

Clinical Practice Guidelines

Prevention & Control of Catheter-Associated Urinary Tract Infection (CAUTI)

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1. What is the definition and prevalence of a urethral catheter associated urinary tract infection (CAUTI)?

Catheter-associated urinary tract infection (CAUTI) is defined as a urinary tract infection that occurs in persons with an indwelling urinary catheter. A urinary tract infection (UTI) is defined as an inflammatory response of the epithelium of the urinary tract to invasion and colonization by pathogen, usually a bacterial species (Schaeffer & Schaeffer, 2007). CAUTIs are classified as a complicated UTI and the most common cause of health care-associated infection (Klevens et al., 2007). Recently, the Centers for Disease Control and Prevention (CDC) revised the definition of CAUTI that limits criteria to symptomatic UTI (Horan, Andrus, & Dundeck, 2008). Infection preventionists utilize population-based epidemiologic criteria to identify CAUTIs when setting up systems for surveillance of hospital-associated infections. Clinicians use similar criteria that may differ from CDC information in identifying or defining UTI. Additional definitions of various types of UTI have been published elsewhere (Nicolle et al., 2005). These include the recognition that many patients have asymptomatic bacteriuria (ASB) and in some populations, such as community-dwelling elders, the prevalence can be as high as 19%. Routine screening and treatment for ASB among these populations is not recommended and if treated, can lead to multi drug-resistant organisms. The daily risk of bacteriuria with catheterization ranges 3% to 10%. By day 30 of catheterization, all patients have bacteria in the bladder. However, in the majority of cases, no symptoms result, and secondary complications such as bacteremia are rare (Tambyah & Malki, 2000). Thus, the majority of cases of CAUTIs indicates unrecognized or sub-clinical infection. For the most current surveillance definitions for CAUTI, visit National Healthcare Safety Network (NHSN) Web site at http://www.cdc.gov/nhsn/psc.html

Urinary tract infections constitute 40% of all hospital-associated infections, and 80% of these infections are attributable to indwelling urethral catheter use. Twelve percent to 16% of hospital inpatients will have an indwelling urinary catheter placed at some time during hospitalization (Nicolle, 2008).

2. What are the causes of urethral CAUTIs?

Most microorganisms causing endemic CAUTIs gain access either by extraluminal (direct inoculation when inserted) or intraluminal contamination (reflux of microorganisms from failure of maintaining a closed system). They derive from the patient's own colonic and perineal flora, and they arise through bacterial entry into the urinary tract via the urinary catheter. Microorganisms surrounding the meatus and distal urethra can be introduced directly into the bladder during catheterization. These organisms can be transmitted exogenously by the hands of health care personnel as they insert catheters, and with care and manipulation of the collecting system, such as opening or interrupting the sterile system. Patients with indwelling catheters have infecting microorganisms that can migrate into the bladder from outside the catheter. Additionally, if the drainage bag or contact ports have been breached, contamination can occur from the internal lumen of the catheter.

Once an indwelling catheter is inserted, bacteria quickly develop into colonies known as biofilms (living layers) that adhere to the catheter surface and drainage bag (Pratt et al., 2007). A biofilm is a collection of microorganisms with altered phenotypes that colonize the surface of a medical device. Urine contains protein that adheres to and primes the catheter surface. Microorganisms bind to this protein layer and attach to the surface. These bacteria are different from free-living planktonic bacteria (bacteria that float in the urine). Urinary catheter biofilms may initially be composed of single organisms, but longer exposures inevitably lead to multi-organism biofilms. Bacteria in biofilms have considerable survival advantages over free-living microorganisms, being extremely resistant to antibiotic therapy (Newman & Wein, 2009). The adaptive and genetic changes of the microorganisms within the biofilm make them resistant to all known antimicrobial agents. Thus, the diagnostic and therapeutic strategies used to fight acute infections are not effective in eradicating medical device biofilm-related infections or chronic biofilm diseases (Rvder, 2005).

CAUTIS are caused by a variety of pathogens, the most common being Escherichia coli. Others include Klebsiella, Proteus, Enterococcus, Pseudomonas, Enterobacter, Serratia, Candida, and methicillin-resistant staphylococcus aureus (MRSA) (APIC, 2008). Many of these organisms are found in a patient's endogenous bowel flora, but can also be acquired by cross contamination from other patients, hospital personnel, and exposure to contaminated solutions and/or equipment. Closed urinary catheter systems are an essential component of prevention of a CAUTI.

3. Are there guidelines for preventing urethral CAUTIS?

The final guideline for the prevention of catheter associated urinary tract infections updates and expands the original Centers for Disease Control and Prevention (CDC) Guideline for Catheter associated Urinary Tract Infections (CAUTI) published in 1981. Several developments necessitated revision of the 1981 guideline. including new research and technological advancements for preventing CAUTI, increasing need to address patients in non-acute care settings and patients requiring long term urinary catheterization, and greater emphasis on prevention initiatives as well as better defined goals and metrics for outcomes and process measures. The revised guideline reviews the available evidence on CAUTI prevention for patients requiring chronic indwelling catheters and individuals who can be managed with alternative methods of urinary drainage (e.g., intermittent catheterization). The revised guideline also includes specific recommendations for implementation, performance measurement and surveillance. Finally, the revised guideline outlines high -priority recommendations for CAUTI prevention to offer guidance for implementation (Gould, Umscheid, Agarwal, Kuntz, Peques & HIC-PAC, 2009).

The existing CDC guideline originally published in 1981, is available at www.cdc.gov/ncidod/dhqp/gl_catheter_assoc.html. The guideline rate recommendations for the prevention of CAUTIs are based on an extensive review of scientific literature. The United Kingdom published guidelines for prevention of CAUTIs (EPIC 2001). Nursing groups, such as the Wound, Ostomy and Continence Nurses Society have also issued guidelines for nursing interventions to prevent CAUTIs. (Parker et al., 2009; Wilson et al., 2009).

Prevention of CAUTIs is taking on increasing importance given that the Centers for Medicare & Medicaid Services (CMS) is no longer reimbursing providers for the cost to treat a hospital-associated CAUTI (Wald & Kramer, 2007). Further, there is ample evidence that indwelling urinary catheters are often placed for inappropriate indications, and health care providers are often unaware that their patients have catheters, leading to prolonged and unnecessary use (Newman & Wein, 2009). A recent 2008 Association for Professionals in Infection Control and Epidemiology (APIC) guide to the elimination of CAUTIs stresses the importance of recognizing the interventions that have been implemented to shorten the duration of catheter use and discontinue catheters when no longer needed. These include assessing the need for a catheter on a daily basis, physician reminder systems, automatic stop orders, nurse-driven protocols, limited post-surgical patient use, and use of portable ultrasound technology (e.g., Bladder Scan) to determine bladder emptying (Saint et al., 2008). In hospitals, it is strongly recommended that an organization-wide program is identified to monitor catheter use so that catheters that are no longer necessary are promptly removed (Lo et al., 2008). There is evidence that a nurse-driven surveillance team is necessary (Fakih et al., 2008).

In addition, SUNA has developed a clinical practice guideline detailing information on patient education and nursing considerations. This SUNA clinical guideline, "Care of the Patient with an Indwelling Catheter" can be reviewed at www.suna.org

The following recommendations for preventing urethral catheter infections are based on the CDC CAUTI Prevention (adapted from Wong, 1981), SUNA (2005), and Health Infection Control Practices Advisory Committee (HICPAC) Guideline for Prevention of Catheter Associated Urinary Tract Infections (2009). The entire summary of recommendations including the guideline is available at: www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf

Modified HICPAC Categorization Scheme for Recommendations

Category 1A: A strong recommendation supported by high to moderate quality evidence suggesting net clinical benefits or harms

Category 1B: A strong recommendation supported by low evidence suggesting net clinical benefits or harms or an accepted (e.g., aseptic technique) supported by low to very low quality evidence

Category 1C: A strong recommendation required by state or federal regulation

Category II: A weak recommendation supported by any quality evidence suggesting a trade off between clinical benefits and harms

No recommendation/unresolved issue: Unresolved issue for which there is low to very low quality evidence with uncertain trade offs between benefits and harms

I. Appropriate Urinary catheter Use

A. Insert catheters only for appropriate indications and leave in place only as needed. (Category 1B). Urinary catheters should be inserted only when necessary and left in place only for as long as necessary. They should not be used solely for the convenience of patient care personnel. Use urinary catheters in operative patients only as necessary, rather than routinely. For operative patients who have an indication for an indwelling catheter, remove the catheter as soon as possible postoperatively, preferably within 24 hours. [Note: The June 2005 CMS manual system publication 100-07 state Operations Provider Certification tag 315 requires that a resident who is incontinent of urine is identified, assessed and provided adequate treatment and services to achieve or maintain as much normal urinary function as possible. Likewise, an indwelling catheter is not used unless there is valid medical justification and an indwelling catheter for which use is not medically justified is discontinued as soon as clinically possible.]

B. Consider using alternatives to indwelling urethral catheterization in selected patients when appropriate. Other methods of urinary drainage such as external condom catheter drainage, external pouches, toileting devices (such as urinals and portable commodes), and intermittent urethral catheterization. (Category II)

See table 2 of the HICPAC document for examples of appropriate and inappropriate use for indwelling urethral catheter use.

II. Proper Techniques for Urinary Catheter Insertion

- A. Perform hand hygiene immediately before and after any manipulation of the catheter device or site. (**Category 1B**). [Note: Hospitals should consider selecting an alcoholbased hand cleaning solution that has good skin tolerance. Hand rubs should be easily available to staff and near patients if possible, and hospitals develop a hospital wide education program that promotes hand hygiene (Kampf, 2004.]
- B. Ensure that only properly trained persons (e.g. hospital personnel, family members or patients themselves) know the correct technique of aseptic catheter insertion and maintenance are given this responsibility. (Category 1B).
- C. In the acute care hospital setting, insert catheters using aseptic technique and sterile equipment. (Category 1B). Gloves, drape, sponges, an appropriate antiseptic solution for periurethral cleaning, and a single use packet of lubricant jelly should be used for insertion. [Note: Recent evi-

dence using povidone iodine solution compared with water prior to insertion of an indwelling catheter showed no significant differences in bacteriuria or urinary tract infections in women (Nasiriani et al., 2009].

- D. In the non- acute care setting, clean (i.e., non-sterile) technique for intermittent catheterization is an acceptable and more practical alternative to sterile for patients requiring intermittent catheterization (Category1A).
- E. Properly secure indwelling catheters after insertion to prevent movement and urethral traction. (Category 1B). [Note: The catheter should follow the natural curve of the urethra and the secure-ment device can be used both around the thigh (leg band) and the abdomen (waist band) (Newman&Wein, 2009). A wide, stretchable nonadhesive cloth band is commonly used to secure the catheter to the upper thigh or abdomen with a soft Velcro strap. There are other products (e.g., adhesive patch with catheter clip available for stabilization).]
- F. Unless otherwise clinically indicated, consider using the smallest bore catheter possible, consistent with good drainage, to minimize bladder neck and urethral trauma. (Category II).
- G. If intermittent catherization is used, perform it at regular intervals to prevent bladder overdistention (Category 1B).
- H. Consider using a portable ultrasound device to assess urine volumes in patients undergoing intermittent catheterization and reduce unnecessary catheter insertions. (Category II).

III. Proper Technique for Urinary Catheter Maintenance

- A. Following aseptic insertion of urinary catheter, maintain a closed drainage system. If break in aseptic technique, disconnection or leakage occur, replace the catheter and collecting system using aseptic technique and sterile technique. (Category 1B). [Note: The use of a waist bag system or "belly bag" was found to have benefit to patient's ambulation, self esteem, convenience, as well as minimize the risk of nosocomial infections and inadvertent self-extractions with resulting trauma (Munnings&Cawood, 2003)].
- B. Maintain unobstructed urine flow. (Category 1B). An unobstructed flow should be maintained. (Occasionally, it may be necessary to temporarily [a few minutes] obstruct the catheter for specimen collection or other medical purpos-

es.) To achieve free flow of urine, catheter and collecting tube should be kept from kinking: collecting bag should be emptied regularly using a separate collecting container for each patient. (The draining spigot and nonsterile collecting container should never come in contact) and collecting bags should always be kept below the level of the bladder. [Note: Catheter bypassing (leakage around the catheter) requires investigation on the cause and appropriate treatment. The use of a larger lumen catheter or larger size balloon may not be indicated.]

- C. Use standard precautions, including the use of gloves and gowns as appropriate, during any manipulation of the catheter or collecting system. (Category 1B).
- D. Complex urinary drainage systems (utilizing mechanisms for reducing entry such as antiseptic- release cartridges in the drain port) are not necessary for routine use. (Category II).
- E. Changing indwelling catheters or drainage bags at routine, fixed intervals are not recommended. Rather, it is suggested to change catheters and drainage bags based on clinical indications such as infection, obstruction or when the closed system is compromised. (Category 1B). [Note: Catheters should be changed according to the individual's usual pattern of catheter care and evaluation of associated catheter problems and complications rather than waiting until infection or encrustations occur. If an infection occurs frequently or obstruction is common, the catheter should be changed more often (Tenke et al., 2008).]
- F. Unless clinical indications exist, do not use systemic antimicrobials routinely to prevent CAUTI in patients requiring either short or long-term catheterization. (Category 1B). [Note: Bacterial colonization of the bladder and urethra (bacteriuria) is inevitable. Inappropriate and excessive use of antimicrobial drugs in catheterized individuals lead to the selection of antibiotic resistant microorganism and accounts for nosocomial outbreaks of infection with multi drug-resistant strains (Newman & Wein, 2009).]
- G. Do not clean the periurethral area with antiseptics to prevent CAUTI while the catheter is in place. Routine hygiene (e.g., cleansing of the surface during daily bathing or showering) is appropriate. (Category 1B). [Note: To promote perineal hygiene, catheter insertion and meatal site may be cleaned with soap and water or a perineal cleaner after

each bowel movement avoiding frequent and vigorous cleaning of the area (Pratt et al., 2007). Showers are also encouraged to maintain meatal care. Uncircumcised men should retract and clean underneath the foreskin, while women should be instructed in correct perineal cleaning after defection.

- H. Unless obstruction is anticipated (e.g., as might occur with bleeding after Prostatic or bladder surgery) bladder irrigation is not recommended. If obstruction is anticipated, continuous irrigation is suggested to prevent obstruction. (Category II).
- I. Routine irrigation of the bladder with antimicrobials is not recommended. (Category II).
- J. Routine instillation of antiseptic or antimicrobial solutions into drainage bags is not recommended. (Category II).
- K. Clamping indwelling catheters prior to removal is not recommended. (Category II).
- L. Further research is needed on the use of bacterial interference (i.e., bladder inoculation with a nonpathogenic bacterial strain) to prevent UTI in patients requiring chronic urinary catheterization. (No recommendation/ unresolved issue).
- M. If CAUTI rate is not decreasing after implementing a comprehensive strategy to reduce rates of CAUTI, consider using antimicrobial/ antiseptic- impregnated catheters. (Category 1B).
- N. Hydrophilic catheters might be preferable to standard catheters for patients requiring intermittent catheterizations. (Category II).
- O. Silicone might be preferable to other catheter materials to reduce the risk of encrustation in long term-catheterized patients who have frequent obstruction. (Category II).
- P. Further research is needed to clarify the benefit of catheter valves in reducing the risk of CAUTI and other urinary complications. (No recommendations/ unresolved issue).
- Q. If obstruction occurs and it is likely that the catheter is contributing to the obstruction, change the catheter. (Category 1B).

- R. Further research is needed on the benefit of irrigating the catheter with acidifying solutions or use of oral urease inhibitors in long-term catheterized patients who have frequent catheter obstruction. (No recommendation/ unresolved issue).
- S. Further research is needed on the use of portable ultrasound device to evaluate for obstruction in patients with indwelling catheters and low urine out put. (No recommendation/ unresolved issue).
- T. Further research is needed on the use of methenamine to prevent encrustation in patients requiring chronic indwelling catheters who are at high risk for obstruction. (Category 1B).
- U. Obtain urine samples aseptically. If a small amount of fresh urine is needed for examination (i.e., urinalysis or culture), aspirate the urine from the needleless sampling port with a sterile syringe/ cannula adapter after cleaning the port with a disinfectant. Obtain large volumes of urine for special analyses (not culture) aseptically from the drainage bag. (Category 1B). [Note: If possible urine specimens for culture and sensitivity should be collected from a newly inserted catheter (Raz, Schiller& Nicolle, 2000).]
- V. Further research is needed on the benefit of spatial separation of patients with urinary catheters to prevent transmission of pathogens colonizing urinary systems. (No recommendation/ unresolved issue). [Note: Use separate graduated containers for each patient drain. With multiple drainage devices for one patient, keep drainage devices on opposite side of the bed and keep drainage devices in semi-private rooms on opposite sides of the room.]

IV. Quality Improvements Programs

A. Implement quality improvement (QI) programs or strategies to enhance appropriate use of indwelling catheters and to reduce the risk of CAUTI based facility risk assessment. (Category 1B).

V. Administrative Infrastructure

A. Provision of guidelines. Provide and implement evidencebased guidelines that address catheter use, insertion and maintenance. (Category 1B).

- B. Education and training. Ensure that healthcare personnel and others who take care of catheters are given periodic in-service training regarding techniques and procedures for urinary catheter insertion, maintenance and removal. Provide feed back about CAUTI, other complications of urinary catheterization and alternatives to indwelling catheters. (Category 1B).
- C. Supplies. Ensure that supplies necessary for aseptic technique for catheter insertion are readily available. (Category 1B).
- D. System of documentation. Ensure that documentation is accessible in the patient record and recorded in a standard format for catheter insertion, date and time of insertion, individual who inserted and date and time of catheter removal. (Category II).

VI. Surveillance

- A. Consider surveillance for CAUTI when indicated by facilitybased risk assessment. (Category II).
- B. Use standardized methodology for performing CAUTI surveillance. (Category 1B).
- Routine screening of catheterized patients for asymptomatic bacteriuria (ASB) is not recommended. (Category II). [Note: Do not give the asymptomatic patient antibiotics and antimicrobials as a UTI prevention strategy.]
- D. When performing surveillance for CAUTI, consider providing regular feedback of unit –specific CAUTI rates to nursing staff and other appropriate clinical care staff. (Category II).

4. What are the recommendations for proper hand hygiene?

Waterless, alcohol-based hand rub has been demonstrated to be much more effective in preventing transfer of bacteria on hands of personnel after contact with a contaminated urinary catheter than soap and water (Ehrenkranz & Alfonso, 1991). Alcohol hand rub is also the primary method of hand hygiene recommended by the CDC and therefore should be used prior to insertion of a urinary catheter of care device (CDC, 2002). The CDC Hand Hygiene Guideline states that if hands are visibly soiled, they should be washed with soap and water. The recommended technique for each method follows. Hand rub: When decontaminating hands with an alcohol- based rub, apply product to palm of one hand and rub together, covering all surfaces of hands and fingers until they are dry. Follow the manufacturer's recommendations regarding the volume of product to use.

Hand wash: When washing hands with soap and water, wet hands first with water; apply an amount of product recommended by the manufacturer to hands and rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers. Rinse hands with water and dry thoroughly with a disposable towel. Use the towel to turn off the faucet. Avoid using hot water as repeated exposure may lead to dermatitis.

For both hand rub and handwashing, vigorously rub hands together for 15 seconds, generating friction on all surfaces of the hands and fingers, thumbs, backs of the fingers, backs of the hands, and beneath the fingernails. When using an alcohol-based handrub, the CDC recommends choosing products that contain at least 60% alcohol. A summary of the guideline for hand hygiene in health care settings is available at the CDC Web site: www.cdc.gov/handhygiene/

5. Are there any differences in the guidelines for a suprapubic catheter?

A suprapubic catheter may be preferable to an indwelling urethral catheter in patients who require chronic long-term bladder drainage and for whom no other alternative therapy is possible (Newman & Wein 2009). This type of catheter decreases the risk of contamination with organisms from fecal material, decreases the risk of infection on a short-term basis, eliminates damage to the urethra, does not interfere with sexual activity, and is more comfortable for individuals with limited mobility (Newman & Wein, 2009). When compared with standard indwelling urethral catheters, suprapubic urinary catheters may reduce catheter-related bacteriuria. The anterior abdominal wall possesses a lower microbial load (less bacterial colonization) than the periurethral area and has a lower risk of infection (Sedor & Mulhollard, 1999). Suprapubic catheters require a surgical procedure for insertion and may result in postoperative complications. The primary problem associated with suprapubic catheter use involves mechanical complications associated with insertion, dislodgement, obstruction, or failed introduction (Newman & Wein, 2009).

Scant long-term data are available on the use of suprapubic catheters, and research is still not available that demonstrates the advantages of suprapubic compared with urethral catheters (Tenke et al., 2008). Likewise, research is lacking in the area of long-term management and/or the care of suprapubic catheters because the medical literature has only documented short-term use. Difficulties can exist with long-term medical and nursing management of suprapubic catheterization due to the lack of knowledge and expertise on the part of health care providers and the inability of homebound individuals to access medical care (Newman & Wein, 2009). Prevention of complications and catheter management are similar to those with indwelling urethral catheters. The proper insertion depends on adequately trained personnel. Newly inserted catheters cannot be changed for 10 days to 4 weeks after insertion. There is no evidence available about the frequency of catheter change and the best size catheter to use (Newman & Wein, 2009). Some experts recommend the use of a 22-24 French catheter for suprapubic drainage (Linsenmeyer et al., 2006).

SUNA has developed a clinical practice guideline: Care of a Patient with a Suprapubic Catheter. The guideline for care can be reviewed at: www.suna.org

6. Is there any benefit to the use of silver alloy or antibioticcoated urethral catheters in the prevention CAUTIs?

Silver alloy-coated catheters resist bacterial adhesion more than all-silicone catheters. Silver alloy coating resists adherence and may slow down formation of a biofilm on or inside the catheter. Other antimicrobial catheters contain an antibiotic that exudes over time off the surface of the catheter. A meta analysis found that antibiotic-coated catheters delay bacteriuria in short-term catheterization in hospitalized patients (Johnson, Kuskowski, & Wilt, 2006). While there is reasonable evidence showing that silver alloy-coated catheters may reduce the incidence of bacteriuria, most studies in this base of evidence failed to clearly show a decrease in symptomatic infection or clinically significant UTI. This reflects variation in criteria of the outcome used by investigators. The use of a silver allov-coated urinary catheter may reduce CAUTIs (broadly includes all types of UTIs) by 32% to 69% if the catheter is used for a short term, less than 30 days (Newman & Wein, 2009). Silver alloy-coated and other antimicrobialcoated catheters are more expensive but may be useful if other aspects of a CAUTI prevention program are not effective or the facility identifies select high-risk populations who may benefit from their use. However, more research using outcomes such as symptomatic UTI is necessary to verify their efficacy and cost effectiveness.

7. May unlicensed assistive personnel (UAP) or medical assistants insert urethral catheters?

Only personnel trained in the correct technique of aseptic insertion and maintenance of a catheter should insert catheters. These are usually licensed personnel. Health care workers who insert catheters should have periodic in-service training to review the proper techniques and complications associated with catheters. The American Association of Medical Assistants (AAMA) established for certified medical assistants (CMAs), standards for patient care responsibilities that include preparing and assisting with examinations, procedures, and treatments. While some unlicensed assistive personnel have been allowed to insert catheters, individual state Boards of Nursing as well as state Nurse Practice Acts should be consulted in regards to the functions of unlicensed medical professionals.

8. What is the impact of the October 1, 2008, Center for Medicare and Medicaid Services' ruling regarding changes in reimbursement for hospital acquired CAUTIs?

On October 1, 2008, CMS has stopped paying hospitals for 8 conditions including CAUTIs acquired during the hospital stay (Wald & Kramer, 2007). These 8 hospital-associated conditions were determined to be reasonably preventable through compliance with evidenced-based guidelines. Whether this initiative will reduce CAUTIs is too early to measure. However, hospitals are taking this initiative very seriously and are implementing greater prevention steps. SUNA anticipates that we, as the leaders and authority in the care of patients with catheters, will continue to be the resource to other health care agencies in the education of patients and health care professionals in the prevention of CAUTIs.

References

- Centers for Disease Control and Prevention (CDC). (2002). CDC guideline for hand hygiene in health care settings: Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force, MMWR 2002-51(No.RR –16): 1-56.
- Ehrenkranz, N.J., & Alfonso, B.C. (1991). Failure of bland soap handwash to prevent hand transfer of patient bacteria to urethral catheters. Infect Control Hosp Epidemiol. 11, 654-662.
- EPIC. (2001). Guidelines for the preventing infections associated with insertion and maintenance of short-term indwelling urethral catheters in acute care. *Journal Hosp Infect, 47*(Suppl.), S39-46.
- Fakih, M.G., Dueweke, C., Meisner, S., Berriel-Cass, D., Savoy-Moore, R., Brach, N., et al. (2008). Effect of nurse-led multidisciplinary rounds on reducing use of urinary catheterization in hospitalized patients. *Infection Control Hosp Epidemiol 29*(9), 815-9.
- Gould, C.V., Umscheid, C.A., Agarwal, R.K., Kuntz, G., Pegues, D.A., & Healthcare Infection Control Practices Advisory Committee (HICPAC). (2009). *Guideline for the prevention of catheter-associated urinary tract infections.* Available at: http/www.cdc.gov/hicpac/ pdf/CAUTI/CAUTIguideline2009final.pdf

- Horan, T.C., Andrus, M., & Dudeck, M.A. (2008). CDC/ NHSN surveillance definition of health care – Associated infection and criteria for specific types of infections in the acute care setting. *Am J. Infect Control, 36*(5), 309-332.
- Johnson, J.R., Kuskowski, M.A., & Wilt, T. J. (2006). Systematic review: Antimicrobial urinary catheters to prevent catheter-associated urinary tract infection in hospitalized patients. *Annuals of Internal Medicine, 144*, 116-126.
- Kampf, G. (2004). The six golden rules to improve compliance in hand hygiene. *Journal Hosp Infect, 56* (2, Suppl.), S3-5.
- Klevens, R.M., Edwards, J.R., Richards, C.L., Jr., Horan, T.C., Gaynes, R.P., Pollock, D.A., et al. (2007). Estimating health care-associated infections and deaths in U.S. hospitals, 2002. *Public Health Rep., 122*(2) 160-166.
- Linsenmeyer, T.A., Bodner, D.R., Creasey, G.H., Green, B.G., Groah, S.L. & Joseph, A. (2006). Bladder management for adults with spinal cord injury: a clinical practice guideline for health care providers. *Journal of Spinal Cord Medicine, 29*, 527-573.
- Lo, E., Nicolle, L., Classen, D., Arias, K.M., Podgorny, K., Anderson, D.J., et al. (2008). Strategies to prevent catheter-associated urinary tract infections in acute care hospitals. *Infection Control and Hospital Epidemiology*, 29(1, Suppl.), 41-50.
- Munnings, L.J., & Cawood, C.D. (2003). Clinical study of a new urine collection bag. Urologic Nursing, 23(4), 28-91.
- Nasiriani, K., Kalani, Z., Farnia, F., Motavasslian, M., Nasiriani, F., & Engberg, S. (2009). Comparison of the effect of water vs. povidone iodine solution for periurethral cleaning in women requiring an indwelling catheter prior to gynecologic surgery. *Urologic Nursing*, 29(3), 118-121.
- Newman, D.K., & Wein, A.J. (2009). *Managing and treating urinary incontinence* (2nd ed.). Baltimore: Health Professions Press.
- Nicolle, L.E. (2008). The prevention of hospital-acquired urinary tract infection. *Clin Infect Dis*, 15(46), 251-253.
- Nicolle, L.E., Bradley, S., Colgan, R., Rice, J.C., Schaeffer., A., Hooton, T.M., et al. (2005). Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. *Clinical Infectious Dis.*, 40, 643-654.
- Parker, D., Callan, L., Harwood, J., Thompson, D.L., Wilde, M., & Gray, M. (2009). Nursing interventions to reduce the risk of catheter-associated urinary tract infection: Part 1. J. Wound Ostomy Continence Nurs, 36(1), 23-24.
- Pratt, R.J., Pellowe, C.M., Wilson, L.A., Loveday, H.P., Harper, P.J., Jones, S.R., et al. (2007). Epic
 2: National evidenced-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. *Journal of Hospital Infection, 65*(1, Suppl.), S1-S64.
- Raz, R., Schiller, D., & Nicolle, L.D. (2000). Chronic indwelling catheter replacement before antimicrobial therapy for symptomatic urinary infection. *Journal of Urology, 164,* 1254-1258.
- Ryder, M.A. (2005). Catheter-related infections: It's all about biofilm. *Topics in Advanced Practice Nursing eJournal*, *5*(3).
- Saint, S. Kowalski, C.P., Kaufman, S.R., Hofer, T.P., Kauffman, C.A., Olmstead, R.N., et al. (2008). Preventing hospital-acquired urinary tract infection in the United States: a national study. *Clin Infection Dis*, 15(46), 243-250.
- Schaeffer, A.J., & Schaffer, E.M. (2007). In A.J. Wein, L.R. Kavoussi, A.C. Novick, A.W. Partin, & C.A. Peters (Eds.), *Campbell-Walsh urology*. (9th ed) (pp. 221-303). Philadelphia: Elsevier-Saunders.
- Sedor, J., & Mulholland, S.G. (1999). Infections in urology: Hospital-acquired urinary tract infections with the indwelling catheter. *Urologic Clinics of North America, 26,* 821-828.
- Siroky, M.G. (2002). Pathogenesis of bacteriuria and infection in the spinal cord injured patient. *American Journal of Medicine, 113*(1A, Suppl.), 67S-79S.
- Tambyah, P., & Malki, D. (2000). Catheter-associated urinary tract infection is fairly symptomatic. Arch Intern Med, 160, 678-682.
- Tenke, P., Kovacs, B., Bierklund, J.T.E., Matsumoto, T., Tambyah, P.A., & Naber, K.G. (2008). European and Asian guidelines on management and prevention of catheter-associated infections. *Int J Antimicrob Agents*, *31*(1, Suppl.), 68-78.
- Wald, H., & Kramer, A.M. (2007). Nonpayment for harms resulting from medical care catheter associated urinary tract infections. *JAMA*, 298(23), 2782-2784.

- Wilson, M., Wilde, M., Webb, M.L., Thompson, D., Parker, D.Harwood, J., et al. (2009). Nursing interventions to reduce the risk of catheter-associated urinary tract infection: Part 2: Staff education, monitoring and care techniques. J. Wound Ostomy Continence Nurse, 36(2), 137-154.
- Wong, E. (1981). Guideline for the prevention of catheter associated urinary tract infections. Atlanta, GA: U.S. Department of Health & Human Services, Centers for Disease Control and Prevention (CDC).

Additional Readings

- Ahern, D.G., Grace, D.T., Jennings, M.J., Borazjani, R.N., et al. (2000). Effects of hydrogel/silver coatings on in vitro adhesion to catheters of bacteria associated with urinary tract infections. *Current Microbiology*, *41*, 120-125.
- Gray, M. (2004). What nursing interventions reduce the risk of symptomatic urinary tract infection in the patient with an indwelling catheter. *Journal of Wound Ostomy and Continence Nursing*, *31*, 3-13.
- Saint, S., Veenstra D.I., Sullivan, S.D., et al. (2000). The potential clinical and economic benefits of silver alloy urinary catheters in preventing urinary tract infection. *Arch Intern Med*, 160, 2670-2675.
- U.S. Department of Health and Human Services (DHHS) Centers for Medicare and Medicaid Services (CMS). (2005). *Pub. 100-07 state operations provider certificate. transmittal 8, F315.*
- U.S. Department of Health and Human Service, Public Health Service, Agency for Health Care Policy and Research. (1996). *Urinary incontinence in adults: Acute and chronic management. Clinical practice guideline no. 2.* Washington, DC: Author.

Prevention of Catheter Associated Infection Task Force

Susan Lipsy, APRN-BC, CUNP Chair Pamela Ceo, APRN-BC, CUNP Kristine Green BSN, RN, CURN Janelle Harris, MSN, RN, CUNP Laura Croft Maw, MS, APRN-BC Victor Senese, BSN, RN, CURN Rita Yee, APRN-BC, CUNP

Advisors and Reviewers:

Diane K. Newman, RNC, MSN, CRNP, FAAN Russell Olmsted, MPH, CIC Donna Thompson, MSN, APRN-BC, CCCN Mary Anne Wasner, RN, CURN

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For more information, contact:

Society of Urologic Nurses and Associates East Holly Avenue Box 56 Pitman, NJ 08071-0056 Phone 888-TAP-SUNA or 856-256-2335 suna@ajj.com www.suna.org

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