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# Preventing Urinary Tract Infections in the Acute Care Setting

Charlotte Evette Philyaw  
*Walden University*

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# Walden University

College of Health Sciences

This is to certify that the doctoral study by

Charlotte Philyaw

has been found to be complete and satisfactory in all respects,  
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the review committee have been made.

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Walden University  
2016

Abstract

Preventing Urinary Tract Infections in the Acute Care Setting

by

Charlotte Philyaw

MSN, Kaplan University, 2010

BSN, Florida College of Health Sciences, 2008

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

July 2016

## Abstract

More than 13,000 deaths and \$340 million in health care costs are the result of catheter-associated urinary tract infections (CAUTIs) annually in the United States. CAUTIs can also result in acute patient discomfort and potentially preventable exposure to antibiotics. The hospital for which this quality improvement project was developed was above the National Healthcare Safety Network CAUTI bench mark. Framed within the Iowa model of evidence-based practice, a multidisciplinary team of 8 hospital stakeholders guided the project (n=8). The purpose of the project was to develop an indwelling urinary catheter maintenance checklist using evidence-based practice guidelines related to preexisting inappropriate risk factors for catheterization and appropriate indications for catheterization, as well as evidence-based maintenance practices for care of the indwelling catheter. Each piece of evidence to be included in the checklist was evaluated by 4 content experts using a 10 item 5 point Likert scale ranging from “strongly disagree” to “strongly agree”. Descriptive analysis showed an average of 4.8/5 for all items with “agree” being voiced in two of the items rather than “strongly agree”. The checklist was completed and presented to hospital senior leadership who recommended that the checklist be incorporated into the hospital CAUTI prevention plan. All project team members (n=8) completed an 8 item 5 point Likert scale summative evaluation of the purpose, goal, objectives, and my leadership which averaged as 5 or “strongly agree” supporting the development of the project. Implications for social change include improved patient outcomes, mindful stewardship of healthcare dollars, and increased patient and family satisfaction.

Preventing Urinary Tract Infections in the Acute Care Setting

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## Dedication

This project is dedicated to all health care professionals who give of themselves on a daily basis to provide the best care to patients. Your willingness to adapt to the forever changing health care field speaks highly of your character. Thank you for all that you do every single day.

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## Section 1: Nature of the Project

In October 2004, the American Association of Colleges of Nursing (AACN) formally approved the doctor of nursing practice (DNP) (Zaccagnini & White, 2011). The DNP, a terminal degree, is now considered by many health care organizations as the preferred degree for nursing leaders who solve the vexing problems facing the health care system by evaluating, implementing, and translating research evidence into best practice. DNP students are required to implement a project that incorporates the breadth of the student's education and the knowledge gained during the course of study. Zaccagnini and White (2011) stated the DNP project focuses on a practical problem and the evidence-based solutions for the problem.

This DNP design-only quality improvement (QI) project was related to *Essentials II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking* (AACN, 2006). Hospital-acquired infections (HAIs) occur in a patient during the process of care in a health care facility (Tsuchida et al., 2008). The Centers for Disease Control and Prevention (CDC) defines a catheter-associated urinary tract infection (CAUTI) according to clinical symptoms and laboratory evidence of a urinary tract infection (UTI) in a patient who has had a urethral catheter in place for more than two days (Magers, 2013). HAIs compromise the quality of patient care, and CAUTIs represent the largest portion of HAIs resulting in increased health care costs, patient discomfort, and unnecessary exposure to antibiotics, morbidity, and mortality (Finan, 2012). More than 13,000 deaths a year are a result of CAUTIs, and over \$340 million in health care is attributable to CAUTIs annually (CDC, 2014a).

The development of this DNP project occurred at a 450-bed facility in Northwest Florida. The hospital's CAUTI rate of 4.23 per 1000 catheter days was above the National Healthcare Safety Network (NHSN) national benchmark rate of 1.07 per 1000 catheter days (CDC, 2015), resulting in increased patient care days and financial repercussions for the facility. In addition, the hospital's CAUTI rate was the highest amongst the 131 hospitals within the faith-based health care organization in which it belongs. This design-only project facilitated meeting the national benchmark through the development of an indwelling urinary catheter maintenance checklist (IUCMC) to be proactive in identifying problems that might occur and provide prevention and intervention. A review of literature for this project was completed to identify the best evidence-based practice. Many themes emerged from the synthesis of the literature, including CAUTIs can be reduced through the implementation of best practice through reminder systems (Meddings, Rogers, Macy, & Saint, 2010). However, there were no themes that related to the prevention of CAUTIs through the use of an IUCMC. Implications for positive social change include an increase in patient well-being, patient satisfaction, and maintenance of urinary tract homeostasis from admission through discharge.

### **Background**

Review of the literature indicates that CAUTIs can be reduced and/or prevented by the implementation of best practice guidelines (Meddings et al., 2010). Key guidelines for prevention of CAUTIs include placement of indwelling urinary catheters for appropriate indications, early removal of indwelling catheters, and alternatives to indwelling catheterization. Meddings et al. (2013) reported that CAUTI prevention

guidelines can reduce CAUTI rates by 53%. Organizations such as the CDC (2009), the Association for Professionals in Infection Control and Epidemiology (APIC, 2014), and the Society for Healthcare Epidemiology of America (SHEA, 2014) have established best practice CAUTI prevention guidelines. Despite the availability of these guidelines, CAUTI prevention has proven challenging for some health care facilities.

The landmark study by the Institute of Medicine (1999) led to the creation of the National Quality Forum (NQF) of 28 Never Events list. However, not all preventable medical errors were included on this list; therefore, in 2006 the Deficit Reduction Act (DRA) was signed by the President of the United States. These conditions, which are commonly called HAIs, are deemed *never events* by the Centers for Medicare & Medicaid Services (CMS, 2006). On October 1, 2008, the CMS announced Medicare would no longer pay the extra cost of treating HAIs unless documented as present on admission. The Centers for Medicare & Medicaid Services consider CAUTIs as preventable and no longer reimburse for the extra cost of treatment.

According to a study conducted by the CDC (2014b), common medical errors account for more than \$4.5 billion in additional health spending a year. Results of other studies (Andel, Davidow, Hollander & Moreno, 2012; Weingarten, 2013) indicated that hospitals paid only a small percentage of the total cost of these preventable medical errors. According to a study by Sipkoff (2010), hospitals in Pennsylvania billed Medicare for 67% of the total cost of preventable medical errors.

### **Problem Statement**

The problem addressed in this design-only DNP project was the rate of CAUTIs that resulted in increased hospital stays and treatment with lost revenue for the health care organization. This problem was demonstrated by the fact that CAUTI rates ranged from a low of 0.0 per 1000 catheter days to a high of 35.2 per 1000 catheter days in spite of implementation of evidence-based practice guidelines (National Healthcare Safety Network, 2015). The CAUTI rate of 4.23 per 1000 catheter days for this health care organization was above the national benchmark CAUTI rate of 1.07 per 1000 catheter days.

The most common risk factor for CAUTIs is the duration of catheterization. Andreessen, Wilde, and Herendeen (2012) reported that catheterizations lasting more than six days increase the risk of CAUTIs by nearly seven fold, while catheterizations lasting more than 30 days increase the risk of CAUTIs by almost 100%. Andreessen et al. posited that an estimated 17% to 69% of CAUTIs may be preventable with recommended evidence-based practice guidelines. The CDC's (2009) updated guidelines on the appropriate indications for the use of acute care indwelling urethral catheters are as follows: perioperative use, prolonged surgery, operative patients with urinary incontinence, intraoperative hemodynamic monitoring and diuretics during surgery, monitoring in critically ill patients, chronic indwelling urinary catheter, immobilization after trauma or surgery, acute urinary retention and obstruction, pressure ulcer healing, and end-of-life care.

Andreessen, et al. concluded that implementation of evidence-based practice guidelines for indwelling urinary catheter use coupled with recommendations on proper



insertion, maintenance techniques, and prompt removal of the urinary catheter when no longer needed resulted in a reduction of catheter use by 57% and a significant decrease in catheter duration by 71% on three medical units.

### **Purpose**

The purpose of this quality improvement project was to develop an indwelling urinary catheter maintenance checklist based on evidence-based practice guidelines related to indicators and risk factors associated with catheterization. Hospitals are no longer reimbursed if patients develop CAUTIs (CMS, 2008). There is now mandated reporting of hospital infection rates by individual states. Despite published guidelines and evidence-based recommendations supporting several practices to prevent CAUTIs, the percentage of hospitals using these practices remains low. Krein, Kowalski, Hofer, and Saint (2011) examined the use of prevention practices in United States hospitals between 2005 and 2009 and concluded that the use of practices to prevent CAUTIs remained relatively low compared to other HAIs. This gap suggests additional strategies may be needed to encourage the use of CAUTI prevention practices to decrease infection risk and enhance patient safety.

### **Project Goal/Objectives**

#### **Goal**

The goal for this QI project was to achieve the national benchmark CAUTI rate through the use of an evidence-based indwelling urinary catheter maintenance checklist.

## **Objectives**

At the conclusion of this project, the following objectives were met:

1. An evidence-based indwelling urinary catheter maintenance checklist was developed to monitor the appropriateness of an indwelling urinary catheter and to promote proper maintenance practices based on CDC practice guidelines.
2. Content evaluation of the checklist was conducted by content experts.
3. Summative evaluation was completed by the stakeholders.

## **Framework of the Project**

Evidence-based practice models offer a framework to guide organizations and their health care professionals to implement evidence-based policies, protocols, and guidelines (White & Dudley-Brown, 2012). The indwelling urinary catheter maintenance checklist development process followed the Iowa model of evidence-based practice (Doody & Doody, 2011). This model was developed by Titler and other colleagues to describe knowledge transformation and to guide implementation of research into practice to improve quality of care (White & Dudley-Brown, 2012). The checklist development was based on the seven steps of the Iowa model of evidence-based practice:

1. Selecting a topic: The practice problem selected was the ongoing unacceptable rate of CAUTIs resulting in increased hospital stays and treatment despite implementation of evidence-based practice guidelines.
2. Forming a team: A multidisciplinary team was formed that consisted of the following members: DNP student, director of adult services, director of quality, infection control nurse, two nurse managers, two bedside nurses, and an educator.

3. Retrieving evidence: A scholarly literature review was conducted using the following databases: Cumulative Index to Nursing and Allied Health (CINAHL), MEDLINE, ProQuest, Cochrane Review, and Ovid. The Google Scholar search engine was also used.

4. Grading the evidence: An analysis and synthesis of the literature was presented to the multidisciplinary team who determined which evidence to use to develop the project using the Iowa model criteria in Figure 1.

Area	Concern	Criteria
Effectiveness	Relates to whether the intervention achieves the intended outcomes.	Does the intervention work? What are the benefits and harm? Who will benefit from its use?
Appropriateness	Concerned more with the psychosocial aspects of care than with the physiological.	What is the experience of the consumer? What health issues are important to the consumer? Does the consumer view the outcomes as beneficial?
Feasibility	Addresses the broader environment in which the intervention is situated and involves determining whether the intervention can and should be implemented.	What resources are required for the intervention to be successfully implemented? Will it be accepted and used by healthcare workers? How should it be implemented? What are the economic implications of using the intervention?

*Figure 1.* Iowa model of evidence grading criteria. (Doody & Doody, 2011).

5. Developing an evidence-based practice standard: The indwelling urinary catheter maintenance checklist was developed based on the literature review and evidence-based practice guidelines.

6. Implementing the evidence-based practice: Implementation of the checklist will occur after graduation.

7. Evaluating the project. There were three different evaluations that occurred with the project development. Process evaluation was ongoing and reflected in meeting minutes. Checklist evaluation was conducted by the multidisciplinary team and is described in Section 4. A summative evaluation of the project, process, and leadership is presented in Section 4.

### **Nature of the Project**

Quality improvement methods are needed to address the gap between research and practice for health care clinicians (Kelly, 2011). As team lead of this design-only project with collaboration from a multidisciplinary team, I identified a practice problem. I conducted a scholarly literature search using the following key words: *catheter-associated urinary tract infections, prevention of catheter-associated urinary tract infections, hospital-acquired infections, checklist development, and Iowa model evidence-based practice*. An analysis and synthesis of the literature was presented to the multidisciplinary team who determined which evidence to use to develop the project. Utilization of evidence-based practices assisted with the development of the IUCMC. The checklist was approved for use by senior leadership and will be implemented after graduation. The IUCMC will focus on indications for the catheter, whether appropriate or inappropriate, and proper maintenance practices.

## Definitions of Terms

The following definitions were used to guide this DNP project:

*Asymptomatic bacteriuria (ASB)*: A positive urine culture without any symptoms of a symptomatic urinary tract infection (Simon, Klaus, & Dunton, 2009).

*Catheter-associated urinary tract infection*: A symptomatic urinary tract infection or asymptomatic bacteriuria in which an indwelling urinary catheter was in place for more than two calendar days (CDC, 2014a).

*Checklist*: A list of action items, tasks, or behaviors arranged in a consistent manner that allows the evaluator to record the presence or absence of the individual items listed (Hales, Terblanche, Fowler, & Sibbald, 2010).

*Hospital-acquired infections*: A localized or systemic condition resulting from an adverse reaction to the presence of an infectious agent(s) or its toxin(s). There must be no evidence that the infection was present or incubating at the time of admission to the acute care setting (CDC, 2014b).

*Indwelling catheter*: A drainage tube inserted into the urinary bladder via the urethra, left in place, and connected to a closed collection system (CDC, 2014a).

*National Healthcare Safety Network (NHSN)*: Healthcare-associated infection tracking system (CDC, 2014a).

*Never events*: Errors in medical care that are of concern to both the public and health care professionals and providers, are clearly identifiable and measurable (and thus feasible to include in a reporting system), and are of such a nature that the risk of occurrence is significantly influenced by the policies and procedures of the health care organization (CDC, 2014b).

*Symptomatic urinary tract infection (SUTI)*: A fever greater than 100.4°F (38°C); urgency, frequency, dysuria, or suprapubic tenderness with no other recognized cause; and a positive urine culture (Simon, Klaus, & Dunton, 2009).

### **Assumptions and Limitations**

#### **Assumptions**

Grove, Burns, and Gray (2013) defined assumptions as statements that are taken for granted or considered true even though they have not been scientifically tested. I assumed the nurses would be motivated to improve in the prevention and reduction of CAUTIs. I also assumed the hospital would have the resources to support implementation of the project.

#### **Limitations**

Grove et al. (2013) stated that limitations are restrictions that may limit the generalizability or credibility of the findings of a study. There were anticipated barriers that may have threatened the desired outcomes of the DNP project. Being that this was a design-only QI project, the inability to implement and evaluate prior to graduation prevented actual presentation of findings to the stakeholders. Another limitation of the project was the lack of literature regarding the effectiveness of an indwelling urinary catheter maintenance checklist in preventing and/or reducing CAUTIs.

### **Significance**

The goal of a health care facility is to provide high quality care every day to every patient. Hospitals can be penalized for care that leads to negative patient outcomes. This quality improvement initiative has the potential to contribute significantly to nursing practice. The checklist can be instrumental in identifying the barriers that prevent

clinicians' adherence to evidence-based CAUTI prevention guidelines. Addressing these barriers would be significant in preventing further CAUTIs.

### **Evidence-Based Significance of the Project**

Use of evidence-based practice guidelines within health care facilities has been shown to significantly reduce the number of CAUTIs. However, despite the use of these guidelines, over 900,000 patients develop a CAUTI in the United States every year (Modica, Raja, Quinones, Diongon, & Figueredo, 2014). Indwelling urethral catheters have been a common practice in hospitals and are considered a source of infection. Seventy-five percent of urinary tract infections acquired in the hospital are thought to be a result of an indwelling urethral catheter (CDC, 2014a). There are ample evidence-based strategies to aid in the prevention of CAUTI. The CDC updated their evidence-based guidelines in 2009 for the diagnosis, prevention, and management of individuals in hospitals and long-term facilities. Bruminhent, Keegan, Lakhani, Roberts, and Passalacqua (2010) conducted a study that included using a sticker placed on patients' medical records binders to remind physicians to remove unnecessary urinary catheters. The results of the study indicated that the use of an intervention can significantly increase awareness of the appropriate use of urinary catheters and decrease the rate of CAUTI in community teaching hospitals.

Tsuchida et al. (2008) found that implementation of daily cleansing of the perineal area and maintaining a preconnected closed system reduced CAUTIs by 50%. Codd (2014) recommended insertion of catheters only when necessary. Codd also noted that evidence-based practice for ongoing care and prompt removal of catheters when clinically indicated are effective measures for reducing catheter-associated urinary tract

infections. However, these guidelines are not consistently followed despite the tools and recommendations provided by the CDC and other organizations such as the Society for Healthcare Epidemiology of America.

Hospitals are required to report ongoing surveillance in regards to CAUTI performance measures. Health care organizations should have documentation that supports compliance with educational programs as well as documentation of catheter insertion and removals. Dailly (2012) suggested designing an audit tool that provides proof that health care professionals are compliant with hospital standards and policies. Within a health care facility, patients should be receiving quality care that is based on current evidence instead of care that is based on tradition alone. Translating evidence into nursing practice promotes standardization of health care practices, which reduces illogical variations in care. Stevens (2013) reported that illogical variation causes unpredictable health outcomes. Stevens also stated the development of evidence-based practice is “fueled by the increasing public and professional demand for accountability in safety and quality improvements in health care” (para 2).

The desired goal of evidence-based practice is to improve patient health and the quality of care (Grove et al., 2013). Implementation of my project initiative may result in a reduction of CAUTI rates as well as identification of practice problems. The new practice guidelines provide valuable prevention information for health care providers. The guidelines include new research and technological advances for the prevention of catheter-associated urinary tract infections. If properly implemented, the checklist will provide indications for the catheter, whether appropriate or inappropriate, and proper maintenance practices.



### **Implications for Social Change**

DNP graduates are professional nurses who practice at the most advanced level of nursing to improve nursing practice and patient outcomes (Zaccagnini & White, 2011).

Health care organizations are charged with reducing the number of CAUTIs.

Development of an indwelling urinary catheter maintenance checklist will reflect DNP Essential II of the American Association of Colleges of Nursing: Organizational and Systems Leadership for Quality Improvement and Systems Thinking (AACN, 2006).

### **Summary**

This section provided an overview of the nature of the project, framework of the project, significance, and implications for social change. Section 2 presents a literature review on hospital-acquired infections, catheter-associated urinary tract infection prevention guidelines, checklists, and the Iowa model of evidence-based practice.

### **Section 2: Review of Scholarly Literature**

The problem addressed in this design-only DNP project was the rate of CAUTIs that can result in increased patient hospital stays and treatment and lost revenue for health care organizations. This problem was demonstrated by the fact that CAUTI rates ranged from a low rate of 0.0 per 1000 catheter days to a high of 35.2 per 1000 catheter days despite implementation of evidence-based practice guidelines (National Healthcare Safety Network, 2015). The purpose of this quality improvement project was to develop an indwelling urinary catheter maintenance checklist based on evidence-based practice guidelines related to indicators and risk factors associated with catheterization. This checklist will be used to monitor the appropriateness of the indwelling urinary catheter as well as proper maintenance practices.

Catheter-associated urinary tract infections constitute the most common type of hospital-acquired infections (CDC, 2014ab). CAUTIs can result in increased health care costs, patient discomfort, morbidity, and mortality. A review of the literature indicates that CAUTIs can be reduced and/or prevented by the implementation of best practice guidelines. Despite published guidelines and evidence-based recommendations supporting several practices to prevent CAUTIs, the percentage of hospitals using these practices remains low. In the following scholarly literature review, I explore current practices and checklist development.

### **Literature Search Strategy**

I conducted an extensive search of the literature using electronic databases such as the Cumulative Index to Nursing and Allied Health (CINAHL), MEDLINE ProQuest, Cochrane Review, and, Ovid. I also used the Google Scholar search engine. The following key words were searched: *catheter-associated urinary tract infections*, *prevention of catheter-associated urinary tract infections*, *hospital-acquired infections*, *checklist development*, and *Iowa model evidence-based practice*. The years searched were from 1999 to 2015. Several of the studies were identified using the Boolean *and* between the key words. The type of literature and sources identified included foundational and current peer-reviewed work. There was limited literature regarding the effectiveness of an indwelling urinary catheter maintenance checklist in preventing and/or reducing CAUTIs.

### **Hospital-Acquired Infections (HAIs)**

HAIs can be caused by infectious agents such as fungi, bacteria, and viruses and are often associated with a variety of risk factors that include surgical procedures, overuse or improper use of antibiotics, and use of indwelling medical devices such as

bloodstream and endotracheal and urinary catheters (CDC, 2014b). HAIs are serious and costly problems in the health care arena. HAIs prolong hospitalization and increase mortality and morbidity. Houghton (2006) reported that two million patients in U.S. hospitals develop an HAI yearly. Of those estimated two million patients who develop HAIs, 90,000 to 100,000 die (Houghton, 2006).

### **CAUTI Prevention**

Guidelines (APIC, 2014; CDC, 2009; SHEA, 2014) have been established to prevent CAUTIs. Despite the evidence-based recommendations, CAUTIs still exist. Knudson (2014) stated one main reason of CAUTIs is the widespread use of indwelling catheters, and one in 333 indwelling urinary catheters will cause infection” (p. C1). In addition, between 21% and 63% of indwelling urinary catheters are placed in patients without appropriate clinical indication (Knudson, 2014). One of the CAUTI prevention recommendations established by the CDC and other organizations emphasizes the importance of using urinary catheters only when clinically indicated, not for convenience. The following are examples of appropriate indications for indwelling urinary catheters: acute urinary retention or bladder outlet obstruction, measurement for urinary output in critically ill patients, perioperative use for selected procedures, open sacral or perineal wounds in incontinent patients, and improved comfort for end-of-life care (Knudson, 2014).

One modifiable risk factor that is commonly present in catheter-associated urinary tract infections is prolonged catheterization time (Crouzet et al., 2007). Contributing to this factor is the unawareness of physicians regarding the length of time an indwelling catheter has been present and catheters remaining in place until a catheter-related

complication occurs (Crouzet et al., 2007). Preeminent care dictates that crucial observation should occur and that emphasis should be given to allowing the indwelling catheter to remain in place only if there are necessary indications.

The American Association of Critical Care Nurses (2014) reported prolonged catheterization is a major risk factor for CAUTIs, and up to 90% of patients in an intensive care unit (ICU) have a urinary catheter during hospitalization, often without an appropriate indication. Gray (2010) reported that of the 40% of hospital-acquired infections in the United States, more than 80% are associated with an indwelling urinary catheter. The hospital prevalence rate for indwelling catheterization varies from 25% to 35%, while prevalence rates in ICU are higher at 67% to 76%. The risk factors that may contribute to CAUTIs that are significant to patients within the critical care setting and that require the use of an indwelling urinary catheter include fecal and urine incontinence, strict intake and output, and severity of illness. However, some indwelling urinary catheters in the ICU are inserted for convenience or remain in longer than warranted.

### **Checklist**

A checklist is commonly used in both medical and nonmedical organizations to guide users through accurate task completion (Ko, Turner, & Finnigan, 2011). Stressful fields of work, such as the airline industry and the military, employ checklists to decrease improper implementation of procedures and protocols, errors of omission, and human error under stressful conditions (Ko et al., 2011). A checklist, which is thought to improve care processes, is essential in ensuring a consistent standard of care in the medical field (Hales et al., 2010). Examples of checklists include the standardized order

set checklists and daily check sheets to increase the use of best practices (Hales et al., 2010).

A study conducted by Hajbaghery and Aghajani (2009) on 377 patients with indwelling urinary catheters included a checklist prepared in two formats, one for assessing the patients' views and the other as a tool for direct observation. The checklist consisted of demographic features, duration of the indwelling urinary catheter, reason for hospitalization, reason for catheterization, and items regarding the quality of care. The study indicated that a checklist can be used as a simple protocol to conduct staff actions when an indwelling urinary catheter should be inserted. Hajbaghery and Aghajani's recommendation for designing an effective checklist was as follows: utilization of prepublished guidelines, formation of an expert panel, and repeat pilot testing of preliminary checklists.

Ko et al. (2011) conducted a systematic review to determine whether the use of safety checklists improved patient safety in a hospital setting. Ko et al. concluded that some improvements in patient safety may result from safety checklists. Ko et al. also suggested health care organizations planning to implement safety checklists should use an evidence-based approach when selecting, designing, and validating checklists for the quality improvement project. Another recommendation from the study was consideration of resources to ensure staff time and funding to properly train and educate those using the checklists (Ko et al., 2011).

### **Iowa Model of Evidence-Based Practice**

Kowal (2010) stated healthcare models are recognized guidelines that integrate the latest evidence into new pathways of care to promote best-practice outcomes for

patients of any population. The Iowa model of evidence-based practice is one of the most appropriate guides for implementing practice change for nursing (Doody & Doody, 2011). The model, which directs change based on current evidence, takes into account the entire health care organization when a practice change is proposed (White & Dudley-Brown, 2012). Titler and other colleagues developed this model to describe knowledge transformation and to guide implementation of research into practice to improve quality of care.

The decision-making algorithm of the Iowa model of evidence-based practice guides nurses in using research findings to improve the quality of care (White & Dudley-Brown, 2012), as shown in Figure 2.

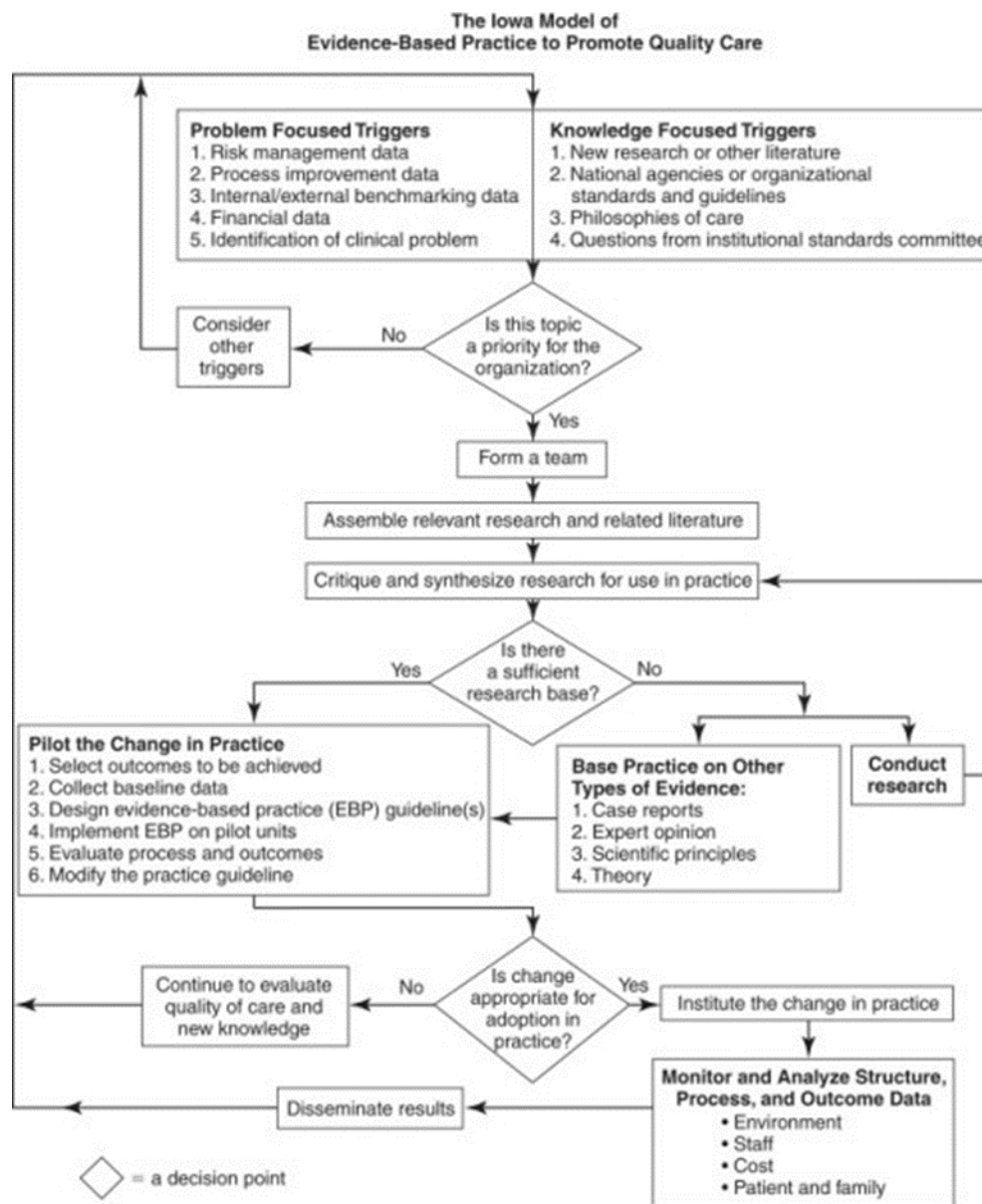


Figure 2. The Iowa model of evidence-based practice to promote quality care (Doody & Doody, 2011).

The Iowa model of evidence-based practice uses the concept of triggers, which allows the nurse to answer the following questions:

1. Is the evidence to change practice sufficient?
2. Are findings across studies consistent?

3. Are the type and quality of findings sufficient?
4. Do the studies have clinical (not just statistical) relevance?
5. Can the studies reviewed be generalized to your population?
6. Are the findings of the study feasible?
7. How appropriate is the risk/benefit ratio? (White & Dudley-Brown, 2012).

The Iowa model of evidence-based practice is instrumental in facilitating change in nursing care. This was evident in a study conducted by Kowal (2010). A hospital in Syracuse, New York discovered there was not an accurate assessment tool to rate pain in the nonverbal patient population in the surgical intensive care unit. Without a proper pain assessment tool for the nonverbal patient population, the staff had difficulty providing timely, appropriate, and patient-specific interventions that had the ability to negatively affect patient outcomes. The Iowa model of evidence-based practice provided a systematic framework for changing nursing practice by incorporating critical thinking, clinical inquiry, and judgment with the implementation of a critical care pain observation tool (Kowal, 2010). Implementation of evidence-based practice using the Iowa model positively impacted that hospital's health care continuum through the improvement of patient care processes.

### **Summary**

This section presented a scholarly review of the literature of HAIs, CAUTI prevention, checklists, and the Iowa model of evidence-based practice. Practice guidelines have been established to prevent CAUTIs. Despite the evidence-based recommendations, CAUTIs still exist. The percentage of hospitals using these practices remains low. The challenge is the ability of health care organizations to incorporate



evidence-based practice into the nursing arena. Development of an indwelling urinary catheter maintenance checklist can help close the gap between research and practice. If properly implemented, the checklist will provide indicators with appropriate and inappropriate uses for indwelling catheters and proper maintenance practices, thereby reducing the number of CAUTIs. Section 3 presents the approach for the DNP project.

### Section 3: Methodology

Section 3 presents the approach used to undertake this quality improvement initiative. The purpose of this quality improvement project was to develop an indwelling urinary catheter maintenance checklist based on evidence-based practice guidelines related to indicators and risk factors associated with catheterization. This checklist will be used to bring awareness to nurses in an effort to help reduce CAUTIs. I led the checklist development and a multidisciplinary team that included the director of adult services, the director of quality, an infection control nurse, two nurse managers, two bedside nurses, and an educator, supported me. The project was triggered by the health care facility's identification of a clinical problem.

#### **Approach**

As leader of the QI project, I wanted to be an effective leader. An effective leader knows the strengths and weaknesses of his or her people (White & Dudley-Brown, 2012). Another attribute of an effective leader is the ability to motivate and inspire others to achieve a compelling vision. As the leader, I was responsible for conducting the meetings. I made my objectives clear, took into consideration who was invited, stuck to the agenda, started on time, ended on time, and provided follow-up for the meetings.

The foundation of the project and checklist development was based on the seven steps of the Iowa model of evidence-based practice (Doody & Doody, 2011):

1. identification of a practice problem,
2. formation of a multidisciplinary team of stakeholders from the health care facility,
3. conduction of a literature review,

4. critique of the literature review,
5. development of an indwelling urinary catheter maintenance checklist,
6. implementation of the checklist after graduation, and
7. evaluation of the project after graduation.

### **Development of the Checklist**

The goal for this QI project was to achieve the national benchmark CAUTI rate through the use of an evidence-based indwelling urinary catheter maintenance checklist. An evidence-based indwelling urinary catheter maintenance checklist was developed to monitor the appropriateness of an indwelling urinary catheter as well as proper maintenance practices based on CDC practice guidelines. To meet the objective of developing an evidence-based checklist, I invited content experts to participate on the multidisciplinary team in which I was the leader. After Institutional Review Board (IRB) approval from Walden University was granted (Appendix I), the initial invitations were sent out via email. Participation was voluntary; however, the team members were selected based on their expertise and commitment to the project.

The multidisciplinary team worked together in an environment with a set purpose of developing an indwelling urinary catheter maintenance checklist. During the meetings, the content of the checklist was reviewed for acceptability and practicality by the multidisciplinary team. Components of the checklist included appropriate and inappropriate indications for placement of the catheter as well as proper maintenance practices (Appendix A). Modification of the checklist was made based on feedback received from the team.

## **Evaluation**

Evaluation for this QI project was twofold. First, a panel of four content experts evaluated the 10 risk factors and rated the degree to which each one had the potential to contribute to the development of a CAUTI using a 10 item 5 point Likert Scale (Appendix B). From that evaluation the checklist was developed which included the review of the literature in determining the indications for and maintenance of an indwelling urinary catheter. The findings of this evaluation are described fully in Section 4. Second, the eight members of the stakeholder team completed a summative evaluation of the project, process, and my leadership (Appendix C). These results are also described in Section 4.

## **Summary**

Reduction of catheter-associated urinary tract infections may result in positive patient outcomes. Quality improvement projects such as development of an indwelling urinary catheter maintenance checklist may help reduce CAUTI rates. Section 4 presents the project findings and implications, including the indwelling urinary catheter maintenance checklist development process, and checklist evaluation. In Section 4, I also describe my growth as a scholar, practitioner, and project manager.

#### Section 4: Findings, Discussion, and Implications

The purpose of this quality improvement project was to develop an indwelling urinary catheter maintenance checklist based on evidence-based practice guidelines related to indicators and risk factors associated with catheterization. This checklist will be used to bring awareness to nurses in an effort to help reduce CAUTIs. The goal for this QI project was to achieve the national benchmark CAUTI rate through the use of an evidence-based indwelling urinary catheter maintenance checklist.

An evidence-based indwelling urinary maintenance checklist was developed to monitor the appropriateness of an indwelling urinary catheter as well as proper maintenance practices based on CDC practice guidelines (APIC, 2014; CDC, 2009; SHEA, 2014). Content of the checklist was reviewed for acceptability and practicality by a multidisciplinary team. Previously discussed aspects of the Iowa model were identifying the problem, forming the team, and retrieving the evidence (Doody & Doody, 2011). The findings section presents the grading of the evidence and the development of an evidence-based indwelling urinary maintenance checklist. Evaluation of the DNP project was conducted through ongoing process evaluation, risk factors evaluation, and summative evaluation. Implementation of the checklist will take place after graduation. Lastly, evaluation of the implementation will also take place after graduation. The purpose of this section is to explain the process of checklist development, evaluation, and content review for appropriateness of the checklist for bedside nurses.

## **Findings, Evaluation, and Discussion**

### **Findings**

Initiation of this project included identifying stakeholders who may be in positions to make decisions about the health care facility. Members of the team needed to have various skills. Those chosen included the director of adult services, the director of quality, an infection control nurse, two nurse managers, two bedside nurses, and an educator. Identified members of the multidisciplinary team received an email containing the initial invitation that explained the purpose of the meeting. I provided a detailed overview of the project during the first meeting and invited the participants to ask questions. The members agreed on meeting dates and times for subsequent meetings during the initial meeting. I emailed an agenda and articles to the team prior to each meeting. The director of quality recorded the minutes of the meetings.

An analysis and synthesis of the literature was presented to the multidisciplinary team who determined which evidence to use to develop the checklist using the Iowa model criteria. Many team members concluded the most common risk factor for CAUTIs is the duration of catheterization (Crouzet et al., 2007). Additional risk factors were inappropriate placement of indwelling urethral catheters, ineffective maintenance techniques, and absence of implementation of evidence-based practice guidelines in health care facilities (Andreessen et al., 2012). Development of the indwelling urinary catheter maintenance checklist was based on two things. First the review of the literature was used to develop the indicators. Secondly risk factors associated with CAUTIs, scholarly analysis and synthesis of the evidence-based of literature, CDC recommendations, and review of data obtained from the lead infection control nurse at

the facility. The CDC's (2009) updated guidelines on the appropriate indications for the use of acute care indwelling urethral catheters are as follows: perioperative use, prolonged surgery, operative patients with urinary incontinence, intraoperative hemodynamic monitoring and diuretics during surgery, monitoring in critically ill patients, chronic indwelling urinary catheter, immobilization after trauma or surgery, acute urinary retention and obstruction, pressure ulcer healing, and end-of-life care. Indwelling urinary catheters should only be inserted when appropriately indicated, the following reasons are inappropriate indicators for insertion: urine monitoring outside the intensive care setting, incontinence, morbid obesity, immobility, confusion or dementia, and patient request (CDC, 2009).

The team discussed and agreed on the components of the checklist. A PowerPoint presentation was presented to directors, managers, the education department, and bedside nurses (Appendix D, Speaker notes [Appendix E]). In addition to the PowerPoint presentation, a poster presentation was displayed at the health care facility's annual nurses' skill day (Appendix F). The approved checklist will be implemented after graduation.

### **Risk Factor Evaluation**

Four content experts were asked to review the literature and evaluate the risk factors. The four experts included the director of quality, two infection control physicians, and an infection control nurse. Each expert evaluated the risk factors and rated the degree to which each one had the potential to contribute to the development of a CAUTI on a scale of 1-5, in which 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. The risk factors evaluated were

appropriate indications, inappropriate indications, lengths of catheter days (Crouzet et al., 2007), lack of routine hygiene of the periurethral area, breaking of the closed system (Tsuchidaet et al., 2008), not properly securing the bag, urinary bag higher than the bladder, regular emptying of urinary bag (Mayers, 2013), no kinks and dependent loops in the catheter/catheter secured (Krein et al., 2011), and aseptic technique when obtaining urine culture (Curran & Murdoch, 2009).

The results of the evaluation were based on each individual risk factor (Appendix G)

Table 1.

*Results of the Evaluation of the Risk Factors*

Risk factor	Agree	Strongly agree
1. Appropriate indications		100%
2. Inappropriate indications		100%
3. Lack of routine hygiene of periurethral area	25%	75%
4. Length of catheter days	25%	75%
5. Breaking of the closed system	100%	
6. Not properly securing the bag	100%	
7. No kinks and dependent loops in the catheter/catheter secured	100%	
8. Urinary bag higher than the bladder	100%	
9. Regular emptying of the urinary bag	100%	



10. Aseptic technique when obtaining urine culture 100%

The experts thought all the risk factors were capable of contributing to the development of a CAUTI and should be included on the checklist. Therefore the proper catheter maintenance activities were derived and included from these risk factors.

### **Summative Evaluation**

Hodges and Videto (2011) stated the purpose of process evaluation is to describe, monitor, and document progress of a project to improve the effectiveness of the project. Process evaluation of this DNP project was ongoing and reflected in meeting minutes. A summative evaluation is conducted to determine whether a project was successful (Hodges & Videto, 2011). The members of the team completed a summative evaluation. The participants were asked to evaluate me and the project using a Likert scale of 1-5, in which 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. The following statements and outcomes were included in the evaluation:

Table 2.

#### *Results of the Summative Evaluation*

Evaluation Statement	Strongly agree
1. The purpose was clearly defined.	100%
2. The stated goals were met.	100%
3. The stated objectives were met.	100%
4. The meeting agendas were sent out in a timely manner.	100%

- |   |      |
|---|------|
| 5. The meetings started and ended in the allotted time.     | 100% |
| 6. The meetings were productive.                            | 100% |
| 7. The DNP student demonstrated effective leadership style. | 100% |
| 8. The DNP student valued my input.                         | 100% |

The only recommendation was to go forward with use the checklist as part of the hospitals CAUTI strategic plan to prevent urinary tract infections. The results of the evaluation demonstrated that the objectives and goals for the DNP project were met. My ability to be an effective leader in this quality improvement project was supported through the results of the evaluation.

### **Applicability to Health Care Practice**

Six hundred thousand patients develop urinary tract infections while in the hospital every year, and CAUTIs account for nearly 80% of those (CDC, 2014a). As of October 1, 2008, the Centers for Medicare and Medicaid Services no longer reimburses for hospital acquired CAUTIs (CMS, 2008). The Joint Commission 2015 National Patient Safety Goal 7 called for implementation of evidence-based practice guidelines to prevent indwelling catheter-associated urinary tract infections. Organizations such as the CDC (2009) and SHEA (2014) have published evidence-based practices guidelines and recommendations to prevent CAUTIs. Despite these published guidelines and evidence-based recommendations supporting several practices to prevent CAUTIs, the percentage of hospitals using these practices remains low (Conway & Larson, 2012). The Association for Professionals in Infection Control and Epidemiology (2014) recommended using an indwelling urinary catheter maintenance tool as part of a CAUTI

prevention strategy plan. Developing an indwelling urinary catheter maintenance checklist for monitoring urinary tract homeostasis from admission through discharge to identify potential problems in the system of care that are amenable to evidence-based interventions will help bridge the gap between research and practice.

### **Implications**

Development of an indwelling urinary catheter maintenance checklist to prevent CAUTIs has the potential to effect social change within a health care organization. At this health care facility as well as others, this checklist has the potential to improve patient outcomes by decreasing and/or preventing CAUTIs, decreasing length of stay, increasing patient comfort, and increasing financial reimbursement (CDC, 2014a).

### **Practice**

Despite the Institute of Medicine's (1999) recommendations to improve the safety and quality of care, health care organizations have been slow to heighten awareness in preventing hospital-acquired infections. White and Dudley-Brown (2012) recommended reducing variability in practice and ensuring consistent application of evidence to improve patient outcomes. White and Dudley-Brown also stated that resource tools such as a checklist may facilitate a decreased rate of infection, length of stay, cost per case, and sequelae. The implementation of an indwelling urinary catheter maintenance checklist has the potential to change practice and reduce the incidence of catheter-associated urinary tract infections. This checklist will allow bedside nurses to apply evidence-based practices guidelines to promote positive patient outcomes.

## **Social Change**

Evidence exists supporting interventions that can substantially reduce the incidence of HAIs like CAUTIs (Finan, 2012). Hospital acquired infections are no longer reimbursed by CMS. Today, reimbursement is reflective of positive patient outcomes, patients' experiences, and best clinical practices instead of services provided. Furthermore, the Joint Commission (2015) has called for implementation of evidence-based practice guidelines to prevent indwelling catheter-associated urinary tract infections.

## **Strengths, Limitations, and Recommendations**

### **Strengths and Limitations**

The project will not be implemented until after graduation. However, strengths and limitations of the design-only project have been identified. One strength of the project was the organization of a multidisciplinary team to address a practice problem in a Level II trauma center. Assemblage of a team allowed input from multiple health care workers with varying backgrounds and expertise (Kelly, 2011). An additional strength of the project was the development of a checklist that will help bedside nurses decrease catheter-associated urinary tract infections. Ongoing evaluation of the project will be conducted to identify measures of success, report progress, and investigate errors and lapses as opportunities to improve. If the quality improvement is successful, the checklist may become a system-wide initiative for the organization. Additionally, there will be minimal resources used to implement the change initiative. The project will expose nurses to the concept of evidence-based practice care. In addition, the nurses should find the checklist simple and not time consuming to complete.

Grove et al. (2013) stated that limitations are restrictions that may limit the generalizability or credibility of the findings of a study. There were anticipated barriers that may have threatened the desired outcomes of the DNP project. Being that this was a design-only QI project, the inability to implement and evaluate prior to graduation prevented actual presentation of findings to the stakeholders. Another limitation of the project was the lack of literature regarding the effectiveness of an indwelling urinary catheter maintenance checklist in preventing and/or reducing CAUTIs.

### **Recommendations**

One recommendation would be to receive feedback from nurses related to the usability and effectiveness of the checklist. Another recommendation would be to use this checklist or a similar checklist as an avenue of ongoing improvement.

### **Analysis of Self**

#### **As Scholar**

Zaccagnini and White (2011) stated the DNP degree focuses on clinical scholarship. The DNP project is the vehicle in which the student demonstrates knowledge gained in the course of study. This project was not only a requirement for the DNP degree but a reflection of the knowledge and skills gained during the course of study. As a scholar, I identified the need to address a CAUTI rate above the national benchmark and developed an intervention that has the potential to positively impact patient and system outcomes.

#### **As Practitioner**

The platform of my DNP project focused on DNP Essential II Organizational and Systems Leadership for Quality Improvement and Systems Thinking (AACN, 2006). DNP graduates should have the ability to organize care to address practice problems to improve patient and health care outcomes. The project contributed to my professional development by improving competency beyond basic practice. As a practitioner, my knowledge of evidence-based practice has grown.

Zaccagnini and White (2011) stated that advanced practice nurses transitioning to the DNP role will be better prepared for the growing complexity of health care. Nurses with a DNP degree can work at the bedside, in the academic setting, or in a leadership setting that allows for improvements in the quality of health care. As a manager in an inpatient setting, I can use the information learned from the project as a resource tool for the staff.

### **As Project Manager**

As the project leader, I was diligent in specificity to oversight. I conceptualized a procedural implementation of a process with emphasis on patient care. I had to define the scope of the project, identify key stakeholders, access resources, and develop goals and objectives. Additional responsibility of the project manager included assemblage of a multidisciplinary team that possessed the necessary knowledge, skills, and authority to accomplish legitimate and sustainable change. A situational analysis of the organization was done to identify the strengths and weaknesses within the organization with respect to the project, the opportunities inherent in the work of the project, and any potential threats to the success of the project.

## Summary

Catheter-associated urinary tract infections constitute the most common type of health-acquired infections. These infections often cause poor outcomes, which can result in delayed recovery time and increased length of stay in the hospital. The goal for this QI project was to achieve the national benchmark CAUTI rate through the use of an evidence-based indwelling urinary catheter maintenance checklist. The purpose of this quality improvement project was to develop an indwelling urinary catheter maintenance checklist based on evidence-based practice guidelines related to indicators and risk factors associated with catheterization. If successfully implemented, the checklist will be the vehicle that empowers bedside nurses to become champions in preventing catheter-associated urinary tract infections. This project was proposed to improve the care of patients with indwelling urinary catheters by reducing the rates of catheter complications and infections with the implementation of evidence-based guidelines. Section 5 presents the scholarly product.

## Section 5: Scholarly Product (Appendices F, H)

Dissemination of the scholarly project is an essential component of the Doctor of nursing practice degree. The scholarly product for this DNP project was the development of an indwelling urinary catheter maintenance checklist for an acute care facility. Christenberry and Lathan (2013) suggested that poster presentations at professional conferences are an excellent means for dissemination of scholarly projects by DNP students. The following abstract was submitted to the 2016 Academy of Medical-Surgical Nurses (AMSN) convention to be held September 29, 2016, to October 2, 2016, in Washington, DC:

### **Title**

Development of an Indwelling Urinary Catheter Maintenance Checklist for the  
Acute Care Setting

### **Background**

Catheter-associated urinary tract infections constitute the most common type of healthcare-acquired infections (HAIs). CAUTIs cost appropriately \$350 million annually for hospitals in the United States (Saint, Gaies, Fowler, Harrod, & Krein, 2014). CAUTIs, like other HAIs, have been deemed by the Centers for Medicare and Medicaid Services as reasonably preventable. To counteract this potentially life-threatening health issue, the Joint Commission (TJC) mandated the implementation of evidence-based practices to aid in the prevention of CAUTIs. The use of indwelling urethral catheters has been a common practice in hospitals. However, urinary catheters can be a source of infections. Seventy-five percent of urinary infections acquired in the hospital are thought to be a



result of an indwelling urethral catheter (CDC, 2015a). However, despite use of these guidelines, over 900,000 patients develop a CAUTI in the United States every year (Modica, Raja, Quinones, Diongon, & Figueredo, 2014). An extensive literature search failed to indicate an existing indwelling urinary catheter maintenance auditing tool.

### **Objective**

The goal for this QI project was to achieve the national benchmark CAUTI rate through the use of an evidence-based indwelling urinary catheter maintenance checklist.

### **Method**

A multidisciplinary team that included the DNP student, bedside nursing members, educators, stakeholders, and infection control experts led the checklist development process. Content experts evaluated the problematic risk factors and rated the degree to which each one had the potential to contribute to the development of a CAUTI using a 5-point Likert scale. The risk factors evaluated were appropriate indications, inappropriate indications, lack of routine hygiene of the periurethral area, length of catheter days, breaking of the closed system, not properly securing the bag, no kinks and dependent loops in the catheter/catheter secured, urinary bag higher than the bladder, regular emptying of urinary bag, and aseptic technique when obtaining urine culture. This QI project was based on the Iowa model of evidence-based practice.

### **Outcome**

An indwelling urinary catheter maintenance checklist was developed.

### **Significance**

The indwelling urinary catheter maintenance checklist will empower bedside nurses to become champions in preventing catheter-associated urinary tract infections. The IUCMC has the potential to improve performance not as a substitute for critical thinking, but rather as a trigger for details that can be lost among the competing demands of complex health care.

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## Appendix A: Indwelling Urinary Catheter Maintenance Checklist

Patient Name: \_\_\_\_\_

Medical Record Number: \_\_\_\_\_

Nurse completing form: \_\_\_\_\_

Indications for Catheter (select one)

Appropriate Indications:

- Acute urinary retention or bladder outlet obstruction
- Perioperative use in selected surgeries
- Assist healing of perineal and sacral wounds in incontinent patients
- Hospice/comfort/palliative care
- Required immobilization for trauma or surgery
- Chronic indwelling on admission
- Urine output monitoring in intensive care setting

Inappropriate Indications:

- Urine output monitoring outside intensive care
- Incontinence
- Morbid obesity
- Immobility
- Confusion or dementia
- Patient request

Yes	No	Indwelling Urinary Catheter Proper Maintenance Practices
		Routine hygiene of the periurethral area with soap and water during daily bath
		Changes urinary systems routinely unless there is infection, obstruction or a break or leak of the closed system
		Make sure the urinary flow is not obstructed (No kinks of catheter or dependent loops)
		The urinary bag should always be lower than the bladder
		Regular emptying of urinary bag
		Catheter should be properly secured to prevent movement and urethral traction
		Disinfect sampling port before obtaining urine culture

Form is to be completed every shift by nurse caring for patient. Nurse evaluating catheter and finding no indication should contact physician to promptly discontinue catheter. Please return completed to manager.

## Appendix B: Risk Factor Evaluation

For each of the questions below, circle the response that best characterizes how you feel about the risk factors' contribution to the development of a CAUTI, where 1=Strongly Disagree, 2=Disagree, 3=Neither Agree Nor Disagree, 4=Agree, and 5=Strongly Agree.

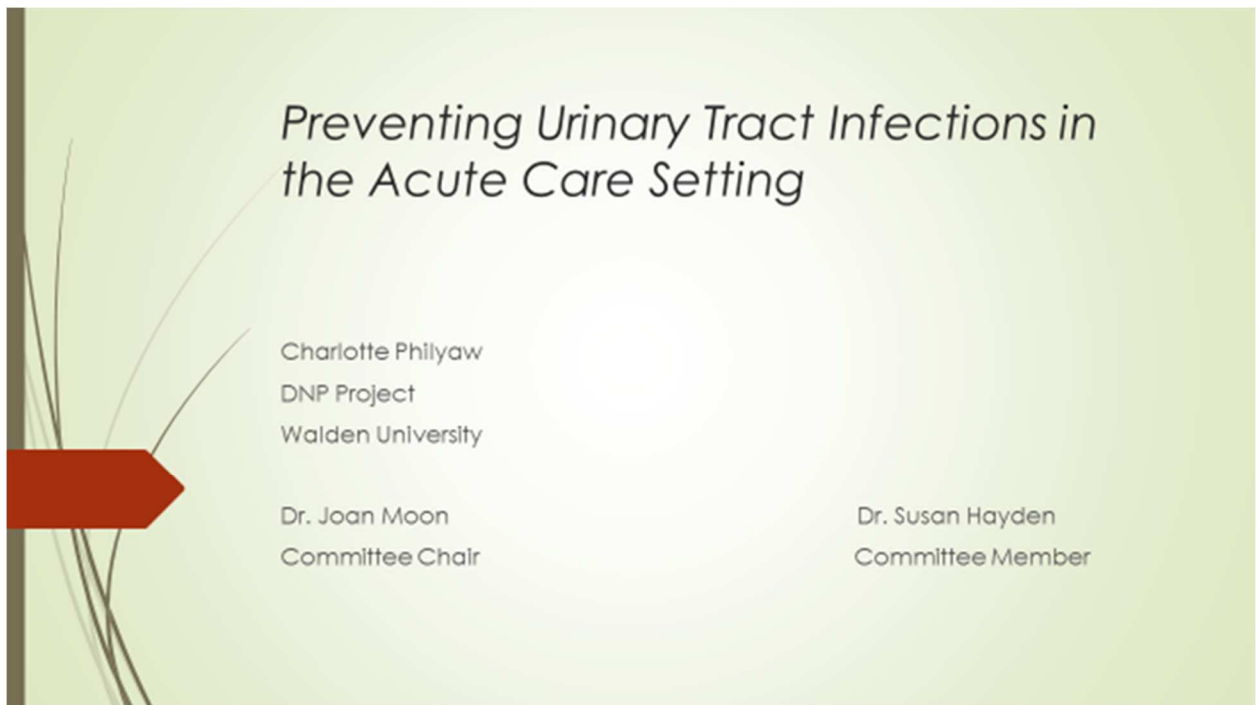
	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1. Appropriate Indications	1	2	3	4	5
2. Inappropriate Indications	1	2	3	4	5
3. Lack of routine hygiene of the periurethral area	1	2	3	4	5
4. Length of catheter days	1	2	3	4	5
5. Breaking of the closed system	1	2	3	4	5
6. Not properly securing the bag.	1	2	3	4	5
7. No kinks and dependent loops in the catheter/catheter secured.	1	2	3	4	5
8. Urinary bag higher than the bladder.	1	2	3	4	5
9. Regular emptying of urinary bag	1	2	3	4	5
10. Aseptic technique when obtaining urine culture.	1	2	3	4	5

## Appendix C: Project Stakeholder Evaluation

Circle the response that best characterizes how you feel about each of the statements, where 1=Strongly Disagree, 2=Disagree, 3=Neither Agree Nor Disagree, 4=Agree, and 5=Strongly Agree.

	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1. The purpose was clearly defined.	1	2	3	4	5
2. The stated goals were met.	1	2	3	4	5
3. The stated objectives were met.	1	2	3	4	5
4. The meeting agendas were sent out in a timely manner.	1	2	3	4	5
5. The meetings started and ended in the allotted time.	1	2	3	4	5
6. The meetings were productive.	1	2	3	4	5
7. The DNP student demonstrated effective leadership style.	1	2	3	4	5
8. The DNP student valued my input.	1	2	3	4	5

## Appendix D: PowerPoint Presentation

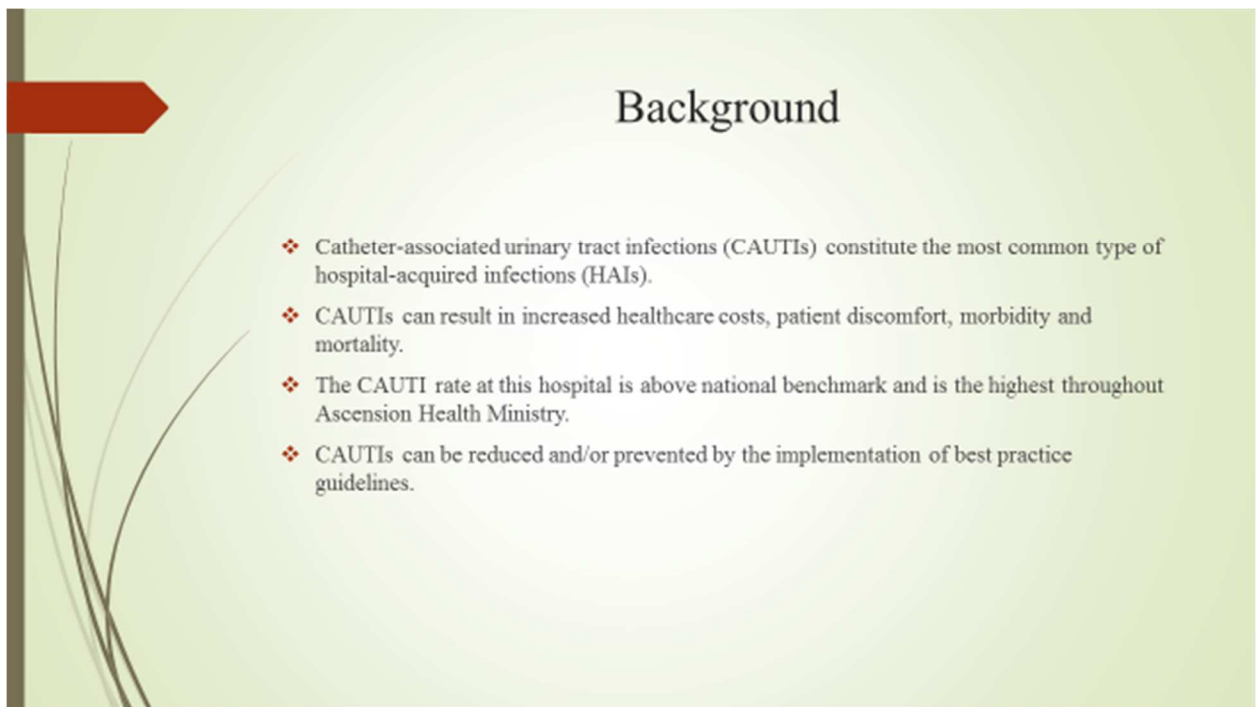


# Preventing Urinary Tract Infections in the Acute Care Setting

Charlotte Philyaw  
DNP Project  
Walden University

Dr. Joan Moon  
Committee Chair

Dr. Susan Hayden  
Committee Member



## Background

- ❖ Catheter-associated urinary tract infections (CAUTIs) constitute the most common type of hospital-acquired infections (HAIs).
- ❖ CAUTIs can result in increased healthcare costs, patient discomfort, morbidity and mortality.
- ❖ The CAUTI rate at this hospital is above national benchmark and is the highest throughout Ascension Health Ministry.
- ❖ CAUTIs can be reduced and/or prevented by the implementation of best practice guidelines.



## Problem Statement

- ❖ The problem addressed in this design-only DNP project was the rate of CAUTIs which can result in increased hospital stays and treatment with lost revenue for healthcare organizations



## Purpose

- ❖ The purpose of this DNP QI project was to reduce the frequency of CAUTI rates by developing an indwelling urinary catheter maintenance checklist.

## Assumptions\Limitations

### Assumptions:


- ❖ The nurses will be motivated to improve in the prevention/decrease of CAUTIs
- ❖ The hospital will have the resources to support implementation of the project.

### Limitations:

- ❖ Evaluation of patient records is susceptible to documentation by the health care providers.
- ❖ The checklist developed in this project will not be effective in decreasing/preventing the rate of CAUTIs.

## Significance

- ❖ The checklist can be instrumental in determining the barriers which prevent clinicians' adherence to evidence-based CAUTI prevention guidelines.
- ❖ Addressing these barriers would be significant in preventing further CAUTIs.
- ❖ The checklist will provide indications for the catheter, whether appropriate or inappropriate and proper maintenance practices.



## Project Objectives

- ❖ An evidence-based indwelling urinary catheter maintenance checklist was developed that monitors the appropriateness of an indwelling urinary catheters as well as proper maintenance practices based on CDC practice guidelines.
- ❖ Content of the checklist was reviewed for acceptability and practicality by a team of bedside nurses and experts in Infection Control, the evidence-based committee and education.



## Scholarly Evidence

- ❖ Knudson (2014) report “one in 333 indwelling urinary catheters will cause infection” (p. C1).
- ❖ The number of catheters inserted without appropriate clinical indication is “between 21 and 63 percent” (Knudson, 2014, p. C9).
- ❖ According to the American Association of Critical Care Nurses (2014), prolonged catheterization is the major risk factor for CAUTIs.
- ❖ A checklist can be used as a simple protocol to conduct staff actions when an indwelling urinary catheter should be inserted (Hajbaghery & Aghajani, 2009).



## Framework of the project

### ■ Iowa Model of Evidence-Based Practice



## Project Approach

- ❖ The indwelling urinary catheter maintenance checklist was developed by the multidisciplinary team.
- ❖ Components of the checklist include appropriate indications and inappropriate placement for the catheter as proper maintenance practices.
- ❖ The content of the checklist was evaluated by infection control experts.

- Patient Name: \_\_\_\_\_
- Medical Record Number: \_\_\_\_\_
- Nurse completing form: \_\_\_\_\_

Indications for Catheter (select one)

- Appropriate Indications:
  - Acute urinary retention or bladder outlet obstruction
  - Perioperative use in selected surgeries
  - Assist healing of perineal and sacral wounds in incontinent patients
  - Hospice/comfort/palliative care
  - Required immobilization for trauma or surgery
  - Chronic indwelling on admission
  - Urine output monitoring in intensive care setting
  
- Inappropriate Indications:
  - Urine output monitoring outside intensive care
  - Incontinence
  - Morbid obesity
  - Immobility
  - Confusion or dementia
  - Patient request

Yes	No	Indwelling Urinary Catheter Proper Maintenance Practices
		Routine hygiene of the periurethral area with soap and water during daily bath
		Do not change urinary systems routinely unless there is infection, obstruction or a break or leak of the closed system
		Make sure the urinary flow is not obstructed (No kinks of catheter or dependent loops)
		The urinary bag should always be lower than the bladder
		Regular emptying of urinary bag
		Catheter should be properly secured to prevent movement and urethral traction
		Disinfect sampling port before obtaining urine culture

## Future Plans

- ❖ Incorporation of this checklist for all patients with indwelling urinary catheters.
- ❖ System wide adoption of the checklist.
- ❖ Electronic version of checklist to monitor compliance.
- ❖ Nurse-driven protocol to remove inappropriate placed indwelling urinary catheters.

## References

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- Knudson, L. (2014). CAUTI prevention requires improved practices and policies. *AORN Connections*, 99(5), C1-C10. [http://dx.doi.org/10.1016/S0001-2092\(14\)00377-9](http://dx.doi.org/10.1016/S0001-2092(14)00377-9)

## Appendix E: PowerPoint Presentation Speaker Notes

**Slide 1:** Welcome stakeholders and leaders of Sacred Heart Hospital. My name is Charlotte Philyaw. I am a DNP Student at Walden University. I have had the privilege of completing my DNP practicum and project here at Sacred. The focus of my DNP project was the prevention of catheter-associated urinary tract infections.

**Slide 2:** CAUTIs are as the most common type of hospital-acquired infections. CAUTIs have negative patient outcomes such as increased cost, morbidity and mortality. In addition, this facility's CAUTI rate is above national benchmark and is the highest throughout Ascension Health Ministry. More than 13,000 deaths a year are a result of CAUTIs, and over \$340 million in healthcare is attributable to CAUTIs annually as well according to the CDC.

**Slide 3:** The problem addressed in this design-only DNP project was the rate of CAUTIs which can result in increased hospital stays and treatment with lost revenue for healthcare organizations. CAUTIs are *never events* which The Centers for Medicare & Medicaid Services consider preventable and no longer reimburse for the extra cost of treatment.

**Slide 4:** The purpose of this project was to reduce the frequency of CAUTI rates by developing an indwelling urinary catheter maintenance checklist. There are evidence-based practice guidelines that have been established to help prevent these infections however, the compliance rate is low. The goal of this project was to develop an indwelling urinary catheter maintenance checklist. The checklist will be used to monitor

the appropriateness of the indwelling urinary catheter as well as proper maintenance practices.

**Slide 5:** The objectives of this projects was to develop an evidence-based indwelling urinary catheter maintenance checklist that monitors the appropriateness of an indwelling urinary catheter as well as proper maintenance practices based on CDC practice guidelines. The content of the checklist was reviewed for acceptability and practicality by a team of bedside nurses and experts in Infection Control, the evidence-based committee and education.

**Slide 6:** One assumption of this project is that the nurses will be motivated to participate in preventing CAUTIs. Of course, financial impact is important with implementing any change. With this checklist one has to rely on the documentation of the healthcare provider. Whether or not this checklist will be effective in preventing/decreasing the number of CAUTIs was not determined as the checklist was not yet implemented.

**Slide 7:** This checklist has the potential to determine the barriers which prevent clinicians' adherence to evidence-based CAUTI prevention guidelines. Of course, addressing these barriers would be significant in preventing further CAUTIs. The checklist will also provide indications for the catheter, whether appropriate or inappropriate and proper maintenance practices.

**Slide 8:** This slide depicts studies that support the significance of CAUTIs and the use of a checklist. Knudson (2014) report "one in 333 indwelling urinary catheters will cause infection". The number of catheters inserted without appropriate clinical indication is

“between 21 and 63 percent” (Knudson, 2014). According to the American Association of Critical Care Nurses (2014), prolonged catheterization is the major risk factor for CAUTIs. A checklist can be used as a simple protocol to conduct staff actions when an indwelling urinary catheter should be inserted (Hajbaghery & Aghajani, 2009).

**Slide 9:** The checklist development was based on the seven steps of the Iowa Model of Evidence-Based Practice: selection of a topic, forming of a team, evidence retrieval, grading the evidence, developing an evidence-based practice standard, implement the evidence-based practice and evaluation.

**Slide 10:** The indwelling urinary catheter maintenance checklist was developed and evaluated by the multidisciplinary team. Components of the checklist include appropriate indications and inappropriate placement for the catheter as proper maintenance practices. The content of the checklist was reviewed for acceptability and practicality by a team of bedside nurses and experts in Infection Control, the evidence-based committee and education.

**Slide 11:** The next two slides are the indwelling urinary catheter maintenance checklist. This slide shows the appropriate indications in which a foley catheter should be inserted.

**Slide 12:** These are the evidence-based maintenance practices.

**Slide 13:** Future plans for this tool include: incorporation of this checklist for all patients with indwelling urinary catheters, system wide adoption of the checklist, electronic version of checklist to ease compliance and development of a nurse-driven protocol to remove inappropriate placed indwelling urinary catheters.

**Slide 14:** This slide are references used to create this PowerPoint. Thank you for your time. Are there any questions?

## Appendix F: Poster Presentation

<p style="text-align: center;"><b>Preventing Urinary Tract Infections in the Acute Care Setting: Development of an Indwelling Urinary Catheter Maintenance Checklist</b> Charlotte Philyaw MSN Walden University</p>																											
<p style="text-align: center;"><b>Background</b></p> <p>Catheter-associated urinary tract infections (CAUTIs) constitute the most common type of hospital-acquired infections (HAIs).</p> <p>CAUTIs can result in increased healthcare costs, patient discomfort, morbidity and mortality.</p> <p>The CAUTI rate at this hospital is above national benchmark and is the highest throughout Ascension Health Ministry.</p> <p>CAUTIs can be reduced and/or prevented by the implementation of best practice guidelines.</p> <p style="text-align: center;"><b>Problem Statement</b></p> <p>The problem addressed in this design-only DNP project was the rate of CAUTIs which can result in increased hospital stays and treatment with lost revenue for healthcare organizations</p> <p style="text-align: center;"><b>Project Goal</b></p> <p>The goal for this QI project was to develop an indwelling urinary catheter maintenance checklist for monitoring urinary tract homeostasis from admission through discharge in order to identify potential problems in the system of care which are amenable to evidence-based interventions.</p>	<p style="text-align: center;"><b>Project Objectives</b></p> <p>An evidence-based indwelling urinary catheter maintenance checklist was developed that monitors the appropriateness of an indwelling urinary catheters as well as proper maintenance practices based on CDC practice guidelines.</p> <p>Content of the checklist was reviewed for acceptability and practicality by a team of bedside nurses and experts in Infection Control, the evidence-based committee and education.</p> <p style="text-align: center;"><b>Project Significance</b></p> <p>The checklist can be instrumental in determining the barriers which prevent clinicians' adherence to evidence-based CAUTI prevention guidelines.</p> <p>Addressing these barriers would be significant in preventing further CAUTIs.</p> <p>The checklist will provide indications for the catheter, whether appropriate or inappropriate and proper maintenance practices.</p> <p style="text-align: center;"><b>References</b></p> <p>Centers for Disease Control and Prevention. (2014). Catheter-associated urinary tract infections. Retrieved from <a href="http://www.cdc.gov">http://www.cdc.gov</a></p> <p>Knudson, L. (2014). CAUTI prevention requires improved practices and policies. <i>AORN Connections</i>, 99(5), C1-C10. <a href="http://dx.doi.org/10.1016/S0001-2092(14)00377-9">http://dx.doi.org/10.1016/S0001-2092(14)00377-9</a></p>	<p>Patient Name: _____</p> <p>Medical Record Number: _____</p> <p>Nurse completing form: _____</p> <p>Indications for Catheter (select one)</p> <p>Appropriate Indications:</p> <p>___ Acute urinary retention or bladder outlet obstruction</p> <p>___ Perioperative use in selected surgeries</p> <p>___ Assist healing of perineal and sacral wounds in incontinent patients</p> <p>___ Hospice/comfort/palliative care</p> <p>___ Required immobilization for trauma or surgery</p> <p>___ Chronic indwelling on admission</p> <p>___ Urine output monitoring in intensive care setting</p> <p>Inappropriate Indications:</p> <p>___ Urine output monitoring outside intensive care</p> <p>___ Incontinence</p> <p>___ Morbid obesity</p> <p>___ Immobility</p> <p>___ Confusion or dementia</p> <p>___ Patient request</p>	<table border="1"> <thead> <tr> <th>Yes</th> <th>No</th> <th>Indwelling Urinary Catheter Proper Maintenance Practices</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Routine hygiene of the periurethral area with soap and water during daily bath</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Do not change urinary systems routinely unless there is infection, obstruction or a break or leak of the closed system</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Make sure the urinary flow is not obstructed (No kinks of catheter or dependent loops)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>The urinary bag should always be lower than the bladder</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Regular emptying of urinary bag</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Catheter should be properly secured to prevent movement and urethral traction</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Disinfect sampling port before obtaining urine culture</td> </tr> </tbody> </table>	Yes	No	Indwelling Urinary Catheter Proper Maintenance Practices	<input type="checkbox"/>	<input type="checkbox"/>	Routine hygiene of the periurethral area with soap and water during daily bath	<input type="checkbox"/>	<input type="checkbox"/>	Do not change urinary systems routinely unless there is infection, obstruction or a break or leak of the closed system	<input type="checkbox"/>	<input type="checkbox"/>	Make sure the urinary flow is not obstructed (No kinks of catheter or dependent loops)	<input type="checkbox"/>	<input type="checkbox"/>	The urinary bag should always be lower than the bladder	<input type="checkbox"/>	<input type="checkbox"/>	Regular emptying of urinary bag	<input type="checkbox"/>	<input type="checkbox"/>	Catheter should be properly secured to prevent movement and urethral traction	<input type="checkbox"/>	<input type="checkbox"/>	Disinfect sampling port before obtaining urine culture
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<input type="checkbox"/>	<input type="checkbox"/>	Disinfect sampling port before obtaining urine culture																									



## Appendix G: Summary of Risk Factor Evaluation

	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
Appropriate Indications					1111
Inappropriate Indications					1111
Lack of routine hygiene of the periurethral area				1	111
Length of catheter days				1	111
Breaking of the closed system					1111
Not properly securing the bag					1111
No kinks and dependent loops in the catheter/catheter secured					1111
Urinary bag higher than the bladder					1111
Regular emptying of urinary bag					1111
Aseptic technique when obtaining urine culture					1111

### Appendix H: Poster Abstract Submission Guidelines

AMSN is pleased to announce the Call for Abstracts for our Annual Convention in 2016. Speaker submissions are open until October 30, 2015. Poster submissions are open until May 15, 2016. Selected speaker abstract presentations will receive complimentary registration for the day of the session presentation and a stipend to cover expenses. Selected poster abstract presentations will receive a \$100 discount for the primary presenter off full main convention registration.

Please visit the online AMSN Abstract Management System to register and submit your abstract for review at the following web address: [https://www.conftool.com/amsn 2016](https://www.conftool.com/amsn2016)

Note that all submissions MUST be accompanied by a complete Conflict of Interest Disclosure Form (download Word form) in order to be accepted.

Remember to click the "Complete Submission" button on the second screen!

Poster Presentation

Abstract for Poster Presentation

Deadline: 15th May 2016, 02:59:00pm EST, Time left: 69 days 11 hours

Chair contact: [amsn\\_abstracts@ajj.com](mailto:amsn_abstracts@ajj.com)

Appendix I: Institutional Review Board (IRB) Approval Letter

Dear Ms. Philyaw,

This email is to notify you that the Institutional Review Board (IRB) confirms that your study entitled, "Preventing Urinary Tract Infections in the Acute Care Setting," meets Walden University's ethical standards. Our records indicate that your project does not include the types of activities that require a traditional IRB review. This Confirmation of Ethical Standards (CES) has an IRB record number of 05-21-15-0483170.