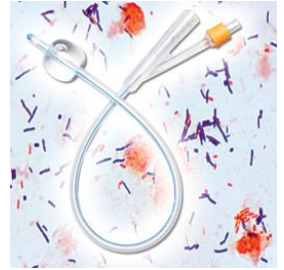


Urinary Tract Infections

Urinary Tract infections are the most common type of healthcare associated infections and pose serious health problems affecting people each year. An estimated 560,000 patients develop catheter associated urinary tract infections (CAUTI) each year. According to the National Healthcare Safety Network, this accounts for approximately thirty percent of acute care infections. By implementing consistent infection control practices, it is estimated that seventy percent of urinary tract infections can be prevented. Urinary catheters increase the likelihood of infection, length of stay, cost, antibiotic use, and patient discomfort. The prolonged use of a urinary catheter is the greatest risk factor for developing a urinary tract infection. The longer a catheter is used, the more likely bacteria and yeast will travel up the catheter and result in an infection. Evidence has shown that urinary catheters should be used only when necessary and should be removed as soon as possible.



Women are especially prone to UTIs for reasons that are poorly understood. It is estimated that one in five women develop a UTI during her lifetime. The average adult passes about a quart and a half of urine each day. The amount varies on the amount of fluids consumed. Normal urine is sterile. It contains fluids, salts, and waste products but is free from bacteria, viruses, and fungi. An infection occurs when microorganisms, usually bacteria from the digestive tract, cling to the opening of the urethra and begin to multiply. Most infections arise from one type of bacteria called *Escherichia coli* (E. coli), which normally lives in the colon. Urinary tract infections and urosepsis are also more common in the incontinent population. Urinary sepsis may also occur as a result of urinary retention which produces stasis and bacteria movement. Incontinent products, such as pads, should also be considered a risk factor for UTI related to increase of microbial counts on the skin.

An evidenced-based, user-friendly tool was developed by the American Nurses Association (ANA), a partner of Partnership for Patients, to prevent CAUTI in hospitals. There is no universally accepted tool to reduce CAUTI, however, the tool developed by the ANA has been used by many disciplines in different settings. The one-page tool entitled, "Streamlined Evidence-Based RN Tool: Catheter Associated Urinary Tract (CAUTI) Prevention" is available for use. This tool is based on the 2009 Center for Diseases Control and Prevention (CDC) Guideline for Prevention of Catheter-Associated Urinary Tract Infection. This tool incorporates an algorithm to determine whether a urinary catheter is appropriate and removal is timely. A catheter insertion checklist is included with cues for maintenance and post removal care. The tool can be found at: <https://www.nursingworld.org/practice-policy/work-environment/health-safety/infection-prevention/ana-cauti-prevention-tool/>

Organizations such as the Society of Urological Nurses and Associates, CDC, and the Wound, Ostomy, and Continence Nurses Society all recommend use of a catheter securement device to lessen the potential for CAUTIs and preventing trauma. The Association for Professionals in Infection Control and Epidemiology (APIC) and the Society for Healthcare Epidemiology of America (SHEA) are among many organizations that are leading the fight to reduce CAUTI.

All members of the health care team are responsible to limit and prevent exposure to infections. Clinical training materials should keep healthcare professionals up to date with current treatments and trends and allow them to continually improve their clinical knowledge and competency and to educate patients and caregivers. Providing quality care is a critical factor in prevention of readmissions and cost management

strategies. Knowledge of infection control principles enables home care clinicians to treat and make decisions about infection control and look for ways to reduce the occurrence of infections. Providing quality care is a critical factor in prevention of readmissions and reduction of infection. It also improves patient comfort, prevents complications, and improves patient outcomes.

Some home health patients will have a urinary catheter, so efforts should be directed at ensuring that staff are adequately trained to insert and care for patients with urinary catheters and are aware of signs and symptoms of urinary tract infections and steps to help prevent infection from ever developing. Proper catheter insertion, maintenance, and removal should be included in orientation and staff competencies. Organizations should not assume that all staff hired with previous experience have received appropriate training and are competent on proper technique. Periodic retraining or assessment of competency is especially important for personnel who do not insert catheters frequently. Alternatives to catheter use should also be provided.

Key Point: The most important risk factor for a urinary tract infection development is the prolonged use of a catheter.

Nursing Assessment

The presenting features of lower urinary tract infection include frequent urination or an urgent need to urinate, dysuria, suprapubic pain and foul smelling urine. Fever and non-specific lower back pain may be present. Loin pain accompanied by systemic symptoms such as fevers, rigors, nausea, and vomiting may suggest an ascending infection or pyelonephritis. In the elderly, confusion may be the only presenting symptoms. Symptoms consistent with cystitis may not always be due to infection. Pelvic inflammatory disease, sexually transmitted diseases, kidney stones, or carcinoma may cause these same symptoms. Careful diagnosis and follow up are critical components in the nursing assessment. The urinary tract is a common source of nosocomial infection, especially in patients with catheters. In these patients, bacteriuria is expected within a few days due to colonization, although in the short term it is usually asymptomatic and from a single organism. UTI's are often derived from the patients' own colonic flora. Catheterization for longer than 30 days is associated with colonization of multiple organisms. The amount of urine produced is dependent on the state of hydration, activity level, environmental factors, weight, and the person's overall health. Producing too much or too little urine requires medical attention. The pH is normally within the range of 5.5 to 7 with an average pH of 6.2.

Typically urine does not have a strong odor if you are healthy and drink plenty of fluids. The smell of urine is usually not a direct indicator of a disease but more of an indicator of foods recently eaten or medications. The consumption of products such as saffron, alcohol, coffee, tuna, fish, and onion can result in various urine smells. Spicy foods can have a similar effect because they often pass through the kidneys without fully being broken down before exiting the body. Foul smelling urine may be due to bacteria. Musty smelling urine may be related to liver disease and certain metabolic disorders. Sweet smelling urine can alert you to think of diabetes. Certain foods such as asparagus can also change the smell of urine.



The Color of Urine can assist the healthcare provider in establishing a correct diagnosis and treatment plan along with the proper laboratory data, including a urinalysis and culture.

- **Red or Pink:** Blood in urine is most common reason for concern. Factors that can cause blood in urine include urinary tract infections, kidney stones, enlarged prostate, cancerous and non-cancerous tumors, kidney cysts, bladder stones and catheter trauma. Of note, it only takes a single drop of blood to turn water in the toilet bowl red. Foods such as beets, blackberries, and rhubarb are known to turn urine red or pink. Medications such as rifampin, phenazopyridine, and laxatives containing senna can turn urine reddish orange.
- **Orange:** Orange urine can indicate a liver or bile duct problem in some cases. This is especially of concern if patient also has light-colored stools. Some medications may turn urine orange including rifampin, sulfasalazine, phenazopyridine, some laxatives; and certain chemotherapy medications. Orange urine may also indicate dehydration.
- **Green:** Some bright colored food dyes can cause urine to appear green. In addition, some medications produce blue or green urine, including amitriptyline, indomethacin and propofol. Green urine sometimes occurs during urinary tract infections caused by pseudomonas bacteria.
- **White, Cloudy, and Murky:** Urinary tract infections and/or kidney stones can cause urine to appear cloudy or murky.
- **Transparent:** Urine that is completely clear may mean that the patient is drinking too much water. In general, if urine looks like water, the patient may be drinking more than needed.
- **Pale, Amber, or Honey:** Generally means that the patient is drinking a lot of fluids, or taking a diuretic.
- **Dark Brown or Cola-like:** Can be caused by some medications such as chloroquine, primaquine, metronidazole, and nitrofurantoin, laxatives containing senna or cascara and methocarbamol. Muscle injury from extreme exercise can result in pink or cola-colored urine and kidney damage. Eating fava beans, rhubarb, or aloe can also cause dark brown urine. In addition some liver and kidney disorders can turn urine dark brown as can some urinary tract infections.
- **Dark:** Usually a sign that the patient is not drinking enough fluid, suggesting dehydration. The human body requires a certain amount of fluid to function so when it is not getting what it needs, it holds onto the fluid and concentrates the urine.
- **Black:** Causes can include medications such as nitrofurantoin, metronidazole, cascara or senna laxatives, methocarbamol, sorbitol, and phenol derivative, cresol. Intramuscular iron injections are also associated with black urine as a benign effect of the medication.
- **Purple:** The only cause of purple urine is purple urine bag syndrome. Purple urine is associated with Gram-negative bacteria and typically resolves after treatment with antibiotics and changing the catheter.

National Institutes of Health (2015). <https://medlineplus.gov/ency/article/003139.htm>
<https://www.mayoclinic.org/diseases-conditions/urine-color/symptoms-causes/syc-20367333>

Catheter Indications

1. Acute urinary retention or obstruction includes prostatic hypertrophy with obstruction, urethral obstruction and urinary blood clots with obstruction. Acute urinary retention may be induced by medication, trauma of the spinal cord or from neurogenic bladder.
2. Catheter use for urological surgical procedures or other structures of the genitourinary tract are appropriate indications for use. Other appropriate indications are surgery of prolonged duration, large volumes of infusions during surgery, intraoperative urinary output monitoring. The use of anesthesia, both epidural and spinal, may also lead to urinary retention.
3. Assistance with wound healing in perineal and sacral regions in incontinent patients. Urinary incontinence can lead to skin breakdown and delay wound healing.

4. End of life care.
5. Immobilization for trauma or surgery. Examples may include but not limited to unstable thoracic or lumbar spine, traumatic injuries such as pelvic fractures and acute hip fractures with risk of displacement.
6. Accurate urinary output measurement in critically ill patients. This applies to patients who are critically ill and expected to be cared for in intensive care settings. This is important to clearly identify what is considered to be a fluid monitoring in a critically ill patient. A recent update of the indications published by the Society for Healthcare Epidemiology of America clarified the need as “hourly assessment of urine output in patients in the intensive care setting”.

<https://www.cdc.gov/HAI/caUTI/uti.html>

Prevention



Human bodies need a continuous supply of fluid in order to carry on essential physiological functions. Unfortunately, the normal thirst mechanism can decrease with age and therefore the need for fluids is easily overlooked. Inadequate hydration leads to dehydration which may lead to a urinary tract infection. Symptoms of possible dehydration may include dark urine,

increased thirst, drying of the skin, headache, dry mouth, inability to sweat, and few tears. It is important to educate patients and caregivers on ways to increase hydration, if not contraindicated by their physician. Offering frequent snacks and water is one simple way to do this. Consider seasonal options such as lemonade, pop sickles, gelatin, or watermelon during the warm summer months or offering warm teas, cocoa, and soups in the colder months. If the patient is unable to ambulate, it is important for the caregiver to keep fluids close to patient for easy reach. Encourage patients to drink extra water with meals and with medications and when doing oral care.

Toilet hygiene is extremely important in prevention of UTI's. While many patients are able to perform hygiene activities themselves, many are unable due to arthritis, poor balance, sensory issues, or other conditions associated with advancing age that challenges their ability to do so. Several products are available to promote personal cleanliness that allows patients to provide better self-care. Among them are portable, disposable sitz baths and products that assist in cleaning and wiping and are flushable. There are many loose-fitting breathable undergarments available. Consider ways to return self-care responsibilities back to the patient. Teaching patients about the importance of handwashing and proper peri-care includes washing and wiping from front to back should not be taken lightly. It is also vital to remind patients about changing incontinent products such as pads when damp and/or wet. Many elders are on a limited budget and do not change these products as often as necessary. Providing the necessary supplies and equipment is a minor investment if it is able to prevent infection.

UTI's develop from bacteria that multiply in the external genital area and then move up through the urinary track. Urination can flush out bacteria. If urination is infrequent, whether from medical reason, reduced

Catheter Care at home

The following videos from Memorial Sloan Kettering Cancer Center demonstrate proper home management of urinary catheters.

<https://www.mskcc.org/cancer-care/patient-education/how-change-your-foley-catheter-drainage-bag>

<https://www.mskcc.org/cancer-care/patient-education/how-remove-your-urinary-foley-catheter>

<https://www.mskcc.org/cancer-care/patient-education/caring-your-urinary-foley-catheter>

hydration, or bladder emptying problems, patients can be at an increased risk of developing a UTI. If there are no underlying medical reasons, it is important to address hydration and then encourage patients to avoid long intervals between urinating. Encourage patients not to “hold it” until a more convenient time. Make sure patients do not feel it is inconvenient to ask for assistance with toileting. Encourage them to urinate and “try” even if they say it is not necessary.

Promoting healthy behaviors includes making sure patients have adequate fluid intake, promote complete bladder emptying in a relaxed environment, ensure that daily personal hygiene is performed to prevent excess skin contact with urine or feces, use appropriate incontinent supplies that are selected on absorbency needs. One technique that is beneficial is offering versus asking. For example: “Here is some fresh water for you”, instead of “Do you want something to drink?”

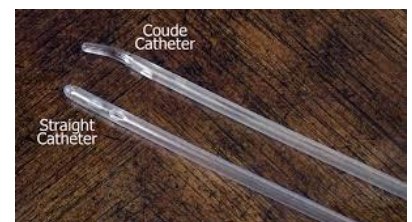
Proper Techniques for Urinary Catheter Insertion

- ✓ Hand hygiene immediately before and after insertions or any manipulation of the catheter or site.
- ✓ Properly trained persons (nurses, healthcare personnel, family members, or patients themselves) who are able to perform aseptic catheter insertion and maintenance.
- ✓ In the **acute care setting**, insert catheters using aseptic technique and sterile equipment including gloves, drape, sponges, and antiseptic or sterile solution for peri-urethral cleaning, and a single-use packet of lubricant jelly for insertion.
- ✓ In the **non-acute setting**, clean (non-sterile) technique for intermittent catheterization is an acceptable and more practical alternative to sterile technique for patients requiring chronic intermittent catheterization.
- ✓ Indwelling catheters should be properly secured after insertion to prevent movement and urethral traction.
- ✓ Use smallest bore catheter possible to elicit drainage, unless otherwise indicated. This will lessen injury to bladder neck and urethral trauma.
- ✓ If intermittent catheterization is used, it should be done at regular intervals to prevent over-distension of the bladder. Consider using a portable ultrasound to assess urine volume to reduce unnecessary catheters insertions.
- ✓ If using bladder scanners, ensure that indications for use are clearly communicated and nursing staff are trained in their use. Equipment should be cleaned and disinfected between patients.
- ✓ <https://www.cdc.gov/infectioncontrol/guidelines/cauti/index.html>
- ✓ If coude tip catheter is used, insert into urethral opening with coude tip pointing toward the ceiling.



Proper Techniques for Catheter Maintenance

- Follow aseptic insertion of the catheter, maintain a closed drainage system. If breaks in the aseptic technique occurs, disconnection, or leakage occurs, replace the catheter and collecting system.
- Consider using urinary catheter systems with pre-connected, sealed tubing junctions.
- Keep the catheter and collecting tube free from kinking.



- Keep the collecting bag below the level of bladder at all times. Do NOT rest the bag on the floor. If a fabric covering is used to hide the collection bag, it should not touch the floor.
- Empty the collecting bag regularly. Avoid splashing and prevent contact of the drainage spigot with the non-sterile collection container or graduate.
- Use Standard Precautions, including the use of gloves and gowns as appropriate and during any manipulation of the catheter or collecting system.
- Changing indwelling catheters or drainage bags at routine, fixed intervals is not recommended. Changes should be made on an individual basis based on clinical symptoms such as infection, obstruction, or when the closed system is compromised.
- Remember that unless clinically indicated, (e.g., patients with bacteriuria upon catheter removal post urologic surgery), antimicrobials are not routinely used to prevent CAUTI in patients requiring either short or long term catheterization.
- Do not clean the peri-urethral area with antiseptics to prevent CAUTI while the catheter is in place. Routine hygiene is appropriate.
- Do not perform bladder irrigations unless necessary such as with potential obstruction that may occur after prostatic or bladder surgery. If obstruction is anticipated, use a closed continuous irrigation.
- Avoid routine irrigation with antimicrobials. Instillation of antiseptic or antimicrobial solutions into drainage bags is not recommended.
- Do not clamp indwelling catheters prior to removal.

<https://www.cdc.gov/infectioncontrol/guidelines/CAUTI/index.html>

Indwelling catheters should not be used as a substitute for incontinence, as a means of obtaining urine culture when the patient is able to voluntarily void, or prolonged duration after a surgery without an appropriate reason.



Catheter Removal

Reducing the risk of CAUTI should be foremost in the healthcare provider assessment and care of patients. Strategies that have been successful in reducing catheter duration should be used. Examples include but are not limited to developing alerts or reminders in rounding or computerized ordering systems, stop orders, mandatory renewal orders that include documentation of indication, protocols for nurse directed removal of unnecessary catheters and guidelines for appropriate peri-operative catheter management.

<https://www.cdc.gov/infectioncontrol/guidelines/CAUTI/index.html>

Education of all staff and physicians is fundamental. Practices that should occur routinely and those that should be avoided are key education topics. This may be especially helpful to those with years of experience, as some recommendations have changed over time. It is also important to explain to staff, patients, and caregivers the rationale for recommendations.

Home health agencies may want to consider implementing a quality improvement program to ensure the appropriate use of indwelling catheters and reduce the risk of CAUTI. This can be done based on a risk assessment. The purpose of the QI programs should be to assure appropriate use of catheters, to identify and remove catheters that are no longer necessary, and ensure that all staff, patients, and caregivers adhere to good hand hygiene and proper care of catheters.

Website:	Examples/Descriptions:
https://www.catheterout.org/resources.html	Provides evidence-based clinical information/resources for Catheter Associated Urinary Tract Infections
https://www.mskcc.org/cancer-care/patient-education/caring-your-urinary-foley-catheter	Patient handout: Caring for your catheter. Videos also available for patient use.
http://nursingworld.org/CAUTI-Tool http://nursingworld.org/CAUTI-tool-Guidance	Evidenced based, user friendly tool that incorporates an algorithm to determine whether it is appropriate to use a urinary catheter and timely removal. A catheter insertion checklist is included with cues for maintenance and post removal care.
https://apic.org/Resource/_TinyMceFileManager/for_consumers/IPandYou_Bulletin_Urinary_tract_infections.pdf	Consumer Urinary Tract Infection handout.
http://www.gericareonline.net/tools/eng/urinary/	Urinary Incontinence Toolkit. Contains educational materials, suggested guidelines, forms and tools for evaluation, diagnosis and treatment.
https://consultgeri.org/patient-symptoms/unable-control-urine	Consult Geri: A clinical website from the Hartford Institute for Geriatric Nursing Provides information on urinary and fecal incontinence, inter-professional assessment and collaborative interventions.
http://www.wocn.org/	Professional nursing society promoting education and clinical guidance for wound, ostomy and incontinence.
http://www.presentwoc.com/	Online medical education for Nurses and Therapists who treat wounds. Multimedia online lectures that simulate the lecture hall experience, discussion forums, Chat rooms, and email e-zine publications.
Search the American Journal of Infection Control website for more articles on CAUTI.	To access these articles, you need to first login to the APIC website
https://shop.lww.com/Wound--Ostomy-and-Continence-Nurses-Society--Core-Curriculum--Continence-Management/p/9781451194418	Book for purchase

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9. <http://www.apic.org> APIC CAUTI Elimination Guide
10. <http://www.gericareonline.net/tools/eng/urinary/> Urinary incontinence tool kit
11. <http://www.hpnonline.com/inside/2016-01/1601-IP-CAUTIs.html>
12. <http://www.ihl.org/> IHI Program to Prevent CAUTI
13. <https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/longtermcare/homehealthcare/examples.html>
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