

Educational Module for Nursing Assistants in Long-term Care Facilities: Urinary Tract Infections & Asymptomatic Bacteriuria

In this module you will learn about urinary tract infections (UTIs), asymptomatic bacteriuria, and antibiotic resistance among long-term care facility (LTCF) residents.

This module:

- Describes the physical and non-physical resident changes that should be recognized and communicated
- Outlines laboratory testing for UTI
- Defines and describes asymptomatic bacteriuria
- Discusses management of residents without signs/symptoms of UTI
- Discusses appropriate antibiotic use for UTI in LTCF residents



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Pre-test

Urinary Tract Infections and Asymptomatic Bacteriuria in Long-term Care Facility Residents

1. Is the following statement true or false?
Asymptomatic bacteriuria is defined as bacteria in the urine without symptoms of UTI.
True False

2. Which of the following are risk factors for the development of asymptomatic bacteriuria in long-term care residents?
 - a. Increased age
 - b. Increased number of diagnoses
 - c. Decreased ability to perform activities of daily living
 - d. Indwelling urinary catheter
 - e. All of the above

3. Recognizing changes in resident condition is an essential component of care for a resident with a possible urinary tract infection. Which of the following symptoms or conditions is not important to recognize in a resident who may have a UTI?
 - a. Pain with urination or urinary urgency/frequency
 - b. New onset or worsening of:
 - Sudden, severe confusion
 - Shaking chills
 - Urinary incontinence
 - c. Tenderness in the lower abdominal and flank areas
 - d. Blood in the urine
 - e. None of the above (all symptoms and conditions listed are important to recognize)

Objectives

After completion of this module you will be able to:

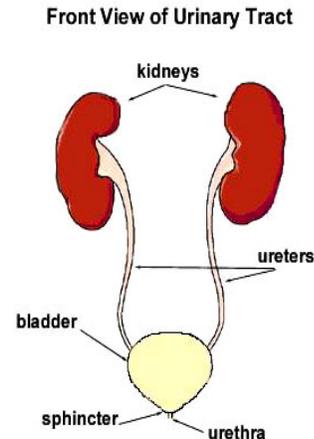
1. Define these terms:
 - a. Urinary tract infection (UTI)
 - b. Asymptomatic bacteriuria.
2. Describe risk factors for UTI and asymptomatic bacteriuria among LTCF residents.
3. Describe the physical and non-physical resident changes that should be recognized and communicated.

Urinary tract infection (presence of bacteria in the urine and symptoms of an infection) is easily confused with asymptomatic bacteriuria (presence of bacteria in the urine without symptoms of infection). This module will provide you with a thorough description of these two conditions and their management - including the appropriate use of antibiotics.

Urinary tract infection (UTI)

A UTI is an infection in the bladder, kidney, or ureters (tubes that connect the kidneys to the bladder) that is characterized by bacteria in the urine (bacteriuria) and clinical symptoms (such as painful urination, fever, etc.). The presence of bacteria in the urine is determined by a urine culture.

Urine does not typically contain bacteria, yeast, or white blood cells (pus or pyuria) in younger, healthy people. However, bacteria and pus are frequently found in the urine of elderly and debilitated people due to several risk factors described below.



LTCF Resident Risk Factors for Developing a UTI

Not only are LTCF residents at increased risk for having bacteria in their urine, they are also at greater risk than healthy, younger people for developing symptoms of UTI. Studies estimate that in a 500-bed LTCF, about 2 residents per week would be diagnosed with a UTI.

While many risk factors cannot be changed, you can still take several actions to reduce residents' risk of developing a UTI.

Factors that contribute to the high frequency of UTIs among LTCF residents include:

- Increased Age
 - Older people have weaker immune systems and are less able to fight infections.
 - **ACTION:** Increased responsibility for staff to protect residents
 - Consistently perform hand hygiene (washing with soap and water or using an alcohol-based hand sanitizer)
 - Practice Standard Precautions (assume all blood, body fluids, environmental surfaces could be contaminated with germs)

- Chronic Disease
 - Chronic diseases such as diabetes, heart disease, and kidney disease lower a person's ability to fight infections.
 - **ACTION:** Increased responsibility for staff to protect residents (consistently perform hand hygiene, practice Standard Precautions)
 - Neurogenic bladder (nerves and muscles controlling the bladder are affected) as a complication of diseases that cause nerve damage (Alzheimer's, Parkinson's, and cerebrovascular diseases).
 - **ACTION:** Avoid unnecessary catheterization; when catheters are needed, follow protocols to provide appropriate catheter care
- Functional Impairment
 - Incomplete bladder emptying caused by decreased ability to move or participate in day-to-day activities.
 - **ACTION:** Provide regular opportunities for resident to empty bladder; assist as needed
- Indwelling Devices
 - Devices that are inserted inside the body, such as urinary catheters, allow bacteria and viruses to enter the body.
 - **ACTION:** Avoid unnecessary catheterization
 - Twisted urinary catheter tubing prevents urine flow into the collection bag
 - **ACTION:** Ensure tubing is secured properly, without kinks or twists, with collection bag below bladder; notify the nurse of any tubing problems
 - **ACTION:** Follow protocols to provide appropriate catheter care
- Other factors that promote bacterial growth in urine:
 - Dehydration and poor fluid intake
 - **ACTION:** Offer fluids frequently (unless on fluid restriction)
 - Prostatic hypertrophy (enlarged prostate) in men (sometimes referred to as "BPH")
 - Decreased estrogen in women
 - **ACTION:** Care givers should be aware of this increased risk among elderly residents

Recognition of UTI

The key factor in determining if a UTI requires treatment is the presence of symptoms involving the urinary system, as displayed in Figure 1 below. Urine tests can provide supportive evidence, but results are not helpful without associated clinical information.

Recognizing a Resident's Change in Condition

Nursing assistants' early recognition and communication of a resident's change in condition plays an important role in providing clinicians information they can use to diagnose and treat residents. Nursing assistants should notify the nurse of the following changes identified by the Agency for Healthcare Research and Quality (AHRQ) Improving Patient Safety in Long-Term Care Facilities, Module 1: Detecting Change in a Resident's Condition: Changes That Matter in Residents

Physical Changes	Non-Physical Changes
Walking	Demeanor
Urination and bowel patterns	Appetite
Skin	Sleeping
Level of weakness	Speech
Falls	Confusion or agitation
Vital signs	Resident complaints of pain

Examples of resident changes may include:

- Pain or tenderness in the lower abdominal or flank area; nonverbal cues that may indicate pain:
 - Vocal complaints (moans, groans, cries, sighs, gasps)
 - Facial grimaces/winces (furrowed brow, clenched teeth)
 - Bracing (holding onto furniture, equipment, or affected area during movement)
 - Restlessness (difficulty keeping still, rocking, constant or occasional shifting of position)
 - Massaging or rubbing of affected area
- Changes in urination and bowel patterns:
 - Intake and output (note any change in trend or unusually high or low values)
 - Urinary urgency/frequency
 - New onset or worsening of:
 - Urinary incontinence
 - Visible blood in the urine

Communicate resident changes to the resident's nurse as soon as possible.

- Vital signs:
 - Fever
 - Shaking chills
- Confusion or agitation:
 - Delirium (sudden, severe confusion)

Other possible causes of resident symptoms, other than UTI:

- Change in medications
 - Some medications can affect urine output, urge, or color, and cause other changes in alertness or body temperature
- Change in routine
 - New environments or routines may increase likelihood of confusion
- Change in diet
 - Some foods can affect appearance and odor of urine; some beverages can increase urine output
- Bowel patterns
 - Constipation can cause abdominal and/or back pain that can be mistaken for pain associated with UTI
- Diagnoses
 - Underlying illnesses may explain resident behaviors (incontinence may be influenced by dementia, depression, diabetes, etc.)
 - Keep in mind that dementia and medications may mask or prevent recognition of symptoms such as pain, urgency, or fever.

Figure 1. Clinical symptoms of UTI

For residents **WITH**
indwelling urinary catheters:

- Fever $>100^{\circ}\text{F}$ ($>37.9^{\circ}\text{C}$) or 2.4°F (1.5°C) increase above baseline
- New costovertebral angle (CVA) tenderness (flank pain)
- Rigors (shaking chills) with or without identified cause
- Delirium (new onset)
- Altered mental status
- Malaise
- Lethargy with no other identified cause
- Acute hematuria
- Pelvic discomfort

If recent catheter removal:

- Dysuria
- Urgent or frequent urination
- Suprapubic pain or tenderness

For residents **WITHOUT**
indwelling urinary catheters:

- Acute dysuria (painful urination)
or
- Fever $>100^{\circ}\text{F}$ ($>37.9^{\circ}\text{C}$) or 2.4°F (1.5°C) increase above baseline *and* at least one of the following:
 - New or worsening:
 - Suprapubic pain (pain over the bladder)
 - Urinary frequency or urgency
 - Urinary incontinence
 - Gross hematuria (blood in the urine)
 - Costovertebral angle (CVA) tenderness (flank pain)

Recognizing and communicating residents' change in condition should be done according to your facility's protocol. If signs or symptoms outlined in Figure 1 are identified, these should be communicated to the resident's nurse, who will determine potential next steps, including whether laboratory testing is required.

Laboratory testing for UTI

Most UTIs result from bacteria that are present in the perineal/peri-anal areas (close to the urinary opening), where they can gain entry to the bladder. The most common organisms found in urine are:

- *Escherichia coli* (*E. coli*)
- *Klebsiella pneumoniae*
- *Proteus mirabilis*
- Enterococci
- Streptococci (Group B)
- *Candida*

When should a urinalysis or urine culture be performed?

Symptoms of UTI should be present before nurses request a urinalysis or urine culture. The physician or nurse practitioner will use information reported by nursing assistants about residents' change in condition, nursing assessment findings, and laboratory results to determine if antibiotic treatment is needed.

Bacteria in the urine without signs and symptoms of infection is not a UTI and does not require antibiotics

Appropriate urine specimen collection ensures accurate lab results

Appropriate urine specimen collection techniques are essential to the effective diagnosis and treatment of a UTI. Accurate lab results are only possible if the urine specimen is collected using appropriate techniques that prevent contamination of the specimen. This includes:

- Clean catch collection
 - If towelettes are used for cleaning prior to urine collection, wipe front to back (from the urinary opening toward the anus, never scrub back and forth)
 - Mid-stream urine should be collected, if possible
- Bladder catheterization
 - Specimen should be collected from a sterile port of the indwelling catheter. If catheter has been in place for more than 14 days, specimen will likely show the presence of bacteria growing inside the catheter; results will be more meaningful if specimen is collected from newly placed catheter, if catheter is still needed.

Collect a urine specimen before giving antibiotics. A urine culture may be falsely negative if the specimen is collected after antibiotics have been started.

Urinalysis or urine culture should be done in order to:

- Confirm the presence and type of bacteria
- Determine which antibiotics will kill the bacteria

Treating urinary tract infections

The primary goal of UTI treatment is to make the most of antibiotics by prescribing antibiotics only when needed. The Society for Healthcare Epidemiology in America (SHEA) has guidelines to help providers decide when antibiotics should be started to treat UTI in residents of LTCF (Table 1).

NOTE: The guidelines are different for LTCF residents who have an indwelling catheter from those LTCF residents who do not have an indwelling urinary catheter.

Table 1: Guidelines for Initiation of Antibiotics for Urinary Tract Infection in Long-Term Care Residents

Catheterized Resident (Foley or suprapubic)	Non-catheterized Resident
Presence of at least one of the following symptoms: <ul style="list-style-type: none"> • Fever: $>37.9^{\circ}\text{C}$ or 100°F; or 1.5°C or 2.4°F increase above baseline • New costovertebral angle (CVA) tenderness (flank pain) • Rigors (shaking chills) • New onset of delirium 	<ul style="list-style-type: none"> • Acute dysuria (pain with urination) Note: Dysuria alone is an indication to start antibiotics without any other symptoms <p>OR</p> <ul style="list-style-type: none"> • Fever: $>37.9^{\circ}\text{C}$ or 100°F; or 1.5°C or 2.4°F increase above baseline PLUS at least one of the following symptoms: <ul style="list-style-type: none"> • New or worsening: <ul style="list-style-type: none"> ○ Urgency ○ Frequency ○ Suprapubic pain ○ Gross hematuria (blood in urine) ○ Costovertebral angle (CVA) tenderness (flank pain) ○ Urinary incontinence

Residents who have a catheter inserted or applied and removed several times a day to empty the bladder (either with a straight catheter or condom catheter) are at lower risk of developing UTIs than residents who have an indwelling catheter. For this reason, the guidelines for non-catheterized residents should be used for these residents when determining when to prescribe antibiotics. While providers are responsible for making UTI treatment decisions, nursing assistants' early recognition and communication of resident signs/symptoms leads to nursing assessment and actions that can promote informed provider decision-making.

Preventing UTIs in LTCF residents

While many of the factors that increase a LTCF resident's chance of developing a UTI cannot be changed (other than avoiding long-term catheterization), it is important to focus on infection prevention. Infection prevention measures include:

- Use Standard Precautions when caring for all residents
 - Wear gloves when there is potential for having contact with blood, body fluids, secretions, or excretions (including contact with urine, and genital mucous membranes)
 - Wear gowns when there is potential for your clothing to become contaminated by splashing or contact with blood, body fluids, secretions, or excretions, regardless of the resident's multidrug-resistant organism (MDRO) status
 - Always clean your hands:
 - Before touching a resident
 - Before putting on gloves
 - Before a clean/aseptic procedure
 - After body fluid exposure
 - After removing gloves
 - After touching a resident
 - After touching resident surroundings
- Increase hydration in residents at high risk for UTI by offering fluids as instructed by nursing
 - Check resident's care plan to assure that the resident is not on a fluid restriction
- Prevent fecal soiling by offering regular opportunities for toileting; regularly check for soiling in incontinent residents
- Encourage frequent bladder emptying by offering assistance with / providing toileting opportunities
- Ensure proper perineal and catheter care is provided
 - Wipe front-to-back (from urinary tract opening (urethra) to anus) to prevent contamination of urethra with fecal flora (microorganisms from the digestive tract that can cause infection if they get into the urinary tract)

Asymptomatic bacteriuria

Asymptomatic bacteriuria means there are bacteria in the urine without symptoms of UTI.

Asymptomatic bacteriuria and UTI among LTCF residents

Asymptomatic bacteriuria is very common and considered a harmless condition among LTCF residents. It occurs as a result of increased age, decreased mobility and/or decreased bladder emptying. Routine testing for bacteriuria among LTCF residents is not recommended.

It is believed that as many as 15 - 40% of men and 25 - 50% of women in LTCFs who do not have indwelling urinary catheters have bacteria in their urine (bacteriuria). Nearly 100% of LTCF residents with an indwelling urinary catheter have bacteria in their urine. *Ninety-eight percent of LTCF residents with bacteriuria do not have symptoms of a UTI.*

Table 2. Prevalence of Asymptomatic Bacteriuria

Group	Prevalence
Pre-menopausal women	1 - 5%
Post-menopausal women	2.8 - 8.6%
Pregnant women	1.9 - 9.5%
Elderly females in LTCF	25 - 50%
Elderly males in LTCF	15 - 40%
Short-term catheter	9 - 23%
Chronic indwelling catheter	100%

Risk factors for asymptomatic bacteriuria among LTCF residents include:

- Indwelling catheter
- Increased age
- Increased number of diagnoses
- Increased number of medications
- Decreased ability to perform independent activities of daily living
- Decreased mental status
- Decreased independent mobility
- Decreased overall health status (self-rated)

"You cannot make an asymptomatic resident better."
(Adapted from presentation by Dr. Ayesha Rashid, St Paul Infectious Disease Associates, Minnesota Antimicrobial Stewardship Conference October 24, 2013.)

Frequently asked questions about UTI and asymptomatic bacteriuria

Do nonspecific behavioral and mental status changes mean a resident has a UTI?

There are many myths about what symptoms indicate a UTI. While the following symptoms require evaluation, current guidelines do not link these symptoms to a UTI that needs antibiotic treatment:

- Chronic incontinence (during sleep or when awake, when coughing or sneezing)
- Anorexia (loss of appetite)
- Difficulty falling asleep or staying asleep
- Fatigue
- Malaise (a generalized feeling of discomfort, illness, or lack of well-being)
- Weakness
- Mental status change
- Fall

Does the presence of pyuria (white blood cells/ pus in the urine) mean a resident has a symptomatic UTI?

No, the presence of pyuria alone does not mean that the resident has a symptomatic UTI or bacteria in the urine. Pyuria is an immune response to bacteria present in the urine. If a resident has bacteria in their urine, they will almost always have pyuria. Pyuria without symptoms should not be treated with antibiotics.

Does foul-smelling urine mean a resident has a UTI?

Foul-smelling or cloudy urine has been used by nurses and other healthcare providers as an indicator of a UTI in the past. However, a resident's urine can smell foul for several reasons, including dehydration, diet, medication, or the presence of specific bacteria. Foul-smelling urine without symptoms of a UTI does not mean that the resident has a UTI and does not require antibiotics.

Are antibiotics needed to treat a UTI?

Symptomatic urinary tract infections should be treated with antibiotics.

Residents with asymptomatic bacteriuria generally should not be treated with antibiotics.

Does it matter if asymptomatic bacteriuria is treated with antibiotics?

Yes! Antibiotics should only be given for bacterial infections. Inappropriate antibiotic use can lead to antibiotic resistance. Infections caused by antibiotic-resistant bacteria can be more severe, require more powerful and toxic antibiotics, and can lead to secondary infections, longer hospital stays, and increased healthcare costs. Additionally, antibiotics can cause bad reactions and side effects; some of these can be severe. Harmful effects caused by antibiotics can include:

- Allergic reactions
- Imbalance between the helpful and harmful bacteria that are normally present in the intestines:
 - Antibiotics kill the helpful bacteria, leaving space for disease-causing bacteria such as *Clostridium difficile* (or *C. diff.*) to take over and cause infection; see *Clostridium difficile* module
 - Diarrhea
- Increased future infections with resistant bacteria
- Harmful drug interactions
- Rashes
- Yeast infections:
 - Antibiotics can kill the bacteria that normally live in the area (such as the mouth or around the vagina). *Candida albicans*, a common yeast, can then take over the area and cause an infection.

Bacteriuria without symptoms of a UTI should not be treated with antibiotics. Treatment of asymptomatic bacteriuria will not:

- Decrease chronic (long-term) symptoms
- Decrease the risk of future UTI episodes
- Decrease persistent bacteriuria (bacteriuria that keeps coming back)
- Decrease the risk of death

Giving antibiotics when they are not needed - such as for asymptomatic bacteriuria - CAN:

- Increase the chance of the resident having a harmful drug reaction
- Increase the chance that the resident will develop antibiotic-resistant bacteria that may cause an infection
- Increase healthcare costs
- Increase the risk of death from a harmful drug reaction or an infection caused by antibiotic-resistant bacteria

Should antibiotics be given to prevent a UTI in residents with asymptomatic bacteriuria?

Antibiotics should not be given to prevent a UTI in LTCF residents, unless it's prior to a surgical urinary tract procedure or if the resident is pregnant.

Do cranberry juice and other cranberry products prevent UTI?

There are no clear data to show that cranberry juice prevents UTI, but if not otherwise restricted, there is no reason not to give cranberry juice to residents. Check with the resident's nurse to make sure it's ok to provide cranberry juice to a resident.

Post-test

Urinary Tract Infections and Asymptomatic Bacteriuria in Long-term Care Residents

1. Is the following statement true or false? **Answer: True**
Asymptomatic bacteriuria is bacteria without symptoms of UTI.
True **False**

2. Which of the following are risk factors for the development of asymptomatic bacteriuria in long-term care residents? **Answer: e**
 - a. Increased age
 - b. Increased number of diagnoses
 - c. Decreased ability to perform activities of daily living
 - d. Indwelling urinary catheter
 - e. **All of the above**

3. Recognizing changes in resident condition is an essential component of care for a resident with a possible urinary tract infection. Which of the following symptoms or conditions is not important to recognize in a resident who may have a UTI? **Answer: e**
 - a. Pain with urination or urinary urgency/frequency
 - b. New onset or worsening of:
 - Sudden, severe confusion
 - Shaking chills
 - Urinary incontinence
 - c. Tenderness in the lower abdominal and flank areas
 - d. Blood in the urine
 - e. **None of the above** (all symptoms and conditions listed are important to recognize)

Glossary

Antibiotic resistance - The ability of bacteria to change so that they develop the ability to survive when exposed to antibiotics that are intended to kill them.

Asymptomatic bacteriuria - Presence of bacteria in urine without signs or symptoms of UTI

Bacteremia - Bacteria in the blood

Bacteria - Bacteria are single-celled life forms. Bacteria are present in soil, water, and all living organisms. Many disease-causing organisms are bacteria; however, not all bacteria cause disease. Some bacteria are necessary for essential functions like digestion.

Colonization - Bacteria are present without causing disease

Costovertebral angle (CVA) tenderness - Pain near the ribs and thoracic vertebrae (sometimes called 'flank pain')

Cystitis - Infection of the urinary tract that is limited to the bladder, usually involving only the mucosal surface. This is the infection that most people think of when they say "UTI." A more common term would be "bladder infection".

Delirium - Sudden, severe confusion. An altered state of consciousness, consisting of confusion, distractibility, and disorientation.

Dysuria - Difficulty or pain with urination

Hematuria - Blood in the urine

Infection - The presence and multiplication of microorganisms (germs) that are causing symptoms (fever, redness, wound drainage). Infection generally implies that the person has signs or symptoms of a disease.

Pyelonephritis - Infection of the kidney usually resulting from travel of the infection from the bladder to the ureter (the tube connecting the bladder and kidney) and then to the kidney. This infection is commonly referred to as a kidney infection.

Pyuria - Presence of white blood cells or pus in the urine

Rigors - Shaking chills

Suprapubic pain - Pain in the lower abdominal region

Urinary incontinence - Involuntary excretion of urine from one's body. It is often temporary, and almost always results from an underlying medical condition.

Urinary tract infection (UTI) - An infection of the urinary tract (bladder, kidney, ureters, urethra (the tube that releases urine from the body)) that is characterized by bacteriuria and symptoms.

Urosepsis - Sepsis occurs when bacteria enter the blood stream and lead to a widespread infection - urosepsis means the infection has stemmed from an infection of the urinary tract.

Virus - A submicroscopic (very small) particle that can reproduce only if it's inside the cell of a living organism. Viruses cannot be killed by antibiotics.

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