Practice Inquiry Project Final Manuscript:

Prevention of Catheter Acquired Urinary Tract Infection in

Long Term Care Facility

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This practice inquiry project has been approved for meeting full requirements for the Doctor of Nursing Practice Degree at the University of Hawaii at Hilo School of Nursing

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Abstract

Patients of nursing home facilities are vulnerable to acquiring catheter associated urinary tract infection (CAUTI). This healthcare acquired infection is a safety hazard causing unnecessary pain, discomfort, extended hospital stay, complications and puts the facility at risk for non-reimbursement. According to the Centers for Disease Control and Prevention (CDC, 2017), 75% of CAUTIs are acquired during hospitalization associated with indwelling urinary catheters. Although highly preventable, the prevalence of CAUTI remains in healthcare facilities. The Joint Commission announced National Patient Safety Goal (NSPG07.06.01) in 2017 as guidelines for healthcare facilities in CAUTI prevention. This practice inquiry project aims to prevent CAUTI in long-term care facility using performance elements stated in NSPG07.06.01 which primarily focus on establishing evidence based practices in the nursing facilities. Result of this project aims to prevent CAUTI, improve patient’s quality of life, reduce risk of complications, establish culture of safety and maximize facility reimbursements.
Chapter 1

Introduction

Catheter-associated urinary tract infection (CAUTI) is considered one of the most common types of hospital acquired infections (HACs) harming more than 560,000 patients annually and contributing to unnecessary patient discomfort, extended hospitalization, morbidity, mortality and increased health care costs (American Nurses Association, 2018). The causes of CAUTI are multi-factorial but approximately 70-80% of infections are related to the use of indwelling urinary catheters. The length of catheterization may be short term (in situ 30 days of less) or long term (in situ 30 days or more). Short term catheterizations are associated with admissions in acute care settings while long term catheterization is common among residents of long-term care facilities (Nicolle, 2014).

CAUTI occurs when bacteria invades the urinary tract system through the urinary catheter and causes infection. Women and the elderly population are at higher risk of acquiring an infection. According to Centers for Disease Control and Prevention (CDC, 2017) prolonged use of an indwelling urinary catheter is a major risk factor for developing CAUTI. Complications associated with prolonged use of catheters include catheter obstruction, bladder urolithiasis, purulent urethritis, gland abscess, urethral inflammation, mechanical trauma and mobility impairment (Nicolle, 2014). Significant distress, discomfort, pain, activity restriction, and cost due to extended hospitalization are an unnecessary added burden to patients and families.

In long-term care settings, the elderly are considered vulnerable populations and at higher risk for contacting infections. The risk of bacteremia in residents with indwelling catheters in
these facilities is 3–36 times that of residents without an indwelling catheter. More than 50% of episodes of bacteremia in long-term care are attributed to CAUTI (Nicolle, 2014). There is an estimated 5% daily increase rate of acquiring infection for patients who are catheterized posing the risk of experiencing morbidities associated with indwelling catheters such as urinary obstruction, bladder urolithiasis, purulent urethritis, gland abscesses and prostatitis (Kahen, Flanders, & Magalong, 2011).

Indwelling Foley catheters are identified as the leading cause of hospital acquired infections costing around $1000 per episode. Treatment cost of CAUTI include manpower, medications and supplies (Conway & Larson, 2012). Parker, Giles, Graham, Suthers, Watts, O'Brien, & Searles (2017) reported that infections frequently occur after catheter placement and each day there is a 5% increase chance of patients having bacteriuria and each episode of urinary tract-related bacteremia.

In October 2008, the Centers for Medicare and Medicaid Services (CMS) implemented a change in the payment system for all healthcare facilities participating in Medicare and Medicaid reimbursement. The change in CMS policy regarding reimbursement no longer reimburses hospitals for the additional costs of care for patients who develop CAUTI during hospitalization resulting in decreased monthly revenue and profitability.

**Significance**

The majority of admitted patients in long term care facilities are made up of the elderly and individuals needing therapy after orthopedic surgery. Both populations are at risk for developing conditions that may warrant catheterization. The elderly are especially at risk for CAUTI due to poor fluid intake leading to dehydration and low urine output. Urinary retention is
also observed with patients noted to have low urine output. Rehabilitation patients are at risk due to limited mobility, obesity, cellulitis, and non-weight bearing status resulting in decreased activity (Brushch, 2015).

According to the Centers for Disease Control and Prevention (CDC, 2017), 75% of UTIs acquired during hospitalization are related to indwelling urinary catheter. Lack of adherence to infection prevention protocols is a concern that may be contributing in the incidence of CAUTI. Prevention of CAUTI will avoid further complications, unnecessary discomfort, unnecessary extended hospitalization and decreased healthcare cost. Prevention will ensure the well-being of residents as well as staff. CAUTI prevention refers to decreased risks of complications and spread of infection.

Residents of LTC are predominantly elderly or patients on short rehabilitation therapy. Patients on short-term hospitalization are recuperating from trauma, pneumonia and cellulitis. Some patients are placed in the facility due to a chronic medical condition and inability of the family to provide the appropriate care. Patients admitted in these facilities have admitting diagnoses which include falls, fractures, syncope, difficulty walking and generalized weakness. These conditions impair mobility. Other co-morbidities contributing to impaired mobility are cellulitis, administration of IV antibiotics, obesity and contractures. A limitation in mobility predisposes patients to urinary obstruction which triggers the need for catheterization. Residents on IV infusion and medications due to infections or dehydration become at risk patients for catheter insertion.

Due to continued prevalence of CAUTI in healthcare facilities across the nation, the Joint Commission announced National Patient Safety Goal 07.06.01 for CAUTI prevention (See
Appendix A). The Joint Commission stated that effective January 2017 the NSPG07.06.01 performance elements will apply to accredited nursing care centers and hospitals. Step one of the Elements of Performance for NSPG07.06.01 requires educating staff and licensed independent practitioners involved in the use of indwelling catheters about CAUTI and the importance of infection prevention. Step 2 performance of elements for NSPG07.06.01 requires educating patients who will have indwelling catheters and to inform families as needed on CAUTI prevention and symptoms of urinary tract infection. Step 3 calls for developing of written criteria, using evidence-based guidelines, for placement of an indwelling urinary catheter. Written criteria should be revised as scientific evidence changes. Step 4 of NSPG07.06.01 performance of element requirements state to have the written procedures address the following: 1.) Limiting use and duration; 2.) Performing hand-hygiene prior to catheter insertion or maintenance of care; 3.) Using aseptic techniques for site preparation, equipment and supplies; 4.) Maintaining the sterility of the urine collection system; 5.) Replacing the urine collection system when required and 6.) Collecting urine samples. Finally, Step 5 of NSPG07.06.01 performance element requirements state that healthcare facilities should “measure and monitor CAUTI prevention process and outcomes in high-volume areas by doing the following: 1.) selecting measures using evidence-based guidelines or best-practices; 2.) have a constituent method for medical record documentation of indwelling catheter use, insertion and maintenance; and 3.) evaluating the effectiveness of prevention efforts.” (TJC, 2017, p. 2).

The frequency of residents developing CAUTI has been a continued problem in long-term care facilities. Literatures support the claim that CAUTI is common and highly preventable (Parker, et. al. 2017). Evaluation of the current protocol on catheterization is needed to improve
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Quality of care and reduce the rate of CAUTI in long-term care. Further investigation is needed to determine whether there are possible opportunities to address gaps in procedures that may have contributed to the vulnerability of patients in acquiring the infection. The goal of this project is to use an evidence based-guidelines to prevent health care-associated infections. The National Patient Safety Goal (NPSG 07.06.01) elements of performance provides evidence based practices to prevent CAUTI (See Appendix A).

CAUTI is a significant problem to long-term care facilities because it directly impacts reimbursements, staffing, and quality of life patient’s life. Reducing the rate of CAUTI greatly affects the health outcome of patients in a positive way. Preventing CAUTI means freedom from further complications, additional medications, discomfort, pain and timely discharge from facility.

Problem Statement

CAUTI is considered one of the most common types of health care acquired infections. Although preventive guidelines are in place, CAUTI remains a top concern because it is associated with increased mortality, morbidity and additional costs to hospitals (CDC, 2017). Long term care patients are especially at increased risk of CAUTI due to the characteristics of patients admitted at any given time. Prevention of CAUTI requires early recognition of infection, coordination with staff and adhering to protocol and evidence-based practices. Preventing the occurrence of infection is a proactive step in safeguarding the health of patients and reducing costs.
Project Aim

The overall aim of this project was to prevent CAUTI of admitted patients in long-term care. This was accomplished by assessing current protocols of catheterization and complete STEP 1 and STEP 2 performance elements of NPSG.07.06.01 which are to: 1) educate staff and licensed independent practitioners involved in the use of urinary indwelling catheters about CAUTI and the importance of infection prevention and to 2.) educate patients who will have an indwelling catheter and their families as needed, on CAUTI prevention and the symptoms of urinary tract infection.

The project will assess the effectiveness of current protocols with intentions of preventing incidence of CAUTIs in LTC. The National Patient Safety Goal (NPSG.07.06.01) served as the basis for any modification to improve current interventions. The results of this project will support evidence based practice for updating current practices of catheterization providing direct benefits for patients, staff workload and facility workflow that will contribute to savings related to cost of care associated with CAUTI.

Aims and Objectives

Specific Aim: 1. Determine the rate of CAUTI from January 2016 – December 2018

Objective 1: Obtain monthly data of CAUTI incidences for years 2016 and 2018.

Objective 2: Compare and tabulate rate of infection in a month to month basis

Specific Aim 2: Identify indications warranting insertion of indwelling catheter

Objective 1: Determine patient’s symptoms warranting catheter insertion

Objective 2: Evaluate organizational protocol in UTI/CAUTI prevention

Specific Aim 3: Implement NPSG 07.06.01 standard elements performance step 1 and step 2.
Objective 1: Identify areas of improvement in facility protocols to prevent future infections

Objective 2: Complete step 1 and 2 of NSPG07.06.01 which is to educate staff on evidence based practices to prevent indwelling CAUTI
Chapter 2

Literature Review

The word *catheter* came from the Greek word *kathiénai*, which means to “thrust into” or “to send down”. Before the advent of Foley catheter in 1930s, the earliest record of catheter use can be traced back to some 1500 BC during the time of ancient Egypt as treatment of urinary retention using transurethral bronze tubes, reeds, straws and curled-up palm leaves (Feneley, Hopley, & Wells, 2015).

Catheter associated urinary tract infection is an infection in the urinary tract system associated with the use of urinary catheters and prolonged catheterization (CDC, 2017). CAUTI is the most common hospital acquired-condition affecting approximately 560,000 patients annually. The condition can lead to extended hospitalization, increased health care cost, and patient morbidity (American Nurses Association, 2019). It is also the leading cause of secondary blood stream infection attributing to increase in mortality rate, claiming the life of approximately 13,000 patients each year (Taha, Raji, Khallaf, Hija, Mathew, Rashed, Plessis, Allie, 2017).

Diagnosis of CAUTI include clinical signs and symptoms such as fever, rigors, hypotension, flank pain, dysuria, delirium, leukocytosis, change in cognition, and positive result of urine culture. Pathogens associated with positive results include *Escherichia coli*, *Staphylococcus aureus* and *Enterococcus* species. Armbruster, Prenovost, Mobley, & Mody, (2016) stated that CAUTI is considered a common infection in nursing homes causing cystitis, pyelonephritis and bacteremia leading to increase in antibiotic prescriptions.

Use of indwelling urinary catheters is a common intervention in hospitalized patients. The study conducted by Bhatia, Daga, Garg, S., & Prakash, (2010) determined the frequency of
inappropriate catheterization in the medical ward and the various risk factors associated with CAUTI and bacterial colonization. The result of the study comprising of patients admitted in the medical ward showed the most frequent indication for catheterization was urinary incontinence and more than 50% of the subjects developed bacterial colonization and were diagnosed with CAUTI while in the hospital.

**Indications of Catheterization**

According to Feneley, Hopley, & Wells, (2015), “the principal reasons for indwelling catheterization are as follows: to permit urinary drainage in patients with neurological conditions which cause bladder dysfunction; to manage urinary incontinence in patients lacking cognitive function; to minimize skin breakdown and pressure ulcers in paralyzed, comatose or terminally ill patients; to irrigate bladder; to administer chemotherapy; to aid in urological surgery; to obtain accurate measurements of urinary output in critically ill or post-operative patients; to empty bladder during childbirth; and to undertake urodynamic studies” (p. 462).

Similarly, Bhatia et al. (2010) listed indications for appropriate use of indwelling urinary catheters in the medical ward which include “bladder obstruction, paralysis, trauma, acute urinary retention, patients with neurogenic bladder, patients with acute renal insufficiency, urologic surgery, preoperative catheter insertion, urinary incontinence posing risk to patients (major skin breakdown, protection of operative site), critically ill patients requiring accurate measurement of urinary output and for palliative care for terminally ill or severely impaired incontinent patients for whom bed and clothing changes are uncomfortable” (p.15)

Indwelling urinary catheters are generally considered to be short term if they are in situ for less than 30 days and chronic or long term when in situ for 30 days or more. Indication
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for short-term catheterization include urinary retention, obstruction of urinary tract, urinary incontinence that puts patients at risk due to pressure ulcers stage three or greater, comfort care for terminally ill patients. Patients in acute settings usually have short term catheterization while chronic catheters are most common for residents of long term care facilities (Nicolle, 2014).

Cost and Complications

Health care acquired infections in the United States includes 1.7 million patients with urinary tract infections and is linked to the cause of death in approximately 13,000 cases per year (Finan, 2008). In addition to the discomfort associated with CAUTI, patients become vulnerable to complications and extended hospitalizations due to treatment regimens. Patients with indwelling catheters may develop complications such as pyelonephritis, fever, urinary tract stones, chronic renal inflammation, prolonged hospital stay and increase cost of care (Bhatia et al. 2010).

Similarly, Finan (2008) noted that CAUTIs can lead to complications including cystitis, pyelonephritis, gram-negative bacteremia, prostatitis, epididymitis, septic arthritis, and urosepsis. Additional consequences include patient discomfort, activity restriction and potential development of multi drug-resistant organisms. Adverse effects of Foley catheter use include bacterial colonization, antibiotic resistance, chronic infection, kidney and bladder damage, pseudopolyps, septicaemia, urethral trauma and balloon fragments (Fenely et al, 2015).

According to National Healthcare Safety Network as reported by the CDC (2017), episodes of CAUTI occurring annually is approximately is around 449,334 events per year and each of these cases is worth $758 in medical costs related to care and treatment. In doing the math, a total of over $340 million in health care expenditures are attributed to CAUTI each year.
The Centers for Medicare and Medicaid (CMS) considers CAUTI as a preventable condition. Over two decades ago, CMS has released recommended practices to prevent CAUTI emphasizing the importance of hand hygiene, aseptic catheter insertion, and proper maintenance using a closed urinary drainage system. In 2008, CMS implemented “Hospital-Acquired Conditions Initiative” in which CMS will no longer pay facilities extra when patients develop complications during hospitalization. In addition to CAUTI, hospital acquired conditions not eligible for additional payment effective October 2008 include decubitus ulcer, vascular-catheter associated infections, falls, trauma, deep vein thrombosis, pulmonary embolism and manifestations of poor glycemic control (Saint, Meddings, Calfee, Kowalski, & Krein, 2009).

A study conducted by Palmer, Lee, Dutta-Linn, Wroe & Hartmann, (2013) evaluated stakeholder’s perception of the 2008 CMS payment policy change concerning healthcare acquired infections and the impact on hospital practices. The research team interviewed infection prevention nurses from different hospitals across the country affected by the 2008 CMS policy. The researchers concluded that the impact brought by the change in CMS payment policy should be monitored continuously.

The changes in reimbursement facilities is expected to lower incidences of healthcare acquired infections including CAUTI. This mandate should improve quality of care and affect patients positively. Healthcare facilities admitting patients under CMS must revisit their regulations and protocols on management of healthcare acquired infections. Procedures and policies must be updated to ensure compliance with the new regulations, improve quality of care of catheterized patients and maximize reimbursements.
Nursing Theories

According to the CDC (2017), the increase in prevalence of urinary catheter use leads to a substantive increase in infections leading to complications and in some cases, death. Staff’s inadequate knowledge of infection control and the lack of experience with implementation of preventive measures are barriers to preventing CAUTI. Kolcaba’s Theory of comfort centers on safety and comfort of patients. It is a middle-range theory stating that comfort exists in three forms: relief, ease and transcendence. The emphasis is on assessment of comfort needs, development and implementation of care plans and evaluation of comfort level after catheterization (Petiprin, 2016).

Another theory related to the project is the Self-Care Deficit Theory by Dorothea Orem. The theory states that satisfying universal and self-care requisites are vital components of primary care prevention. The theory follows a nursing process comprising of three parts: 1. assessment (determination of problem), 2. diagnosis and creation of care plan, and 3. evaluation and implementation of desired changes (Petiprin, 2016). This model complements the theoretical framework of this project to improve nursing practice.

Theoretical Framework

The Iowa Model will be utilized to guide the project (see Appendix B). The Iowa model is an evidence based practice guideline used to promote quality of care. The model is structured and easy to follow. It has the step-by-step components involving areas of development, implementation and evaluation. Also, the model follows a scientific process and “can help nurses and other healthcare providers translate research findings into clinical practice while improving outcomes for patients” (Brown, 2014, p. 157). The model uses an objective and logical approach.
involving steps in practice change which is the primary goal of this PIP. The model involves the following key main steps 1. Assess the need for change in practice, or identifying the “trigger” or clinical problem 2. Assess whether the trigger is a priority for organization; 3. Research and gather relevant literatures; 4. Critically analyze the evidence 5. Pilot change in practice which will include designing evidence based practice guidelines 6. Implement and evaluate change in practice and 6. Integrate and maintain the change in practice. The Iowa Model best fits the theoretical framework of this PIP. The setting of the project will be in a nursing home facility and will involve nurses and other members of interdisciplinary team such as quality improvement chair and electronic health nurse.
Chapter 3

Project Design and Evaluation Plan

Project Design: The project will be based on the steps of The Iowa Model (see Appendix B).

Project setting: The project will be conducted at The Nursing Home Facility situated in Central Oahu. The facility is a 107 bed long-term care facility connected to the main community hospital. The facility is accredited by The Joint Commission and admits recovering patients from acute care of the main hospitals and referrals from other hospitals in the island of Oahu. The Nursing Home also participates in CMS reimbursements.

Project Participants: Study population will be derived from database of the facility’s electronic health records of patients admitted from January 2016 through December 2018. Records of admitted residents during this time frame who was catheterized, diagnosed with UTI and CAUTI will be obtained via electronic health records. Patient identifiers will be excluded from data search. No human subject will be included in the project thus no consent form is necessary.

Data Collection Tools

The data collection tools will include the following:

1. Data managed by the Quality Improvement committee of The Nursing Facility will be used to obtain the number of residents per month diagnosed with healthcare acquire infections particularly UTI and CAUTI. The time period observed will be from January 1, 2016 through December 31, 2018. Number of catheter days for each catheterized patient will also be obtained and tabulated.
2. Policy on catheter care and CAUTI management will be obtained from the Infection Department and/or QI nurse of The Nursing Home to identify opportunity in the care plan of patients.

**Evaluation Plan**

Data on CAUTI rates from January 2016 to December 2018 were graphed and compared. Simple statistical methods were utilized to analyzed data. The project used a descriptive and correlational design for analysis of data. Proposed and finalized interventions were submitted to the director of nursing for approval to implement new proposals to improve care plans on catheter care and management. Once approval was obtained, meeting with staff was initiated to discuss new interventions for immediate implementation. Implementation of proposed policy modifications is targeted to run from six to twelve months which is outside the scope of this project. Effectiveness of the proposed interventions will be evaluated after six to twelve months through comparison of data and incidences of CAUTI during the time range.

**Budget**

The project was funded personally by the author. Expense included materials such as bond papers, ink for printer, gas for transportation and tokens of appreciation for the management of The Nursing Home for allowing the conduct of research. See Appendix D)
Chapter 4 Results

This chapter discusses the results of the project in relation to the aims and objectives mentioned in the previous chapters. The overarching aim of this project was to prevent CAUTI in long-term facilities by aligning the protocols set forth stated by the Joint Commission and completing STEP 1 and 2 performance elements of NSPG.07.06.01 which are to 1) Educate staff and licensed independent practitioners involved in the use of indwelling urinary catheters about CAUTI and the importance of infection prevention; and 2.) Educate patients who will have an indwelling catheter, and their families as needed, on CAUTI prevention and the symptoms of a urinary tract infection (TJC, 2017, p.1).

The project site is a licensed long-term care facility in Central Oahu with a 107-bed capacity. The facility is a small facility situated in a rural community and boasts of patient-centered care admitting skilled nursing and intermediate care patients.

The project’s main objectives were to: 1.) Determine the rate of CAUTI from January 2016 – December 2018; by comparing monthly data of CAUTI incidences between the years 2016 and 2018; and 2.) Identify indications warranting insertion of indwelling catheters and 3.) Implement NSPG 07.06.01 standard elements performance step one and step two.

Objective 1 Determine the rate of CAUTI from January 2016 – December 2018.

The first objective of this project was to obtain data on the number CAUTI and UTI cases from 2016, 2017 and 2018. The data was requested and obtained from the Infection Committee of the long-term facility who keeps track of all infections occurring in the facility.

Tabulated data showed the number of CAUTI and UTI occurrences monthly and yearly. Results showed that for the year 2016, a total of 10 CAUTI infections occurred; in 2017, a total
of 16 CAUTI infections occurred, and in 2018, a total of 12 CAUTI infections were recorded (See Table 1).

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Table 1. Number of UTI and CAUTI incidences per month for years 2016, 2017 & 2018

The year 2016 had the most incidences of UTIs but had the lowest incidences of CAUTI while the year 2017 had the most CAUTI patients (15) followed by year 2018 (12). For the years
2016 and 2017, the months of November and December had the greatest number of UTIs. The number of patients with CAUTI in 2016 was 10, in 2017 was 15 and in 2018 was 12.

![Fig 1. Number CAUTI incidences per month for years 2016, 2017 & 2018](image)

The month of November in 2016 had the most CAUTI incidences, while months of February and August had the greatest number of CAUTI rates in 2017. The year 2018 had an even incidence of CAUTI in the months of March, May, July and November.

**Object 2. Identify indications warranting insertion of indwelling catheter**

Patients in LTC are categorized upon their admission on the facility. Patients are admitted either as skilled (SNF) or intermediate care (ICF). Skilled patients are those requiring short-term rehabilitation requiring the services of licensed therapists (physical, occupational or speech therapists) and or patients requiring the skills of nurses for administration of parenteral medication and management of complex wound and pressure ulcers. Patients admitted are either
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elderly staying for long-term, post-operative patients needing short-term stay for rehabilitation or patients with complex wound and communicable infections (such MRSA, E-coli, C.diff).

These patients have high risk factors for indwelling catheterization. The elderly are at risk for poor liquid intake, dehydration, urinary retention and urinary obstruction. Skilled and post-operative patients are also at risk due to restricted mobility, non-weight bearing status and in a number of cases, status of obesity. Prevention positively impact the health outcome of patients in long term care. Freedom from complications, unnecessary discomfort, medications, pain and hospital stay are some of the positive health outcomes brought by an effective in-house infection prevention program.

Data suggests the following indications warranting the insertion of urinary catheter as ordered by attending physicians. The list of indications include fever, rigors, acute dysuria, acute change in mental status, urinary retention, complaints of suprapubic pain and declining functional mobility. The top indications were fever, rigors, dysuria and complaints of suprapubic pain.

Objective 3. Implement NPSG 07.06.01 standard elements performance step 1 and step 2.

STEP one of performance elements of NPSG07.06.01 which include “educate staff and licensed independent practitioners involved in the use of urinary indwelling catheters about CAUTI and the importance of infection prevention” (TJC, 2017, p.1) provides an opportunity to improve care plans on catheter care and CAUTI management. STEP 1 of performance elements of NSPG07.06.01 was fulfilled focusing on improving written guidelines on the use, insertion and maintenance of urinary catheters. For the education of staff and licensed independent practitioners, the facility adopted the Safety Program for Long-Term Care on CAUTI developed
by Agency for Healthcare Research and Quality (AHRQ). The five elements of the AHRQ Safety Program on CAUTI prevention include: catheter removal, aseptic insertion, use of regular assessments, training for catheter care and incontinence care planning.

Duration of catheter use is the most important risk factor for the development of infection. Patients with long-term catheters are almost assured of developing CAUTI hence timely removal of catheter is of prime importance to avoid infection. In addition, reinforced teaching on the appropriate indications for an indwelling urinary catheter is equally vital in preventing infection. Attending physicians, nurses and staff involved in direct patient care should be provided with in-service training on the appropriate indications warranting insertion of catheters which include: 1.) to assist in healing of open sacral or perineal wounds in incontinent residents; 2.) for acute urinary retention or bladder obstruction; 3.) to improve end-of-life care if needed (AHRQ Safety Program for Long-Term Care, 2018).

Insertion of indwelling urinary catheters require aseptic technique and staff should be trained periodically. Aseptic technique is the appropriate method in inserting urinary catheters which includes hand-hygiene, avoiding cross contamination and using barrier precautions such as sterile gloves, drapes, sponges, antiseptic solution, and single use packets of sterile lubricant.

Evaluation of knowledge post in-service training will provide staff reinforcement of key factors in preventing CAUTI. Sample of in-service quiz for catheter-associated urinary tract infection prevention will include key points such as appropriate indications for insertion, risk factors, patient care with indwelling urinary catheters, methods of insertion and drainage, antibiotics, hand-hygiene, removal and maintenance (See Appendix E). Further, an algorithm for urinary catheter care will be posted at nursing stations and will serve as a guide for licensed staff
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(See Appendix F). Regular assessments, training for catheter care and incontinence care planning are also key components to include in educating staff regarding CAUTI prevention that satisfied the objectives for STEP one of performance elements of NPSG07.06.01.

STEP two of performance elements of NPSG07.06.01 which include, “educating patients who will have an indwelling catheter and their families as needed, on CAUTI prevention and the symptoms of urinary tract infection” (TJC, 2017, p.1) is focused on educating patients and families regarding indwelling catheter, maintenance and care. STEP two of performance elements of NPSG07.06.01 encourages families to be pro-active and involved in the care of their loved ones who are at risk or with orders for urinary catheter insertion.

For this project, the infographic from the Association for Professionals in Infection Control and Epidemiology (APIC) on the role of patient and family member on preventing CAUTI was utilized to educate patients and family members. The infographic’s illustrations and verbiage are easy to follow and contains key aspects geared to prevent occurrence of infection (See Appendix G). The 10 key points of catheter care include: 1.) Asking providers alternatives to catheter insertion such as providing access to bedside commode, bedpan training, and managing incontinence; 2.) Asking providers to use a bladder scanner first prior to catheter insertion; 3.) Hand-washing for everyone; 4.) Determine the length needed for catheterization and estimated date removal; 5.) Importance of keeping the urine collection bag below the bladder and off the floor; 6.) Importance of keeping the catheter tube free from kinks; 7.) Cleaning after bowel movement; 8.) Importance of maintaining a closed system; 9.) Signs and symptoms that warrants the attention of staff and; 10.) Ways to preserve dignity (APIC, 2018).
Care plans on prevention of CAUTI and UTI were updated that included interventions and desired outcomes. An updated care plan was created if a catheter is in place and another care plan focused on patients with an indwelling urinary catheter. Care plans include measurable objectives, specific interventions, hydration status, cognitive and functional abilities, frequency and timely notification of physician (See Appendix H).
Chapter 5

Implications for Nursing Practice

The literature presents evidence that prevention of CAUTI in healthcare facilities is highly achievable through adherence on evidence based practices regarding care and management of indwelling urinary catheters. The harmful effects of CAUTI can contribute to poor health outcomes and further deterioration of health. Key interventions such as monitoring of hydration status, observation of signs and symptoms of UTI and promoting standard precautions such as hand-washing, peri-care and catheter maintenance including the use of gloves and gowns, are preventive measures in spreading infections.

Therefore, it is of great importance to maintain continued education of staff, patients and families through periodic in-service training regarding proper techniques and procedures for urinary catheter insertion, maintenance and removal. Having a systematic process for assessment, monitoring and documentation is of utmost importance to prevent the onset of CAUTI.

Nurse practitioners hold a special role in terms of ability to influence positive health outcomes of patients. The impact of infection prevention is vital to the residents of long-term care facilities. Eventually, the facility expects to eradicate CAUTI in six to twelve months upon implementation of updated care plans, rigid monitoring, regular in-service of staff training and efficient evaluation of care and patient outcomes.

Recommendations

Limitations of this project include limited data, time constraints and lack of input or feedback from staff. Results cannot fully represent the whole picture due to the missing parts.
Therefore, this project recommends further research that should include cost of resources needed in the care of catheterized patients. These resources include catheter bag, wipes, antibiotics, specimen collection kit, peri-care supplies and sanitation kits. Inclusion of resources spent to care for patients with CAUTI on daily, weekly or monthly basis will provide financial perspective on the amount that can be saved from preventing occurrence of infection. Another recommendation that will enrich this project is to include NSPG07.06.01 element of performance STEP three which is to develop written criteria, using established evidence-based guidelines, for placement of an indwelling urinary catheter. Written criteria for placement of an indwelling urinary catheter should include critically ill patients who need accurate urinary output measures, patients with acute urinary retention or bladder outlet obstruction, patients with prolonged immobilization, incontinent patients with an open sacral or perineal wounds and patients with neurogenic and end-of-life-care.
References


Appendix A

Requirements for the Catheter-Associated Urinary Tract Infections (CAUTI) National Patient Safety Goal for Hospitals

Standard NPSG.07.06.01
Implement evidence-based practices to prevent indwelling catheter-associated urinary tract infections (CAUTI).

Note: Evidence-based guidelines for CAUTI are located at:
- Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals, 2014 at http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=10312260&fulltextType=RA&fileId=S0899823X000193845

Element(s) of Performance for NPSG.07.06.01

1. Educate staff and licensed independent practitioners involved in the use of indwelling urinary catheters about CAUTI and the importance of infection prevention. Education occurs upon hire or granting of initial privileges, and when involvement in indwelling catheter care is added to an individual's job responsibilities. Ongoing education and competence assessment occur at intervals established by the organization. (See also HR.01.05.03, EPs 1, 4, and 5; HR.01.08.01, EPs 1-15; MS.08.01.01, EPs 1-9; MS.12.01.01, EPs 1-5)

2. Educate patients who will have an indwelling catheter, and their families as needed, on CAUTI prevention and the symptoms of a urinary tract infection.

Note: See FAQs about "Catheter-associated Urinary Tract infection" at http://www.sheainonline.org/images/patients/NNL_CAUTI.pdf

3. Develop written criteria, using established evidence-based guidelines, for placement of an indwelling urinary catheter. Written criteria are revised as scientific evidence changes.

Note: Examples of criteria for placement of an indwelling urinary catheter include the following:
- Critically ill patients who need accurate urinary output measurements
- Patients with acute urinary retention or bladder outlet obstruction
- Patients who require prolonged immobilization (for example, a potentially unstable thoracic or lumbar spine or multiple traumatic injuries such as pelvic fractures)
- Incontinent patients with an open sacral or perineal wounds
- Perioperative use for selected surgical procedures, such as patients undergoing urologic surgery or other surgery on contiguous structures of the genitourinary tract; patients who will have a prolonged duration of surgery (catheters inserted for this reason should be removed in a post-anesthesia care unit); patients anticipated to receive large-volume infusions or diuretics during surgery; patients needing intraoperative monitoring of urinary output
- End-of-life care
- Neurogenic bladder
Appendix C

Table 1.
List of Hospital-Acquired Conditions Affected by the 2008 CMS Payment Policy

<table>
<thead>
<tr>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Foreign Object Retained After Surgery</td>
</tr>
<tr>
<td>• Air Embolism</td>
</tr>
<tr>
<td>• Blood Incompatibility</td>
</tr>
<tr>
<td>• Stage III and IV Pressure Ulcers</td>
</tr>
<tr>
<td>• Falls and Traumas</td>
</tr>
<tr>
<td>• Manifestations of Poor Glycemic Control</td>
</tr>
<tr>
<td>• Catheter-Associated Urinary Tract Infection</td>
</tr>
<tr>
<td>• Vascular Catheter-Associated Infection</td>
</tr>
<tr>
<td>• Surgical Site Infection</td>
</tr>
<tr>
<td>– Following Coronary Artery Bypass Graft (Mediastinitis)</td>
</tr>
<tr>
<td>– Following Bariatric Surgery for Obesity</td>
</tr>
<tr>
<td>– Following Certain Orthopedic Procedures</td>
</tr>
<tr>
<td>• Deep Vein Thrombosis/Pulmonary Embolism Following Certain Orthopedic Procedures</td>
</tr>
</tbody>
</table>
Appendix D

Proposed Budget
Projected Budget for the Project Implementation

**Title:** Prevention of Catheter Acquired Urinary Tract Infection in Long Term Care  
**Place of Conduct:** Wahiawa Nursing and Rehabilitation Center  
**Proposed Duration:** 2-weeks (Date TBD)

<table>
<thead>
<tr>
<th>Category</th>
<th>Projected Expense (Amount)</th>
<th>Actual Expense (Amount)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper</td>
<td>$ 100</td>
<td></td>
</tr>
<tr>
<td>Ink for printer</td>
<td>$ 100</td>
<td></td>
</tr>
<tr>
<td>Folders/binder</td>
<td>$ 25</td>
<td></td>
</tr>
<tr>
<td>Pens/pencils</td>
<td>$ 25</td>
<td></td>
</tr>
<tr>
<td>Token of appreciation post project implementation</td>
<td>Approximately: $ 400~ in kind such as gift cards, gift of appreciation ~ plants, office items,</td>
<td></td>
</tr>
<tr>
<td>QI nurse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EHR nurse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Director of Nursing Facility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation/Gas</td>
<td>$50</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>$ 700</strong></td>
<td></td>
</tr>
</tbody>
</table>
Appendix E

Sample Quiz Post In-service Training for CAUTI Prevention

1.) Which of the following is an appropriate indication for inserting an indwelling urinary catheter?
   
a. Managing bladder outlet obstruction  
b. Assessing residual urine in the bladder  
c. Solution for acute change in mental status  
d. All of the above

2.) Which of the following is the leading risk factor for developing CAUTI?
   
a. Male gender  
b. Limited mobility  
c. Prolonged use of indwelling catheter  
d. Advanced age

3.) When caring for a patient with an indwelling urinary catheter, when should the catheter be disconnected from the drainage tubing?
   
a. Only after performing hand hygiene  
b. When the patient requests for catheter to be disconnected  
c. When urine specimen is collected for urine analysis  
d. None of the above

4.) Which of the following of the following statements about CAUTI is true?
   
a. CAUTI is bound to happen to hospitalized patients  
b. Use of prophylactic antibiotics will reduce the incidence of CAUTIs  
c. Insertion of urinary catheter is the best solution for urinary retention of the elderly  
d. Insertion of urinary catheter only when absolutely necessary
5.) Which of the following statements regarding the use of antibiotics for patients with indwelling catheters is true?
   a. Oral antibiotics should be the first line of treatment for preventing CAUTI
   b. Administration of oral antibiotics 2 days after removal of catheter
   c. Follow standards of protocol for administering prophylactic antibiotics
   d. None of the above

6.) Which of the following statements is true regarding Foley catheter insertion?
   a. It is a clean procedure and requires provider’s order
   b. It is a clean procedure and does not require provider’s order
   c. It is a sterile procedure and requires provider’s order
   d. It is a sterile procedure and does not require provider’s order

7.) After surgery, urinary indwelling catheters should be removed ….
   a. Right after surgery
   b. Right after patient has bowel movement
   c. On post-op day 1 or 2
   d. When patient reach home on discharge day

8.) Which intervention is a vital component of catheter maintenance?
   a. Replacing drainage system daily
   b. Disconnecting the system regularly
   c. Emptying the drainage bag only when it is full
   d. Emptying the drainage bag at least once per shift using a clean container
9.) In doing routine catheter care, staff do not have to wash hands as long as gloves are worn during the procedure.
   a. True
   b. False

10.) Effective measures of preventing CAUTI include
   a. Monitoring catheter use
   b. Prompt removal of catheter
   c. Both a and b
   d. Neither a nor b
Appendix F

GUIDELINES FOR URINARY CATHETER NEED

Is there a urinary catheter in place?
- NO: No action necessary. Avoid catheter placement.
- YES: Does the patient meet criteria for a urinary catheter?
  - NO: Remove catheter.
  - YES: Appropriate uses of catheters
    - Acute urinary retention or bladder outlet obstruction
    - Accurate urinary output measurement in critically ill patients
    - Pre-operative for selected procedures
    - To assist healing open sacral or perineal wounds in incontinent patient
    - Comfort care at end of life if necessary
  OR
  Alternatives to catheterization
    - Condom catheter (external male catheter)
    - Intermittent catheterization
    - Spinal cord injuries
    - Bladder emptying dysfunction
    - Risk/benefit of urethral stent
    - Risk/benefit of suprapubic catheters

Material prepared by Oklahoma Foundation for Medical Quality, the Medicare Quality Improvement Organization for Oklahoma
Appendix G

Consumer’s Role in CAUTI Prevention
## CARE PLAN # Indwelling Urinary Catheter

<table>
<thead>
<tr>
<th>Date Initiated</th>
<th>Problem, Needs</th>
<th>Desire outcomes with projected date</th>
<th>Interventions</th>
<th>Disciplines Involved</th>
<th>Result: Improved, no change, worsened, resolved</th>
<th>Status: Continue, discontinue, or change intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At risk for CAUTI R/T use of indwelling catheter</td>
<td>Will have no UTI while catheter is in place.</td>
<td>1. Educate resident/responsible party on risk &amp; benefits of catheter, catheter care. Give information sheet.</td>
<td>NSG</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>History of ____________________________</td>
<td>2. Assess &amp; document clinical, rational for continued catheter use. To be assessed on admission, quarterly and PRN.</td>
<td></td>
<td>NSG, MDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clinical indication for catheter: ____________________________</td>
<td>3. Standard Precautions to be used when providing pericare and catheter maintenance.</td>
<td></td>
<td>NSG, CNA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Provide privacy with all peri &amp; catheter care.</td>
<td>4. Provide privacy with all peri &amp; catheter care.</td>
<td></td>
<td>NSG</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Pericare daily, after each incontinent episode and PRN, Wipe front to back with soap &amp; water. Keep peri area clean &amp; dry.</td>
<td>5. Pericare daily, after each incontinent episode and PRN, Wipe front to back with soap &amp; water. Keep peri area clean &amp; dry.</td>
<td></td>
<td>NSG, CNA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Catheter care per P&amp;P. Catheter &amp; collection bag to be changed for clinical indications per P&amp;P.</td>
<td>6. Catheter care per P&amp;P. Catheter &amp; collection bag to be changed for clinical indications per P&amp;P.</td>
<td></td>
<td>ALL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Monitor daily for S/S infection; fever, burning with</td>
<td>7. Monitor daily for S/S infection; fever, burning with</td>
<td></td>
<td>NSG, CNA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAUTI PREVENTION</td>
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<td>------------------</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>CAUTI: Urination, frequency, urgency, cloudy urine, foul-smelling urine, pain or discomfort, and changes in mental and/or functional status. S/S of hematuria. Document in progress notes.</td>
</tr>
<tr>
<td>8</td>
<td>Notify MD of any S/S of infection or changes in status. Document in progress notes.</td>
</tr>
<tr>
<td>9</td>
<td>Notify resident/responsible party for any changes in plan of care.</td>
</tr>
<tr>
<td>10</td>
<td>Monitor I&amp;O daily for hydration status. Notify dietary of poor PO intake. Encourage PO intake, offer choices, and offer fluids in-between meals.</td>
</tr>
<tr>
<td>11</td>
<td>Assess resident’s comprehension and participation of FOC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSG</td>
</tr>
<tr>
<td>NSG</td>
</tr>
<tr>
<td>NSG, CNA, DIETARY</td>
</tr>
<tr>
<td>ALL</td>
</tr>
</tbody>
</table>