

## WOCN FACT SHEET: Catheter-Associated Urinary Tract Infections: Fact Sheet

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### Prevalence and Incidence

Catheter-associated urinary tract infections (CAUTI) are one of the most frequent infections today:

- \* The daily risk of developing CAUTI is 3% to 7% in the acute care setting.[1](#)
- \* CAUTI comprise 40% of all institutionally acquired infections.[2](#)
- \* There is an 8% prevalence of CAUTI in the home care setting.[3](#)
- \* There is limited evidence regarding the incidence of CAUTI in long-term suprapubic catheter users compared to urethral catheter users.[4](#)

The Centers for Medicare & Medicaid Services (CMS) identified hospital-acquired CAUTI as 1 of 8 conditions for which hospitals will not receive additional reimbursement.[5,6](#) Long-term care facilities also follow the CMS regulatory guidance. In the long-term-care federal regulation (F-315 Tag), the use of urinary catheters must be medically justified and care rendered to reduce the risk of infection for all residents with or without a catheter.[7](#) The CMS regulations emphasize the complications/risks of CAUTI, which include the following conditions [6,8](#):

- \* cystitis, periurethral abscess, prostatitis, epididymitis, and acute or chronic pyelonephritis [9,10](#)
- \* gram negative bacteremia [11](#)
- \* urosepsis, which can be fatal in 40% to 60% [2,9,12-15](#)

Bacteriuria: Bacteria in the urine [16](#)

- \* Long-term catheter users (catheter for  $\geq$  30 days) have high concentrations of bacteria in the urine that tend to be polymicrobial.[17,18](#)
- \* Asymptomatic bacteriuria is defined as at least 1 microorganism found in 2 consecutively collected urine specimens with  $\geq$  100,000/colony-forming units/mL and no lower urinary tract symptoms.[19](#)
- \* People with catheters acquire bacteriuria at different rates. Incidence of conversion from sterile urine to bacteriuria occurs at the rate of 3% to 10% per day.[20](#)
- \* Asymptomatic bacteriuria will be present in virtually every long-term catheter user once the catheter has been in place  $>$  30 days.[10,21](#)
- \* Asymptomatic bacteriuria should not be treated in long-term catheter users. Bacteriuria may be treated in selected cases of short-term catheter users such as patients who are immunocompromised, pregnant, or scheduled for urological surgery.[18](#)

Bacteremia: Blood stream infection

- \* Approximately 3% of all patients with a catheter will develop bacteremia, which is a serious and possibly life-threatening complication.[22](#)
- \* CAUTI is the second most common cause of nosocomial bloodstream infection.[4](#)

Diagnosis of CAUTI

The diagnosis of CAUTI is based on finding bacteriuria along with an elevated white blood cell count on a urinalysis examination. Additionally, in some cases, an elevated serum white blood cell and 2 or more of the following signs/symptoms may be present [3](#):

- \* Pain or burning in the region of the bladder, urethra, or flank [23](#)
- \* Fever (greater than 100.4°F or 38°C) or chills [3,23](#)
- \* Malaise [3](#)
- \* Offensive urine odor [3](#)
- \* Change in color or character of urine, including cloudy urine or increased sediment [3,23](#)
- \* Hematuria [23-25](#)
- \* Bladder spasms/leakage [12](#)
- \* Catheter obstruction [12](#)

- \* Increased weakness or spasticity, especially, in those with neurological disease or injury [12](#)
- \* Change in mental status, particularly in older adults, such as confusion, lethargy, agitation, delirium, or subtle changes in behavior [2,9,12,26](#)
- \* Bacteremia (especially after trauma to the urinary mucosa)[3,24,25](#)

Risk/Contributing Factors

Certain individuals are more prone to developing CAUTI. Some catheter management techniques can also contribute to increased risks for developing CAUTI. A summary of the risks and factors contributing to CAUTI is presented in [Table 1](#).

<b>TABLE 1.</b>	
<b>Risk and Contributing Factors for Developing Catheter-Associated Urinary Tract Infections</b>	
<b>Catheter Factors</b>	<b>Individual Factors</b>
<p>The catheter is</p> <ul style="list-style-type: none"> <li>• left in place for more than 6 days<sup>4,10</sup></li> <li>• inserted in a place other than an operating room<sup>4,10</sup></li> <li>• used to measure urinary output<sup>21,27</sup></li> <li>• not positioned correctly and the level of the drainage tubing is above the bladder or below the level of the drainage bag<sup>1,12,21,26</sup></li> <li>• not maintained as a closed system (eg, switching between gravity and leg bag drainage systems)<sup>26,27</sup></li> </ul>	<p>The person</p> <ul style="list-style-type: none"> <li>• is female<sup>10,19</sup></li> <li>• is pregnant<sup>10</sup></li> <li>• is malnourished, frail, or has chronic illness<sup>4,10</sup></li> <li>• has diabetes mellitus<sup>4,10,19</sup></li> <li>• has azotemia (creatinine &gt; 2.0 mg/dL)<sup>4</sup></li> <li>• has a ureteral stent<sup>4</sup></li> <li>• has other sites of infection<sup>4</sup></li> <li>• is immunosuppressed<sup>14,21,28,29</sup></li> <li>• has a catheter in place postfractured hip and resides in a nursing home<sup>30</sup></li> </ul>

Table 1. Risk and Contributing Factors for Developing Catheter-Associated Urinary Tract Infections

Treatment of Symptomatic CAUTI

- \* Identify the microorganism causing infection and differentiate that species from other bacteria found in the existing catheter.[31](#)
- \* Initial treatment may be empirical, but the choice of therapy with oral or parenteral antimicrobial drugs should be based on results of culture and sensitivity testing.[12](#)
- \* Urosepsis is the most serious complication of indwelling catheter use and requires aggressive antibiotic therapy and supportive care and may require hospitalization.[12](#)

Prevention of CAUTI

A key component of any plan for the prevention of bacteriuria or symptomatic urinary tract infection (UTI) involves prompt removal of the catheter, whenever possible, and use of an alternative method of bladder drainage (eg, spontaneous voiding, clean intermittent catheterization, or external condom). If catheter removal is not an option, other effective UTI prevention strategies can be implemented such as those indicated in [Table 2](#).

Table 2. Strategies to Prevent Urinary Tract Infections

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General Principles of Catheter Care	Catheter Type
<ul style="list-style-type: none"> <li>• Use a sterile procedure for catheter insertion.<sup>26</sup></li> <li>• Use a catheter with the smallest size lumen and balloon possible (ie, 5-mL balloon).<sup>32</sup></li> <li>• Minimize duration of the catheterization.<sup>12,33</sup></li> <li>• Maintain a closed drainage system.<sup>26</sup></li> <li>• Keep the collection device below the level of the bladder/tubing.<sup>21,27,34</sup></li> <li>• Routine meatal care is recommended.<sup>10</sup> Evidence is insufficient to support a specific hygiene routine. Antimicrobial agents have not been proven to be effective for urinary tract infection prevention.<sup>35-37</sup></li> <li>• Include measures to prevent tension or traction on the catheter.<sup>26,38-41</sup></li> <li>• There is insufficient evidence to support or refute increasing fluid intake as a strategy to prevent CAUTI. It is a common practice and may be of some benefit.<sup>42</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Evidence is insufficient to support silver alloy-impregnated catheters for long-term use.<sup>43,44</sup></li> <li>• Short-term silver alloy catheters may reduce incidence of CAUTI and bacteremia.<sup>45</sup></li> <li>• Silicone or hydrogel catheters are recommended for people using catheters greater than 14 days.<sup>46</sup></li> </ul>

Abbreviation: CAUTI, catheter-associated urinary track infections.

### Unproven Strategies to Prevent UTI

Research indicates none of the following practices are useful in preventing urinary tract infection with indwelling catheter use:

- \* Instilling antibiotics or other additives to the drainage bag [47-49](#)
- \* Antiseptic compounds applied to the meatus [12,46](#)
- \* Specific agents used for meatal cleansing [12,35,36](#)
- \* Systemic antibiotics for prophylaxis [2,12,19,26,50,51](#)
- \* Cranberry juice [52-54](#)
- \* Cranberry juice may be helpful in preventing recurring UTI in non-catheterized persons, but there is insufficient evidence to support this practice to prevent CAUTI.
- \* The juice does not affect the acidity of the urine but interacts with the mucosal walls of the urethra to prevent microbial replication and adherence. [52-55](#)