

Guidelines for the Prevention and Treatment of Urinary Tract Infections (UTIs) in Continuing Care Settings

**Saskatchewan
Infection Prevention and Control Program**

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The Saskatchewan Infection Prevention and Control Technical Advisory Group (TAG) requested that these guidelines be developed in an effort to reduce urinary tract infections and to improve the care, comfort, and dignity of residents and clients in a variety of continuing care settings.

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Introduction

These guidelines were developed based on recommendations of the Healthcare Infection Control Practices Advisory Committee (HICPAC),¹ Institute for Healthcare Improvement (IHI),² Association for Professionals in Infection Control and Epidemiology (APIC),³ Infectious Diseases Society of America (IDSA),⁴ and Alberta's "Toward Optimized Practice (TOP)"⁵ clinical guidelines, as well as other published sources.

This document is intended to:

- provide criteria to assist healthcare workers to accurately identify urinary tract infections (UTIs) and catheter-associated urinary tract infections (CA-UTIs);
- provide recommendations to reduce or prevent the risk of UTIs and CA-UTIs; and
- discuss management and treatment options for adult individuals with UTIs/CA-UTIs.

For the purposes of this document, the term "resident" refers to a patient, resident or client in a continuing care setting. Because most references use the term "long-term care", we will also use it here. Please note that in doing so we intend it to apply, where appropriate, to continuing care in both institutional and community settings.

Epidemiology

Urinary tract infections are the most frequently encountered healthcare-associated infections (HAIs) in long-term care (LTC) facilities, accounting for at least 30% of all HAIs.⁵ Infections are usually asymptomatic, with prevalence rates of asymptomatic bacteriuria ranging from 15% to 50% in non-catheterized individuals, to almost 100% in catheterized individuals.^{6,7} Two published studies quoted by the Public Health Agency of Canada give the incidence of UTIs in LTC facilities as 0.18 and 1.51 per 1,000 resident days.⁸ UTIs are the leading cause of bacteremia among LTC residents, which can lead to significant morbidity and mortality in the elderly.⁵ The presence of an indwelling catheter increases the likelihood of bacteremia almost 40-fold.⁷ UTIs are one of the most common reasons for resident hospitalization, and are also the reason for considerable antibiotic use in the LTC setting.⁵

Etiology

The most common pathogens isolated from UTIs in LTC facilities are the *Enterobacteriaceae*. Typically, *Escherichia coli* is the most common pathogen isolated from women and *Proteus mirabilis* the most common pathogen isolated from men. Other frequently encountered pathogens include *Klebsiella pneumoniae*, *Citrobacter* species, *Enterobacter* species, *Serratia* species, *Providencia stuartii*, *Morganella morganii*, and *Pseudomonas aeruginosa*. Gram positive organisms such as *Enterococcus* species and group B *Streptococci* are also frequently isolated.⁷

Many of the organisms associated with UTIs found in LTC facilities have increased antimicrobial resistance patterns. Factors that may contribute to antibiotic resistance include repeated exposure to antibiotics due to treatment of recurring infections, increased use of antibiotics in LTC facilities, and increased opportunities for transmission of organisms among residents due to multiple contacts with healthcare workers.⁷

Role of Urinary Catheters in the Development of UTIs^{3,9}

The presence of a urinary catheter provides a direct entry for microorganisms into the urinary tract. It also interferes with the body's natural ability to clear the bladder and the bladder mucosa of microbes through the action of voiding. These pathogens gain access to the urinary tract either along the outside of the catheter (external route) or from the inside of the catheter itself (internal route), from a contaminated collection bag or a break in the urinary drainage system. Sources of microbes can be either from the resident's own flora or from an external source like contaminated equipment, supplies, or healthcare workers' hands. The external route may play a more significant role for females, because of the short urethra and closeness to the vaginal and anal areas. For both sexes, the progressive colonization of the inner and outer surface of the catheter leads to the formation of biofilms, which are complex communities of different microorganisms that attach to surfaces. Biofilms are able to produce a protective slime coating to resist the body's defence mechanisms and antibiotics. The only way to eliminate biofilms and the ongoing risk of infection is to remove the catheter.

Risk Factors^{5,10,11}

The primary risk factors for the development of UTI in residents of LTC facilities include:

- Age
- Presence of an indwelling catheter
- Chronic comorbidities
- Neurogenic bladder (caused by conditions such as stroke, Alzheimer's disease, and Parkinson's disease)
- Diminished mental status
- Urinary incontinence
- Diabetes
- Being female
- Gynecological disorders (e.g. prolapse)
- Male prostatic hypertrophy

Secondary risk factors include dehydration, immobility, other infection, colonization with resistant organisms, and poor personal hygiene.

Diagnosis

1. *Clinical Presentation*

The diagnosis of UTI in LTC residents is often difficult because cognitively impaired residents may not be able to recall or communicate their symptoms; other illnesses may present with non-specific symptoms similar to UTI (e.g. fever, altered mental status); and residents may not present with classic genitourinary symptoms, or alternatively, may present with chronic genitourinary symptoms.¹² It is important to note that frail residents may not present with a classic febrile response, and may be

afebrile or even hypothermic. Despite the possibility of such atypical presentation, most serious UTIs will nevertheless be associated with fever and classic genitourinary symptoms.¹³ Appendices A and B outline suggested diagnostic pathways for identification of symptomatic UTI and CA-UTI. These pathways are based on Loeb and colleagues' document "Development of Minimum Criteria for the Initiation of Antibiotics in Residents of Long-Term-Care Facilities: Results of a Consensus Conference,"¹⁴ Stone et al. in "Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria"¹⁵ and Alberta's TOP "Guideline for the Diagnosis and Management of Urinary Tract Infections in Long Term Care."⁵ These pathways should only be used as a guide to aid in the diagnosis of UTI – confirmation should always rest on the clinical judgement of the healthcare provider.

Signs and symptoms not specific for UTI⁵

The following signs and symptoms may indicate an infection at another site, and therefore are not necessarily indicative of a UTI:

- Worsening of functional status
- Worsening of mental status, increased confusion, delirium, or agitation
- Increased falls

For medically stable residents who present with any of the above non-specific signs and symptoms, the recommended intervention is to increase their oral fluid intake for 24 hours, then reassess. If non-specific symptoms continue, consider an alternate diagnosis. Further investigation may be warranted.

Note:

- Cloudy or turbid urine can occur in normal urine and is not considered an indicator of a UTI.
- Malodorous or smelly urine may be caused by poor diet or hygiene.

2. Laboratory Investigation

Urine Culture

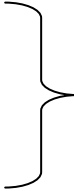
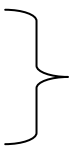
A urine culture should always be obtained to confirm a diagnosis of UTI whenever signs and symptoms suggestive of a UTI are present. In addition to providing confirmation of diagnosis, a urine culture will identify the causative organism and provide information required for the appropriate selection of an antibiotic.

Collection of Urine for Culture and Sensitivity (C&S)^{5,15}

- The specimen of choice is a clean catch or midstream urine specimen [refer to your regional laboratory specimen collection manual for details on specimen collection].
- If a voided specimen cannot be obtained, a specimen collected from a freshly applied condom catheter is suitable for men and in-and-out catheterization is suitable for women.
- For residents with short-term indwelling catheters, specimens should be collected from a specifically designed sampling port. Do not collect the sample from a drainage bag.
- For residents with indwelling catheters ≥ 14 days, remove the existing catheter, and collect the urine specimen through the freshly placed catheter.

- If urine specimens cannot be sent for processing within 30 minutes of collection, they should be refrigerated while awaiting transport because organisms multiply quickly at room temperature. Specimen delivery should occur within 24 hours of collection.

Table 1: Culture Counts Indicative for UTI¹⁵ Please note the lab values referenced in this document are in cfu/ml and not in cfu/L which is currently reported by Saskatchewan Microbiology Laboratories.

<p>For residents without an indwelling catheter</p>	<ul style="list-style-type: none"> • At least 10⁵ cfu/mL of no more than 2 species of microorganisms present in a voided sample • At least 10² cfu/mL of any number of organisms in a specimen collected by an in-and-out sample 	 <div data-bbox="1242 514 1432 682" style="border: 1px solid black; padding: 5px;"> <p>Indicates UTI only if accompanied by symptoms</p> </div>
<p>For residents with an indwelling catheter</p>	<ul style="list-style-type: none"> • At least 10⁵ cfu/mL of any organisms when specimen taken from a new catheter or catheter < 14 days since insertion 	 <div data-bbox="1242 745 1432 913" style="border: 1px solid black; padding: 5px;"> <p>Indicates UTI only if accompanied by symptoms</p> </div>

Note:

- Collect the urine sample prior to administration of any antibiotics.
- A confirmed UTI requires a positive urine culture plus classic genitourinary symptoms. A negative urine culture excludes symptomatic UTI.
- Repeating C&S sampling after completion of antibiotic therapy is NOT indicated unless signs and symptoms of a UTI persist or recur.
- Do not collect urine samples in the absence of UTI symptoms. Routine screening for asymptomatic bacteriuria is not recommended.

Other Diagnostic Tests

Creatinine clearance

A recently calculated creatinine clearance (CrCl) is required for the appropriate dosing of antibiotics as decreased renal function is a common finding in the elderly.⁵

Dipstick tests

Dipstick screening is not recommended to diagnose UTIs. A negative dipstick test indicates the absence of a UTI, but a positive dipstick test for leukocyte esterase or nitrite is not diagnostic for UTI and does not indicate the need for antibiotics. Pyuria, which is the presence of white blood cells in the urine, occurs in virtually all cases of symptomatic bacteriuria but is also found in over 90% of residents with asymptomatic bacteriuria and in approximately 30% of residents without bacteriuria.¹⁶

Prevention of Urinary Tract Infections (UTIs)^{5,17}

The following practices are recommended to promote overall urinary health, thereby reducing or preventing the occurrence of UTIs.

1. *Ensure proper hydration and nutrition*

Dehydration results in concentrated urine and less frequent voiding, conditions that support bacterial growth in the bladder. Dehydration is a concern for residents who may also be on medications that increase diuresis or who have a disease such as diabetes that may cause excessive urination.¹⁸ For additional guidance, consult the “interRAI Clinical Assessment Protocols (CAPs)”¹⁹ manual, in particular the Undernutrition CAP (p. 121) and/or the Dehydration CAP (p. 127). Adequate hydration is indicated by pale-coloured urine, moist mucous membranes, and/or normal specific gravity of the urine. The following strategies may be used to promote adequate hydration in residents:

- Offer a variety of fluids throughout the day.
- Routinely encourage fluid intake during social activities such as “Happy Hour” or “Tea Time”, as well as in therapeutic group activities.
- Offer foods that contain high water content.
- Educate residents, healthcare providers, and families on the importance of hydration and urinary health.
- Document the resident’s preference for type and temperature of fluids, and customize a plan that will best meet the hydration needs of the client.
- Fill water pitchers and leave by residents’ bedsides, within their reach.
- Maintain therapeutic blood glucose levels in residents with diabetes.

2. *Provide good perineal hygiene*

- Ensure that personal hygiene is performed correctly to prevent prolonged contact with urine or feces.
- Perineal hygiene with mild soap and water should be done daily, and after episodes of bowel incontinence.²⁰
- Use incontinence products best suited for the individual’s needs. Residents and families should understand that an incontinence product is much more appropriate than a catheter, and that these products are reasonably comfortable and discreet. Explanation of the benefits preserves the dignity of the resident and encourages compliance.

3. *Promote healthy voiding habits*^{19,21}

- Completely emptying the bladder is best accomplished by providing a relaxed voiding environment with a comfortable toilet seat at the appropriate height and convenient safety hand rails.
- Ensure that any issues with constipation or fecal impaction are addressed.
- Consult the Urinary Incontinence CAP (p. 159) of the “interRAI Clinical Assessment Protocols (CAPs)” manual for additional management options.

- Consider implementing a prompted voiding program. The Registered Nurses' Association of Ontario document, "Promoting Continence Using Prompted Voiding" provides guidelines to implement a treatment program of prompted voiding for older adults with urinary incontinence.²¹ Additional information and tools on how to implement an effective prompted voiding program are also available through the Borun Centre.²²

Prevention of Catheter-Associated Urinary Tract Infections (CA-UTIs)^{1,2,3}

Consistent with the most current evidence-based guidelines, the Institute for Healthcare Improvement (IHI) has developed a How-to Guide which focuses on four components of care recommended for all patients/residents to prevent or reduce the risk of CA-UTI. IHI recommends using the guide as a complement to APIC's 2009 document "Guide to the Elimination of Catheter-Associated Urinary Tract Infections". The four components of care include:

1. *Avoid unnecessary urinary catheters*

Studies have indicated that more than 50% of urinary catheters are unnecessary. The Healthcare Infection Control Practices Advisory Committee (HICPAC) recommends inserting catheters only for appropriate indications [see Table 2].

Table 2: Appropriate and Inappropriate Indications for Urinary Catheter Insertion

Examples of appropriate indications include: <ul style="list-style-type: none">• Management of acute urinary retention or bladder outlet obstruction• Urine output monitoring in critically ill individuals• Perioperative use for selected surgical procedures such as urogenital surgery, prolonged duration of surgery, use of high volume infusions or diuretics during surgery• Assistance in healing of open sacral or perineal wounds in incontinent individuals• Patient requires prolonged immobilization (e.g. potentially unstable thoracic or lumbar spine, multiple traumatic injuries such as pelvic fractures)• To improve comfort for end of life care situations
Examples of inappropriate uses of indwelling catheters include: <ul style="list-style-type: none">• A substitute for nursing care of the resident with incontinence• As a means of collecting urine for culture when the resident can void voluntarily• For healthcare worker or patient convenience

Alternatives to indwelling catheters include the following:

- External condom catheters for male residents without urinary retention or bladder outlet obstruction
- Regular resident checks for assistance in accessing the toilet or bedside commode

- Intermittent catheterization for residents with spinal cord injury, or for residents with bladder emptying dysfunction
- Bladder ultrasound to assess for urinary retention

Note:

- It is important to involve the resident and/or substitute decision-maker in care decisions related to achieving the highest level of urinary continence. Education on the risks and complications that may result from chronic catheterization must be provided to ensure that informed choices can be made.
- For the resident with an indwelling catheter on admission, a comprehensive assessment should be completed to document the continued need for catheter use and/or determine whether there is potential to develop a plan for removal.²³

2. Insert urinary catheters using aseptic technique

- Perform hand hygiene before and after insertion of the catheter device.
- Ensure that only properly trained healthcare workers who know the correct technique of catheter insertion and maintenance are given this responsibility.
- Meatal cleansing involving the mechanical removal of encrustations and smegma with soap and water should be done prior to insertion.²⁴
- Insert urinary catheters using aseptic technique and sterile equipment including gloves, drapes, sponges, antiseptic or sterile solution for cleaning the urethral meatus, and single-use sterile lubricant.
- Use the smallest catheter size possible that will not be associated with leakage.²⁵
- Properly secure indwelling catheters after insertion to prevent movement and urethral traction.

For intermittent catheterization:

- If intermittent catheterization is used for some residents, ensure it is done at regular intervals to prevent overdistention.
- For residents undergoing repeated intermittent catheterization, consider using portable bladder ultrasound devices to assess urine volume and reduce unnecessary catheter insertion.
- In continuing care settings, for residents who require chronic intermittent catheterization, clean (i.e. nonsterile) technique is an acceptable and more practical alternative to sterile technique.

3. Maintain urinary catheters based on recommended guidelines

In addition to routine practices, the following should be incorporated into the routine maintenance of indwelling urinary catheters:

- Perform hand hygiene before and after any manipulation of the catheter device or site.
- Maintain an unobstructed urine flow, preventing kinks, vertical loops and blockages in the tubing.
- Maintain a sterile, continuously closed drainage system.

Note: For residents who prefer leg bags, a linkage system connecting to a larger bag is recommended for night time or longer periods of collection. In this case, the outlet tap on the

leg bag is left open so that the urine collects in the larger bag without breaking the closed drainage system.^{24,26}

- Keep the collection bag below the level of the bladder at all times to prevent reflux of urine back into the bladder.
- Secure the catheter by anchoring it to the upper thigh in women, or to the upper thigh or lower abdomen in men, in order to prevent excessive tension on the catheter, which can lead to urethral trauma or tears.²⁰
- Empty the urinary drainage bag regularly and prior to transporting the resident. Use a separate clean collecting container for each resident (the collection container should not be shared between residents and, in a semi-private room situation, containers should be labelled). Avoid allowing contact between the drainage spigot and the non-sterile collection container.⁹
- Avoid rigorous, frequent cleansing of the catheter entry site and do not use antiseptics for routine cleansing. Wash the catheter entry site daily with soap and water or after bowel contamination.²⁰
- For the management of long-term indwelling catheters, an individual care regimen should be designed to minimize the problems of blockage and encrustations. Long-term indwelling catheters should be changed as per the manufacturer's instructions and based on individual patient requirements.²⁰

4. A. Review short-term urinary catheter necessity daily, and remove promptly

The presence of a catheter is the greatest risk factor for developing a UTI. If catheter insertion is indicated, the most important strategy to prevent infection is prompt removal since the risk of bacteriuria increases 3% to 7% per day when an indwelling catheter remains in situ.¹⁰

Strategies that have proven successful in reducing catheter duration include:^{2,3}

- Daily review of catheter necessity
 - Include catheter necessity as a part of daily nursing assessments (e.g. at the start of each shift).
 - If criteria for catheter necessity are not met, nurses should contact the physician to obtain an order to discontinue the catheter.
- Automatic stop orders
 - Implement automatic stop orders at a predetermined time period (e.g. 48-72 hours) after catheter insertion, with continuation only when catheter indication is documented.
- Reminders in resident records/charts
 - Place reminders in the resident's chart requiring physicians/nursing to document the indication for continuing catheterization.

B. Review chronic indwelling catheter use, and remove if possible

- If a chronic indwelling urinary catheter is the management of choice for continence, review this plan at least quarterly and when there is a change in urinary continence status.¹⁷
- Maintain a record of catheter-related problems.

- Provide education to the resident and/or substitute decision-maker regarding the risks and complications of chronic catheterization, and attempt to remove the catheter as soon as possible.¹⁷

Practices to Avoid

- Do not perform bladder or catheter irrigation unless medically necessary (e.g. tissue/clots obstruct drainage after prostatic or bladder surgery).²⁰
- Do not replace catheters routinely if there is no evidence of infection or obstruction. If the collection bag and tubing needs to be replaced, ensure aseptic technique is used.
- Do not disconnect the catheter from the drainage tubing.
- Do not routinely use silver-coated or other antibacterial catheters.
- Unless clinically indicated, do not use antimicrobials routinely to prevent CA-UTI in residents requiring catheterization.
- Do not use systemic antibiotics routinely as prophylaxis.

Treatment⁵

Appendix C outlines suggested treatment protocols for acute UTIs in continuing care residents.

- Do not treat asymptomatic bacteriuria. Inappropriate use or overuse of antibiotics may result in adverse outcomes for the resident and lead to the emergence of resistant organisms.
- Antibiotic therapy should be selected based on the identified organism's sensitivity pattern (this information can be found in the urine C&S results).
- The results of a urine culture should be obtained prior to initiating antibiotics; however, if antibiotic therapy has already begun:
 - Ensure the antibiotic is appropriate by reviewing C&S results. Alter antibiotic therapy if necessary.
 - Stop antibiotics if C&S results are not indicative of a UTI.
- Foul smelling/cloudy urine is not an indication for initiating antibiotics.
- Narrow spectrum, first-line antibiotics are preferred for treatment of a UTI.
- Nitrofurantoin has limited usefulness in residents of LTC facilities as decreased renal function is often an issue. Ensure that the resident has had a recent creatinine clearance ordered to assess their renal function and need for antimicrobial dose adjustments.

Table 3: McGeer Definitions for UTI in the LTC Setting¹⁵ (includes only symptomatic UTI)

No indwelling Catheter	With Chronic indwelling Catheter
<p>Both criteria 1 and 2 must be present</p> <p>1. Must have at least one of the following :</p> <ul style="list-style-type: none"> • Acute dysuria OR acute pain, swelling or tenderness of the testes, epididymis or prostate • Fever^(A) OR leukocytosis^(B) and at least 1 localized urinary tract symptom • Two or more localized urinary tract symptoms <p>Symptoms:</p> <ul style="list-style-type: none"> ○ Acute costovertebral angle pain or tenderness ○ Suprapubic pain ○ Gross hematuria ○ New or marked increase in incontinence ○ New or marked increase in urgency ○ New or marked increase in frequency <p>2. One of the following microbiologic criteria:</p> <ul style="list-style-type: none"> • At least 10⁵ cfu/mL of no more than 2 species of microorganisms in a voided urine sample OR • At least 10² cfu/mL of any number of organisms in a specimen collected by in-and-out catheter 	<p>Both criteria 1 AND 2 must be present</p> <p>1. Must have at least one of the following:</p> <ul style="list-style-type: none"> • Fever, rigors OR new-onset hypotension with no alternate site of infection • Leukocytosis with no alternative diagnosis AND either an acute change in mental status^(C) OR acute functional decline^(D) • New-onset suprapubic pain OR costovertebral angle pain or tenderness • Purulent discharge from around the catheter OR acute pain, swelling or tenderness of the testes, epididymis or prostate. <p>2. Urinary catheter specimen culture with at least 10⁵ cfu/mL of any organism(s)</p> <p>Note: Urinary catheter specimens for C&S should be collected following replacement of the catheter if catheter has been in place ≥ 14 days.</p>
<p>(A) Fever</p> <ul style="list-style-type: none"> • Single oral temperature >37.8°C OR • Repeated oral temperatures >37.2°C or rectal temperatures > 37.5° OR • Single temperature >1.1°C over baseline from any site (oral, tympanic, axillary) <p>(B) Leukocytosis</p> <ul style="list-style-type: none"> • Neutrophilia (>14,000 leukocytes/mm³) OR • Left shift (>6% bands or ≥ 1,500 bands/mm³) <p>(C) Acute change in mental status from baseline based on the confusion assessment method (CAM©) currently used in the minimal data set (MDS) version 3.0. All criteria must be present.</p> <p>1. Acute Onset 2. Fluctuating Course 3. Inattention</p> <p>4. Either disorganized thinking or altered level of consciousness</p> <p>(D) Acute Functional Decline defined as a new 3 point increase based on the rating system used in MDS version 3.0 to score activities of daily living using the following tasks:</p> <p>1. Bed Mobility 2. Transfer 3. Locomotion Within LTC Facility 4. Dressing</p> <p>5. Toilet Use 6. Personal Hygiene 7. Eating</p>	
<p>Note: A diagnosis of UTI can be made without localized urinary tract symptoms <i>only if a blood culture isolate is the same as the organism(s) isolated from the urine and there is no alternate site of infection.</i></p> <p>In the absence of a clear alternate source of infection, fever or rigors with a positive urine culture result in the non-catheterized resident or acute confusion in the catheterized resident will often be treated as UTI. However, evidence suggests that most of these episodes are likely not due to infection of a urinary source.</p>	

Surveillance^{1,27}

Infection control practitioners may have limited resources and time to spend on infection prevention and control activities within a LTC facility; therefore, an effective surveillance program needs to be simple and practical.

HICPAC recommends the following:

1. Perform a facility-based risk assessment to determine which facilities or units would benefit from CA-UTI surveillance based on frequency of catheter use and potential risk factors for UTI/CA-UTI.
2. Use standardized surveillance criteria/definitions for the identification of symptomatic UTI as well as standardized tools to monitor process outcomes or practices.
3. Use standardized methodology for case finding that is appropriate and feasible for the facility. Surveillance of asymptomatic bacteriuria is not recommended.
4. Consider providing regular feedback of unit-specific rates (either process or outcome, described below) to nursing staff and other appropriate clinical care staff.

Note:

- Infection criteria/definitions are used to determine the presence of an infection for surveillance purposes, and are not intended to be used as guidelines for the clinical diagnosis or treatment of infections in residents.²⁸
- With the release of the new surveillance definitions for LTC settings [see Table 3], data collection and education will need to be modified to follow the new criteria.
- Home Care definitions for CA-UTIs were released in 2010.²⁹
- “Recurrent UTI/CA-UTI” is defined as >3 culture-confirmed UTIs in 1 year with the same or different organisms, or >2 culture-confirmed UTIs in 6 months with the same or different organisms. “Relapse UTI” is defined as a repeat infection with the same infecting organism occurring within 4 weeks of a previous UTI.⁵
 - Although not specifically stated in the guidelines, when conducting surveillance, it is useful to include recurrent UTI/CA-UTI in the numerator data. Relapsed cases should trigger a review process to ensure that the antimicrobial therapy was based on C&S results.
 - If surveillance reveals a pattern of recurrent symptomatic UTI/CA-UTI, the facility should review perineal hygiene practices, as well as adherence to all prevention measures.²³
 - If prevention measures are routinely practiced, recurrent symptomatic UTIs in the non-catheterized resident may indicate the need for a medical or urological evaluation to rule out structural abnormalities.²³

Performance Measures¹

HICPAC recommends that facilities consider including both process and outcome measures as part of their surveillance program.

1. Examples of Process Measures (surveillance of infection prevention and control practices)

- Compliance with hand hygiene
- Compliance with proper care and maintenance of indwelling catheters³⁰
- Compliance with documentation of appropriate indication for insertion of urinary catheter
- Compliance with documentation of catheter insertion and removal dates

2. Recommendations for Outcome Measures

- Rate of symptomatic UTI/CA-UTI reported as
of cases per 1,000 resident days **OR**
of cases per 1,000 catheter days
- Rate of bloodstream infections secondary to CA-UTI reported as
of cases per 1,000 catheter days

Performance measures are intended to support quality improvement initiatives; therefore, when conducting surveillance for UTI/CA-UTI, consider reporting both process and outcome measures. Surveillance data should be communicated on a regular basis (e.g. quarterly reports) to senior leadership, nursing staff, physicians, and other appropriate clinical care staff.

Unresolved Issues/Alternative Prevention Options^{1,4}

Antimicrobial/Antiseptic Impregnated Catheters

- There is insufficient evidence to support a recommendation about whether the use of such catheters reduces CA-UTI in residents.
- Hydrophilic catheters might be preferable over standard catheters for those residents requiring intermittent catheterization.

Cranberry Products

- There is insufficient evidence to support a recommendation about the use of cranberry products to reduce CA-UTI in catheterized residents, including those using condom catheters.
- The consumption of cranberry products, including juice and capsules, has not been consistently demonstrated to be effective in preventing UTI.

Cleaning Catheter Bags

- Some practice guidelines from the United States (for longer term catheter management), advocate the cleaning, disinfecting and reusing of catheter drainage bags.^{30, 32, 33} This practice has been described as controversial as it does not provide a validated method of decontamination.²⁵

References

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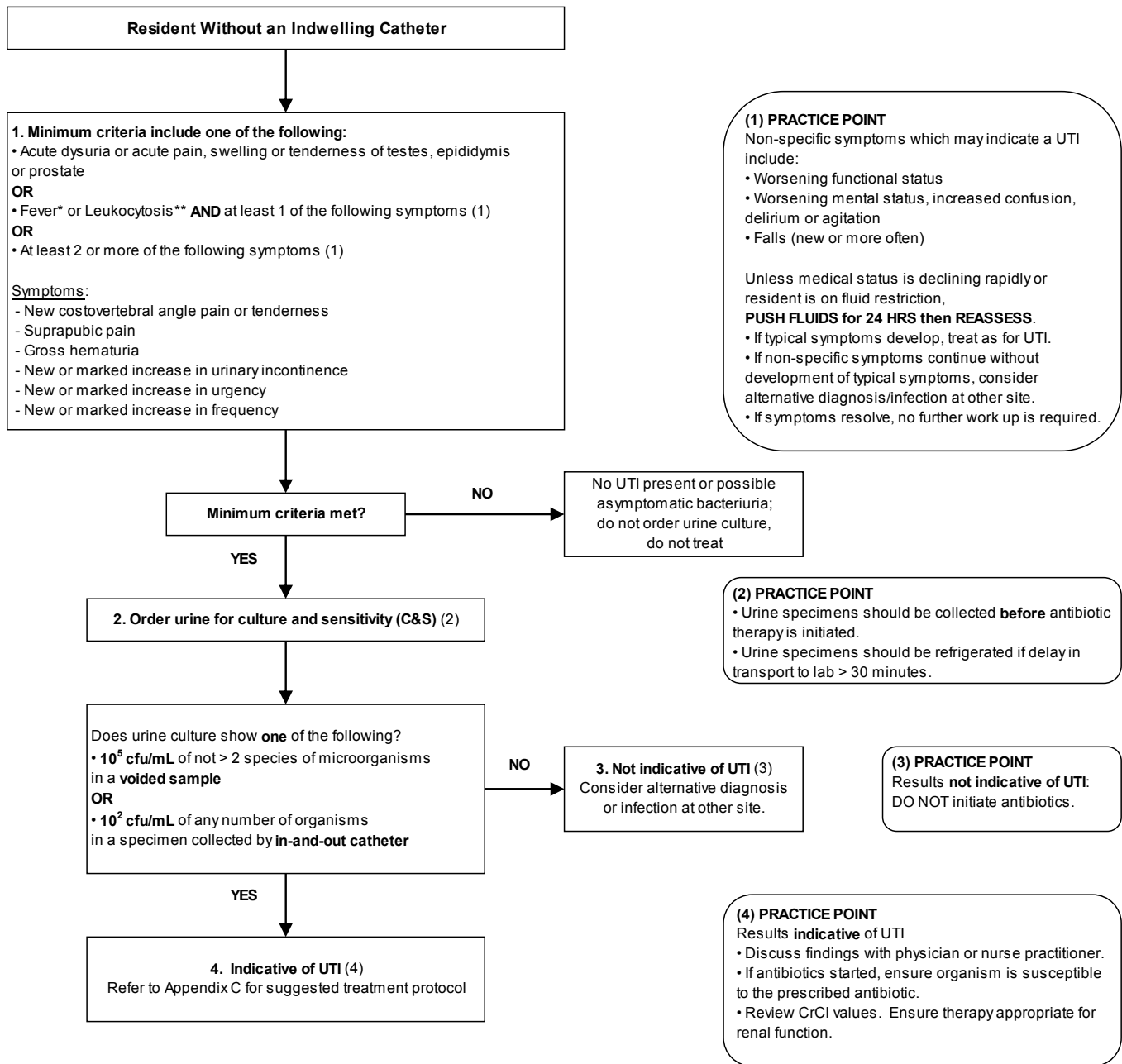
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Appendix A: Suggested Pathway for Identification of Symptomatic UTI

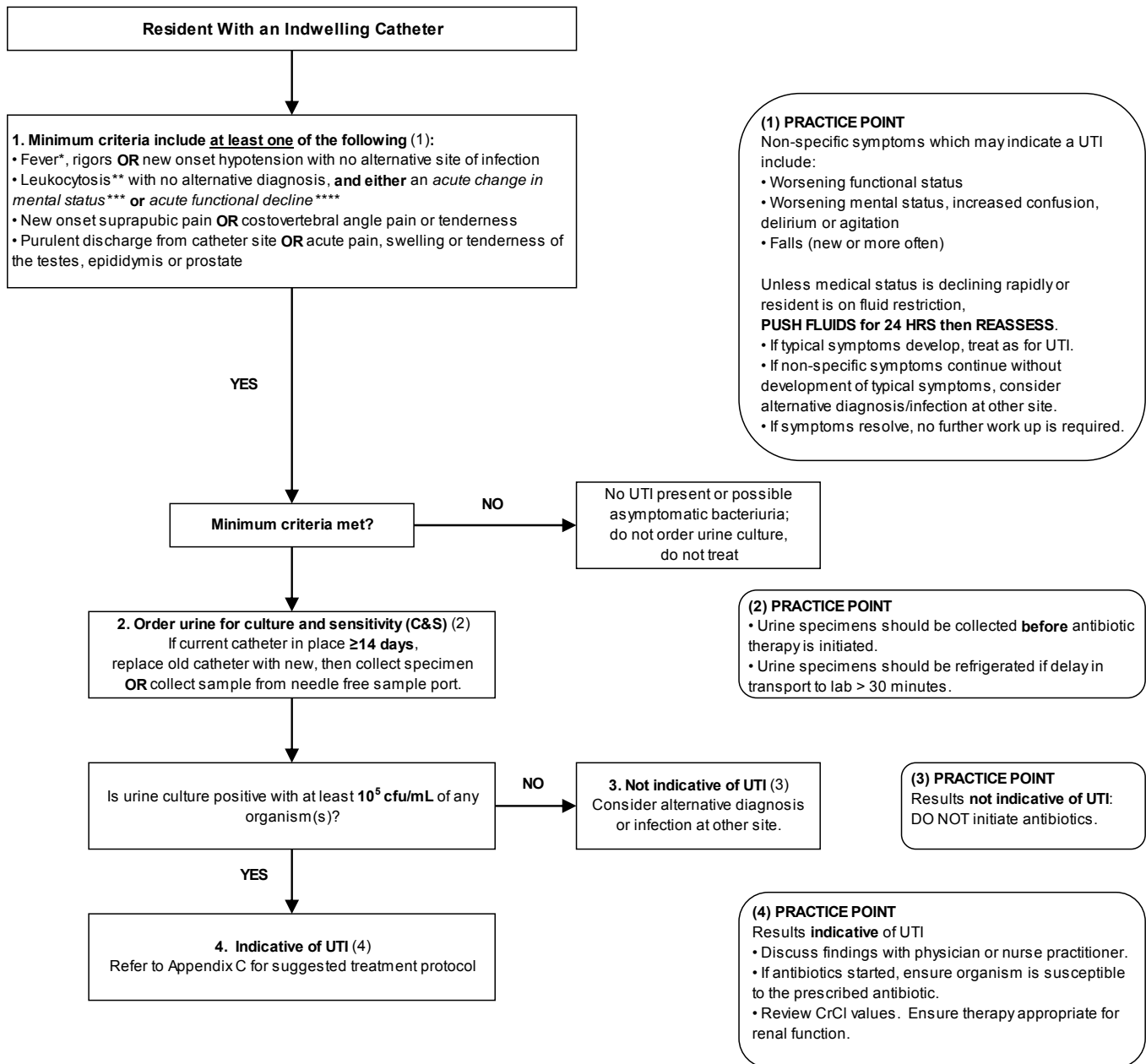


* **Fever** is defined as: (1) a single oral temperature >37.8°C; or (2) repeated oral temperatures >37.2°C or rectal temperatures >37.5°C; or (3) an increase in temperature >1.1°C over the baseline temperature.

** **Leukocytosis** is defined as: (1) Neutrophilia >14,000 leukocytes/mm³; or (2) Left shift >6% bands or ≥1,500 bands/mm³.

Adapted from TOP "Guideline for the Diagnosis and Management of Urinary Tract Infections in Long Term Care" and Stone et al. "Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria".

Appendix B: Suggested Pathway for Identification of Symptomatic CA-UTI



* **Fever** is defined as: (1) a single oral temperature >37.8°C; or (2) repeated oral temperatures >37.2°C or rectal temperatures >37.5°C; or (3) an increase in temperature >1.1°C over the baseline temperature.

** **Leukocytosis** is defined as: (1) Neutrophilia >14,000 leukocytes/mm³; or (2) Left shift >6% bands or ≥1,500 bands/mm³.

*** **Acute change in mental status** – based on the confusion assessment method (CAM©) currently used in minimal data set (MDS) version 3.0. **All 4 criteria must be present:** (1) Acute onset; (2) Fluctuating course; (3) Inattention; (4) Either disorganized thinking or altered level of consciousness.

**** **Acute functional decline** – a new 3 point increase in total activities of daily living (ADL), based on the 4 point ADL scoring system used in MDS version 3.0 to determine the level at which the following tasks are performed: (1) Bed mobility; (2) Transfer; (3) Locomotion within LTC facility; (4) Dressing; (5) Toilet use; (6) Personal hygiene; (7) Eating.

Adapted from TOP "Guideline for the Diagnosis and Management of Urinary Tract Infections in Long Term Care" and Stone et al. "Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria".

Appendix C: Suggested Treatment Protocols for Symptomatic Urinary Tract Infections in Long Term Care Settings

Management Issues related to Treatment of UTIs

- 1/3 of prescriptions for presumed UTI in this population are for asymptomatic bacteriuria or the presence of bacteria in the urine in the absence of urinary symptoms.
- Making a diagnosis of asymptomatic bacteriuria and deciding not to prescribe antibiotic is challenging.
- UTIs are overscreened and overtreated in LTC.
- Older adults have decreased renal function, which needs to be considered when selecting an antibiotic.
- **Generally a minimum of 7 day treatment is required.** For women with lower tract symptoms, 3 days of Cipro 250 mg BID is as effective as 7 days of therapy with fewer adverse effects.
- **Modify antibiotic therapy if necessary once culture and sensitivity (C&S) results are available.**

Treatment of Uncomplicated Symptomatic UTIs in Adults

First Line	TMP/SMX	2 tabs BID or 1 DS tab BID (↓ dose if CrCl < 30 ml/min)
	Trimethoprim	100 mg BID or 200 mg once daily
	Nitrofurantoin	50-100 mg QID or Macrobid 100 mg BID (AVOID if CrCl < 40-60mL/min)
Second Line	Amoxicillin	500 mg TID (500 mg BID if CrCl < 50 mL/min)
	Ciprofloxacin	250 mg BID or 500mg XL* once daily (↓ dose if CrCl < 50 mL/min)
	Levofloxacin*	250 mg once daily
	Amoxicillin/Clavulanate*	500 mg TID or 875 mg BID (500 mg BID if CrCl < 50 mL/min)

*May require Exception Drug Status.

Complicated Urinary Tract Infections

- Includes residents with structural or functional abnormalities such as: obstruction, chronic catheter, spinal cord injury, etc., or any UTI in men.
- Are characterized by mixed culture bacteriology and generally more resistant types of organisms.
- Recurrent infection is common (50% by 6 weeks post therapy). Consider the need to investigate any underlying abnormalities.
- **Generally require longer treatment duration compared to uncomplicated UTI (10-14 days).**
- Residents with catheters should not be treated unless there is evidence of systemic disease.

Treatment of Complicated UTIs in Adults

First Line	TMP/SMX	2 tabs BID or 1 DS tab BID (↓ dose if CrCl < 30 ml/min)
	Trimethoprim	200 mg BID
	Nitrofurantoin	50-100 mg QID or Macrobid 100 mg BID (AVOID if CrCl < 40-60mL/min)
	Norafloxacin	400 mg BID
	Ciprofloxacin	500 mg BID or 1 g XL* once daily (↓ dose if CrCl < 50 mL/min)
Second Line	Levofloxacin*	500 mg once daily x 10 days, or 750 mg daily x 5 days
	Amoxicillin/Clavulanate*	500 mg TID or 875 mg BID (500 mg BID if CrCl < 50 mL/min)

*May require Exception Drug Status.

Adapted from TOP "Guideline for the Diagnosis and Management of Urinary Tract Infection in Long Term Care", PAACT Guidelines on UTIs from "Anti-infective Guidelines for Community-Acquired Infections", and RxFiles "UTI in LTC" (pending release).

Appendix D: Suggested Facility/Program Protocols to Reduce the Incidence of CA-UTI in Continuing Care Settings^{1,3,17}

- Policies and procedures should be developed for recommended catheter use and discontinuation, insertion and management techniques, and replacement indications. Staff should receive education and training relevant to these policies and procedures.
- Encourage and empower nursing staff not to proceed with catheter insertion if criteria are not met, and to contact physicians to discuss alternatives to indwelling catheters (alternatives include a trial of prompted voiding, external condom catheters for male residents, and intermittent catheterization).
- Continuing education should be provided to staff regarding indications for, and alternatives to, urinary catheters. Training can be provided as part of an annual competency program.
- A quality improvement process should be developed for identifying and reviewing cases where catheter insertion does/did not meet the specified criteria. These cases can provide opportunities for improving education modules and existing practices.
- Routine admission assessment and care planning should include documenting the presence and need for an indwelling catheter based on a continence assessment, education and discussions with residents and/or their supports. If the criteria are not met, the catheter should be removed.
- Staff should be provided with regular feedback on process and/or outcome measures related to the quality of care they provide.
- Ensure that staff are educated in, and compliant with, proper hand hygiene practices (including the use of gloves) and have access to hand hygiene products at the point of care.
- Only healthcare providers trained in aseptic technique and the proper use of sterile equipment should be allowed to insert urinary catheters. Competence in this skill should be verified on a regular basis.
- A checklist for the routine maintenance of catheters should be developed. The checklist should allow for easy documentation.
- Educate staff in the proper techniques for obtaining urine specimens if laboratory analysis is required.

Appendix E: Quick Reference Guide for the Management of Urinary Tract Infections in Continuing Care Settings

1: IDENTIFY SIGNS AND SYMPTOMS OF UTI

Typical symptoms suggestive of a UTI include:

No Catheter Present

Acute Dysuria or pain in male genitalia or prostate	OR	Fever* or Leukocytosis* plus 1 new urinary symptom OR 2 or more new urinary symptoms, which include: <ul style="list-style-type: none"> • Urgency • Frequency • Suprapubic pain • Costovertebral angle pain • Gross hematuria • New Incontinence
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With Catheter

At least ONE of the following symptoms: <ul style="list-style-type: none"> • Fever*, rigors or acute hypotension • Leukocytosis* with either an acute change in mental* or functional status* • New onset suprapubic pain, costovertebral angle pain or tenderness • Purulent discharge from catheter site or acute pain or tenderness in male prostate or genitalia
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* See bottom of Appendix A and B for definition of terms.

CAUTION:

- Signs and symptoms **not** specific for a UTI:
 - Worsening functional status
 - Worsening mental status, increased confusion, delirium or agitation
 - Falls (new or more often)
- For residents with non-specific signs & symptoms, **push fluids for 24 hours** and then reassess. If non-specific symptoms continue, consider alternate diagnosis (further investigation may be warranted).
- If symptoms resolve, no further investigation is required.

NOTE:

- Abnormal urine characteristics such as foul smell or abnormal colour are not indicative of a UTI. They may be caused by many factors such as poor hygiene, diet or dehydration.

2: COLLECT URINE FOR CULTURE AND SENSITIVITY (C&S)

Specimen Collection

1. The specimen of choice is a clean catch or midstream urine specimen (refer to your regional laboratory specimen collection manual for details on specimen collection).
2. If a voided specimen cannot be obtained, a specimen collected from a freshly applied condom catheter is suitable for men and in-and-out catheterization is suitable for women.
3. For residents with short term indwelling catheters, specimens should be collected from a specifically designed sampling port using proper technique.
4. For residents catheterized ≥ 14 days, replace the catheter and then collect a fresh urine specimen.

Specimen Handling

- Refrigerate specimens until transport to the laboratory as organisms will multiply at room temperature.

NOTE:

- If antibiotic therapy is indicated, collect the urine sample prior to administration of antibiotics.
- Do not collect urine samples in the absence of UTI symptoms.

3: URINE C&S RESULTS

Urine Culture (C&S) Positive For Symptomatic UTIs

- $\geq 10^5$ cfu/mL of not > 2 species of microorganisms in a voided sample
- 10^2 cfu/mL of any number of organisms in a specimen collected by in-and-out catheter

Urine Culture (C&S) Positive for Symptomatic CA-UTIs

- 10^5 cfu/mL of any organism(s)

Susceptibility

- Check the C&S report against medication orders to ensure that the organism causing the UTI is sensitive to the antibiotic which has been ordered for treatment.
- If more than one organism is causing the UTI, ensure all organisms are sensitive to the prescribed antibiotic.

NOTE:

- Do **not** repeat C&S sampling after antibiotic therapy is completed unless signs and symptoms of a UTI persist or recur.

4: PREVENTION OF UTI

- Limit use of catheters and review need daily and/or regularly.
- Ensure proper hydration and nutrition.
- Provide good perineal hygiene daily and after elimination.
- Promote complete bladder emptying and proper voiding habits.

5: PREVENTION OF CA-UTI

- Ensure resident meets the appropriate criteria for catheter use and document reason.
- Perform hand hygiene before and after catheter insertion or manipulation.
- Ensure that catheter insertion is limited to trained personnel only.
- Insert catheters using aseptic technique and sterile equipment.
- Properly secure catheter and tubing to prevent movement and urethral traction.
- Keep the collection bag below the bladder at all times and ensure the bag is not lying on the floor.
- Check tubing frequently for kinking and maintain a closed drainage system.
- Perform perineal care with soap and water daily and after each bowel movement.
- Remove unnecessary catheters or document reason for extended use.

6: TREATMENT OF UTI

NOTE:

- Only consider antibiotic therapy in symptomatic residents.
- Stop antibiotics if no infection is identified on C&S result.
- Asymptomatic bacteriuria is very common among residents. It does not indicate infection and does not require treatment with antibiotics.