

OBJECTIVE

Alberta clinicians caring for residents in long term care facilities (LTCF)* will:

- Increase the accuracy of clinical diagnosis of urinary tract infections (UTI)
- Reduce inappropriate prescribing of antibiotics for asymptomatic bacteriuria
- Optimize antibiotic therapy for treatment of UTI while minimizing short and long term risks associated with antibiotic use
- Optimize testing and use of laboratory services for UTI

TARGET POPULATION

Older adults living in LTCF

*LTCF is any congregate living environment for older or disabled persons who have high personal and professional care needs

Note: The clinical principles of this guideline apply in general to older adults regardless of where they reside. The [UTI in LTCF Checklist](#), however, is specifically designed for use in LTCF settings.

RECOMMENDATIONS

- ✓ Diagnose UTI based on clinical assessment of signs and symptoms, **not** laboratory testing.
- ✓ Initiate the [UTI in LTCF Checklist](#) to ensure accurate communication of clinical findings between nursing and medical staff.
- X DO NOT treat asymptomatic bacteriuria (the presence of bacteria in the urine in the absence of clinical signs and symptoms of infection).
- ✓ For medically stable residents with signs/symptoms of UTI, continue to assess and push fluids for 24 hours, before ordering laboratory tests or initiating antibiotics.
- ✓ Use urine culture and sensitivity (C&S) results to guide selection of antibiotics. Collect urine specimens prior to initiation of antibiotics.
- ✓ Impaired renal function is common in older adults and may require antibiotic dose adjustment.
- ✓ If medical status is deteriorating rapidly and antibiotics need to be initiated prior to receiving C&S results:
 - Select a narrow spectrum antibiotic for empiric therapy as per *Bugs & Drugs*
 - Promptly review C&S results and alter empiric antimicrobial therapy, if indicated
 - **STOP ANTIBIOTICS** if C&S results are not consistent with diagnosis of UTI.
- ✓ Consider an alternate diagnosis if symptoms do not improve within 48 hours following initiation of appropriate antibiotic therapy.
- ✓ If the resident's medical condition deteriorates, and if consistent with the resident's Goals of Care Designation, consider transfer to acute care.

- ✓ For residents with neurogenic bladder caused by multiple sclerosis and with a suspected UTI see [Appendix A](#) for specific assessment, treatment and management recommendations.

BACKGROUND

INTRODUCTION

Antibiotics are prescribed more often for UTI than any other diagnosis in LTCF.¹ Much of this use is inappropriate as the diagnosis of UTI in this population is challenging and the actual frequency of UTI is substantially less.^{1,2} The inability of many residents to communicate signs and symptoms, and the presence of co-morbidities often contribute to difficulties in distinguishing indicators that are specific for UTI. Additionally, the high incidence of asymptomatic bacteriuria in the elderly limits the utility of laboratory testing for diagnosing a UTI.²⁻⁴ Last, prescribers frequently rely on nurses' reports of clinical findings rather than first-hand examination of the LTCF resident leading to diagnostic uncertainty and suboptimal prescribing. As a result, in LTCF antimicrobial therapy is often initiated in the absence of signs and symptoms localized to the urinary tract or as a preventative measure, leading to inappropriate use of antibiotics and increased rates of antimicrobial resistance and adverse effects, such as infection with *Clostridium difficile*.^{5,6}

The availability of antimicrobial agents that target uropathogens has become increasingly limited due to increasing rates of antibiotic resistance, especially in LTCF, as reported in local antibiogram data in Calgary and Edmonton.^{7,8} Consequently accurate diagnosis is vital so that antibiotics are used only when necessary.

RISK FACTORS

The most common risk factor for UTI in LTCF is the presence of an indwelling catheter.⁹ Other risk factors for older adults in LTCF include dehydration, stroke, Alzheimer's disease and Parkinson's disease. Neurogenic bladder associated with multiple sclerosis, is an additional risk for UTI, often seen in younger residents living in LTCF. (See [Appendix A](#) for management of residents with multiple sclerosis.) Risk factors differ for males and females, see [Table 1](#).

Age Group	Female	Male
50 - 70	<ul style="list-style-type: none"> • Prior history of urinary infection at a younger age • Diabetes • Gynecological diseases: cystocele and related surgical procedures 	<ul style="list-style-type: none"> • Prostatic obstruction • Urological/surgical procedures
>70	<ul style="list-style-type: none"> • Gynecological diseases: cystocele and related surgical procedures • Urological diseases (incontinence, residual urine, cystopathy) and related surgical procedures • Urinary catheter • Reduced mental status • Co-morbid diseases • Immunological changes 	<ul style="list-style-type: none"> • Prostatic obstruction • Urological/surgical procedures • Urinary catheter • Reduced mental status • Co-morbid diseases • Immunological changes

Table 1: Female Versus Male Risk Factors^{10,11}

ETIOLOGY

The urine of elderly residents with UTI has a greater variability of uropathogens compared with younger individuals. *Escherichia coli* is the most common uropathogen in older residents with and without indwelling catheters.¹² *Klebsiella pneumoniae* is the second most commonly isolated pathogen. Pathogens more commonly seen in men include: *Proteus mirabilis*, *P. vulgaris*, and *Morganella morganii*, while *Proteus* species are commonly isolated from residents who are chronically catheterized (lab data from CLS and Dynalife). Infections with *Proteus spp.* and *M. morganii* may be associated with renal/ureteric stone formation.

In residents with recurrent infections, Gram negative organisms other than *E. coli* are isolated more frequently as well as Gram positives including *Enterococci*, coagulase negative *Staphylococci*, and group B *Streptococci*. These tend to be more resistant to treatment.

The most common urinary pathogens are listed in [Table 2](#).

Gram Negative	Gram Positive
<i>Citrobacter spp.</i>	<i>Enterococcus spp.</i>
<i>Citrobacter freundii</i> complex	Group B <i>Streptococcus</i>
<i>Citrobacter koseri</i>	<i>Staphylococcus aureus</i>
<i>Enterobacter spp.</i>	
<i>Enterobacter aerogenes</i>	
<i>Enterobacter cloacae</i>	
<i>Escherichia coli</i>	
<i>Klebsiella spp.</i>	
<i>Klebsiella oxytoca</i>	
<i>Klebsiella pneumoniae</i>	
<i>Morganella morganii</i>	
<i>Proteus mirabilis</i>	
<i>Pseudomonas aeruginosa</i>	

Table 2: Common Urinary Pathogens

Source: 2012 Antibigram Calgary Lab Services (CLS) for males and females >40 years of age and Dynalife Dx Laboratories 2005-2012 for LTCF in Edmonton

<http://www.calgarylabservices.com/education-research/publications/microbiology-newsletters.aspx>

<http://www.dynalifedx.com/HealthProfessionals/Antibiograms/tabid/1317/Default.aspx>

CLINICAL INDICATORS

The Loeb minimum criteria for the diagnosis of UTI in residents of LTCF ([Table 3](#)) have been widely used since their publication in 2001. When a UTI is suspected the resident should be assessed for clinical signs and symptoms that are specific for a UTI as listed in [Table 4](#) and documented on the checklist.¹³

Non-catheterized residents with UTI usually present with symptoms that are localized to the urinary tract (dysuria, new or increased urinary frequency, urgency or incontinence, new costo-vertebral angle or suprapubic pain or tenderness, hematuria). Temperature may or may not be elevated in LTCF residents with UTI.

In catheterized residents, new flank or costo-vertebral angle or suprapubic pain or tenderness is an indication of UTI, but a UTI may also present with fever, rigors or new onset delirium. However, there are many other, more common causes for these nonspecific symptoms, both infectious (other than UTI) and non-infectious. (See [Non-Specific Signs and Symptoms](#)) The diagnosis of UTI in catheterized

residents therefore is one of exclusion, made after other causes have been ruled out.¹⁴ This approach is important, both for good antimicrobial stewardship and to avoid overlooking the actual cause of the resident’s symptoms.

Signs/Symptoms	No Indwelling Catheter	With Indwelling Catheter
Dysuria	<p>Acute dysuria is a typical symptom of a UTI.</p> <p>Cognitively impaired residents may have difficulty describing symptoms. Staff should assess if the resident has pain specifically when urinating. If the resident is showing responsive behaviors, rule out other causes before making a diagnosis of UTI.*</p>	
Elevated temperature**	<p>Fever is a marker for serious infections and is the most important clinical indicator for antibiotics.</p> <p>Elderly persons require a longer time to present with fever, may not have an increase in temperature or may even be hypothermic.</p> <p>A temperature greater than 38 °C or an increase of 1.1 °C (on two consecutive occasions, four to six hours apart) above baseline is significant.</p> <p>Elderly adults often take medications that lower baseline temperature.</p> <p><i>Caution: lack of identifying fever may delay diagnosis. Compare temperature with baseline.</i></p>	
New or increased urinary urgency, frequency, incontinence	<p>Chronic genitourinary symptoms are common in the elderly and only acute changes in genitourinary symptoms are relevant for the diagnosis of UTI.</p>	
New suprapubic pain or tenderness New flank/costo-vertebral angle pain or tenderness**	<p>Localized pain can indicate a UTI including an upper UTI (pyelonephritis).</p>	
Hematuria	<p>Blood in the urine alone is not always indicative of infection, but is an indication of a UTI if other urinary signs and symptoms are present.</p>	
Exclusion of other infectious and non-infectious causes		<p>Diagnosis of UTI in a resident with non-specific signs/symptoms is a diagnosis of exclusion.</p>
Rigors**		<p>If no other cause of infection can be identified, rigors can indicate UTI</p>
New onset delirium		<p>If no other cause of infection can be identified, new onset of delirium may indicate a UTI in catheterized residents.</p>
<p>*Responsive behaviors: Words, gestures, or actions used by persons with dementia to express something important about their personal, social, or physical environment such as un-met physical needs, a stimulus in the environment, psychosocial needs, or the approach of care team members or other residents</p> <p>**Indicative of pyelonephritis (upper UTI) rather than cystitis (lower UTI)</p>		

Table 3: Typical Signs/Symptoms of UTI¹³

Typical Symptoms No Indwelling Catheter	Typical Symptoms Indwelling Catheter
<ul style="list-style-type: none"> • Acute dysuria <p>OR</p> <ul style="list-style-type: none"> • Fever (> 38 °C), or an increase of 1.1 °C above baseline on 2 consecutive occasions (4-6 hours apart) <p>PLUS one or more of the following:</p> <ul style="list-style-type: none"> • New or increased urinary frequency, urgency, and incontinence • New flank/costo-vertebral angle or suprapubic pain or tenderness • Gross hematuria 	<ul style="list-style-type: none"> • No other identifiable (infectious or non-infectious) cause for resident's symptoms/signs <p>AND one or more of the following:</p> <ul style="list-style-type: none"> • Fever (> 38 °C) or an increase of 1.1 °C above baseline on 2 consecutive occasions (4-6 hours apart) • New flank/costo-vertebral angle or suprapubic pain or tenderness • Rigors • New onset delirium

Table 4: Clinical Assessment for UTI: Typical symptoms of UTI in non-catheterized and catheterized LTCF residents¹³

NON-SPECIFIC CLINICAL SIGNS AND SYMPTOMS

- Non-specific signs/symptoms such as fever, rigors, or increased confusion or falls, in the absence of localizing signs/symptoms to the urinary tract, are indications of medical changes but are not diagnostic for UTI.^{14,15} Signs and symptoms which should not be used to confirm a diagnosis of UTI are listed in [Appendix B](#).
- Rarely, UTI in catheterized LTCF residents may present with either an acute change in mental status or acute functional decline with no alternate diagnosis and leukocytosis. Changes in mental or functional status must meet stringent criteria measured against objective standards to be considered signs of UTI and additionally cannot be attributable to any other potential source ([Appendix C](#)).¹⁴ The criteria for assessment of mental and functional status are listed in [Appendix D](#).
- Fever, alone, is caused by UTI in non-catheterized residents, in <10% of cases,¹⁶ in catheterized residents in about one third of cases.¹⁷
- In the non-communicative resident, diagnosis should be based on clinical signs and symptoms consistent with a UTI rather than non-specific symptoms. If the resident is showing responsive behaviors associated with dementia, staff must observe carefully whether these behaviors are indicative of pain when urinating. Other causes of responsive behaviors need to be excluded before arriving at a diagnosis of UTI.
- A diagnosis of UTI can be made without localizing urinary tract symptoms if a blood culture isolate is the same as the organism isolated from the urine, and there is no alternate site of infection.
- Common infectious causes of non-specific clinical signs and symptoms include:
 - Respiratory tract infections
 - Skin and soft tissue infections
 - Gastroenteritis
 - Intra-abdominal infections.
- Common non-infectious causes of non-specific clinical signs and symptoms include:

- Dehydration (most common)
- New medication adverse effects
- Trauma
- Hypoxia
- Hyponatremia
- Hypoglycaemia
- Worsening dementia
- Unmanaged pain
- Frailty

DIFFERENTIATING ASYMPTOMATIC BACTERIURIA FROM UTI

Asymptomatic bacteriuria is the presence of bacteria in the urine in the absence of clinical signs and symptoms of infection. The prevalence of asymptomatic bacteriuria increases with age and is more common in women than men.¹⁸ Asymptomatic bacteriuria is most common in those with impaired urinary voiding, indwelling urinary devices or in those who are functionally impaired (e.g. dementia residents), irrespective of gender. Since these risk factors are more prevalent in the elderly who need personal or professional care, the prevalence of asymptomatic bacteriuria is higher in individuals receiving care at home or residing in a LTCF. Catheterized residents with long-term, indwelling catheters have asymptomatic bacteriuria in 100% of cases.¹⁸

[Table 5](#) shows the prevalence of asymptomatic bacteriuria (%) in different populations. Age related changes that contribute to asymptomatic bacteriuria are listed in [Table 6](#).

Population	Prevalence of Asymptomatic Bacteriuria (%)
Elderly residents (≥70y) in community	
• Women	• 10-20
• Men	• 5-20
Elderly residents in LTCF	
• Women	• 25-50
• Men	• 15-40
Residents with spinal cord injuries	
• Intermittent catheter use	• 20-90
• Condom catheter	• 60
Residents with indwelling catheter	
• Short term	• 10-20
• Long term (>14d)	• 100

Table 5: Prevalence of Asymptomatic Bacteriuria in Different Populations¹⁸

Anatomical	Pelvic prolapse/cystocele; benign prostatic hypertrophy; urinary tract obstruction; fecal incontinence/impaction; vaginal atrophy; estrogen deficiency; bladder or prostate cancer
Functional	Incomplete bladder emptying or neurogenic bladder; CNS disorders (i.e., Parkinson’s disease, dementia); spinal cord injury; insufficient fluid intake/dehydration
Metabolic	Diabetes; immunosuppression
Instrumental	Indwelling Foley catheter or urinary catheterization or instrumentation procedures
Gender	In women, a prior history of UTI at a younger age

Table 6: Age Related Factors Associated with Asymptomatic Bacteriuria¹⁹

Diagnosis of UTI in LTCF residents must be based on clinical findings not urine testing. The high prevalence of asymptomatic bacteriuria in LTCF residents limits the usefulness of urine testing for diagnosis of UTI.^{2,4,12} A negative urine microscopy for pyuria or a negative urine culture result can exclude UTI, but neither a positive urinalysis nor a positive culture result is diagnostic for UTI. Urine testing cannot be used to diagnose UTI in LTCF residents.

Pyuria is common among those with asymptomatic bacteriuria. Among residents of LTCF, 90% of those with bacteriuria, 30% of those without bacteriuria, and 50-100% of those with indwelling catheters have pyuria.^{12,18}

Do not treat asymptomatic bacteriuria. The presence of bacteria in the urine in the absence of clinical signs and symptoms of a UTI does not indicate infection or the need to treat with antibiotics.^{4,12,18} Similarly, the presence of pyuria is not diagnostic for UTI and is not an indication for antibiotic treatment.^{12,18} Routine urine testing is not recommended or required and can lead to unnecessary administration of antibiotics, which is harmful to residents, increases antibiotic resistance rates and is wasteful of finite healthcare resources.

Results of several studies have shown no benefit associated with the treatment of asymptomatic bacteriuria as measured by the rate of subsequent symptomatic infections, improved chronic urinary symptoms or survival. The only exceptions for screening and treating asymptomatic bacteriuria, where the benefits outweigh the harm, are during pregnancy and prior to any urological procedure likely to cause mucosal bleeding.¹⁸

ENSURE ADEQUATE HYDRATION

If signs and symptoms suggest a UTI, push fluids for 24 hours while continuing to monitor, as typical symptoms often resolve with adequate hydration. Watchful waiting is a reasonable approach for antibiotic use for UTI in LTCF given its success in other populations.^{9,20-22} Exceptions to this recommendation are residents whose medical status is deteriorating rapidly or residents on fluid restriction. Symptoms indicating transfer to the emergency department or acute care are listed in [Appendix E](#).

Strategies to facilitate adequate fluid intake for older adults include education of the client, their family and staff and offering a variety of fluids at meals and between meals including water, tea, coffee, juice, soup, and mild oral rehydration solutions. Ideally older adults should receive 30 mL/kg with a minimum of 1500 mL per day.²³ Hypodermoclysis or IV fluids are recommended for residents who are unable to be hydrated orally and whose fluid intake is less than 1000 mL/day.²⁴

If symptoms continue, treat as for UTI. If symptoms resolve, no further intervention is required. This practice avoids risks associated with antibiotic use without compromising resident safety.

PRACTICE POINT

For medically stable residents with signs and symptoms of a UTI, push fluids for 24 hours and continue to assess. Symptoms often resolve with adequate hydration, thus avoiding unnecessary antibiotics without compromising resident safety.

LABORATORY

The role of urine culture and sensitivity (C&S) is to guide selection of antibiotic therapy rather than to diagnose a UTI. Dipsticks or urine microscopy cannot be used to diagnose a UTI.²⁵ A positive dipstick test for leukocyte esterase or nitrite or positive microscopy for WBC and/or bacteria are not diagnostic for a UTI. Pyuria is found in over 90% of cases of asymptomatic bacteriuria and 100% of symptomatic UTIs. The absence of pyuria by urine microscopy rules out a UTI but the presence of pyuria, or the relative amount of pyuria, will not distinguish asymptomatic bacteriuria from UTI. Asymptomatic bacteriuria and pyuria are common in the elderly and do not indicate infection or the need to treat with antibiotics.^{12,18} If the diagnosis of UTI is uncertain, a urine microscopy for WBC (not dipstick) should be requested as a negative result will exclude a UTI.

A urine specimen for C&S should be obtained when signs and symptoms consistent with a UTI are present and continue after adequate hydration. If the resident's condition is deteriorating rapidly and empiric antibiotic therapy is indicated, collect the specimen before any antibiotics are given.

PRACTICE POINT

Pyuria alone is not sufficient for a diagnosis of a UTI as it does not differentiate between UTI and asymptomatic bacteriuria.

A positive dipstick for leukocyte esterase or nitrite is not diagnostic for UTI.

Electrolytes and serum creatinine testing may be appropriate if fluid status is a concern.

A recent calculated creatinine clearance is required for appropriate antibiotic dosing as decreased renal function is common in the elderly. Nitrofurantoin is not recommended for residents with creatinine clearance less than 60mL/min because drug levels in the bladder may not reach sufficient concentrations to be effective and incidence of adverse effects is higher in those with decreased renal function.

Repeat C&S after initiation or completion of antibiotic therapy is NOT necessary unless typical UTI signs and symptoms persist (after 48-72 hours of starting treatment) or recur. There is no need to check for a microbiological cure. This applies to complicated UTI as well.

SPECIMEN COLLECTION

Correct specimen collecting and handling will ensure accurate results.

- The preferred method for urine collection is:
 - A clean catch midstream urine sample (MSU) collected two to four hours after last void
 - The specimen MUST be collected BEFORE starting antibiotics
 - Both clear, verbal AND written instructions should be given to minimize the risk of contamination with perineal flora
- When a voided specimen cannot be collected, use:
 - A freshly applied condom catheter for men if measures are taken to limit contamination

- In-and-out catheterization for women collected aseptically
- For residents with indwelling catheters in situ less than 14 days:
 - Specimens should be obtained by aseptic aspiration from the catheter tubing port
 - DO NOT collect the specimen from the drainage bag where contamination is likely
- For residents with indwelling catheters *in situ* more than 14 days:
 - Remove the catheter first, then either collect an MSU or, if re-catheterization is indicated, insert a new catheter and collect a urine specimen from the catheter tubing port
- Urine should be collected in a sterile container and transferred IMMEDIATELY into a preservative containing tube (can be stored and transported at room temperature). If this method is not available, urine should be submitted in an orange-top container, which MUST be refrigerated after collection, and transported with an ice pack.
- To assist with laboratory testing and interpretation, include on the laboratory requisition:
 - Two resident identifiers
 - Details of submitting physician/location
 - Type of specimen
 - Date and time of collection
 - Clinical signs and symptoms, i.e. reasons for sending the urine for culture
 - Drug allergies
 - Current or recent antibiotic use
- Label specimen container and provide with lab requisition ([as above](#))
- Deliver to the laboratory as soon as possible after collection to expedite the result.
- For those individuals with catheters in place longer than 14 days and symptoms of a UTI, the catheter should be replaced before the urine sample is collected. This is important because 1) it will ensure only bladder urine is sampled for investigation rather than the bacteria colonizing the inside of the old catheter,^{9,26} and, 2) it will provide effective source control, thus improving clinical outcomes, i.e., earlier defervescence, lower risk for recurrent infection and reduced chance of developing a resistant infection. Collect specimens by aseptic aspiration from the catheter tubing port rather than from the collection bag.
- The urine specimen for culture must always be collected before antimicrobials are initiated. In all cases, specimens should be collected in laboratory supplied containers and handled according to approved laboratory guidelines.

C&S RESULTS AND TREATMENT

- Traditionally, only high bacterial colony counts of uropathogens (10^7 and 10^8 cfu/L) were considered significant. More recent evidence supports the significance of lower counts of 10^6 cfu/L in certain groups of residents who have signs/symptoms of UTI. Lower bacterial counts might be expected in LTCF residents particularly if fluids have been pushed for 24 hours prior to specimen collection and also because bacterial counts may not reach high levels if the resident is voiding frequently. If symptoms of UTI are stated on the laboratory requisition, identification and susceptibility testing will be performed on specimens with low counts of uropathogens.
- In the absence of symptoms/signs of UTI, high counts represent asymptomatic bacteriuria while low counts represent perineal contamination.
- A mixed growth (≥ 3 organisms) in MSU or intermittent catheter specimens usually indicates contamination from perineal/distal urethral flora, and the need for a repeat, properly collected specimen.
- A mixed growth in a long-term, indwelling catheter specimen usually indicates colonization of the catheter. However, in the presence of signs/symptoms of UTI, it may indicate a polymicrobial infection. Only if relevant signs/symptoms are stated, will the uropathogens in a mixed culture be identified and tested for susceptibilities.
- Urine C&S results will indicate which antibiotics will be effective against the organism(s) causing the UTI.
- Select a narrow spectrum antibiotic as per *Bugs & Drugs*^{27,28}
- If the resident's condition is not deteriorating, wait for C&S results before initiating the antibiotic.
- If the resident's condition was deteriorating rapidly and an antibiotic was initiated prior to availability of C&S results, ensure all pathogens are susceptible to the antibiotic. If the organisms are not sensitive to the initial antibiotic, **STOP** the initial antibiotic and initiate new therapy based on the C&S result.
- If the urine culture is negative or if bacterial count is less than 10^6 cfu/L, **STOP** the antibiotic.

ANTIBIOTIC RECOMMENDATIONS FOR UTI IN LTCF RESIDENTS

ANTIBIOTIC AGENTS

Selecting an antimicrobial for treatment of a UTI is based on the known or anticipated culture result, local susceptibility data,^{7,8} and the resident's tolerance or allergies to the treatment. Narrow spectrum, first-line agents are preferred.^{27,28} Recommended treatment options for UTI in LTCF have been extracted from *Bugs & Drugs*.^{27,28}

TREATMENT DOSE, FREQUENCY AND DURATION

To limit development of antibiotic resistance, follow recommendations in *Bugs & Drugs*^{27,28} for antibiotic dose, frequency and duration. Failure of a resident to respond to antibiotics is a signal to investigate for other underlying conditions such as diabetes mellitus, structural renal tract abnormality or antibiotic resistance.

Appropriate antibiotic dosing is important as renal impairment is common in the elderly and often goes unrecognized. Calculated creatinine clearance is a better measure of renal function than serum creatinine concentration, particularly in the elderly. A creatinine clearance calculation will assist with medication dose adjustment.¹⁸

The majority of individuals who have a complicated UTI associated with functional and anatomical abnormalities of the genitourinary (GU) tract are treated with 7-14 days of antibiotic therapy. If there is a prompt response, i.e., within 48 hours, to antimicrobial therapy, the duration of therapy should be seven days to limit adverse effects and the emergence of resistant organisms. Longer courses of therapy, i.e., up to 14 days, may be needed for delayed response or structural abnormality.^{27,28}

For residents with catheter-associated UTI and prompt response, i.e., within 72 hours, treat for seven days and if delayed response, treat for 10-14 days (see *Bugs & Drugs*^{27,28} for specific details). Three days may be sufficient in women ≤ 65 years old if:

- No fever or upper urinary tract symptoms, AND
- Short-term catheterization, AND
- Catheter has been removed (and not replaced)

RECURRENCES

Repeat C&S after completion of antibiotic therapy is inappropriate and leads to the misconception that recurrent UTIs are common in LTCF. If typical signs and symptoms of UTI resolve, urine C&S should not be ordered. If signs and symptoms of UTI persist or recur, a microbiological and urological evaluation is required to determine what interventions may be appropriate. Use of low dose antibiotics/prophylaxis to reduce recurrence is not recommended and can promote the carriage of resistant bacteria and subsequent infections that are even more difficult to treat.

ANTIBIOTIC PROPHYLAXIS

Prophylactic antibiotics should only be administered to residents who are found to have asymptomatic bacteriuria prior to an invasive urological procedure where mucosal bleeding is anticipated. The use of antibiotics to prevent UTI in other residents with asymptomatic bacteriuria is not appropriate as it will not decrease the frequency of symptomatic episodes of UTI and encourages the emergence of resistant organisms.

CATHETER ASSOCIATED UTIs

In LTCF, 5-10% of residents have a chronic urinary catheter in place.²⁹ Catheters may be indicated for urinary retention or incontinence control, wound management and resident comfort at end of life.⁹

Long-term placement of urinary catheters should be reassessed on a regular basis, for example upon admission or return from acute care, or at least annually, to determine ongoing need. If the need for a catheter is questionable, the catheter should be removed and the individual monitored for urinary retention. This allows for consideration of options other than catheterization with an aim of preventing or avoiding further catheter-related complications. Although catheter-related bacteriuria in the elderly is extremely common (90% with intermittent catheterization and 100% with long-term, indwelling catheters), bacteriuria alone is not indicative of a UTI. Biofilms form along the catheter leading to universal bacteriuria and can include a wide variety of bacteria or yeast species.⁹

Symptomatic infection in chronically catheterized residents is often not accompanied by localizing genitourinary findings. When fever is present and localizing symptoms are absent, a diagnosis of UTI is always one of exclusion. Many symptoms may not be from a urinary source, so critical clinical evaluation is essential.²⁹ Treatment algorithms that limit inappropriate treatment of asymptomatic bacteriuria and avoidance of empiric antimicrobial therapy are recommended. The best prevention for catheter-acquired urinary tract infection is to avoid use of a urinary catheter whenever possible and to remove the catheter promptly when it is no longer indicated.²⁹

Catheter-associated UTIs are common and carry increased risks of complications and morbidity. The Centers for Disease Control (CDC) has published guidelines for prevention of catheter-associated urinary tract infections. These are listed in [Appendix F](#).

Residents with catheters who develop symptomatic UTIs should be treated for each episode. Urine C&S is necessary to ascertain the infecting organism and the appropriate antimicrobial therapy. Multiple species of bacteria may be found in catheterized residents. Recommended treatment options for catheter-associated UTIs have been extracted from *Bugs & Drugs*.^{27,28}

SPECIALIST CONSULTATION

UROLOGIC CONSULTATION

Urologic consultation may be required when obstructive uropathy, calculi, abscesses or genitourinary tract anatomic abnormalities are suspected. Imaging studies may be appropriate.

Routine urinalysis and C&S may be required as part of the consultation (not recommended), but results should not be used to diagnose a UTI. Diagnosis of UTI in elderly residents must be based on clinical assessment due to the prevalence of asymptomatic bacteriuria which confounds laboratory results in making a diagnosis.

PSYCHIATRIC CONSULTATION

Psychiatric consultation may be required when a resident's behavior or mental condition changes or deteriorates. Although urine C&S may be routinely ordered as part of a psychiatric consultation (not recommended), results must be interpreted with caution. In the absence of clinical signs and symptoms of UTI, a positive urine C&S is not diagnostic for UTI. Misinterpretation of urine C&S results may cause the real source of behavioral changes to be overlooked.

Diagnosis of UTI in elderly residents must be based on clinical assessment. Laboratory results cannot be used to diagnose a UTI due to the high prevalence of asymptomatic bacteriuria in LTC residents. Prescribing antibiotics for behavior changes inappropriately ascribed to a UTI is one of the most significant reasons as to why antibiotics are overused in LTCF.

TRANSFER TO EMERGENCY DEPARTMENT OR ACUTE CARE

Transfer to the emergency department or acute care may be required when medically indicated or when care cannot be managed or provided at the LTCF. Typical symptoms which might indicate a need for transfer are listed in [Appendix E](#).

Although urinalysis and C&S may be ordered as part of routine assessment protocols (not recommended), results should not be used to diagnose a UTI due to the prevalence of asymptomatic

bacteriuria in LTCF residents. Screening for UTI in residents transferred from LTCF should be done by clinical assessment of signs and symptoms.

UTI SURVEILLANCE IN LTCF

The original McGeer surveillance definitions of UTI in LTCF³⁰ have recently been updated¹⁴ and are provided in [Appendix C](#). Although surveillance definitions differ in intent from diagnostic criteria, underlying principles are the same. It is noteworthy that the updated surveillance definitions reflect the importance of excluding positive laboratory results as an indication of UTI. Additionally, these definitions caution against using non-specific signs and symptoms, such as increased falls in the absence of localizing lower urinary tract findings as indicators of UTI in LTCF. Further, the revised criteria highlight the importance of excluding other causes of non-specific symptoms, both infectious (other than UTI) and non-infectious, e.g. dehydration and new medication adverse effects, before making a diagnosis of UTI in catheterized residents.

ANTIMICROBIAL STEWARDSHIP

Antimicrobial stewardship is the practice of using the correct antibiotic, at the optimal dose, duration and frequency, in order to cure the infection while minimizing risks to the patient and limiting development of antibiotic resistance. Antibiotic resistant urinary isolates are more common in LTCF residents than in the community or in acute care.^{7,8} This reflects the higher antibiotic usage (both appropriate and inappropriate) in LTCF. An antimicrobial stewardship program for UTI in LTCF should focus on the following:

Appropriate diagnosis: Because rates of asymptomatic bacteriuria in LTCF residents are high, neither laboratory urinalysis (dipstick or microscopy) nor a urine culture can differentiate colonization from infection. Use of laboratory testing alone to diagnose UTI in LTCF as well as routine ordering of urine cultures to screen for UTI are inappropriate. Diagnosis of UTI in LTCF is based on clinical signs and symptoms.

Minimizing risks for the resident: Unnecessary exposure of residents to antibiotics is associated with specific risks and should be avoided. Risks include adverse effects from, and allergic reaction to the antibiotic therapy, infection with *Clostridium difficile*,⁶ carriage of resistance factors in the commensal flora leading to subsequent infections that are difficult to treat, and increased rates of antibiotic resistance in microbes found in residents of the LTCF.^{6,31}

Strategies to improve diagnosis: Diagnosis of UTI in the LTCF setting relies on evidence informed best practices, clear documentation of symptoms, good communication among the resident's care team, and clinical judgment. Educational interventions and algorithms have been moderately successful in improving the diagnosis and prescribing of antibiotics for UTI in LTCF.^{13,32} A more recent pilot of replacing laboratory results with an automated message about the low risk of UTI in the asymptomatic bacteriuric resident has been effective in reducing inappropriate prescribing.³³ Antimicrobial stewardship initiatives for LTCF have recently been reviewed⁶ and suggest that programs addressing inappropriate prescribing for asymptomatic bacteriuria or UTI prophylaxis have been most successful.^{13,32}

Communication between the LTCF and the prescriber: The [UTI in LTCF Checklist](#) is an antimicrobial stewardship resource for LTCF and follows the recommendations in this clinical practice guideline.

The checklist should be initiated at the LTCF when a resident shows signs and symptoms of a UTI and inserted into the resident's chart. It is intended to guide a consistent approach in clinical assessment and documentation and to facilitate communication between nursing staff at the LTCF and the prescriber.

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SUGGESTED CITATION

Toward Optimized Practice (TOP) Working Group for Urinary Tract Infections in Long Term Care Facilities. 2015 Jan. Diagnosis and management of urinary tract infections in long term care facilities: clinical practice guideline. Edmonton, AB: Toward Optimized Practice.

For more information see: www.topalbertadoctors.org

GUIDELINE COMMITTEE

The committee consisted of representatives from continuing care, family medicine, infectious disease, medical microbiology, pharmacy and public health.

2010

Major Revision January 2015

APPENDIX A

Guidelines for Residents with Multiple Sclerosis³⁴

<p>SAME DAY ATTENTION IN PRIMARY CARE</p>	<p>ASSESS FOR UTI including:</p> <ul style="list-style-type: none"> • Typical signs and symptoms of UTI OR • New/worsening neurological symptoms PLUS 1 or more of the following: <ul style="list-style-type: none"> ◦ history of UTIs or bladder dysfunction ◦ fever, chills ◦ catheterization ◦ new severe fatigue or confusion <p>NOTE: New/worsening neurological symptoms in isolation fall outside the scope of this guideline</p> <hr/> <p>URGENT MANAGEMENT</p> <ul style="list-style-type: none"> • Collect clean catch midstream urine sample. For indwelling catheters, collect from a newly inserted catheter • Order urine for culture and susceptibility (C & S) <i>Label requisition: "MS patient symptomatic of UTI, [indicate sample method]. Work up for low colony count of uropathogens. Contact immediately if sample is unsatisfactory."</i> • Start antibiotic immediately after urine sample collected • Tell patient to phone back if not better within 48-72 hours or sooner if symptoms worsen <ul style="list-style-type: none"> X Do not use dipstick X Do not start antibiotics without collecting urine sample first X Do not wait for results of urine culture to start antibiotic
<p>MONITOR 24 TO 48 HOURS</p>	<p>REVIEW C & S RESULTS</p> <ul style="list-style-type: none"> • Positive growth: Adjust antibiotic, if necessary • No growth: STOP antibiotic <p>NOTE: If microscopic urinalysis is used, stop antibiotics if results are fully negative, i.e., no nitrites, leukocytes, blood, WBC, RBC or bacteria</p>
<p>FOLLOW-UP 14 TO 21 DAYS</p>	<p>ASSESS</p> <ul style="list-style-type: none"> • Review symptoms to ensure UTI has resolved. Repeat urine culture is not required unless patient is symptomatic or pregnant • Recurrent UTI (2 infections in 6 months or ≥ 3 in 12 months) • Overall bladder function: <ul style="list-style-type: none"> ◦ overactive bladder ◦ impaired emptying ◦ incontinence ◦ difficulty with catheters <hr/> <p>CONSIDER REFERRAL to specialist if issues with above</p> <hr/> <p>DISCUSS</p> <ul style="list-style-type: none"> • Prevention strategies • <i>MS: My Bladder Management Action Plan. Consider self-management plan if appropriate</i>

Click [here](#) for the complete MS and Urinary Tract Infection Guideline and the MS: My Bladder Management Action Plan

APPENDIX B

Signs and Symptoms Which Should NOT be Used to Diagnose a UTI	
Sign/Symptom	Comments
Cloudy, milky, or turbid urine	<ul style="list-style-type: none"> Cloudiness can occur with asymptomatic bacteriuria and dehydration, and is not an indicator of UTI or for antibiotic treatment¹²
Malodorous urine	<ul style="list-style-type: none"> Smelly urine is not a valid indicator of UTI and may be caused by diet or poor hygiene.
Worsening or decline in mental status or functional status	<ul style="list-style-type: none"> Acute state of confusion or acute decline in functional status can be associated with any significant infection including UTI as well as non-infectious causes, e.g., dehydration and new medication adverse effects.
Increased responsive behaviors associated with dementia	<ul style="list-style-type: none"> Responsive behaviors are unlikely to be attributable to UTI in the absence of localizing genitourinary signs or symptoms. Delirium may impair the ability to report or observe genitourinary signs or symptoms.
Increased falls	<ul style="list-style-type: none"> Falls indicate a change in functional status and are not a specific indicator of infection including UTI.¹⁴

APPENDIX C

Surveillance Definitions for Urinary Tract Infections

Reprinted with permission from Stone et al. 2012¹⁴

Criteria	Comments
<p>A. <u>For residents without an indwelling catheter (both criteria 1 and 2 must be present)</u></p> <p>1. At least one of the following signs or symptoms:</p> <ul style="list-style-type: none"> a) Acute dysuria or acute pain, swelling, or tenderness of the testes, epididymis, or prostate b) Fever or leukocytosis and at least one of the following localizing urinary tract signs or symptoms: <ul style="list-style-type: none"> i. Acute costovertebral angle pain or tenderness ii. Suprapubic pain iii. Gross hematuria iv. New or marked increase in incontinence v. New or marked increase in urgency vi. New or marked increase in frequency c) In the absence of fever or leukocytosis, then two or more of the following localizing urinary tract signs or symptoms: <ul style="list-style-type: none"> i. Suprapubic pain ii. Gross hematuria iii. New or marked increase in incontinence iv. New or marked increase in urgency v. New or marked increase in frequency 	<ul style="list-style-type: none"> • UTI should be diagnosed when there are localizing genitourinary signs and symptoms and a positive urine culture result. • A diagnosis of UTI can be made without localizing symptoms if a blood culture isolate is the same as the organism isolated from the urine and there is no alternate site of infection. • 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>2. One of the following microbiologic criteria:</p> <ul style="list-style-type: none"> a) At least 10^8 cfu/L of no more than two species of microorganisms in a voided urine sample b) At least 10^5 cfu/L of any number of organisms in a specimen collected by in-and-out catheter 	<ul style="list-style-type: none"> • Urine specimens for culture should be processed as soon as possible, preferably within one to two hours. • If urine specimens cannot be processed within 30 minutes of collection, they should be refrigerated. • If preservative (boric acid) containing tubes are available, urine should be transferred into these, IMMEDIATELY after collection. These can be kept at room temperature during storage and transport. • Refrigerated specimens should be cultured within 24 hours. • Specimens in preservative should be cultured within 48 hours. <p style="text-align: right;"><i>Continued on next page</i></p>

Criteria	Comments
<i>Continued from previous page</i>	
<p>B. For residents with an indwelling catheter (both criteria 1 and 2 must be present)</p> <ol style="list-style-type: none"> 1. At least one of the following signs or symptoms: <ol style="list-style-type: none"> a) Fever, rigors, or new-onset hypotension, with no alternate site of infection b) Either acute change in mental status or acute functional decline, with no alternate diagnosis and leukocytosis c) New-onset suprapubic pain or costovertebral angle pain or tenderness d) Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate 2. Urinary catheter specimen culture with at least 10⁸cfu/L of any organism(s) 	<ul style="list-style-type: none"> • Recent catheter trauma, catheter obstruction, or new-onset hematuria are useful localizing signs that are consistent with UTI but are not necessary for diagnosis. • Urinary catheter specimens for culture should be collected following replacement of the catheter (if current catheter has been in place for more than 14 days)

cfu = colony-forming units

Note: Pyuria does not differentiate symptomatic UTI from asymptomatic bacteriuria. Absence of pyuria in diagnostic tests excludes symptomatic UTI in residents of long-term care facilities.

APPENDIX D

Criteria for Assessment of Non-Specific Signs and Symptoms	
Criteria for Assessment of Mental Status Confusion Assessment Method ¹⁴	Criteria for Assessment of Functional Status Activities of Daily Living (ADL) Score ¹⁴
<p><i>Acute onset (all criteria must be present):</i></p> <ul style="list-style-type: none"> • Fluctuating behavior • Inattention • Disorganized thinking • Altered level of consciousness <p><i>Plus exclusion of any other possible source</i></p>	<p><i>New 3-point increase in total ADL score from baseline, each scored from 0 (independent) to 4 (total dependence):</i></p> <ul style="list-style-type: none"> • Bed mobility • Transfer • Locomotion within LTCF • Dressing • Toilet use • Personal hygiene • Eating <p><i>Plus exclusion of any other possible source</i></p>

APPENDIX E

Typical Signs and Symptoms Which May Indicate the Need for Transfer to Emergency Department or Acute Care
<ul style="list-style-type: none"> • Respiratory distress (e.g., respiratory rate over 40) • Tachycardia (pulse over 125) • Congestive heart failure • Systolic BP less than 90 mmHg • Signs of impending hemodynamic instability • Signs of respiratory failure • Reduced level of consciousness • Clinical judgment of the attending physician at any time • Level of acuity that cannot be managed at the LTCF • Limited capacity to care for illness at the facility, e.g., oxygen not available

APPENDIX F

Prevention of Catheter-Associated Urinary Tract Infections (CAUTI)⁹

- ✓ Insert catheters only for appropriate indications
- ✓ Minimize urinary catheter use and duration of use
- X Avoid the use of urinary catheters in residents for the management of incontinence
- ✓ Perform hand hygiene immediately before and after insertion or any manipulation of the catheter device or site
- ✓ Ensure proper training of personnel in the correct technique of aseptic catheter insertion and maintenance
- ✓ Insert urinary catheters using aseptic techniques and sterile equipment:
 - Use sterile gloves, drapes, sponges, an appropriate antiseptic or sterile solution for peri-urethral cleaning, and a single-use packet of lubricant jelly for insertion
 - Routine use of antiseptic lubricants is not necessary
- ✓ Properly secure indwelling catheters after insertion to prevent movement and urethral traction
- ✓ Unless otherwise clinically indicated, consider using the smallest bore catheter possible, consistent with good drainage, to minimize bladder neck and urethral trauma
- ✓ If intermittent catheterization is used, perform it at regular intervals to prevent bladder over distension
- ✓ Following aseptic insertion of the urinary catheter, maintain a closed drainage system
- ✓ If breaks in aseptic technique, disconnection, or leakage occur, replace the catheter and collecting system using aseptic technique and sterile equipment
- ✓ Consider using urinary catheter systems with pre-connected, sealed catheter-tubing junctions
- ✓ Maintain unobstructed urine flow:
 - Keep the catheter and collecting tube free from kinking
 - Keep the collecting bag below the level of the bladder at all times. Do not rest the bag on the floor
- ✓ Empty the collecting bag regularly using a separate, clean collecting container for each resident; avoid splashing, and prevent contact of the drainage spigot with the non-sterile collecting container.
- ✓ Use standard precautions, including use of gloves and gown as appropriate, during any manipulation of the catheter or collecting system
- X Complex urinary drainage systems are NOT necessary for routine use
- X Changing in-dwelling catheters or drainage bags at routine, fixed intervals is 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.
- X Unless clinical indications exist, DO NOT use systemic antimicrobials routinely
- X DO NOT clean the peri-urethral area with antiseptics to prevent CAUTI while the catheter is in place. Routine hygiene is appropriate
- X Unless obstruction is anticipated, bladder irrigation is NOT recommended
 - If obstruction is anticipated, closed continuous irrigation is suggested to prevent obstruction
 - Routine irrigation of the bladder with antimicrobials is not recommended
- X Routine instillation of antiseptic or antimicrobial solutions into urinary drainage bags is NOT recommended
- X Clamping indwelling catheters prior to removal is NOT necessary

These recommendations are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances. They should be used as an adjunct to sound clinical decision making.