

Antibiotic Stewardship for Asymptomatic Bacteriuria

Demonstration Project: Long Term Care Facility
May 7, 2015

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Demonstration Project

Provided in partnership with the National Association for City and County Health Officials (NACCHO), FDOH in Orange County, and FDOH Health Care-Associated Infection (HAI) Prevention Program.

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Objectives

- To understand the antimicrobial resistance threat
- To identify an antibiotic stewardship opportunity for long-term care
- To understand the difference between asymptomatic bacteriuria and urinary tract infections
- To identify project objectives

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Economic Threat

The CDC reports that antibiotic-resistant infections account for at least \$20 billion in excess direct health care costs and up to \$35 billion in lost productivity due to hospitalizations and sick days each year.

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Antibiotic Resistance

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Photos Source: CDC

Top Threats

- *Clostridium difficile*
- Carbapenem-resistant Enterobacteriaceae
- Multi-drug resistant *Neisseria gonorrhoeae*



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National Strategy

- National Strategy for Combating Antibiotic Resistant Bacteria (CARB)
 - Slow the development and spread
 - Strengthen surveillance
 - Improve diagnostic tests
 - Develop new antibiotics, therapeutics, and vaccines
 - Improve international collaboration and capacities for antibiotic resistance prevention, surveillance, control, and antibiotic research and development

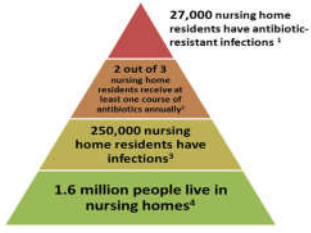
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National Strategy

- Slow the development of resistant bacteria and prevent the spread of resistant infections
 - Improve antibiotic stewardship: prescribe medications only when necessary
 - Right drug for the right bug for the right amount of time
- Antibiotic stewardship for asymptomatic bacteriuria

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Antibiotic use in long-term care: Where are we?



1. Centers for Medicare and Medicaid Services, Long Term Care Minimum Data Set, Resident profile table as of 05/02/2005, Baltimore, MD.

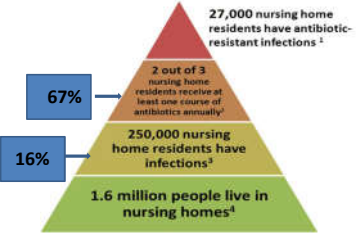
2. Doms, M et al. Antibiotic use in Ontario facilities that provide chronic care. *J Gen Intern Med* 2002; 16: 276-283.

3. Centers for Disease Control and Prevention, National Center for Health Statistics, 1999 National Nursing Home Survey, Nursing Home Residents, number, gender, distribution, and age per 1000, by age at interview, according to sex, race, and region - United States, 1999.

4. Centers for Disease Control and Prevention, National Center for Health Statistics, 1999 National Nursing Home Survey, Nursing Home Residents, number, percent distribution, and age per 1000, by age at interview, according to sex, race, and region - United States, 1999.

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Something doesn't add up...



1. Centers for Medicare and Medicaid Services, Long Term Care Minimum Data Set, Resident profile table as of 05/02/2005, Baltimore, MD.

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Why high antibiotic use in LTC?

- Inconsistent use of criteria for diagnosing infection
- Inconsistent use of criteria for initiating antibiotics
- Challenges with separating colonization from true infection
 - Colonization ≠ treatment

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Why should we be concerned?

- Increase risk of hospitalization
- Selection of antibiotic-resistant organisms
- Increase in *Clostridium difficile* infections
- Fewer antibiotics coming into the marketplace
- Shared resource: use today impacts effectiveness for tomorrow

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Why Asymptomatic bacteriuria (ASB)?

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Asymptomatic Bacteriuria

- Studies have consistently shown that about 30%-50% of frail, elderly long-term care residents can have a positive urine culture even without any symptoms of a urinary tract infection (bacteriuria).
- Asymptomatic bacteriuria is more common than UTI.

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In the literature

Asymptomatic bacteriuria, antibiotic use, and suspected urinary tract infections in four nursing homes

Phillips, CD et. al. BMC Geriatrics 2012; 12:73

Conclusions

"We confirm the findings of earlier research indicating frequent the use of antibiotics for ASB in nursing homes...half of the antibiotic prescriptions for a suspected UTI in a resident without catheters occurred with no documented signs or symptoms of a UTI. Urine studies were performed in almost all suspected UTI cases in which an antibiotic was prescribed."

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In the literature

Adverse Outcomes in Nursing Home Residents with Increased Episodes of Observed Bacteriuria

Rituparna Das, MD et. al. ICHE 2011;32(1):84-86

Conclusions

"Although bacteriuria was not associated with hospitalization for urinary tract infection (UTI) or change in mental status, it was associated with use of antibiotics to treat UTI and with isolation of multidrug-resistant gram-negative rods from urine specimens, which suggested a causal relationship."

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Preventing *C. difficile* infections?

A study conducted on residents in the US Department of Veterans Affairs long-term care facilities found that residents with ASB who were treated with antibiotics are 8.5 times more likely to develop a *C. difficile* infection within the three months following the course of antibiotics (Phillips, C. BMC Geriatrics, 2012, 12:73).

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Asymptomatic Bacteriuria

- What is it?
 - Presence of bacteria in the urine which may result in a positive urine culture, in the absence of new signs and symptoms of urinary tract infection
- Prevalence
 - Up to 50% of females in LTC have ASB
 - Most common patient group to have ASB is elderly, diabetic women
 - 14-40% of males in LTC have ASB

Nicolle et. al. CID 2005;40:643-54



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Urinary Tract Infection

- What is it?
 - Clinically detectable condition associated with invasion by disease causing microorganisms of some part of the urinary tract, including the urethra (urethritis), bladder (cystitis), ureters (ureteritis), and/or kidney (pyelonephritis).
- Symptomatic UTI is the presence of clinical symptoms attributed to the genitourinary tract in association with significant bacteriuria.

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The Difference

<p>ASB</p> <ul style="list-style-type: none"> • No symptoms • Bacteria in urine • No treatment <ul style="list-style-type: none"> – Exception: Unless patient is pregnant or undergoing urological procedure 	<p>UTI</p> <ul style="list-style-type: none"> • Symptoms and bacteria in urine • Treatment 
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How often are asymptomatic residents treated?

A study of inappropriate treatment of UTI in two Rhode Island nursing homes (*Rotjanapan P. Arch Int Med 2011;171:438-43*)

- Case residents: 172 nursing home residents with an abnormal urinalysis and no Foley catheter.
- Antibiotic treatment initiated in 96 case residents (56%).
- 146 case residents (85%) did not meet criteria for treatment, but 70 (41%) of them were started on antibiotics.
 - 69 case residents (72%) received inappropriate drug per IDSA criteria
 - 44 case residents (46%) received inappropriate drug based on creatinine clearance
 - 64 case residents (67%) received treatment longer than recommended

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Infectious Diseases Society of America Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults

Leslie E. Nicolle, Suzanne Bralley, Richard Colgan, James C. Rice, Anthony Schaefer, and Thomas M. Hooton

SUMMARY OF RECOMMENDATIONS

1. The diagnosis of asymptomatic bacteriuria should be based on results of culture of a urine specimen obtained from a patient for whom asymptomatic bacteriuria is being sought (Table 1).
2. For asymptomatic women, bacteriuria is defined as:
 - a. 2 consecutive voided urine specimens each containing at least 10⁵ bacteria when by quantitative culture (10⁵ CFU/100 mL)
 - b. A single clean-catch voided urine specimen with a bacterial concentration of a quantitative culture 10⁴–10⁵ (single-voider bacteriuria) in more than 10⁴ mL
 - c. A single catheterized urine specimen with a bacterial count indicated in a quantitative culture 10³–10⁵ (catheter-bacteriuria) in more than 10³ mL
3. Prior to considering asymptomatic bacteriuria as an indication for antimicrobial treatment (A.1),
 - a. Pregnancy status should be assessed by history or by urine culture at least once in each pregnancy, and that should be tested if the results are positive (A.2).
 - b. The absence of antimicrobial therapy should be
 - Confirmed by history (A.3).
 - Verified by culture (A.4).
4. For asymptomatic men, bacteriuria is defined as:
 - a. 2 consecutive voided urine specimens each containing at least 10⁵ bacteria when by quantitative culture (10⁵ CFU/100 mL)
 - b. A single clean-catch voided urine specimen with a bacterial concentration of a quantitative culture 10⁴–10⁵ (single-voider bacteriuria) in more than 10⁴ mL
 - c. A single catheterized urine specimen with a bacterial count indicated in a quantitative culture 10³–10⁵ (catheter-bacteriuria) in more than 10³ mL
5. Prior to considering asymptomatic bacteriuria as an indication for antimicrobial treatment (A.1),
 - a. Pregnancy status should be assessed by history or by urine culture at least once in each pregnancy, and that should be tested if the results are positive (A.2).
 - b. The absence of antimicrobial therapy should be
 - Confirmed by history (A.3).
 - Verified by culture (A.4).
6. Screening for and treatment of asymptomatic bacteriuria before institutional admission of the patient is recommended (B.1).
7. In the absence of the presence of bacteriuria, screening for and treatment of asymptomatic bacteriuria is not recommended for the following groups:
 - Antimicrobial therapy should not be initiated after the procedure, when an indwelling catheter remains in place (B.2).
 - Screening for and treatment of asymptomatic bacteriuria is recommended before other urologic procedures for which antimicrobial therapy is indicated (B.3).
 - Screening for or treatment of asymptomatic bacteriuria is not recommended for the following groups:
 - Antimicrobial therapy should not be initiated after the procedure, when an indwelling catheter remains in place (B.2).
 - Other urologic procedures (A.1).
 - Patients with renal insufficiency (A.1).
 - Patients with spinal cord injury (A.1).
 - Catheterized patients with no urinary tract infection (A.1).
8. Antimicrobial treatment of asymptomatic women with culture-proven bacteriuria that persists 48 h after instituting antibiotic treatment may be considered (C.1).

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Infectious Diseases Society of America Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults

Leslie E. Nicolle, Suzanne Bralley, Richard Colgan, James C. Rice, Anthony Schaefer, and Thomas M. Hooton

University of Manitoba, Winnipeg, Canada; University of Michigan, Ann Arbor; University of Montreal, Montreal; University of Iowa, Galstonville, Iowa; University of Illinois, Chicago, Illinois; and University of Washington, Seattle

“Treatment of asymptomatic bacteriuria may itself be associated with undesirable outcomes, including subsequent antimicrobial resistance, adverse drug effects, and cost. If treatment of bacteriuria is not beneficial, screening of asymptomatic populations to identify bacteriuria is not indicated, unless performed in a research study to further explore the biology or clinical significance of bacteriuria.”

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**Infectious Diseases Society of America Guidelines
for the Diagnosis and Treatment of Asymptomatic
Bacteriuria in Adults**

Lindsay E. Nicolle,¹ Suzanne Bradley,² Richard Colgan,³ James C. Rice,⁴ Anthony Schmitz,⁵ and Thomas M. Hooton⁶
¹University of Manitoba, Winnipeg, Canada; ²University of Michigan, Ann Arbor; ³University of Maryland, Baltimore; ⁴University of Iowa, Iowa City; ⁵Northwestern University, Chicago, Illinois; and ⁶University of Washington, Seattle

In summary...
 "...asymptomatic bacteriuria has not been shown to be harmful. Although persons with bacteriuria are at an increased risk of symptomatic urinary infection, treatment of asymptomatic bacteriuria does not decrease the frequency of symptomatic infection or improve other outcomes. Thus, in populations other than those for whom treatment has been documented to be beneficial, screening for or treatment of asymptomatic bacteriuria is not appropriate and should be discouraged."

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F-315 Highlights

- No one lab test alone proves that a UTI is present however, several test results in combination with clinical findings can help to identify UTIs.
 - A positive urine culture will show bacteriuria but that alone is not enough to diagnose a symptomatic UTI.
- In someone with nonspecific symptoms such as a change in function or mental status, bacteriuria alone does not necessarily warrant antibiotic treatment.

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F-315 HIGHLIGHTS: Catheter-Related Bacteriuria and UTI

- Most individuals with indwelling catheters for more than 7 days have bacteriuria. Bacteriuria alone in a catheterized individual should not be treated with antibiotics.
- By the 30th day of catheterization, bacteriuria is nearly universal.
- A long term indwelling catheter (>2 to 4 weeks) increases the chances of having a symptomatic UTI and urosepsis.
- The incidence of bacteremia is 40 times greater in individuals with a long term indwelling catheter than in those without one.

Mass. Infection Prevention Partnership
Prepared for Massachusetts long term care facilities

Treating Asymptomatic Bacteriuria: All harm, No Benefit

High Prevalence of Asymptomatic Bacteriuria

- The bladder is normally colonized in many elderly people
- A positive urinalysis or culture in the absence of symptoms reveals **colonization, not infection**
- Treatment of asymptomatic bacteriuria is **not recommended**

50% in long-term care
19% in the community

Prevalence of Asymptomatic Bacteriuria in seniors over 70 (upper extremities)

It's Hard to Ignore A Positive Test

Habitual Testing + Unnecessary prescriptions = Colonization ≠ missing the real diagnosis

Unnecessary Rx and Missed Diagnoses Harm Patients

- Drug-drug interactions
- renal & other complications
- increase of multi-drug resistant bacteria
- C. difficile infection
- nausea and vomiting
- Drug allergies
- Missing the real diagnosis

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Examples of When Antibiotics are Urgent and Necessary

Antibiotics Save Lives, Ensure They Work Where We Need Them.
Use Antibiotics Appropriately
Prevent Antibiotic Resistance

Antibiotics are Miracle Drugs.
Use Antibiotics Appropriately
Prevent Antibiotic Resistance

EDC

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What's next?

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Project Goals

- To decrease antibiotic use for asymptomatic bacteriuria
- To collect urine specimens, using proper collection methods, for the evaluation of urinary tract infections only when signs and symptoms consistent with urinary tract infection are present
- To assess urinary catheter need and remove urinary catheters when indication for use is not present

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Project Objectives

- To ensure residents are assessed for signs and symptoms of urinary tract infection prior to collection of urine specimen.
- To only collect urine specimens for ruling a urinary tract infection (UTI) in or out when a resident has symptoms consistent with UTI per the 2012 McGeer criteria.
- To ensure proper collection of urine specimens to have a 10% or less urine specimen contamination rate.
- To decrease urinary catheter device utilization rate by 10%.

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McGeer Definitions Revised

- Updated October 2012
- Include criteria that define infections for surveillance purposes to increase the likelihood that infections captured by this definition are true infections
- Definitions do not replace clinical decision making

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McGeer Definition: UTI without Catheter

At least 1 sign or symptom described below + microbiologic criteria (i.e. positive urine analysis)

Symptoms

- Acute dysuria or acute pain, swelling, or tenderness of the testes, epididymis, or prostate

OR....

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McGeer Definition cont'd: UTI w/o Catheter

- Fever or leukocytosis and at least 1 of the following localizing urinary tract subcriteria
 - Acute costovertebral angle pain or tenderness
 - Suprapubic pain
 - Gross hematuria
 - New or marked increase in incontinence
 - New or marked increase in urgency
 - New or marked increase in frequency
- In the absence of fever or leukocytosis, then 2 or more of the following localizing urinary tract subcriteria
 - Suprapubic pain
 - Gross hematuria
 - New or marked increase in incontinence
 - New or marked increase in urgency
 - New or marked increase in frequency

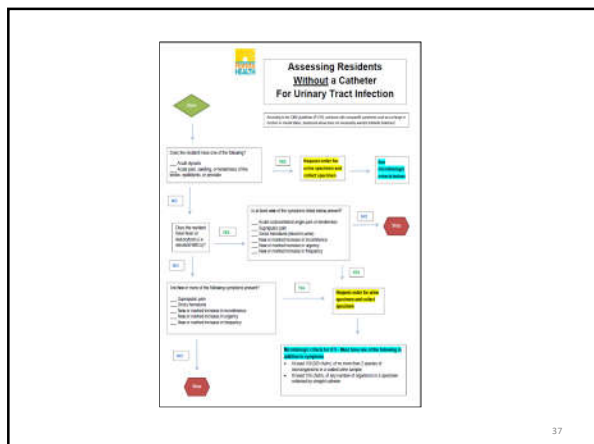
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McGeer Definition cont'd: UTI w/o Catheter

Microbiologic Criteria

- At least 100,000 (10^5) cfu/mL of no more than 2 species of microorganisms in a clean catch (e.g. voided) urine sample
- At least 100 (10^2) cfu/mL of any number of organisms in a specimen collected by in-and-out catheter

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McGeer Definition: UTI with Indwelling Catheter

At least 1 sign or symptom described below + microbiologic criteria (I.e. positive urine analysis)

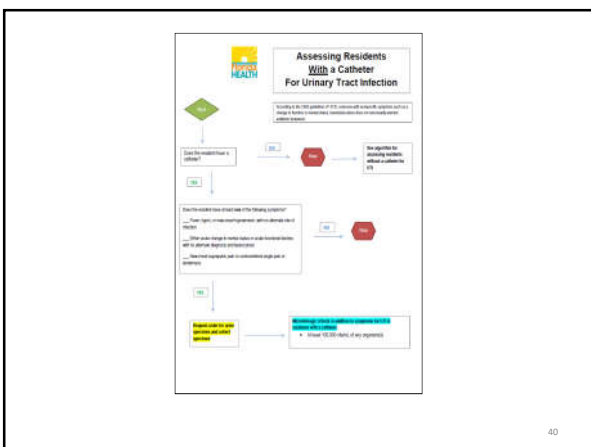
Symptoms

- Fever, rigors, or new-onset hypotension, with no alternate site of infection
- Either acute change in mental status or acute functional decline, with no alternate diagnosis and leukocytosis
- New-onset suprapubic pain or costovertebral angle pain or tenderness
- Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate

McGeer Definition cont'd: UTI with Indwelling Catheter

Microbiologic Criteria

- At least 100,000 (10⁵) cfu/mL of any number of organisms



McGeer definitions 2012: Additional definitions

- Fever (one of the following):
 1. Single oral temperature >37.8°C (>100°F)
 2. Repeated oral temperatures >37.2°C (99°F) or rectal temperatures >37.5°C (99.5°F)
 3. Single temperature >1.1°C (2°F) over baseline from any site (oral, tympanic, axillary)
- Leukocytosis (one of the following):
 1. Neutrophilia (>14,000 leukocytes/mm³)
 2. Left shift (>6% bands or ≥1,500 bands/mm³)

McGeer definitions 2012: Additional definitions

- Acute change in mental status from baseline (all criteria must be present):
 1. Acute onset
 2. Fluctuating course
 3. Inattention
 4. Either disorganized thinking or altered level of consciousness

Not on the List of Symptoms

- Falls
- Mental Status

Urinary tract infection is less likely without specific symptoms. Non-specific symptoms, such as a change in mental status, fatigue, or a fall may be due to a variety of causes, including: pain, depression, constipation, dehydration, poor sleep, or medication side effects.

It is important to consider a range of possible causes to prevent missing the real diagnosis.

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Other considerations

- Pericare
 - Assess pericare procedures and identify if there are opportunities for improvement
- Hydration
 - Ensure resident is receiving sufficient hydration

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No symptoms of UTI

- > Do not test urine
- > Do not treat if a urine test was done by someone else or for "routine"

Weakness, delirium, or fever without a focus

- > Individualize care
- > Be mindful of the prevalence of asymptomatic bacteriuria
- > Seek other causes

Specific UTI symptoms

- > Test or treat as usual

Developed by: Massachusetts Infection Prevention Partnership, MA Coalition for the Prevention of Medical Errors, MA Dept. of Health, & MA Senior Care Assoc. & Masspro

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Specimen collection

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Specimen collection

- Quality of specimen can impact results.
 - Contaminated specimens may be interpreted as a positive result.
- Quality and accuracy of results relies directly on the manner in which the specimens are obtained, stored, and processed.
- It is important to follow proper procedure to ensure quality of specimen and assure accurate test results.

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Nun's Cap

- Do not use nun's cap to collect sterile specimen.
- Nun's cap is not a sterile container.
- The purpose of a nun's cap is to measure urine output.



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Specimen Collection

1. Clean Catch
 - Also referred to as “mid-stream voided”
2. Straight Catheter
 - Also known as In-and-Out Catheter
3. Indwelling Catheter

All methods/processes require the assistance and oversight of healthcare personnel.

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Specimen Collection cont'd

- Indwelling catheters
 - Residents with indwelling urethral catheters should have a specimen obtained through a freshly placed catheter or by aspiration of the catheter tubing lumen.
 - Catheters must be replaced prior to specimen collection if they have been in place for ≥ 14 days.
 - Specimens should not be collected from the drainage bag.
 - Specimens may be obtained from freshly applied external (condom) catheters in men if standardized collection methods that limit contamination are used.

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Sterile Urine Specimen Handling & Transport

- Sterile urine specimens must be refrigerated within 2 hours of collection. Specimen must be kept at 2°-8° C (35.6°-46.4° F) during storage and transport until testing. Specimens must be tested within 24 hours.
- If the specimen is collected in a container with a chemical preservative, then it may be stored at room temperature until time of testing, for up to 24-72 hours.
- Unrefrigerated and unpreserved specimens over 2 hours old should be rejected. Recollect specimen.

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Sterile Urine Specimen Handling & Transport cont'd

Sterile urine specimens must be collected using sterile technique. Specimens should be collected using a sterile collection cup. Each specimen cup label needs to include the following information:

- resident name,
- date of birth, and
- date and time for when the specimen was collected.

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Checklists

- Use checklists to ensure sterile urine specimens are collected
 - Clean catch
 - Straight catheter
 - Indwelling catheter

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Summary

- Urine cultures should not be collected from asymptomatic residents.
- The minimal workup of residents with signs and symptoms suggestive of UTI should include a urinalysis and urine culture.
- The quality of urine specimens sent for culture and sensitivity testing must be assured.
- The quality and accuracy of results relies directly on the manner in which the specimens are obtained, stored, and processed.
- Without guidelines in place, the integrity of specimens and quality of specimen results cannot be guaranteed to physician providers.