

# STRATEGIES TO PREVENT URINARY TRACT INFECTION FROM URINARY CATHETER INSERTION IN THE EMERGENCY DEPARTMENT

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Urinary catheters are commonly placed in ED patients to manage urine output, provide bladder drainage, and facilitate the care of patients with unstable hemodynamics. Many of these patients are admitted to the hospital for treatment, and the catheter may remain in place for days or during the entire time of hospitalization. There are risks associated with the use of urinary catheters.<sup>1</sup> They can cause such complications as urethritis, urethral strictures, hematuria, and mechanical trauma.<sup>1</sup> Bladder perforation and encrustation of the catheter leading to blockage of the urine flow are other potential problems.<sup>2</sup> One of the most common complications is a urinary tract infection (UTI).<sup>1</sup> UTI accounts for 32% of all health care–associated infections.<sup>3</sup> Eighty percent of these infections are attributable to the use of an indwelling catheter.<sup>1</sup> Use of best practice techniques by emergency nurses can help prevent UTIs from occurring as a result of urinary catheter insertions in the emergency department. The Centers for Disease Control and Prevention (CDC) guidelines for prevention of catheter-associated UTIs

(CAUTIs) recommends that hospital personnel and others who take care of catheters should be given periodic in-service training that stresses use of the correct technique and potential complications of urinary catheterization.<sup>3</sup>

## Significance and Literature Review

CAUTIs also can cause bacteremia and sepsis.<sup>1</sup> If the infection is complicated by bacteremia, it could increase the cost of care by more than \$2800.<sup>4</sup> The mean length of hospital stay can be prolonged by 2.4 to 4.5 days and is related to increased in-hospital mortality.<sup>2</sup> The significance and risks of CAUTI necessitates a demand for interventions to help prevent complications. Interventions have focused on preventing intra-luminal or extra-luminal entry of organisms into the urinary drainage system and the transmission of organisms upon insertion of the catheter.<sup>2</sup> In a systematic review of research published by the Joanna Briggs Institute, CAUTI prevention strategies and interventions such as catheter insertion technique, meatal care regimens, specially coated catheters, the use of flush solutions, maintenance of a closed catheter system, educational programs, and changes in care delivery practices were explored.<sup>2</sup>

Methods to prevent CAUTI in adults with short-term urethral catheters should be based on clinical judgment because of the absence of clear research findings.<sup>2</sup> The CDC guidelines for prevention of CAUTI reports that not all CAUTIs can be prevented, but it is believed that a large number can be avoided by the proper management of the indwelling catheter.<sup>3</sup> Best practice recommendations for prevention and monitoring of CAUTI in all acute care hospitals consist of having an appropriate infrastructure for preventing CAUTI, monitoring surveillance of CAUTI, providing education and training for staff, following appropriate technique for catheter insertion and management of the catheter, and accountability for ensuring that an infection prevention and control program is in place.<sup>1</sup>

## Education Project

The purpose of this article is to describe a project implemented in the emergency department that focused on strategies to

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prevent CAUTI. The goal of the project was to disseminate knowledge to emergency nurses regarding the incidence of CAUTI and the integration of best practices in their insertion technique to aid in decreasing the incidence of CAUTI. The project included the concepts of correct insertion technique and covered instruction, proper hand washing, set-up, perineal cleansing prior to insertion, Foley catheter management, and documentation. The information utilized to prepare the content of the program was based on CDC guidelines, the organization's policy and protocol, *Perry & Potter's Clinical Nursing Skills and Techniques* (2006), and information obtained from the literature review. Content and teaching strategies were reviewed and revised by one of the organization's clinical nurse specialists who is very active in implementing evidence-based practices. The project was approved by the UTI Team and the director and nurse manager of the emergency department.

The project included development and implementation of a PowerPoint presentation outlining the proper steps for insertion of a Foley catheter through discussion of the CDC guidelines and University Hospital's policy. The concepts of best practice techniques and suggestions to prevent CAUTIs in male and female populations were provided based on research obtained to prepare the program. Strategies such as leaving a Foley catheter in place for only as long as indications persist and considering other methods for management were discussed. Methods of patient and procedure preparation were outlined. Staff members were given an in-depth instruction on the importance of providing proper perineal cleansing prior to insertion to decrease micro-organisms near the urethral meatus and proper hand washing as some of the single most important steps to assist in the prevention of a CAUTI. Tips for easing the Foley insertion process and Foley catheter troubleshooting were provided. The concepts of catheter securement, allowing slack in the catheter, maintaining a sterile and continuous closed drainage system, and placing the Foley bag in the lowest position were highlighted.

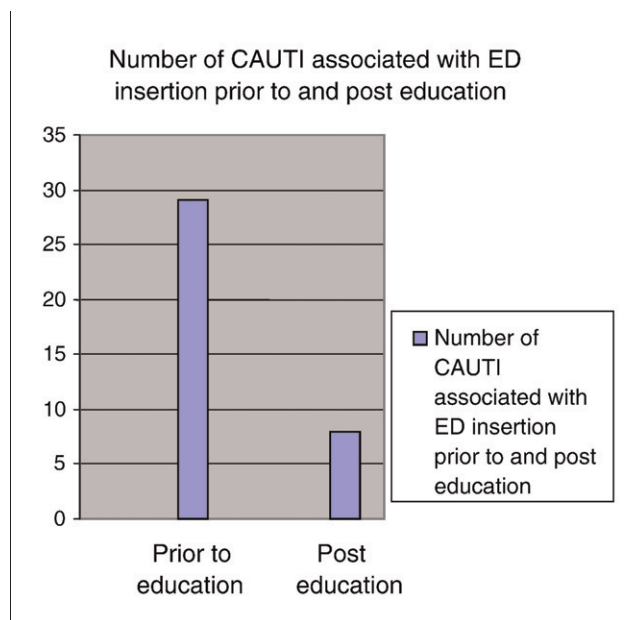
A poster presentation was developed that included visual displays of an antimicrobial skin cleaner that is used for perineal cleansing prior to insertions in the emergency department. It also presented the specific hospital methods and devices for obtaining urine specimens from the Foley catheter, as well as the correct use of anchoring devices and screenshots of appropriate documentation regarding Foley insertions. Important concepts included in the education of proper documentation consisted of assessing the color, clarity, and characteristics of urine once a Foley catheter is placed to allow for consistent communication among the health care team to allow for early recognition of a possible

CAUTI. Pictures of proper hand-washing techniques, Foley catheter insertions, and examples of CAUTIs were components of the poster board presentation. Demonstration and return demonstrations were included through the use of mannequins. The return demonstration took place in the form of a game, and the staff paired up in teams of two alongside another team to practice proper Foley placement. It then was decided by other staff members which team performed the best procedure set up and Foley insertion. This contributed to active hands-on learning and promoted discussion among staff regarding proper technique. The staff pointed out their areas of weaknesses and strengths. There was an increased awareness among staff members regarding proper insertion techniques, when to place a Foley catheter, and methods of proper management.

Handouts were provided to staff to include best practice strategies, CDC guidelines, and University Hospital's urine elimination policy. The teaching sessions lasted approximately 30 to 45 minutes each and were provided during work hours for night shift and day shift on 4 different days. The sessions were mandatory for all health care staff employed in the emergency department. Refreshments such as candy and small snacks were provided. Gift bags that included small items such as pens and note pads were given to staff members who attended the program.

The need for this project was identified based on the Centers for Medicare and Medicaid Services (CMS) guidelines, effective October 2008, that outline particular hospital-acquired conditions that will no longer be reimbursed. CAUTI is one of the conditions that Medicare has selected to be reasonably preventable by following evidence-based guidelines and that are either costly or common.<sup>5</sup> Review of CAUTI with infection prevention also was performed at the beginning of this project, and the emergency department had a total of 29 insertions (Figure) resulting in CAUTIs between January and July of 2008. This data warranted the need for re-educating staff. Additional indications for the need of this project were based on clinical observations in which it was noted that staff members were not performing perineal cleansing prior to insertions other than with the Betadine provided in the Foley catheter kits.

The UTI team developed a multiple-choice questionnaire survey on Foley catheter practices that was completed in all departments prior to the development of this project. There were a total of 27 participants from the emergency department. Staff findings significant to the CAUTI project indicated a need for education. Staff reported not performing perineal cleansing prior to insertions, improper technique during insertions, breaks in aseptic technique, and re-use of the same catheter after unsuccessful insertion attempts. These findings contributed to determination of the content to be in-



FIGURE

Number of catheter-associated urinary tract infections in the emergency department prior to and after education program. It is assumed that there were no changes in Foley catheter insertion rates. The emergency department is not targeted at decreasing Foley catheter usage. CAUTI, Catheter-associated urinary tract infection; ED, emergency department. This figure is available in color and as a full-page document at [www.jenonline.org](http://www.jenonline.org).

cluded in the project to enhance the emergency nurses' knowledge of best practices during catheter insertions.

This project is significant to nursing because it enhances the knowledge and competency in emergency nurses and contributes to promoting excellence in patient care. It is significant to the organization because it is based on utilizing best nursing practices to provide quality care that is safe and assists in the prevention of hospital-acquired infections, such as that of a CAUTI. The project is significant to the patient by promoting safety and ensuring that measures are implemented to decrease the risk of a CAUTI. It has provided additional education and knowledge to emergency nurses that will remind them to integrate the appropriate technique during catheter insertions to aid in reducing possible complications for the patient.

#### Practice Implementation Resulting From the Project

Through the efforts of this project, new practices were implemented in the emergency department. The emergency department has implemented the use of an antimicrobial skin cleanser as a method of perineal cleansing prior to catheter insertions as a prevention strategy to decrease UTIs from catheter placement in the emergency department. Approval was obtained from the product committee and the nurse

manager in the emergency department, who is also a member of the UTI team. The rationale for the use of an antimicrobial skin cleanser is to provide appropriate perineal cleansing in efforts to decrease organisms that can be introduced into the urethral canal during catheter insertion. Additionally, this practice will aid in strategies to decrease CAUTIs to reduce the number of hospital-acquired infections that the CMS has determined to be non-reimbursable.

The antimicrobial skin cleanser implemented is a bathing system based on the Theraworx solution (Asheville, NC) added to non-woven fabric in an enclosed resealable package.<sup>6</sup> It contains allantoin, aloe, beta-glucan, vitamin E, and surfactants that contain antimicrobial properties.<sup>7</sup> A study performed by St. John's Medical Research Institute that compared the early antimicrobial efficacy of Theraworx found that it has broad spectrum coverage and is greater than 99.9% effective against gram-negative and gram-positive bacteria.<sup>7</sup> The studies also show that the Theraworx solution has prolonged activity to beyond 3 hours.<sup>6</sup>

#### Project Cost

The cost of the project has been based on University Hospital supplies (Table 1) and presentation supplies (Table 2). These supplies were used to provide the education program. The combined cost was estimated to be a total of \$153. The cost of rate wages for emergency nurses and other health care staff members have not been calculated because the education took place during normal working hours. Staff attended classes during their assigned shifts. A total of 62 staff members consisting of emergency nurses and other members of the health care staff attended teaching sessions that lasted 30 to 45 minutes each.

#### Evaluation

The survey tool used to measure the effectiveness of the project was developed using a Likert-type scale consisting of 10 items with 5 response categories ranging from strongly agree to strongly disagree. Sixty-two participants attended the class, and 51 surveys were returned. A total of 51 respondents agreed to utilize proper insertion technique and 51 agreed that they would implement the use of an antimicrobial cleanser in their catheter insertion practices. It is also significant to mention that all 51 participants who returned a survey reported that the project contributed to their knowledge and competency base of catheter insertions and UTIs.

#### Discussion

The training of emergency nurses and health care staff was supported by the findings of the post-survey, but additional

TABLE 1  
**Cost of University Hospital supplies for instructional use**

Item	Cost
Access device for Foley urine specimen collections (2 @ \$0.73 each)	\$1.46
Foley securement device (2 @ \$3.12 each)	\$6.24
Antimicrobial skin cleanser: Theraworx packs of 8 (2 @\$2.95 each)	\$5.90
Foley catheter insertion kit (3 @ \$17.30 each)	\$51.90
Total	\$65.50

TABLE 2  
**Costs associated with program presentation**

Item/description	Cost
Presentation supplies (poster board, lettering, graphics, pictures, ink, handouts)	\$55.00
Refreshments and gifts (gift bags, pens, notepads, candy)	\$32.50
Total	\$87.50

research will be required to determine if the project will be appropriate for other departments and patient care areas. The implementation of the antimicrobial skin cleanser for perineal care prior to Foley catheter insertions is a new practice, and evaluation over a period of time will be required to monitor its efficiency based on the CAUTI rates in the emergency department. Project implementation began in January 2009, and there have been 8 CAUTI as of July 2009 (Figure) that are related to catheter insertions in the emergency department according to infection prevention. Further evaluation and analysis of the CAUTI rates since implementation of the project will need to occur to assess progress and effectiveness before and after implementation of education.

Research performed by the Joanna Briggs Institute regarding the management of urethral catheters found that meatal care strategies to prevent bacteriuria provided little or no benefit overall to the use of anything other than standard personal hygiene when caring for patients with indwelling catheters.<sup>2</sup> Some benefit was indicated in a small number of female patients who are considered high risk.<sup>2</sup> The research compared standard meatal care by washing with soap to use of a povidone-iodine, neomycin-polymixin beta bacitracin ointment or poly-antibiotic cream.<sup>2</sup> Overall, catheter care should consist of good personal hygiene around the meatal area.<sup>2</sup>

These studies also found that there is a need for continued education and reinforcement of the required behaviors related to catheter management.<sup>2</sup> Strategy development and

re-education will provide nurses with the comprehension required to practice appropriate catheter insertion technique and care. The educational program implemented was based on these concepts and was the driving factor to promote patient safety. It provided for a change in practice in the emergency department that contributes to ensuring quality nursing care.

### Conclusion

Because of the significance and risk of UTI, a major component to the management of a patient with an indwelling catheter is the prevention of infectious complications.<sup>2</sup> The goals of this project are to educate emergency nurses and other health care members regarding the implementation of practices that will aid in minimizing the occurrence of hospital-acquired infections such as CAUTI to promote patient safety. The post-survey results demonstrate a significant difference in the nurses' practice strategies when inserting a urinary catheter and utilizing methods to prevent a CAUTI. The emergency nurses took an extreme interest in this project and supported the efforts to decrease CAUTI by practicing what was learned in the classes and implementing proper perineal care with the use of an antimicrobial cleanser prior to urinary catheter insertions. The costs of this project were minimal, and the results have been positive. The UTI team, nurse educators, and clinical nurse specialists are reviewing aspects of this project to begin implementing re-education in other patient care

areas. Additional data analysis will be a future focus to monitor the rates of CAUTI after implementation of the education and to determine the continued use of an antimicrobial cleanser for catheter care. Overall, best practice efforts and strategies through implementation of this project will support the organization's goal to provide quality and nursing excellence in our patient care by promoting safety.

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