations that required reporting. The CAUTI surveillance has been attached (see Appendix). The order asked patients with PRN to remove the catheter for voiding trial. If unable to void or if bladder scan was greater than 300 ml, FC was to be reinserted and catheter flushed with PRN. According to the Director of Nursing (DON), the patient with UTI is sent to the hospital immediately. There is no UTI currently, as we do not have a lot of patients with an FC. One of the residents admitted with UTI was inserted with FC after three days, as this UTI does not meet the criteria and would not be CAUTI.

The immersion experience of the week was a conversation with the senior leader, the DON, who proposed a checklist for

implementing quality improvement and resident safety projects in a long-term care facility. The plan is to ensure that all employees receive education concerning the AHRQ safety program for long-term care of HAIs/CAUTI and to make CAUTI reduction a facility-wide priority goal, including strategic planning in the facility. Furthermore, collaboration with staff, residents, and family members is necessary to develop a coordinated plan to achieve CAUTI reduction throughout the long-term care facility. As per the conversation, she would request the documents from medical records for patients who had had CAUTI in the past for retrospective data to compare for the project following the educational CAUTI bundles. Further, I spoke to DON and arranged to attend a meeting with the interdisciplinary team, which is held every Thursday on the facility, and have planned to meet with the project's potential stakeholders this week.

Chapter Three: Methodology

The purpose of the project is to systematically determine an approach to eliminate HAIs, particularly CAUTI, and to explore the impact of an EBP UCP on CAUTI in the Burbank Health Care setting by implementing an evidence-based bundle of care education in sustaining the culture of safety. EBP suggested that the appropriate use of guidelines can assist to avoid CAUTI [23]. The project will incorporate mixed methodology including qualitative and quantitative methods. Mixed-methods techniques offer approaches to assess and address processes affecting the implementation of evidence-based interventions [24]. The study employs pre- and post-intervention mixed-methods approach.

The mixed-methods approach provides a set of methods and opportunities analyzing collect and analyze the information assembled from different stakeholders to develop a deeper understanding of a broad range of perspectives and processes that affect and implement CAUTI prevention, implementation of safety culture, and antibiotic stewardship [24]. The doctoral student will conduct a qualitative study with interviews and surveys on how the organization prevents CAUTI with purposefully selected leaders and staff. The leaders and staff include the administrator, DON, assistant DON, case manager, infection control nurses, wound care nurse, and certified nursing assistants of the Burbank Health Care and Rehabilitation center. The survey aims to communicate with the staff by the point of contact, the DON, asking them to willingly participate in the survey. The doctoral student will send the letter, email, and text before the due date to remind the staff who are asked to complete the survey. The participation in the survey is entirely voluntary, but the staff is encouraged to complete the survey to help improve CAUTI management.

The collected data will serve as a baseline to implement or sustain the safety culture of CAUTI prevention at the facility. The survey for the staff's knowledge in the day shift and evening shift about the understanding of CAUTI prevention will be collected from licensed and unlicensed staff at the facility. The tools that assess the staff knowledge will be utilized from the AHRQ CAUTI prevention guidelines, such as catheter care and maintenance and

hand hygiene in the long-term care setting (see Appendix G). The plan-do-study-act (PDSA) cycle will be utilized after improving staff knowledge related to CAUTI prevention, catheter insertion, and maintenance. Different measuring tools will be applied, such as the mixed-methods approach. Then the findings will be adjusted, adapted, and/or implemented on a larger scale.

Project Design

The quality improvement project is designed to systematically eliminate CAUTI in long-term care facilities and to explore the impact of the unit-based EBP protocol's effect on CAUTI by implementing an evidence-based bundle of care education to sustain the culture of quality and safe care. The project's scope includes all people and processes related to the insertion, maintenance, sampling, and removal of urinary catheters. The patient population consists of all the long-term care residents who received urethral catheters. Residents with condoms and straight catheters are excluded from the study.

The inclusion criteria consider female and male patients with an indwelling catheter and patients transferred to the hospital setting due to CAUTI who met the criteria of the NHSN to diagnose CAUTI. The criteria for the inclusion of patients diagnosed with CAUTI follow the device (catheter) utilization ratios over time as defined by the NHSN, and catheter-days fluctuation changes in the system-wide census. WHO emphasizes the significance of infection, stating that "There is no country, healthcare facility, even within the most advanced healthcare systems, can claim without the problem of healthcare-associated infections." Furthermore, the need for infection-prevention control programs nationally and at the facility level has been reinforced in WHO 100 Core Health Indicators list.

Sampling and Setting

The sampling will take place in a skilled nursing facility with 188 federally certified beds and an average occupancy rate of 80.53%. The facility is approved by the CMS and participates in Medicare and Medicaid programs. The participants in the study will include approximately 30 out of 50 individuals. Additionally, the site has a vendor rehabilitation center for patients in transit care unit, who will also be included for the study's data collection. The problem identified in the facility regarding catheter insertion as indicated in the Medicare list, which facilitates quality survey resulted in May 2019; the reported below the national average on the percentage of long-stay residents with a catheter inserted and left in the bladder as 2.31 is worse than the national expected average of 1.79. Compared to CMS's report of 2021, a huge turnover is observed in the prevention of CAUTI, as the findings indicate the rate to be 1.49, which is better than the national average. The population sample size of the study will be calculated for general estimation using the sample size calculator for the confidence interval and confidence level.

Further, the power alpha using the G*Power program will identify the existing relationship, differences, or effects in the collected sample of the population. The population CAUTI rate will also be calculated by dividing the total number of CAUTI episodes within

a specific period by the total number of patient days within the same period and multiplying it by 10,000 (www.AHRQ.gov). The written permission for the facility to conduct the study has been attached (see Appendix).

Data Collection

The data for the study will be collected from multiple sources. They will be collected from the facility's monthly report to the CDC/NHSN and extracted from EHRs/EMRs. The NHSN requires the data to be submitted monthly and encourages facilities to do the same. The infection-prevention control leader will provide data on device days, patient days, infection counts, and infection rates based on prevailing NHSN definitions, which are occasionally changed during the project. Therefore, collaboration in collecting data with the infection control team leader is imperative. The data extracted from EHRs indicates routine nursing documentation, which mention signs and symptoms of UTI, urinalysis, urine culture, and sensitivity results. Additionally documented are the administered antibiotics in the EMRs for UTI and the collection of data from patients transferred to the hospital setting secondary to CAUTI.

Data Analysis Method

The mixed-methods analysis will compare pre- and post-data within the population in each timeframe. The doctoral student will regularly analyze the results and monitor the progress on each opportunity for improvement. Then they will measure the products and compare them with the predicted outcome. Based on the findings, it will be adjusted, adapted, and/or implemented on a larger scale. Once the cycle is completed, they will inspect the data for the changes that need to be made. Moreover, rapid appraisal analysis for quick response will be utilized in the improvement process. Additionally, the quality of evidence will be assessed with an evidence grading approach.

Ethical Consideration

The data of selected participants will be stored on a secure network, which is password protected and only accessible to members of the committee team. The study does not have a known minimal risk and thus does not need IRB approval. However, the protocol for the inquiry through the IRB approval will be conducted through the Aspen University IRB.

Internal and External Validity

The external validity may threaten the study, as measurements with device-associated infections must be adjusted for the device's rate in question. In the NHSN system, rates were reported as infection per 1,000 device days.

Conclusion

CAUTI is a social concern that contributes to patient distress, increased antibiotic use, increased healthcare cost, and morbidity and mortality. The project proposes implementing strategic elimination of CAUTI in long-term care facilities by integrating the DNP essentials and guiding the implementation with the seven Iowa framework steps.

The project's data extracts EHR and EMR documentation. The project incorporates the required assessment to identify the population at risk due to preexisting conditions as a first step and analyzes to appraise the evidence based on the criteria. It measures the outcome based on the NHNS benchmark, CAUTI rate count in days, and population rate. The DNP student identifies the limitations and delimitation of the study; limitations are out of the researcher's control, while delimitations are the choices made by the researcher, who should mention the boundaries that they have set for the study. The DNP student will limit the delimitations to the actions that a reader might reasonably expect to be done and clearly explain reasons for the omitted actions.

Reflection of the immersion experience at the site integrates DNP Essential 3, i.e., organizational and system leadership for quality improvement and system thinking, as it aligns with its mission and identification of the problem, which impedes quality care, and intervenes accordingly. DNP Essential 7 is integrated while identifying the intervention and progress of the identified problem of the indwelling catheter.

Chapters Four and Five aim to collect, analyze, and interpret data, as well as incorporate the project's operational phase. These chapters elaborate on the DNP student's projected plans. First, the student will utilize the CAUTI-related data collection tool as proposed in the previous chapters. CAUTI rates (CAUTIs per 1,000 catheter days) will be calculated as the total number of CAUTIs divided by the total number of catheter days multiplied by 1,000. Second, the student will use the catheter utilization ratio, calculating it as catheter days divided by resident days and multiplying by 100. Third, the student will utilize urine culture collection days (culture per 1,000 resident days), calculating it as the number of collected culture days divided by the number of resident days multiplied by 100. Finally, the student will utilize an event reporting tool from AHRQ, which is valuable to help identify how an event took place. Once identified, it can and will be interpreted.

The DNP student will elaborate on the relevant data collected to evaluate the project's impact on nursing practice in the following chapters. Additionally, they will describe in detail how the data was managed for analysis, including how the raw data was organized and prepared, such as a response to a survey or instrument to eliminate duplicate surveys, coding/recoding of variables, treating missing values, and scoring and/or calculations used for descriptive statistics. The collection and reporting of data is an effective means of engaging unit staff and physicians in CAUTI prevention programs. Therefore, the DNP student will continue to build a coalition team. Further, they will provide feedback to teams on how they are performing and sustaining the improvement. The process measures that can be considered necessary include the number of staff who insert catheters and whose competency has been validated in audits of aseptic insertion compliance and maintenance measures. However, as a quality assurance method, majority of FC insertion and follow-up is rendered by the wound care nurse.

The DNP student also describes in detail the analysis approach: the procedures used to conduct the analysis, such as the coding and theming process, which should be related to the analysis and interpretation of the data to indicate the correlation and significance of CAUTI in nursing-home populations with multiple comorbidities.

Chapter Four: Results

The project of CAUTI prevention strategy implementation through the bundle of care education and CAUTI protocol guidelines took place in a nursing-home setting for seven months. The data collected was processed based on all the patients selected with indwelling FCs and followed through depending on whether they developed UTI, and they were treated with antibiotics. The Burbank Healthcare Center had about 172 long-term and short-term stay patients, mainly the elderly, with multiple comorbidities. During the data collection time frame incorporated in the study, the residents with indwelling FCs were selected. The site operates based on the criteria of indwelling catheter placement for multiple reasons, mainly urinary retention and Stage 3 or 4 management. The patients with community-acquired UTI who reside at the facility, were hospitalized for a higher level of care, and put on an FC were not specified during the data collection related to the community with the indwelling catheter. The DNP student assembled the data based on gender and CAUTI development data acquired by the facility or community as the patients transferred to a higher level of care due to different medical issues.

The results were analyzed every month after monitoring weekly and are indicated as follows:

June 2021: Based on the data obtained, the findings indicate 46 infections: 12 HAIs and 34 community-associated infections; four do not meet the criteria. Among the 10 residents with UTI developed without catheter residents, most noted incontinence. The analyzed results indicated no CAUTI in the month of June.

July 2021: The analysis data on infection control indicated 40 infections: 12 HAIs and 28 community-associated infections; three did not meet the criteria. CAUTI was developed in one of the residents in the study who acquired community-associated infection with an indwelling FC.

August 2021: Based on the data obtained, there were 50 infections: 14 HAIs and 36 community-associated infections; four do not meet the criteria. Two participants developed CAUTI as a community-associated infection with catheter residents.

September 2021: Based on the data obtained, there were 57 infections: 24 HAIs and 33 community-associated infections; eight do not meet the criteria. Five participants developed CAUTI as a community-acquired infection with a catheter resident.

October 2021: Based on the data collected, there are a total of 39 infections: 19 HAIs and 20 community-associated infections; five

do not meet the criteria. Three participants developed CAUTI as a community-acquired infection with catheter residents.

November 2021: The total number of residents infected was 40, with 12 new nosocomial infections and 28 new community-acquired infections; three did not meet the criteria. There was no CAUTI in the participants of the study in the month of November.

December 2021: Only one participant in the study was on an FC and they did not develop CAUTI.

Months	June	July	August	September	October	November	December
HAI	12	12	14	24	19	12	1
CAUTI-Nursing Home	0	1	2	0	0	0	0
Community-Acquired CAUTI	0	0	0	5	3	0	0

Chapter Five: Discussion of Findings

The data analysis presented the residents who both developed and did not develop CAUTI with indwelling FC in place. The requirements for the FC insertion adhere to the guidelines. The purpose of indwelling catheter insertion at the site is primarily due to Stage 3 pressure ulcers. The site would not have control when the patients are hospitalized for different reasons due to multiple comorbidities and would be unable to track the purpose of insertion. As the residents return to the facility with FC and develop UTI, it gets difficult to identify the root cause, which is stated as community-acquired UTI with FC as a categorical assessment in analyzing the data. The alteration is impactful in bringing a collision and further narrowing the gap to fully eradicate CAUTI through a collaborative approach with the community and nursing homes. This will require a separate project to combat CAUTI globally. The DNP student followed the selected patients in the study to assess if they developed UTI and possibly CAUTI. The patients in the study who developed UTI were treated with antibiotics based on the clinical symptoms of UTI and urine culture. The participants in the study developed UTI while they had Foley, and were possibly considered as CAUTI. However, there are complex issues that need further studying, such as community-acquired UTI, which is possibly CAUTI, and creating a system that tracks and communicates with the receiving site on the immediate removal of FC to prevent CAUTI. Atkins et al. [18] indicated that the most frequently reported barriers to and facilitators of CAUTI-related behaviors relate to environmental contexts and resources. The study describes the behavioral factors as knowledge, beliefs about consequences, social influences, memory, attention, decision processes, social factors, professional role, and identity. Being socially aware and influenced by the environment in decision-making based on the professional identity and social context significantly impacts CAUTI prevention strategy. The infection control lead at the facility is fully engaged on this matter as per the discussions on the community-acquired UTI prevention; they help narrow the gap via a partnership with the community through enablement, training, and education. The infection cycle's initial prevention through technique and behavior change effectively

utilizes the aseptic indwelling catheter insertion, which is an adequately maintained closed-drainage system, and unobstructed urine flow. Since many of these infections occur in clusters, and not just in a single episode, good hand washing before and after catheter care is essential.

The protocol to implement based on the assessment of nurses' knowledge and the need for better documentation have been studied. Findings indicate that prolonged catheterization significantly increases CAUTI risk, with each catheter day raising the infection risk from 3 to 10 percent. Yet, catheter duration is rarely monitored daily. Most nursing documentation flow sheets feature a small area for genitourinary assessment, but accurate documentation of catheter assessment, time of use and condition, and tubing securement methods are commonly missing [22].

The study mainly incorporated older adults who were selected based on the availability of the participants at the site with an indwelling FC. The indwelling catheter care knowledge of randomly selected staff and application findings at the setting, with the utilization of guidelines, pre-intervention of CAUTI care bundles, and protocol checklist were analyzed and compared with post-intervention techniques. The responsibility of Foley insertion mainly falls on the wound care nurse, along with the change of FC monthly and as needed. However, it is imperative that both licensed and unlicensed staff, as well as environmental services are involved in prevention measures, as this is a team approach of care.

The lack of proper intervention to prevent CAUTI in nursing-home residents leads to sepsis, hospitalization, mortality, cost inflation, and antimicrobial use, ultimately leading to MDROs. A CDC report indicated that an estimated 17 to 69 percent of CAUTI could be prevented if the recommended infection-control measures had been appropriately utilized and effectively communicated. Up to 380,000 infections and 9000 deaths per year could thus have been prevented [12]. Further, CAUTI project implementation in long-term care facilities plays a significant role in eliminating unnecessary antibiotic use. The establishment of antibiotic stewardship is at the infancy stage in long-term care facilities, although there is sufficient experience and evidence to guide the hospital settings. The CAUTI project significantly contributes to the widespread efforts to reduce the threats posed by antimicrobial-resistant organisms across the spectrum of health care settings required by the Centers for Medicare & Medicaid services.

The project aimed to eliminate the cost inflation problem, hospitalization, mortality, and antibiotic overuse issues that CAUTI can trigger by strategically placing an approach through the bundle of care education and protocol. The quality improvement program under category 1B evidence recommends implementing programs or strategies to enhance the appropriate use of indwelling catheters and reduce the risk of CAUTI based on a facility risk assessment. The DNP student assesses the facility's purposed assurance of proper utilization of catheters, identifies and removes catheters that are no longer needed by daily reviewing the continued need,

and ensures adherence to hand hygiene and providing proper catheter care. As part of sustainability of the quality improvement project, a short quiz to assess the knowledge of the infection control team will be shared with the ID team; the DNP student agreed to distribute the quizzes from the AHRQ to the facility staff for further integration and awareness in implementing CAUTI prevention.

This would help implement a system that alerts or reminds to identify all patients with urinary catheters and assess the need for continued catheterization. Further guidelines and protocols will be included for nurse-directed removal of unnecessary urinary catheters. Feedback regarding appropriate use, hand hygiene, and catheter care is important, as unmaintained, uncleaned, and uncared-for indwelling catheters lead to CAUTI. Literature suggests the importance of implementing evidence-based standards of care prevention strategy. The questionnaire data was coded and entered in a spreadsheet, and statistical software was used to determine significant changes.

Findings

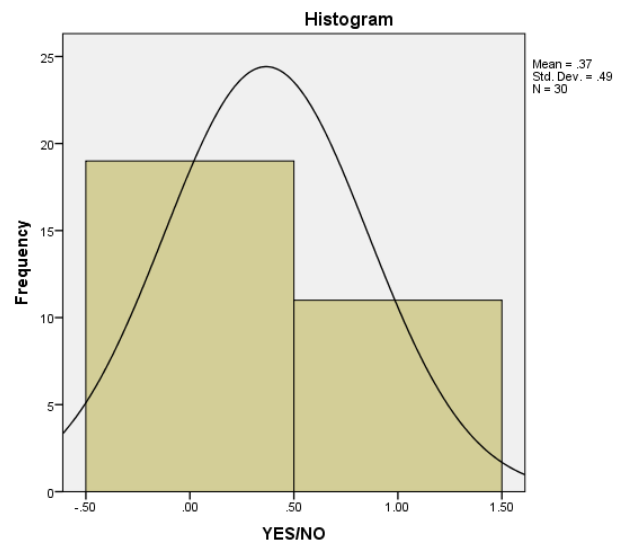
The Statistical Package for the Social Sciences (SPSS) 22.0 analyzed the project data of the frequency table on female and male patients with UTI and possible CAUTI. Although the number of male participants was higher, female participants are more affected by CAUTI/UTI according to the findings. Further, for a more well-rounded approach to intervene due to time constraints, the qualitative data collected through the knowledge questionnaire was aggregated and categorized thematically and sent to the infection control team. The plan is to assess and submit to the DNP student if the time allowed to make the project broader and create a folder of CAUTI prevention. This would help sustainable implementation at the facility upon consensus. The summary of methods and procedures will present the analytical methods of the findings of the CAUTI prevention strategies to inform the larger conceptual framework of the Iowa model surrounding the investigation of the importance of utilization of the CAUTI guidelines based on EBP.

The IOWA model of evidence-based structure for quality improvement assisted in identifying the required improvement in the design to promote quality care and cost reduction in the findings of the facility. The histogram below indicates the frequency distribution of the phenomena (Yes = CAUTI, No = No CAUTI).

Yes = Participants developed CAUTI		No = Participants did not develop CAUTI			
YES/NO		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	19	63.3	63.3	63.3
	YES	11	36.7	36.7	100.0
	Total	30	100.0	100.0	

The frequency of participants in the study showed higher male count; the development of CAUTI significantly affected the female

participants, although they appear in lesser numbers in the study.



The results indicate the gap and the need for prevention of community-acquired UTI, possibly CAUTI, before admission to nursing homes to contribute to the safety culture by providing awareness to the larger community. The clinical significance of these findings is imperative. Since it will serve the nursing community, primarily the healthcare team, early identification in everyday life reduces the cost. It avoids the overuse of antibiotics in the elderly population with multiple comorbidities. Furthermore, it pinpoints an alert system that inquires more information on putting indwelling catheters and choosing a better intervention.

Further, the results inform theory, as the project findings disseminate scientific knowledge, critical studies, and synthesis of research findings, and determine the application of guidelines, evidence-based outcomes, and strategies at the facility to prevent CAUTI. They assist in deciding to evaluate change in practice and sufficient research to guide practice. The conceptual framework shows the institution's data to transform into information to evaluate the research-based implementation in practice. It helps evaluate the change in practice based on the findings and monitor the outcomes on family/patient, staff, and the fiscal level. The data collected were followed weekly and analyzed monthly from June to December. The aim is to incorporate scientific evidence and discuss with the infection control team to prepare a folder that specifically identifies the CAUTI identification criteria besides a description of UTI. One patient in the hospital setting was diagnosed as a possible CAUTI case. The patient must be treated with antibiotic therapy for the UTI, as strategically implemented prevention can significantly reduce the need for antibiotics, which is crucial in addressing the global threat of antimicrobial resistance.

The study indicated that CAUTI is one of the most frequent device-related infections that may be amenable to prevention through a collaborative approach utilizing the AHRQ tool kit in long-term care settings. To reduce CAUTI and maintain these improvements,

a strategy to address culture and clinical practice in the long-term care setting is necessary. The facility's culture comprises the team's values, attitudes, and beliefs, which impact the team's ability to improve clinical practice. The guide highlights the main program elements, necessary steps to plan for and implement a quality improvement program, which is focused on reducing CAUTI and other HAIs, and improving safety culture. The recommendations for an entire change in the plan should be incorporated in the clinical component and culture of safety interventions by utilizing the educational bundles, tools, and quality improvement plans.

Based on the data collected on female and male patients with indwelling catheters, 30 were followed through to assess if they developed UTI, possibly CAUTI. They were further categorized on the analysis criteria of CAUTI compared to the sex of the participants in the study. As stated, the number of female patients who developed UTI while on indwelling FC is higher than that of male patients. The DNP student looked at a study to substantiate the results with a literature review on gender predisposition, as CAUTI is nosocomial-based. The single-blinded cross-sectional study by Otobo et al. [25] assessed the gender predisposition to CAUTI, utilizing findings for leukorrhea and nitrate analysis using dipstick urinalysis in a tertiary health facility. The study utilized the CYBOW combi-11 reagent strips for urine analysis. The findings of the study indicated that the females developed detectable leukorrhea within the first week and had positive urine tests for nitrates with flank tenderness within two to three weeks of catheterization. The males in the study did not have detectable leukorrhea within the first week; they developed positive urine tests for nitrates with flank tenderness within three to four weeks of catheterization. Both males and females developed significant leukorrhea and positive urine tests for nitrate with or without flank tenderness with a mean duration of three weeks. Supporting this finding, my study findings indicate that women are more likely to acquire CAUTI than men.

Further, there were no reported cases of UTI among patients in the study in December. In six months of follow up, UTI was reported in 11 out of the 30 participants, who were treated with antibiotics. Of the 11 who developed UTI, male participants were five, while females were six in number. Further, the total number of participants who did not develop UTI but were in FC was 19; those who did not develop UTI with indwelling FC were five in number. The number of male participants who did not develop UTI was 14 in the study with indwelling catheters.

The participants were aged between 58 and 95 years. The NHSN definitions of symptomatic nosocomial UTI, which are commonly used, can be challenging to apply to patients with indwelling catheters who have localizing signs and symptoms, as it may not be present while the catheter is in place or may not be recognizable, as the patient has other comorbid factors that cause the infection. Therefore, clinicians utilize the presence of fever with positive urine culture results without other localizing findings. However, given the high prevalence of bacteriuria in patients with an indwelling catheter, the definition will indeed lack specificity. The study

strictly incorporates the diagnostic criteria of the infection, which is classified as CAUTI under guidelines published by the CDC, where a patient must have the following: had an indwelling urinary catheter for more than two days by the date of the event (with Day 1 being the day of catheter insertion); one sign or symptom including fever, suprapubic tenderness, costovertebral angle tenderness, urinary frequency or urgency, or dysuria; and urine culture with more than 105 CFU/mL of one bacterial species (non-bacterial pathogens have been excluded since 2015). The findings of the study meet the criteria of developed CAUTI. Although detailed indications of the participants' manifestation were dictated and not diagnosed in the patients' chart, the treatment modality was rendered accordingly to halt the offending organism. The lack of interoperable capabilities of the EHR limited the ability to collect some granular data that may have supplemented the analysis for the community-acquired UTIs and augmented the study.

Conclusion

Based on the data collected on female and male patients with indwelling catheters, age of the participants, and gender ranges, out of 30 patients, 19 participants did not develop UTI but was in FC. Female participants who did not develop UTI while in indwelling FC were five. In seven months of follow up, UTI was found in 11 of the 30 participants, who were treated with antibiotics. Of the 11 who developed UTI, five were males and six were female. The clinical significance of the findings is imperative. Since it will serve the nursing community, primarily the health care team, early identification in everyday life reduces the cost, hospitalization, and antibiotic use. In alignment with the findings of Otobo et al. [25], it is indicated that women are more likely to acquire CAUTI. The desired outcome of this project was to implement a successful CAUTI prevention strategy with EBPs that would sustain even after the initial post-data collection period ends to have decreased CAUTI rates.

Based on the DNP student's observation through data collection, the infection control nurse (provisionist's intervention) played a significant role. Utilizing prevention strategies as bundle of care education and protocols, this interventional study impacted the low incidence of CAUTI at the facility. It evaluated the effectiveness of the TIP multimodal intervention in reducing MDRO prevalence and device-associated infections at Burbank Healthcare and Rehabilitation center. The intervention included a structured interactive educational program for the staff, hand hygiene promotion, preemptive barrier precautions when assisting with high-risk activities of daily living, active surveillance for MDROs and infections, and monthly feedback.

Introduction

Urinary tract infections remain the most common HAI in nursing home residents, occurring at significantly higher rates among indwelling urinary catheters. Implementing the CAUTI prevention intervention of the study can reduce most health-associated infections in nursing homes residents by contributing to strategic prevention through education, training, and socio adaptive behavior changes. The alternative study to the indwelling catheter indicated

to reduce CAUTI such as the placement of female patients who are candidates for the pure wick catheter, as indwelling time, which contributes to UTI, does not apply to the device. The study's findings indicated that using an external female urinary collection device is a feasible alternative to an indwelling urinary catheter and managing urinary incontinence.

According to AHRQ [23], an estimated two million HAIs occur among nursing home residents every year that leads to hospitalization, morbidity, and mortality. The DNP project aimed to implement strategic prevention with multiple evidence-based resources to combat the incidence by collaborating with local-, state-, and national-level initiatives to reduce CAUTI-related problems to reduce cost, hospitalization, mortality, and comorbidity among nursing home population. The guidelines have always recommended aseptic insertion for the sake of health care providers to minimize or prevent harm to their patients. However, the health care system's configuration is not always aligned with the health care providers' workflow. Health care providers develop workarounds to overcome system barriers, which can have unintended consequences. Therefore, the DNP student examined the available strategies and utilization tools, socio adaptive behavior to minimize infection control at the facility, and role directly applied to prevent CAUTI. The DNP student collected data monthly and followed up for seven months to collect adequate participant data and obtained information from the wound care nurse and infection control lead nurse. The DNP project's data analysis presented the residents who both developed and did not develop CAUTI with indwelling FC. The requirements for the FC insertion adhere to the guidelines for prevention of Catheter Associated Urinary Tract Infection 2009, which were set forth by HICPAC.

The DNP student observed, collected, and assessed the need for the patients on Foley catheter at Burbank Healthcare and Rehabilitation Center and found that the purpose of indwelling catheter insertion at the site is primarily due to Stage 3 pressure ulcers to prevent infection. The site would not have control when the patients are hospitalized for different reasons due to multiple comorbidities and would be unable to track the purpose of Foley catheter insertion. When the residents return to the facility with FC and develop UTI, it is difficult to identify the root cause, which is stated as community-acquired UTI with FC as a categorical assessment in analyzing the data. The altercation is impactful in bringing a collision and further narrowing the gap to fully eradicate the CAUTI through a collaborative approach with the community and the nursing homes. The collaboration between nursing homes and hospitals in setting a mutual goal will require a separate project to combat CAUTI globally.

The DNP student followed the selected patients in the study to assess if they developed UTI and possibly CAUTI. The patients in the study who developed UTI were treated with antibiotics based on the clinical symptoms of UTI and urine cultures. The participants in the study who developed UTIs while they had Foley, possibly considered as CAUTI. However, complex issues need

further investigation, such as community-acquired UTI, possibly CAUTI, and creating a system that tracks and communicates well with the receiving site on the immediate removal of the FC to prevent CAUTI. Based on the data collected on female and male patients with indwelling catheters, 30 patients followed through to assess if they developed UTI, possibly CAUTI. The participants were further categorized on the analysis criteria of CAUTI on the basis of the sex of the participants in the study. The number of female patients who developed UTIs while on indwelling FC is higher than that of male patients. The section overviews the main contents and areas of how the CAUTI study remains an eminent topic, as it broadly encompasses the multiple safety culture issues to individuals, families, congregations, and organizations, globally and nationally. Numerous studies have indicated different strategies that work. Still, as this topic held an individual care approach based on knowledge and behavior change, the findings of my project contribute significantly to the body of knowledge.

Conclusions

The project purposed to pilot the bundle of care education and unit-based urinary protocol, which are effective prevention methods for CAUTI occurrence in adults and elderly clients in long-term care settings. The problem addressed in the project, increased CAUTI rates, can result in increased hospital admission and treatment, increased lost revenue to the health organization, and overuse of antimicrobials. The risk factor for CAUTI, i.e., leaving indwelling catheters longer, was below the national level at the facility in 2019 as per the CMS report. The standardized infection ratio (SIR) is a summary measure used to track HAIs at the national-, state-, or local-level over time [4]. $SIR = \text{number of observed CAUTI rates} / \text{predicted CAUTI rate}$, which indicated 0.36. A SIR less than 1.0 indicates that fewer infections reported during the surveillance period than would have been predicted, given the baseline data. A SIR equal to 1.0 indicates that the numerator and denominator are equal. This implies that the number of infections reported during the surveillance period is the same as the number of infections predicted, given the baseline data. A SIR that is significantly more than 1.0 indicates more infections reported during the surveillance period than predicted, given the baseline data. While a SIR less than 1.0 indicates fewer infections occurring than predicted, the results show a significant reduction compared to the NHSN CAUTI rate of 1.0. Although it did not meet the proposed outcome, the piloted findings indicate a lower rate of CAUTI.

The study's value suggests sustaining the strategies to achieve zero results with more intervention and surveillance. During the survey in November and December, as well as first month of data collection at the facility, there were zero findings of CAUTI. The highest rate in September and October showed us a community-acquired CAUTI, which totaled 8 out of the 11 participants who developed CAUTI. The finding on the community-acquired is a significant concern for DNP students, as this unexpected finding is an external threat while performing the SWOT Survey analysis. The identification of strength, weakness, threats, and opportunities for

CAUTI prevention played a significant role for future implication. The table below illustrates the rate of CAUTI occurrence in the nursing home and community-acquired such as in hospitals.

Months	June	July	August	September	October	November	December
HAI	12	12	14	24	19	12	1
CAUTI-Nursing Home	0	2	1	0	0	0	0
Community-Acquired CAUTI	0	0	0	5	3	0	0

The IOWA model of evidence-based structure for quality improvement assisted the identification of improvements in the design to promote quality care and reduce cost in the facility's findings. The decision to explore identified problem-focused and knowledge-focused triggers using the Iowa model of evidence-based practice recognized the DNP project's gap in clinical practice communication within the organization and the hospital setting and the patients admitted for other medical issues. The Iowa model of evidence-based practice as a theoretical framework was utilized to implement the project into the design for clinical problem resolution, after problem identification, and when the researched evidence within the review of current literature supports the finding(s) as a priority for the organization. Of the Eight steps of the IOWA model of the evidence-based practice, step one was triggered by a problem on the catheter left at the facility and was found to be below the national average on the grading in an inspection in 2019. Infection control is the facility's priority, and it is well established with two infection control nurses who work to manage the facility and render services to the staff. Step three of the framework is incorporated when the DNP student built a team in the project with the stakeholders, infection preventionist, and wound care nurse, who directly work and manage the foley catheters at the facility. Stakeholders within the organization support change and secure it with the initial project initiating the difference. In step four, the DNP student formulated the PICOT question. In step five of the project, the literature was scientifically reviewed to determine change. Step six gathered sufficient evidence to implement the change and discussed the infection prevention lead. In step seven, the DNP student implemented change in a pilot program. Step eight evaluated the results, and concluded that change was feasible with further recommendations. The available tools that assist in mitigating the errors with the facility have been discussed. When change occurs to the status post clinical interventions and data collection, the practiced change will have the support of the stakeholders. Following which the new practice change can be integrated and maintained. Furthermore, the pilot testing indicated a gap in the prevention of CAUTI that needs further consideration.

The study results of the IOWA model elaborated as the piloted results evaluated the critical components of age, gender, and comorbidities and the gap that limited the accurate findings. The CAUTI prevention strategy implementation project used the bundle of care education and CAUTI protocol guidelines and was conducted in a nursing home for seven months. The data

collected was processed based on all the patients selected with indwelling FCs and a follow up depending on whether or not the participants developed UTI and were treated with antibiotics. The Burbank Healthcare Center had about 172 long- and short-term stay patients, mainly the elderly, with multiple comorbidities at the time of data collection. During the data collection's time frame incorporated in the Study, the residents with indwelling FCs were selected. The site operates on the criteria of indwelling catheter placement for multiple reasons, mainly urinary retention and Stage 3 or 4 wound management as aligned with the guidelines criteria. The patients with community-acquired UTI who resided at the facility, were hospitalized for a higher level of care, and put on a FC were not specified during the data collection concerning the community with the indwelling catheter.

The findings significantly contribute to the larger community in multiple ways theoretically by surrounding the IOWA model. The pilot testing findings communicate the concept of intervention in cost reduction, decrease in morbidity and mortality rates, and antibiotic overuse by strategically placing evidence-based CAUTI prevention. The results emphasize the importance of applying behavior-based strategies, empowering education on the bundle of care, and providing external support as regulatory agents' incentive and grading the rate of the quality care. Furthermore, the national study in nursing homes by Mody [14], which took place in 404 nursing homes spanning over 38 states in the United States, set the ground for the local findings of my project as this study indicated a decrease in CAUTI rates by 50%. The nursing homes implemented infection-prevention strategies, which dropped to 3.33 per 1,000 catheter days.

The DNP student's findings show the gap and need to prevent community-acquired UTI, possibly CAUTI, before admission to nursing homes to contribute to the safety culture by providing awareness to the larger community. The clinical significance of the findings is imperative; as it will serve the nursing community, primarily the healthcare team, in early identification and prevention; CAUTI increases cost, morbidity, and mortality rates. The project findings contribute to avoiding the overuse of antibiotics in elderly population with multiple comorbidities. Moreover, it pinpoints as a behavioral strategy, an alert system that inquires more information on inserting indwelling catheters is according to the standards set for by the guidelines in the requirements for CAUTI and in choosing a better intervention. Further, the results inform theory as the project findings disseminate scientific knowledge, critical studies, and synthesis of research findings and determine the application of guidelines, evidence-based outcomes, and strategies at the facility to prevent CAUTI. The results assist in deciding to evaluate a change in practice and utilizing sufficient research to guide practice in the identified gap.

The DNP students' understanding in exploring the existing model came together to inform a particular problem. It shows the reader how the different elements come together to understand the results clearly. For example, the significant gender difference was that despite more male participants, more females were affected

by CAUTI, the final piloting. The results Report the research questions on the importance of the strategies and protocols to prevent CAUTI in nursing homes. The model helps understand the relationship among CAUTI prevention strategies concerning the practice setting. Each idea of the findings is related to the project in question. The DNP student explains the why and how phenomenon by substantiating the literature and incorporating a visual histogram and frequency table to show the findings. Translate theoretical knowledge into practice to improve health outcomes. The DNP-prepared nurse creates a transformational change in utilizing the policy development, research, teaching, learning, and experimentation based on the education level [7].

The DNP student's project supported the advancement of nursing knowledge to improve patient care quality through nursing education and quality improvement initiatives. It will add to the existing literature through dissemination and further recommended investigations. The study's participant's catheter placement continued for more than a month, as it was primarily based on long-term catheter usage. Based on the project's findings, the team-taught nursing home staff consistently applied the techniques that were grounded in the research, including assessing the patient's need for catheters carefully, knowing how to care for and maintain catheters in residents who have them, and identifying patients who are appropriate candidates for lab tests and antibiotics. Furthermore, they learned to improve communication, leadership, and staff engagement and reviewed safety culture to promote the consistent use of these practices.

Recommendations

The project's goal was to strategically eliminate CAUTI at the Burbank healthcare and rehabilitation nursing home. The DNP student's finding indicated developments concerning the topic's focus understudy throughout the project and recommended further research. The project had investigated multiple altercations and revealed several areas open to a need for ongoing literature review, communication, and utilization of interoperability as a valuable method to serve nursing home population. The nursing home population, for those with multiple comorbidities and transfer to the hospital setting, some return with Foley catheter in place and some without FCs, but potentiate other catheter needs further investigations if they developed CAUTI after seven days of Foley catheter removal. Communication, awareness, and behavior change can decrease the incidence of hospital-acquired CAUTI at nursing homes.

Future implications of this DNP project include conducting an RCA to determine the next steps for another PDSA cycle to improve the CAUTI rates for the organization. An ongoing literature review needs to be completed to find other interventions to incorporate into the next phase. As a DNP student expected to make practice change recommendations to sustain measurable change from a systems perspective, the next PDSA cycle may need to collaborate with the organization's interoperability for data collection. In collaboration with hospitals, the residents admitted for other health medical issues come back to the nursing home with a foley catheter

and develop CAUTI. Develop a standard protocol or checklist for indwelling urinary catheters to ensure that the interventions align with the nursing home protocol for continuity of care. The CAUTI may develop after 3 to 4 days of catheter removed before arrival to the nursing homes. A simple checklist continued the flow and may risk the patient's development of CAUTI. Despite the evidence-based tools that are present, the facility does not have one that will make other staff aware of the results, thus, using AHRQ CUSP may reduce CAUTI in the nursing home. Recommendations include continuing the intervention and repeating the project at another sister facility of the Longwood management to compare the findings. Therefore, it is a recommendation that the project be sustained and reinforced to reduce the insertion of the IUC, which may, in turn, reduce CAUTI. Another offer for the female residents to utilize pure wick, an external catheter connected to suction, can be used with a variety of female participants to eliminate the use of Foley catheter. While reducing damage to the patient's skin from urinary incontinence and wound management, using the pure wick protocol offers a pure wick to the appropriate population, i.e., females with decreased mobility.

The DNP student introduced structured and organized evidence based on facility infection control; the utilization of the "AHRQ Safety Program in Long-Term Care: HAIs/CAUTI" emphasized professional development in catheter utilization, catheter care and maintenance, antimicrobial stewardship, and promotion of patient safety culture, team building, and leadership engagement. Furthermore, the proposed initiative to integrate and utilize technical and socio-adaptive principles serves as a model for future initiatives to reduce other infections, multidrug-resistant organisms, and noninfectious adverse events among nursing home residents. The further recommendation that there is not much in the literature regarding the utilization of pure wick external catheter on female patients at long-term facility could be further studied. Although it may not help urinary retention patients, it will benefit and reduce the bedridden unstageable or stage three wound.

Summary

Despite multiple research studies on CAUTI, the prevalence raises concerns, especially in the long-term care for residents with various comorbidities. CAUTI is a UTI in an indwelling urinary catheter, caused by the catheter being placed for more than two consecutive days in an inpatient location on the date of the event, with a day of device placement being Day 1(CDC.org). According to the CDC, a 2015 report indicated an estimated percentage of 17 to 69 of CAUTI cases that could have been prevented if the measures for prevention were utilized appropriately and communicated effectively. The study findings of the project play a significant impact in preventing CAUTI at the facility. First, the most needed assessment identified evidence-based strategies that close the gap of CAUTI at the facility, among the nursing home population, and second, to narrow down or eliminate CAUTI.

The introduction concisely presents the AHRQ project with PDSA cycle to benefit the facility. The DNP student introduced the national implementation initiative of CAUTI to reduce the number

of infection control nurses at the facility. CAUTI arises due to indwelling Foley catheter; indwelling time increases the risk of infection and raises attention in prevention. Besides insertion, maintaining and educating anyone who cares for such patients play an important role in combating this endemic HAI. As multifaceted interventions that combine the best practice guidelines, engage staff, educate, and monitor have shown to be more effective in bringing a practice change rather than only focusing on a single intervention. Further, the cost of hospitalization and overuse of antibiotics for treating CAUTI instead of preventing relates to the cost inflation and antibiotic stewardship and raises a global concern.

The Consideration can be taken as utilization of alternative to indwelling catheters should be considered inappropriate. However, if indwelling catheterization is necessary, proper aseptic practices for catheter insertion and maintenance and a closed catheter collection system are essential to prevent CAUTI and further incorporate the quality improvement program that is categorized under IB summary recommendation guidelines of CAUTI [4] as an evidence recommending the importance of implementing strategies to enhance risk reduction based on the facility's risk assessment. As guideline indicated on 1A as a critical question and categorized IB in avoiding the use of urinary catheters in nursing home residents for incontinence management, avoidance is apparent at the facility as per the guidelines. The DNP project aimed to systematically determine an approach to eliminate health care infection, mainly CAUTI. Based on the existing literature and exploration of effective evidence-based practice urinary catheter protocol and an educational bundle of care on CAUTI in the long-term care settings. Further, implementing an evidence-based bundle of care education and unit-based care protocol to sustain the safety and quality care culture to eliminate CAUTI.

The general purpose of the investigation is contribution of strategies that are a bundle of care for CAUTI and unit-based protocols that impact CAUTI prevention at the nursing home residents. At the site of the study, monitoring, maintaining, insertion of Foley catheter falls on the wound care nurse. Although the application at the site is more on the wound care nurse, this is a collaborative approach of care; the involvement of licensed and unlicensed staff and environmental services in the prevention measures is, thus, imperative to combat CAUTI. The DNP student examined the breadth of knowledge and justified the study of CAUTI prevention strategies, which are evidence-based research from a peer-reviewed literature review conducted with systemic control. The DNP student has read the top 20 academic, peer-reviewed papers on CAUTI and existing national initiatives on CAUTI in long-term care facilities. The initial GRADE of evidence for each outcome, deemed high as the evidence base, including a randomized controlled trial (RCT) and a systematic review of RCTs. It would be low if the evidence base had only observational studies or be very low if the evidence base consisted only of uncontrolled studies. My studies incorporated the randomized control and systemic review that are peer-reviewed literature.

The project objective to identify the impact of evidence-based CAUTI prevention bundle of care in nursing homes partially met in some areas with a strategic approach, since the approach in the collaborative team is missing at the facility. And the facility utilized one dedicated person to insert the Foley catheter and maintain and under wound care. Compared to the leaving the indwelling catheter in the national rating, the reduction rate improved due to improved CAUTI rate at the facility. Compared to the findings, the community-acquired CAUTI rate exceeds the CAUTI rate at the facility. Utilization of evidence-based unit protocol checklist assesses indications for catheter use, maintenance of care, insertion based on CDC practice guidelines, address the technical and adaptive problems to CAUTI reduction, and adopts the best practice for CAUTI prevention.

Methodology

The methodology worked well in the study, as the chosen methodology incorporated mixed approach. Therefore, to conceptualize the appropriate process at the facility, studies utilized the pre- and post-intervention; the study also included identified problems at the site as a target point to show the improvement alongside collected data in seven months. The DNP student reviews qualitative, quantitative, and hybrid approaches to mixed methods dissemination and implementation studies and describes methods for integrating multiple strategies to increase the depth of understanding while improving reliability and validity of the findings. The guideline was based on a targeted systematic review of the best available evidence on CAUTI prevention. The utilization of the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) approach provides explicit links between the available evidence and resulting recommendations. The DNP student developed the key questions and reviewed the guidelines, searched literature on multiple databases, abstract and full-text screened, synthesized, and analyzed for use as evidence.


The section generally provides an overview of the implications of the study. The study significantly shows the gender difference in the impact of CAUTI. The study's findings were based on data collected on female and male patients with indwelling catheters; 30 patients were followed to assess if they developed UTI, possibly CAUTI. The findings were further categorized, and analysis criteria of CAUTI compared the sex of the participants in the study. The number of female patients who developed UTIs while on indwelling FC was higher than that of male patients. The following were the steps in the PDSA: Plan, planning the test or observation, including a plan to continue collecting data on the community-acquired CAUTI and the CAUTI results that showed a higher number in community-acquired than in the facility; making Do a cycle. try out the findings on a small-scale to communicate and create a checklist that inquires the resident's information from the receiving community for any development of CAUTI or Foley catheter insertion at a particular time while the resident is at the facility; Study, set aside time to analyze the data and study the results; Act, refine the change based on test results.

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Appendix

Appendix A



Appendix A: Approval of the DNP Proposal

Doctoral Student: Madhri Khatwaj

The DNP Project Team of the above-named Doctoral Student has read and reviewed the DNP Proposal entitled:

<Project Title> Systemic Elimination of CAUTI

The DNP Project Team has determined that the proposed DNP is likely to:

1. Make a significant contribution to the field of knowledge;
2. Demonstrate the student's ability to perform independent research;
3. Contain material worthy of publication in a form appropriate to the discipline.

We recommend acceptance of this proposal. It contains all appropriate content and form.

DNP Project Team Member's Signatures:

Faculty Mentor: Dr. Barbara Miller DNP, EdD, RN (Printed Name)

Faculty Reviewer: Dr. Melba Reed PhD, RN (Printed Name)

Independent Reviewer: Sabrina Fricker, EdD, DNP, FNP-C, APRN (Printed Name)

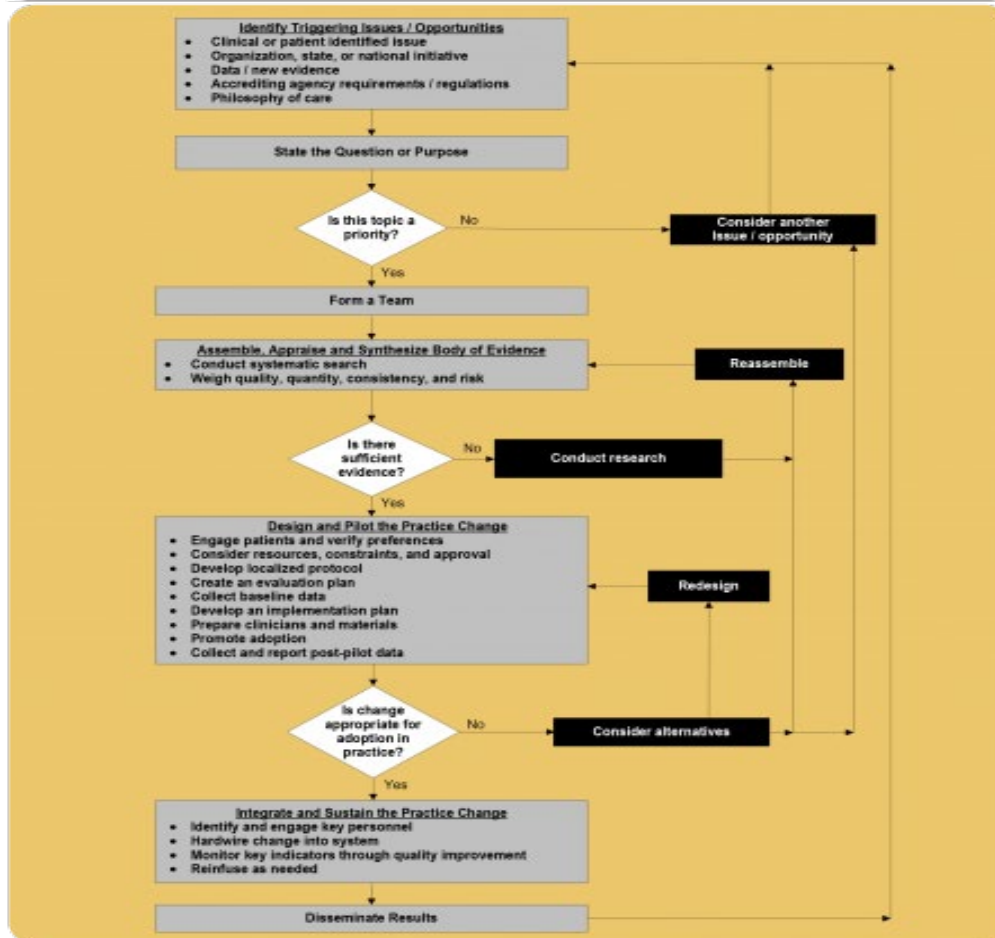
Program Approval Signature:
Tracy Lookingbill DNP, MSN, RN (Printed Name of Program Representative)

08/25/2021
Date

Completed form should be submitted to ProjectConcert after all signatures are attained. Directions can be found in the DNP Handbook under "Instructions Uploading Documents to ProjectConcert."

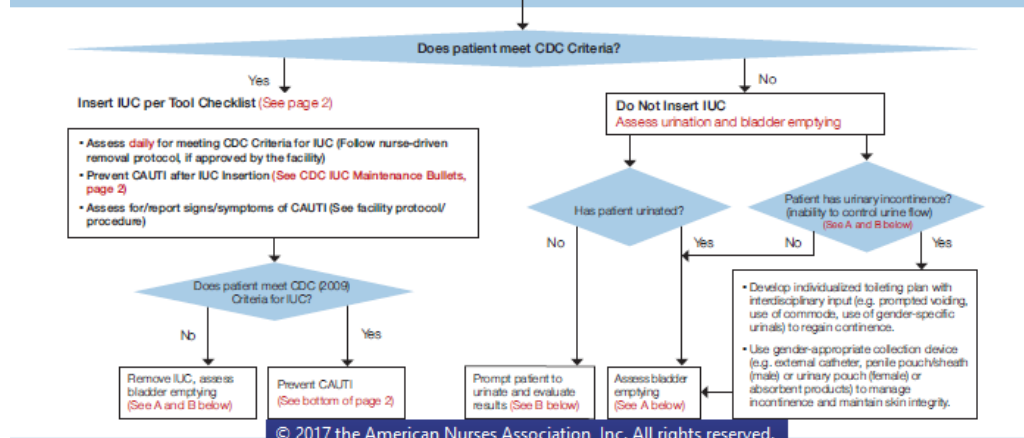
17

The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care



CDC (2009) Criteria for Indwelling Urinary Catheter (IUC) Insertion:

- Acute urinary retention (sudden and painful inability to urinate (SUNA, 2008)) or bladder outlet obstruction
- To improve comfort for end-of-life care if needed
- Critically ill and need for accurate measurements of I&O (e.g., hourly monitoring)
- Selected surgical procedures (GU surgery/colorectal surgery)
- To assist in healing open sacral or perineal wound in the incontinent patient
- Need for intraoperative monitoring of urinary output during surgery or large volumes of fluid or diuretics anticipated
- Prolonged immobilization (potentially unstable thoracic or lumbar spine, multiple traumatic injuries such as pelvic fractures)



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Appendix B



**AHRQ Safety Program for
Long-Term Care: HAIs/CAUTI**



Appendix I.
NHSN Definition CAUTI Criteria Pocket Card

The National Healthcare Safety Network (NHSN) Definition CAUTI Criteria Pocket Card is a tool to help frontline and clinical long-term care staff identify catheter-associated urinary tract infections (CAUTIs) based on the Centers for Disease Control and Prevention's NHSN criteria. Frontline staff can use the pocket card while caring for residents to assess for signs and symptoms of CAUTI. Also, clinicians can use it when evaluating residents for signs and symptoms of CAUTI.

References
Adapted from the Centers for Disease Control and Prevention, Urinary Tract Infection (UTI) Event protocol for Long-Term Care Facilities (LTCF), January 2016.
Detailed CAUTI protocol is available on the CDC/NHSN website:
<http://www.cdc.gov/nhsn/011411/index.html>

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Appendix C

Table 1. Urinary Tract Infection Criteria

Criterion	Urinary Tract Infection (UTI)
	<p>Symptomatic UTI (SUTI)</p> <p>Must meet at least <u>one</u> of the following criteria:</p>
<p>SUTI 1a</p> <p>Catheter-associated Urinary Tract Infection (CAUTI) in any age patient</p>	<p>Patient must meet 1, 2, <u>and</u> 3 below:</p> <ol style="list-style-type: none"> 1. Patient had an indwelling urinary catheter that had been in place for more than 2 consecutive days in an inpatient location on the date of event AND was either: <ul style="list-style-type: none"> • Present for any portion of the calendar day on the date of event[†], OR • Removed the day before the date of event[†] 2. Patient has at least <u>one</u> of the following signs or symptoms: <ul style="list-style-type: none"> • fever (>38.0°C) • suprapubic tenderness* • costovertebral angle pain or tenderness* • urinary urgency ^ • urinary frequency ^ • dysuria ^
<p>SUTI 1b</p> <p>Non-Catheter-associated Urinary Tract Infection (Non-CAUTI) in any age patient</p>	<p>Patient must meet 1, 2, <u>and</u> 3 below:</p> <ol style="list-style-type: none"> 1. One of the following is true: <ul style="list-style-type: none"> • Patient has/had an indwelling urinary catheter but it has/had not been in place for more than two consecutive days in an inpatient location on the date of event[†] OR • Patient did not have an indwelling urinary catheter in place on the date of event nor the day before the date of event[†] 2. Patient has at least <u>one</u> of the following signs or symptoms: <ul style="list-style-type: none"> • fever (>38°C) • suprapubic tenderness* • costovertebral angle pain or tenderness* • urinary frequency ^ • urinary urgency ^ • 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 $\geq 10^5$ CFU/ml. (See Comments) All elements of the SUTI criterion must occur during the IWP (See IWP Definition Chapter 2 Identifying HAIs in NHSN). <p>[†] When entering event into NHSN choose "NEITHER" for Risk Factor for IUC</p> <p>*With no other recognized cause (see Comments)</p> <p>^These symptoms cannot be used when IUC is in place. An IUC in place could cause patient complaints of "frequency" "urgency" or "dysuria".</p>



Appendix I: Immersion Site Agreement

This IMMERSION AGREEMENT is entered into between the ASPEN UNIVERSITY INC. with its principal place of business located at 1660 S. Albion St. Suite #525 Denver, CO 80222 (hereinafter referred to as "SCHOOL") and *Burbank Health Care Center* (hereinafter referred to as "AGENCY"). This agreement shall replace or supersede all other agreements between the parties.

WHEREAS, the mission of the Aspen University School of Nursing and Health Sciences is to enhance the health and quality of life for individuals, families, and communities at local, state, and national levels through excellence in teaching, scholarship and practice.

WHEREAS, the Doctor of Nursing Practice (DNP) program prepares nurses to assume leadership roles in management, education, and practice within a diverse society and across a spectrum of healthcare settings.

WHEREAS, the AGENCY is willing to share its facilities with the SCHOOL by making its resources available for the instruction of students.

NOW, THEREFORE, for and in consideration of the foregoing objectives and in further consideration of the covenants and promises hereinafter set forth, the parties hereto mutually agree as follows:

1. Upon inception, the doctoral student shall execute a form acknowledging all applicable policies required by SCHOOL and AGENCY.
2. The doctoral student participating in the immersion experience at the AGENCY will be enrolled in the doctoral nursing program and currently enrolled in a doctoral nursing course with an appropriately credentialed faculty member.
3. The doctoral student will hold a current, unencumbered nursing license. This license is on file with the SCHOOL and available upon request to the AGENCY.
4. A general orientation to the AGENCY will be provided by the Preceptor or AGENCY designee and must be attended by the doctoral student prior to beginning the immersion experience.
5. When on AGENCY premises, the doctoral student will be under the direct supervision of a specified Preceptor agreed upon by the SCHOOL and AGENCY.
6. The doctoral student and Preceptor will negotiate the specific areas of the immersion experience in alignment with the requirements of the doctoral course in which the student is enrolled.
7. The SCHOOL shall instruct the doctoral student that he/she shall follow all administrative policies, standards and practices of AGENCY while participating in the immersion experience to the extent that AGENCY's rules and regulations do not contradict the SCHOOL'S rules and regulations.

Appendix D



Appendix K: Student Profile

Full Name Medbin Kansay Date: 03/11/21
Street address 25252 Denny Rd
City/State/Zip Code Torrance CA 90505
Home Telephone (310) 5905027
Other Telephone (if applicable) _____
E-mail address MK26524137@usuniversity.edu

Potential Topic of DNP Project: (provide a short discussion of the intended topic):

The DNP project aims to systematically determine an approach in eliminating healthcare acquired infection, particularly catheter-associated urinary tract infection, and explore the impact of an evidence-based practice secondary catheter protocol (UCP) on catheter-associated urinary tract infection (CAUTI) in skilled care nursing facility. Therefore, an evidence-based bundle of care education that sustains a safety culture will integrate into the project to eliminate CAUTI. The project utilizes the Iowa model of evidence-based framework in the stepwise approach in implementing safe & effective care to eliminate CAUTI, including the AHRQ CAUTI Toolkit & Guidelines.

Emergency Contact Person
Name: Musse Okbamiheel
Telephone: (310) 926 9519
Relationship: Husband

Student: Submit this information through ProjectConcert Directions can be found in the DNP Handbook under "Instructions Uploading Documents to ProjectConcert."

8. The SCHOOL and the doctoral student shall comply with the AGENCY'S applicable policy regarding the Health Insurance Portability and Accountability Act (HIPAA) and shall not disclose any records concerning a patient or participant to any third party without the prior written consent of the AGENCY.
9. Upon mutual agreement, the AGENCY reserves the right, upon consultation with the SCHOOL, to require the dismissal or removal from the AGENCY any doctoral student (i) whose personal characteristics prevent desirable relationships with AGENCY, (ii) whose health status is a detriment to the doctoral student's successful completion of the immersion experience or to the welfare of patient or participants or (iii) whose performance, after appropriate instruction and counseling, continues to fall below the level required to maintain practice standards.
10. The SCHOOL agrees that the faculty member may serve as consultant and on committees of the AGENCY when requested by the AGENCY.
11. There will be no exchange of monies between the AGENCY, the SCHOOL, the Preceptor, or the doctoral student.
12. The doctoral student will be responsible for personal transportation, meals, laundry and health care needs in the performance of this agreement.
13. To the extent permitted by applicable law, each party does hereby covenant and agree to indemnify and hold harmless the other party, its appointed boards and commissions, officials, officers, employees, students, and subagents, individually and collectively, from all fines, claims, demands, suits or actions of any kind and nature by reason of its acts or omissions occurring in the performance of this Agreement. Nothing in this Agreement or in its performance shall be construed to result in any person being the officer, agent, employee or servant of either party when such person, absent of this Agreement and the performance thereof, would not in law have had such status. Nothing in the execution of this Agreement or in its performance shall be construed to establish a joint venture by the parties hereto.
14. In addition to those laws specifically mentioned in this Agreement, AGENCY shall comply with all applicable policies of SCHOOL applicable to it and comply with all applicable laws and rules.
15. Both parties, in connection with any service or other activity under this Agreement, agree not to unlawfully discriminate against any person on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, ethnicity, age, disability, political affiliations or belief. The SCHOOL and the AGENCY will comply with Title VII of the Civil Rights Act of 1964, Americans with Disabilities Act (ADA) of 1991, Title IX of the Education Amendments Act of 1972 and Section 504 of the Rehabilitation Act of 1973.
16. The SCHOOL and AGENCY will maintain in effect during the entire term of this Agreement, at their sole respective cost and expense, at least \$1,000,000 of commercial general liability insurance on a standard comprehensive occurrence form. The SCHOOL and AGENCY will make certificates of insurance available to each other upon request. The SCHOOL and AGENCY will maintain in effect during the entire term of this Agreement, at their sole respective cost and expense, Medical Errors & Omission coverage.
17. This agreement is for a period of 2 years unless terminated by either party upon giving 30 days advance written notice to the other party.

Aspen University Inc.

By: _____

Print Name: _____

Title: _____

Date: _____

Agency

By: _____

Print Name: Alexandra Arreola

Title: ADMINISTRATOR

Date: 3/11/2024

Student: Submit this completed form directly to ProjectConcert. Directions can be found in DNP Handbook under "Instructions Uploading Documents to ProjectConcert." If your site has its own site agreement, secure a copy and submit to the Coordinator for review.

Aspen University Inc.

By: _____

Print Name: _____

Title: _____

Date: _____

Agency

By: _____

Print Name: Alexandra Arreola

Title: ADMINISTRATOR

Date: 3/11/2024

Student: Submit this completed form directly to ProjectConcert. Directions can be found in DNP Handbook under "Instructions Uploading Documents to ProjectConcert." If your site has its own site agreement, secure a copy and submit to the Coordinator for review.

Burbank Healthcare and Rehabilitation Center

To Whom it may concern:

This letter acknowledges that the doctoral student, Medhin Kahsay APRN, FNP-C, MSN(Ed) allowed to conduct the Catheter-associated urinary tract infection (CAUTI) prevention strategies for the DNP project at Burbank Health Care and Rehabilitation Center and grants Permission to use the site.

Best regards,

Administrator

Signature,



9/30/2021.

From: Lewis, David (AHRQ/OC) <David.Lewis@ahrq.hhs.gov>

Sent: Wednesday, September 22, 2021 8:42 AM

To: Medhin Kahsay <MKahsay@concorde.edu>

Cc: Holland, Howard (AHRQ/OC) <Howard.Holland@ahrq.hhs.gov>; Kiser, Kristie (AHRQ/OC) <Kristie.Kiser@ahrq.hhs.gov>; Cleeman, James (AHRQ/CQIP) <James.Cleeman@AHRQ.hhs.gov>

Subject: RE: CAUTI Measuring out come

[EXTERNAL EMAIL - OPEN LINKS AND ATTACHMENTS WITH CAUTION]

Hello Medhin,

Thanks for sending me the details I needed.

Thanks for sending me the details I needed.

This email constitutes permission from the Agency for Healthcare Research and Quality (AHRQ) to you for use of the two tools mentioned below in your Capstone project for a doctoral [Doctor of Nursing Practice?] degree at Aspen University. This permission allows you to reprint the materials for use in your project, and to include them in your Capstone Paper. However, if you subsequently want to reprint the materials (in full or in part) in a professional journal article or book chapter, you will need to obtain a separate reprint permission for the publisher from the AHRQ Office of Communications.

The tools are:

- Appendix I. National Healthcare Safety Network (NHSN) Definition CAUTI Criteria Pocket Card [HTML or in PowerPoint Slide]
- CAUTI-Related Data Collection Tool [HTML or EXCEL Spreadsheet]

The suggested reference citation for the source toolkit is:

[Internet Citation:] Toolkit To Reduce CAUTI and Other HAIs in Long-Term Care Facilities. Content last reviewed September 2021. Agency for Healthcare Research and Quality, Rockville, MD. <https://www.ahrq.gov/hai/quality/tools/cauti-ltc/index.html>

...in the best of the success of your project and your degree program.

Sincerely,

David I. Lewin, M.Phil.
 Health Communications Specialist/Manager of Copyrights & Permissions
 Office of Communications
 Agency for Healthcare Research and Quality
 5600 Fishers Lane
 Room # 07N58D / Mail Stop # 07N94A
 Rockville, MD 20857 USA

Email: David.Lewin@ahrq.hhs.gov
 Phone: +1 301-427-1895
 Fax: +1 301-427-1783

Table 1

Long-Term Care: Indwelling Urinary Catheter Insertion Checklist

Resident Name (print) _____ Med Rec# _____ Unit _____
 _____ Date/Time _____

Inserting _____ Clinician (print) _____ Signature _____

Technique Reviewer¹, if applicable (print) _____ Signature _____

I. BEFORE CATHETER INSERTION	✓	COMMENTS
1. Confirm order to include catheter and balloon size; use the smallest effective catheter size.		
2. Assemble and verify supplies. Consider bringing a second catheter to use if the first one is accidentally contaminated.		
3. Identify the resident per facility policy. Explain the procedure, its necessity, and its potential complications to the resident and/or family.		
4. Ensure privacy and good lighting.		
5. Position the resident correctly for the procedure; consider using an assistant to help resident stay in position and decrease potential contamination of sterile catheter.		
6. Perform hand hygiene, don clean gloves, and cleanse the perineal area with a washcloth, skin cleanser, and warm water, moving from front to back.		

7. Remove gloves and perform hand hygiene.		
II. DURING INSERTION	✓	COMMENTS
1. Open the sterile catheterization kit on a clean bedside table using sterile technique. Ensure all supplies are conveniently positioned.		
2. Put on sterile gloves and drape the resident.		
3. Prepare the antiseptic solution; ensure the resident is not allergic to iodine. Apply sterile lubricant to the catheter tip. Consider attaching catheter to drainage system now, if not already attached, and ensure the drainage bag emptying port is clamped.		
4. With nondominant hand, identify meatus, and be prepared to keep this hand in this position until after the urine is flowing.		
5. With dominant (sterile) hand, clean the meatus opening with the antiseptic solution, moving from top to bottom. Use a new wipe/swab each time. Allow the antiseptic to dry.		
6. With the dominant (sterile) hand, insert the catheter slowly into the urethra until there is a return of urine. Then advance the catheter 2 to 3 inches more. (Do not force the catheter through the urethra.) Leave the catheter in the vagina, if accidentally inserted, until after the new sterile urinary catheter is inserted into the bladder.		
7. Hold the catheter with the nondominant hand; use the dominant hand to fully inflate the catheter balloon with the entire volume of supplied sterile water in the prefilled syringe.		
8. Gently pull on catheter after balloon inflation to feel resistance.		
III. AFTER INSERTION	✓	COMMENTS
1. Remove used equipment and dispose of used supplies in trash per facility policy. Place syringe in sharps container. If a bladder scanner was used, wipe it with appropriate disinfectant cleaner before storing for use with the next resident.		
2. Secure catheter to the resident's leg with securement device. Remove gloves and perform hand hygiene.		
3. Cover the resident with linens and assist to a comfortable position.		
4. Ensure the tubing is not kinked and the drainage bag is below the level of the bladder. Place a cover over the drainage bag to maintain resident dignity.		

5. Perform hand hygiene.		
6. Document: a. Type and size of catheter and balloon b. Amount of fluid inserted in the balloon c. How the resident tolerated the procedure d. Amount of urine obtained and its characteristics e. Name of person performing the insertion and the date it was completed.		
7. Label a urine collection container with a resident identifier and date.		

Appendix E

LTC CAUTI Surveillance Worksheet

13

Date: _____

IVIR #: _____

Resident Name: _____

Room/Unit #: _____

Date of Catheter Insertion: _____

Reason for Catheter Insertion: _____

1 or more of the following signs and symptoms, and laboratory and diagnostic testing:

	YES	NO	Notes
fever (single temperature >100°F or >99°F on repeated occasions, or >2°F over baseline); can be used to meet CAUTI criteria even if the resident has another possible cause for the fever (e.g., pneumonia)	<input type="checkbox"/>	<input type="checkbox"/>	
rigors (shaking chills)	<input type="checkbox"/>	<input type="checkbox"/>	
New onset hypotension with no alternate non-infectious cause	<input type="checkbox"/>	<input type="checkbox"/>	
New onset confusion/functional decline with no alternate diagnosis	<input type="checkbox"/>	<input type="checkbox"/>	
AND leukocytosis (>14,000 cells/mm ³ or Left Shift with >6% or >1,500 bands/mm ³)	<input type="checkbox"/>	<input type="checkbox"/>	
New onset costovertebral angle pain or tenderness	<input type="checkbox"/>	<input type="checkbox"/>	
New or marked increase in suprapubic tenderness	<input type="checkbox"/>	<input type="checkbox"/>	
Acute pain, swelling or tenderness of the testes, epididymis, or prostate	<input type="checkbox"/>	<input type="checkbox"/>	
Purulent discharge (pus) from around the catheter	<input type="checkbox"/>	<input type="checkbox"/>	


AND

Any of the following:

If indwelling urinary catheter (IUC) removed within last 2 calendar days:

	YES	NO	Notes
Specimen collected from clean catch voided urine and positive culture with no more than 2 species of microorganisms ¹ —at least one of which is bacteria of $\geq 10^5$ CFU/ml	<input type="checkbox"/>	<input type="checkbox"/>	
Specimen collected from in/out straight catheter and positive culture with any microorganisms—at least one of which is bacteria $\geq 10^2$ CFU/ml	<input type="checkbox"/>	<input type="checkbox"/>	
<i>If urinary catheter in place:</i>			
Specimen collected from an IUC ² and positive culture with any microorganism—at least one of which is bacteria of $\geq 10^5$ CFU/ml	<input type="checkbox"/>	<input type="checkbox"/>	



Signifies CAUTI

¹ Yeast and other microorganisms, which are not bacteria, are not NHSN acceptable UTI pathogens.

² An IUC in place for >14 days should be changed prior to specimen collection, but failure to change it does not exclude a UTI for surveillance purposes.

Appendix F

Catheter Care and Maintenance Quiz (Assess staff knowledge)

- During catheter care, gloves only need to be worn if you are emptying the urine drainage bag.**
 True False
- Hand hygiene does not need to be performed if you are wearing gloves.**
 True False
- Only trained staff should empty urine drainage bags and rinse/store urine collection containers.**
 True False
- If a resident lives in a single-occupant room, there is no need to include their name or identifier on the bath basin or urine collection container.**
 True False
- It is good practice to disinfect the drainage bag sampling port before obtaining a urine sample.**
 True False
- Catheters and drainage bags should not be changed at routine, fixed intervals.**

True False

7. **Leg bags can be used to improve resident comfort, mobility, and/or dignity.**

True False

8. **The periurethral area should be cleaned vigorously and with a special antimicrobial solution.**

True False

9. **Determine the catheter care error.** Joe Shmoe, a certified nursing assistant (CNA) at Sunny Lane Nursing Home, is conducting a midday check on the residents he works with. Joe enters Mary's room and assesses her catheter and drainage bag, touching it in the process. He notices that Mary's bag needs emptying and leaves the room to gather supplies.

10. **Determine the catheter care error.** Sue Me, a CNA at Sunny Lane Nursing Home, is doing her midday check on the residents she works with. She performs hand hygiene and dons gloves before entering Billboard's room. Sue notices that Bill's drainage bag needs to be emptied, and she places the bag on the elevated table while she gathers the necessary supplies. Sue empties the drainage bag into an unlabeled collection container and discards the urine. Sue discards her gloves and performs hand hygiene before leaving Bill's room.

The How-Tos of Hand Hygiene

1. **How long should you rub your hands with soap when you are hand washing?**

- a. At least 5 seconds
- b. At least 15 seconds
- c. At least 30 seconds
- d. At least 60 seconds

2. **How long should you rub your hands with an alcohol-based hand rub?**

- a. At least 5 seconds
- b. At least 15 seconds
- c. At least 30 seconds
- d. At least 60 seconds

3. **Which type of hand hygiene product is most effective at killing most types of germs on your hands?**

- a. Alcohol-based hand rub
- b. Plain soap
- c. Antimicrobial soap

4. **Alcohol-based hand rub is not recommended for hand hygiene when—**

- a. Touching the resident's bedrail

- b. Giving the resident a high-five
- c. Sneezing into a tissue
- d. Hands are visibly soiled
- 5. **One should perform hand hygiene before and after wearing gloves when touching the urinary catheter or collection system.**
 True False
- 6. **An alcohol-based hand rub is more drying to the skin than soap and water.**
 True False
- 7. **Drying your hands after washing with soap and water is an important step in reducing bacteria on your hands.**
 True False

Appendix G



Completion Date 28-Aug-2021
Expiration Date 27-Aug-2024
Record ID 43165112

This is to certify that:

Medhin Kahsay

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

IRB Chair
(Curriculum Group)

IRB Chair
(Course Learner Group)

1 - Basic Course
(Stage)

Under requirements set by:

Aspen University





Validation of Proposed Master's Degree Thesis

On the subject of the proposed thesis, the undersigned, after consulting the relevant documents, has reviewed the proposed thesis and has found it to be suitable for the proposed subject.

On the subject of the proposed thesis, the undersigned, after consulting the relevant documents, has reviewed the proposed thesis and has found it to be suitable for the proposed subject.

On the subject of the proposed thesis, the undersigned, after consulting the relevant documents, has reviewed the proposed thesis and has found it to be suitable for the proposed subject.

Name of Applicant: Mr. Ahmad Al-Hajjaj / Mr. Ahmad Al-Hajjaj / Mr. Ahmad Al-Hajjaj

Supervisor: Dr. Ahmad Al-Hajjaj

Academic Year: 2022-2023

Department: Public Health

Name of the Faculty: Faculty of Health Sciences / Faculty of Health Sciences / Faculty of Health Sciences

Signature: Dr. Ahmad Al-Hajjaj

1

On the subject of the proposed thesis, the undersigned, after consulting the relevant documents, has reviewed the proposed thesis and has found it to be suitable for the proposed subject.

Name of Applicant: Mr. Ahmad Al-Hajjaj / Mr. Ahmad Al-Hajjaj / Mr. Ahmad Al-Hajjaj

Name of Supervisor: Dr. Ahmad Al-Hajjaj / Dr. Ahmad Al-Hajjaj / Dr. Ahmad Al-Hajjaj

Name of Applicant: Mr. Ahmad Al-Hajjaj / Mr. Ahmad Al-Hajjaj / Mr. Ahmad Al-Hajjaj

Name of Supervisor: Dr. Ahmad Al-Hajjaj / Dr. Ahmad Al-Hajjaj / Dr. Ahmad Al-Hajjaj

Name of Applicant: Mr. Ahmad Al-Hajjaj

Name of Supervisor: Dr. Ahmad Al-Hajjaj

Name of Applicant: Mr. Ahmad Al-Hajjaj

Name of Supervisor: Dr. Ahmad Al-Hajjaj

Name of Applicant: Mr. Ahmad Al-Hajjaj

Name of Supervisor: Dr. Ahmad Al-Hajjaj

Name of Applicant: Mr. Ahmad Al-Hajjaj / Mr. Ahmad Al-Hajjaj / Mr. Ahmad Al-Hajjaj

በደቡ መደብደብ,

Thanks for sending me the details I needed.

This email constitutes permission from the Agency for Healthcare Research and Quality (AHRQ) to you for use of the two tools mentioned below in your Capstone project for a doctoral [Doctor of Nursing Practice?] degree at Aspen University. This permission allows you to reprint the materials for use in your project, and to include them in your Capstone Paper. However, if you subsequently want to reprint the materials (in full or in part) in a professional journal article or book chapter, you will need to obtain a separate reprint permission for the publisher from the AHRQ Office of Communications.

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[Internet Citation:] Toolkit To Reduce CAUTI and Other HAIs in Long-Term Care Facilities. Content last reviewed September 2021. Agency for Healthcare Research and Quality, Rockville, MD. <https://www.ahrq.gov/hai/quality/tools/cauti-ipc/index.html>

All the best on the success of your project and your degree program.

Sincerely,

David I. Lewin, M.Phil.
Health Communications Specialist/Manager of Copyrights & Permissions
Office of Communications
Agency for Healthcare Research and Quality
[5600 Fishers Lane](#)
[Room # 07N58D / Mail Stop # 07N94A](#)
[Rockville, MD 20857](#) USA

Email: David.Lewin@ahrq.hhs.gov



1000 S. ZIMMER ST.
Suite 525
Denver, CO 80222

1303 333-9228 - PHONE
(303) 200-7428 - Fax
www.aspen.edu

March 29, 2021

Dear Medhin Kahsay,

Congratulations!

Your site and mentor have been approved!

This letter serves as notification that you have completed the required documentation to start DNP immersion hours with your site mentor.

Please provide this letter to your faculty mentor. E-mail this letter to your faculty mentor once you have enrolled in the project course(s).

This letter will remain in effect for the duration of your DNP project. Please note that if your immersion site or immersion mentor change during your DNP project, you must immediately notify the DNP Coordinator at dnpcordinator@aspen.edu.

Best wishes as you continue your educational journey and complete this important learning experience.

Warm regards,

Jeannie Randall
Jeannie Randall, DNP, RN
Coordinator – Graduate Programs
Aspen University
(804) 601-6249