



URINARY TRACT INFECTIONS AND ASYMPTOMATIC BACTERIURIA

Educational Module For Nurses In
Long-term Care Facilities

Pre-test

- 1. A thorough nursing assessment is an essential component of care for a resident with a possible UTI. Which of the following symptoms or conditions is not important when assessing a resident who may have a UTI?**
 - a. Symptoms of dysuria (pain on urination) or urinary urgency/frequency
 - b. New onset or worsening of:
 - Delirium
 - Rigors (shaking chills)
 - Urinary incontinence
 - c. Tenderness in the suprapubic and costovertebral angle (flank) areas on palpation
 - d. Hematuria (blood in the urine)
 - e. None of the above (all symptoms and conditions listed are important findings in a nursing assessment)

Pre-test

2. Which of the following are risk factors for the development of asymptomatic bacteriuria in long-term care (LTC) 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. Is the following statement true or false?

Asymptomatic bacteriuria is defined as a bacterial count of $\geq 10^5$ cfu/mL without clinical symptoms of UTI.

Pre-test

- 4. Randomized trials have described the effect of antibiotic treatment for asymptomatic bacteriuria among LTC residents. Which of the following effects have not been consistently shown in these studies?**
- a. No effect on morbidity and mortality
 - b. No effect on symptoms of chronic incontinence
 - c. Increase in the number of acute episodes of UTI

Learning Objectives

- Define these terms:
 - Urinary tract infection (UTI)
 - Asymptomatic bacteriuria
- Describe risk factors for UTI and asymptomatic bacteriuria among LTCF residents
- Describe the components of a thorough nursing assessment for a resident with a possible UTI
- State the clinical indications for antibiotics to treat a UTI

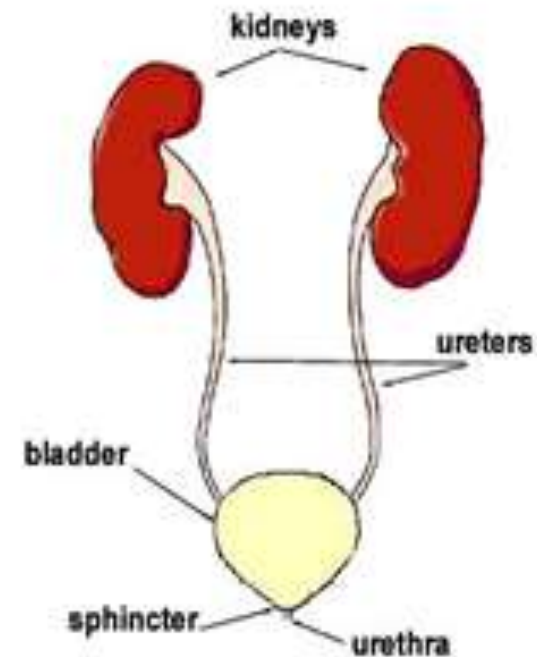
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Urinary Tract Infection (UTI)

Definition:

- A UTI is an infection in the bladder, kidney, or ureters that is characterized by bacteria in the urine (bacteriuria) and clinical symptoms (e.g., painful urination, fever, etc.).
- The presence of bacteria in the urine is determined by a urine culture.

Front View of Urinary Tract



LTCF Resident Risk Factors for Developing a UTI

- A number of factors place LTCF residents at greater risk for infection, including individual and facility characteristics
- While many risk factors are not modifiable, nurses can still take actions to reduce residents' risk of developing a UTI

UTI Risk Factors

Risk Factor	Description	Action Steps for Nursing
Increased Age	Older people have weaker immune systems and are less able to fight infections	Increased responsibility for staff to adhere to Standard Precautions
Chronic Disease	Diabetes, heart disease, and kidney disease lower a person's ability to fight infections	Increased responsibility for staff to adhere to Standard Precautions
	Neurogenic bladder as a complication of degenerative neurological diseases	Avoid unnecessary catheterization; when catheters are needed, follow protocols for appropriate catheter care
Functional Impairment	Incomplete bladder emptying caused by decreased mobility or other functional impairment	Provide regular opportunities for resident to empty bladder

UTI Risk Factors (continued)

Risk Factor	Description	Action Steps for Nursing
Invasive devices	Invasive devices such as urinary catheters allow bacteria and viruses to enter the body	Avoid unnecessary catheterization
	Twisted urinary catheter tubing prevents urine flow into collection bag	Ensure tubing is secured properly, without kinks or twists, with collection bag below bladder. Follow protocols for appropriate catheter care
Other factors that promote bacterial growth in urine	Dehydration and poor fluid intake	Offer fluids frequently (unless on fluid restriction)
	Prostatic hypertrophy in men (sometimes referred to as “BPH”) Decreased estrogen in women	Care givers should be aware of these increased risks among elderly residents

Recognition of UTI: Nursing Assessment Components

- Nonverbal cues that may indicate pain
- Vital signs
- Presence of catheter
 - Insertion date
 - Rationale
- Intake and output (note any change in trend or unusually high/ low values)
- Any localizing urinary symptoms:
 - Dysuria
 - Urinary urgency/frequency/incontinence
 - Tenderness in the suprapubic or costovertebral angle (flank) areas
 - Hematuria
- New onset or worsening of:
 - Urinary incontinence
 - Rigors (shaking chills)
 - Delirium

Complete a thorough nursing assessment prior to contacting the provider.

Other Possible Causes of Resident Symptoms

- Change in medication regimen or recent prn medication
 - Some medications can affect urine output, urge, or color, and cause other changes in alertness or body temperature
- Change in routine
 - New environments or stimuli may increase likelihood of delirium or confusion
- Change in diet
 - Some foods and beverages can affect urine appearance, odor, and output
- Bowel patterns
 - Constipation can cause abdominal and/or back pain that can be mistaken for suprapubic or flank pain
- Diagnoses
 - Clinical course may explain resident behaviors
 - Dementia and medications may mask or prevent recognition of clinical symptoms such as pain, urgency, or fever

Nursing assessments should be completed based on your facility's protocol.

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 tenderness
 - 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)

Laboratory Testing for UTI

Most UTIs result from bacteria present in the perineal area, close to the urinary opening (urethra), where they can gain entry to the bladder. The most common organisms isolated from urine are:

- *Escherichia coli* (*E. coli*)
- *Klebsiella pneumoniae*
- *Proteus mirabilis*

When should a urinalysis (UA) or urine culture (UC) be performed?

- Clinical symptoms of UTI should be present before requesting a urinalysis

(High KP et al. Clinical Practice Guideline for the Evaluation of Fever and Infection in Older Adult Residents of Long-Term Care Facilities: 2008 Update by the Infectious Diseases Society of America. *CID*. 2009;48:149-71)

- If a UA or UC is performed, despite a lack of clinical signs or symptoms of a UTI, antibiotics are not indicated - even if bacteria are present

Laboratory Testing for UTI, cont.

Urine specimen collection that prevents contamination ensures accurate lab results:

- Clean catch collection (assist resident as needed)
 - Wipe from the urinary opening toward the anus with towelettes
 - Mid-stream urine
- Bladder catheterization (from sterile port of indwelling catheter)
 - If catheter has been in place for >14 days, specimen will likely reflect the presence of catheter biofilm
 - Consider obtaining an order to change catheter
- Suprapubic aspiration

Laboratory Testing for UTI, cont.

- Collect a urine specimen prior to initiation of antibiotics in order to ensure an accurate test result
- UA or UC should only be performed on residents with clinical signs or symptoms of a UTI in order to:
 - Confirm the presence and type of bacteria
 - Guide therapy by ensuring that antibiotic selection matches the bacteria and susceptibility results
- If the UC is negative, recommend discontinuing empiric antibiotic therapy

Treating UTI

Summary of the Society for Healthcare Epidemiology in America (SHEA) published criteria intended to help guide the initiation of antibiotics for UTI treatment in residents of LTCF

Minimum Criteria for Initiation of Antibiotics in Long-Term Care Residents

Suspected Urinary Tract Infection

NO indwelling catheter:

- Acute dysuria
- or*
- Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
- and at least one of the following:*
- New or worsening:
- Urgency
 - Frequency
 - Suprapubic pain
 - Gross hematuria
 - Costovertebral angle tenderness
 - Urinary incontinence

WITH indwelling catheter (Foley or suprapubic):

- *At least one of the following:*
 - Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
 - New costovertebral tenderness
 - Rigors
 - New onset of delirium

Post-treatment Testing

Post-treatment urine cultures are not recommended unless the resident continues to have symptoms or develops new symptoms of UTI

ACTION: Continue to assess for symptoms following completion of antibiotic. If no symptoms are present (or no change from baseline), a repeat culture is not indicated.

“Treat the resident, not the culture.”

(Adapted from presentation by Dr. Ayesha Rashid, St Paul Infectious Disease Associates, Minnesota Antimicrobial Stewardship Conference October 24, 2013.)

Preventing UTI in LTCF Residents

Use Standard Precautions when caring for all residents

- Wear gloves when there is potential for having contact with blood, body fluids, secretions or excretions (e.g., urine, feces and mucous membranes)
- Wear gowns when there is potential for 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; putting on gloves; performing a clean/aseptic procedure; and
 - After blood, body fluid exposure; removing gloves; touching a resident or his or her surroundings

Asymptomatic Bacteriuria

- **Definition:** a bacterial count of $> 10^5$ cfu/mL of urine without clinical symptoms of UTI
- Asymptomatic bacteriuria (ASB) is very common and considered a benign condition among LTCF residents.
- Routine testing for bacteriuria among LTCF residents is not recommended

Prevalence of Asymptomatic Bacteriuria

- Many LTCF residents without indwelling urinary catheters have bacteria in their urine (bacteriuria)
- Nearly 100% of LTCF residents with an indwelling urinary catheter have bacteria in their urine
- *98% of LTCF residents with bacteriuria do not have clinical symptoms.*

Prevalence of Asymptomatic Bacteriuria, cont.

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

- **Indwelling catheter**
- **Increased:**
 - Age
 - Number of diagnoses
 - Number of medications
- **Decreased:**
 - Ability to perform independent ADLs
 - Mental status
 - Independent mobility
 - Overall health status (self-rated)

Management of Asymptomatic Bacteriuria

Randomized trials that have studied the effect of antibiotic treatment for ASB among LTCF residents have shown:

- **No effect on:**
 - Morbidity and mortality
 - Symptoms of chronic incontinence
 - Future acute episodes of UTI
- **Negative effect on LTCF residents:**
 - Increased drug side effects
 - Increased future isolation of resistant organisms
 - Increased cost of medication and healthcare
 - Increased risk of acquiring *Clostridium difficile* infection

**Bacteriuria without clinical symptoms of a UTI
should not be treated with antibiotics**

UTI and Asymptomatic Bacteriuria FAQs

Do vague behavioral and mental status changes indicate a UTI?

- There are many myths about what symptoms indicate a UTI
- The following symptoms should be evaluated but 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
 - Difficulty falling asleep or staying asleep
 - Fatigue
 - Malaise
 - Weakness
 - Mental status change
 - Fall

UTI and Asymptomatic Bacteriuria FAQs, cont.

Does the presence of pyuria (pus in the urine) indicate a symptomatic UTI?

- No, the presence of pyuria alone does not mean that the person has a symptomatic UTI.
- Pyuria is considered an immune response to the presence of bacteria.
- Pyuria without clinical symptoms should not be treated with antibiotics.

UTI and Asymptomatic Bacteriuria FAQs, cont.

Does foul-smelling urine indicate a UTI?

- Malodorous urine can be caused by several factors, including dehydration, diet, medication, or the presence of specific bacteria.
- Using urine odor to identify bacteriuria resulted in error in 1/3 of cases in one published study.
- Foul-smelling urine without clinical symptoms of a UTI does not indicate the presence of a UTI.

UTI and Asymptomatic Bacteriuria FAQs, cont.

Are antibiotics needed to treat a UTI?

- Symptomatic UTI should be treated with antibiotics.
- Persons with positive laboratory findings without clinical symptoms (asymptomatic bacteriuria) generally should not be treated with antibiotics.
- Treatment of asymptomatic bacteriuria will not:
 - Decrease chronic symptoms
 - Decrease the risk of future acute UTI episodes
 - Decrease persistent bacteriuria
 - Decrease mortality

UTI and Asymptomatic Bacteriuria FAQs, cont.

Does it matter if asymptomatic bacteriuria is treated with antibiotics?

- Yes! Antibiotics should only be prescribed for bacterial infections
- Inappropriate antibiotic use contributes to antibiotic resistance
- Infections caused by antibiotic-resistant organisms can be:
 - More severe
 - Require more powerful and toxic antibiotics
 - Can lead to secondary infections, longer hospital stays, and increased healthcare costs

UTI and Asymptomatic Bacteriuria FAQs, cont.

Does it matter if asymptomatic bacteriuria is treated with antibiotics?

- Antibiotics can cause adverse effects and side effects, including:
 - Allergic reactions, rashes, adverse drug interactions
 - Disruption of normal flora
 - *Clostridium difficile* diarrhea
 - Yeast infections
 - Increased rates of re-infection with resistant organisms
- Due to the potential of adverse drug reactions or development of antibiotic-resistant super-infections, inappropriate antibiotic prescribing can result in increased mortality

UTI and Asymptomatic Bacteriuria FAQs, cont.

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

- In general, antibiotics should not be given to prevent a clinical UTI in LTCF residents. According to published guidelines, there are only two situations where antibiotics should be given as a prophylactic measure against a UTI:
1) prior to a urologic procedure for which mucosal bleeding is anticipated and 2) during pregnancy.

Do cranberry juice and other cranberry products prevent UTI?

- There are no clear data to indicate that cranberry juice prevents UTI, but if not otherwise contraindicated, there is no reason not to give cranberry juice to residents. Use caution with diabetic residents, as juice commonly contains sugar.

Glossary, part 1

Antibiotic resistance - The ability of a microorganism to withstand the effects of an antibiotic and not be killed by the antibiotic.

Asymptomatic bacteriuria - Presence of bacteria in urine in absence of clinical signs or symptoms of UTI

Bacteremia - Bacteria in the blood

Bacteria - Bacteria (singular: bacterium) are a major group of living microscopic organisms. Bacteria are the most abundant of all organisms. They are ubiquitous in soil, water, and as symbionts of other organisms. Many pathogens, disease-causing organisms, are bacteria.

Biofilm - A layered culture of microorganisms that grow on a surface that they have created themselves by secreting polysaccharides and glycoproteins. Antibiotics generally cannot penetrate a biofilm.

Glossary, part 2

Colonization - Bacteria are present without causing disease

Costovertebral angle (CVA) tenderness - Pain near the ribs and thoracic vertebrae

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 – An altered state of consciousness, consisting of confusion, distractibility, and disorientation.

Dysuria – Difficulty or pain with urination

Glossary, part 3

Hematuria - Blood in the urine

Infection - The entry and multiplication of microorganisms in the tissues of the host that produce injurious effects. Infection generally implies that the person has clinical signs or symptoms.

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

Pyuria - Presence of white blood cells in the urine

Rigors - Shaking chills

Suprapubic pain – Pain in the midline (suprapubic) region

Glossary, part 4

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) that is characterized by bacteriuria and clinical symptoms.

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

Virus - A virus is a submicroscopic parasitic particle that infects cells in biological organisms. Viruses are obligate intracellular parasites that lack the cellular machinery for self-reproduction.

References, part 1

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1. Nicolle LE, Strausbaugh LJ, Garibaldi RA. Infections and antibiotic resistance in nursing home. *Clin Microbiol Rev.* 1996; 9:1-17.
2. Nicolle LE. Urinary tract infection in the elderly. *J Antimicrob Chemother.* 1994;33 Suppl A:99-109.
3. Hooton TM, et al. Diagnosis, prevention, and treatment of catheter- associated urinary tract infection in adults: 2009 international clinical practice guidelines from the Infectious Diseases Society of America. *CID.* 2010;50:625- 663.
4. Loeb M, Bentley DW, Bradley S, et al. Development of minimum criteria for the initiation of antibiotics in residents of long-term-care facilities: results of a consensus conference. *Infect Control Hosp Epidemiol.* 2001;22:120-124.
5. High KP et al. Clinical Practice Guideline for the Evaluation of Fever and Infection in Older Adult Residents of Long-Term Care Facilities: 2008 Update by the Infectious Diseases Society of America. *CID.* 2009;48:149-71

References, part 2

6. Nicolle LE. Urinary tract infection in long-term-care facility residents. *Clin Infect Dis*. 2000;31:757-761.
7. Blumberg E, Abrutyn E. Methods for the reduction of urinary tract infection. *Current Opinion in Urology*. 1997;7:47-51.
8. Warren JW. Catheter-associated bacteriuria. *Clin Geriatr Med*. 1992;8:805- 819.
9. Nicolle LE, et al. Infectious Disease Society of America Guidelines for the Diagnosis and treatment of Asymptomatic Bacteriuria in Adults. *Clin Infect Dis*. 2005;40:643-654.
10. Nicolle LE, Bjornson J, Harding GK, et al. Bacteriuria in elderly institutionalized men. *N Engl J Med*. 1983;309:1420-5.
11. Nicolle LE, Mayhew WJ, Bryan L. Prospective randomized comparison of therapy and no therapy for asymptomatic bacteriuria in institutionalized elderly women. *Am J Med*. 1987;83:27-33.

References, part 3

12. Ouslander JG, Schnelle JF. Incontinence in the nursing home. *Ann Intern Med.* 1995;122:438-49.
13. Brooks S, Warshaw G, Hasse L, Kues JR. The physician decision-making process in transferring nursing home patients to the hospital. *Arch Intern Med.* 1994;154:902-908.
14. Brunzel N. *Fundamentals of Urine and Body Fluid Analysis.* Philadelphia, PA: W.B. Saunders; 1994.
15. Midthun SJ, Paur R, Lindseth G. Urinary tract infections. Does the smell really tell? *J Gerontol Nurs.* 2004;30(6):4-9.
16. Nicolle LE, the SHEA Long-Term—Care Committee. Urinary tract infections in long-term -- care facilities. *Infect Control Hosp Epidemiol.* 2001;22:167-175.



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