

Infection Management and Antibiotic Stewardship

Urinary Tract Infections: Appropriate Prevention, Diagnosis, Treatment and Care

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May 22, 2024



Conflict of interest Disclosures

- ▶ No relevant disclosures

Outline of today's session

1. Discuss prevention of UTIs
2. Examine diagnostic criteria for UTI
3. Discuss treatment for UTIs



Prevention of UTI

Physiologic Risk Factors for UTIs in Older Adults

Physiologic changes of bladder with aging:

Women: Elevation of vaginal pH due to estrogen deficiency

- results in increased ability of bacteria to **adhere to the mucosal cells** of the bladder.



Men:

Decreased bactericidal activity of prostatic secretions

Increased **post-void residual** volume of urine

- Cystocele/rectocele
- Prostate hypertrophy
- Neurogenic bladder from comorbidity

Physiologic Risk Factors for UTIs in Older Adults

Functional / Cognitive Impairment

- ▶ Decrease self care
- ▶ Decrease cues to void
- ▶ Increased incontinence and perineal soiling
- ▶ Difficulty finding bathroom / suitable location to void



Environmental Risk Factors for UTI in Older Adults

Environmental Risk Factors

- ▶ Congregate living
 - Mechanical/chemical restraints
 - Increased exposure to antibiotics
 - Various infection control techniques



The more impaired or frail the greater the risk of UTI!

From this information, what are targeted ways to prevent UTI?

Prevention of UTIs

Hand Hygiene –
both residents and
staff

Adequate
hydration –
30cc/kg of body
weight/day

Perineal hygiene
after toileting

Routine toileting

*Removing urinary
catheter as early
as possible.*

CDC NHSN UTI Definitions

- ▶ Urinary Tract Infection (UTI)/Cystitis
 - ▶ infection of the bladder (lower urinary tract).
- ▶ Pyelonephritis –
 - ▶ infection of the upper urinary tract (ureters / renal collecting system / kidneys).
- ▶ “Mixed flora” is not considered an organism and cannot be reported.
- ▶ Yeast **cannot** be reported as an organism for a UTI.

UTIs

Primary cause of bacteremia in LTC residents is due to UTIs!

Incidence of **symptomatic UTIs** in elderly in LTC around 10%

Asymptomatic bacteriuria prevalence: 30% F/ 10% M

Who needs a UA?

Who Needs a UA?



Burning



Frequency



Irritation



Urgency



New Blood in the Urine

Diagnostic Dilemmas for Older Adults with UTI

Common symptoms

Atypical symptoms

Fever?

Getting the history

Evaluation of Possible UTI

- ▶ Vital signs
- ▶ Fever!?
- ▶ History and examination
- ▶ U/A and C&S BEFORE starting antibiotics
- ▶ Clean catch vs I&O catheterization.



"Pyuria2011" by James Heilman, MD - Own work. Licensed under CC BY-SA 3.0 via Wikimedia Commons - <http://commons.wikimedia.org/wiki/File:Pyuria2011.JPG#mediaviewer/File:Pyuria2011.JPG>

Dipstick Urinalysis

- ▶ Leukocyte esterase
- ▶ Nitrites
- ▶ Protein
- ▶ Blood



Dipstick Urinalysis

- ▶ Leukocyte esterase positive (pyuria)
Leukocyte positive: 50–75% specific; 80-90% sensitive
- ▶ Nitrites: positive (bacteriuria)
- ▶ Protein: small amount may be present
- ▶ Blood: small amount may be present

**Pyuria alone not an indication for treatment.



UA: Hematuria

- ▶ Blood is not common with UTIs in older adults.
- ▶ Frank hematuria should be evaluated promptly!
- ▶ Causes:
 - ▶ Stones
 - ▶ Cancer
 - ▶ Trauma
 - ▶ **infection**
 - ▶ hemorrhage.



McGeer Criteria

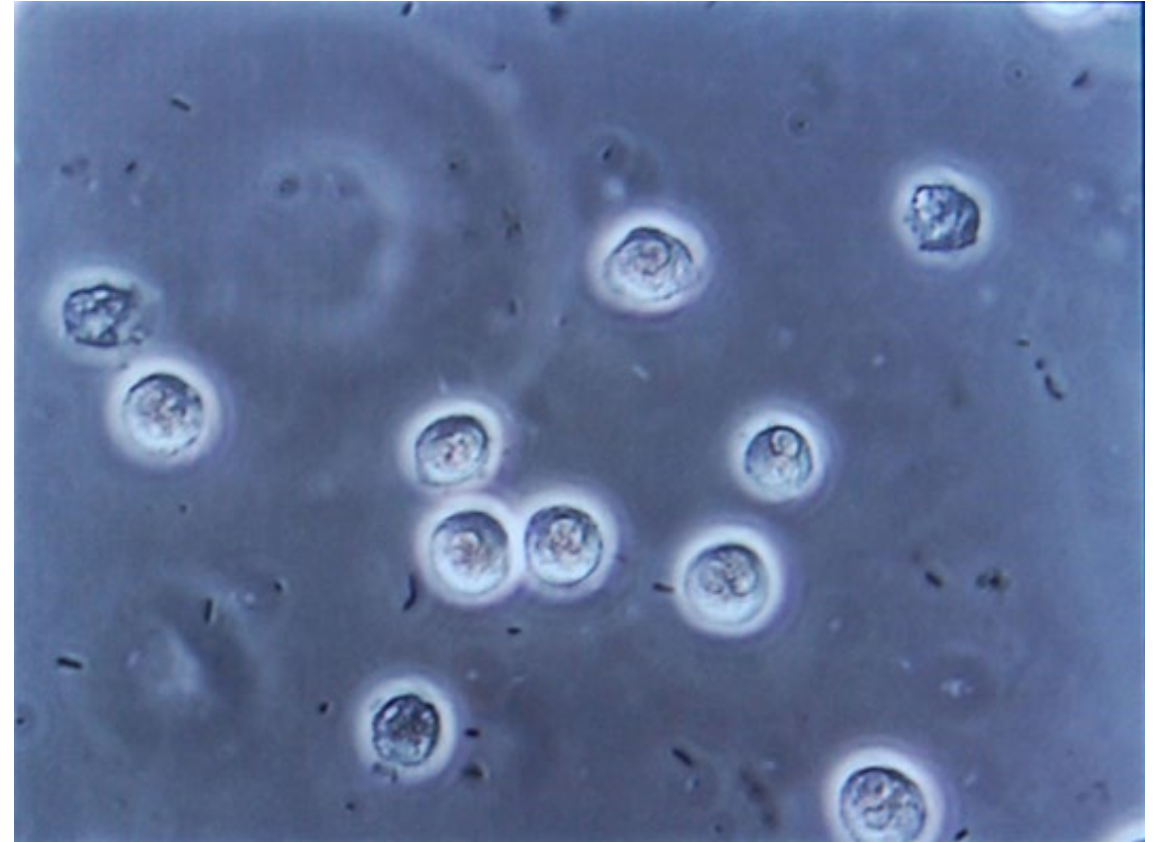
- ▶ Must fulfill both 1 AND 2
 - ▶ 1. At least 1 of the following signs/symptoms
 - ▶ Acute dysuria or pain, swelling, or tenderness of testes, epididymis, or prostate
 - ▶ Fever or leukocytosis and ≥ 1 of the following:
 - ▶ • Acute costovertebral angle pain or tenderness
 - ▶ • Suprapubic pain
 - ▶ • Gross hematuria
 - ▶ • New or marked increase in incontinence
 - ▶ • New or marked increase in urgency
 - ▶ • New or marked increase in frequency
 - ▶ If no fever or leukocytosis, then ≥ 2 of the following:
 - ▶ • Suprapubic pain • Gross hematuria • New or marked increase in incontinence • New or marked increase in urgency • New or marked increase in frequency
 - ▶ 2. At least 1 of the following microbiological criteria:
 - ▶ $\geq 10^5$ cfu/mL of no more than 2 species of organisms in a voided urine sample
 - ▶ $\geq 10^2$ cfu/mL of any organism(s) in a specimen collected by an in-and-out catheter

Microbiology of UTI

► 80% are caused by **gram negative bacilli**

- E.coli, Klebsiella, Enterobacter, Proteus, and Serratia

<20% Gram positive bacilli - Staphylococcus



Urine Culture

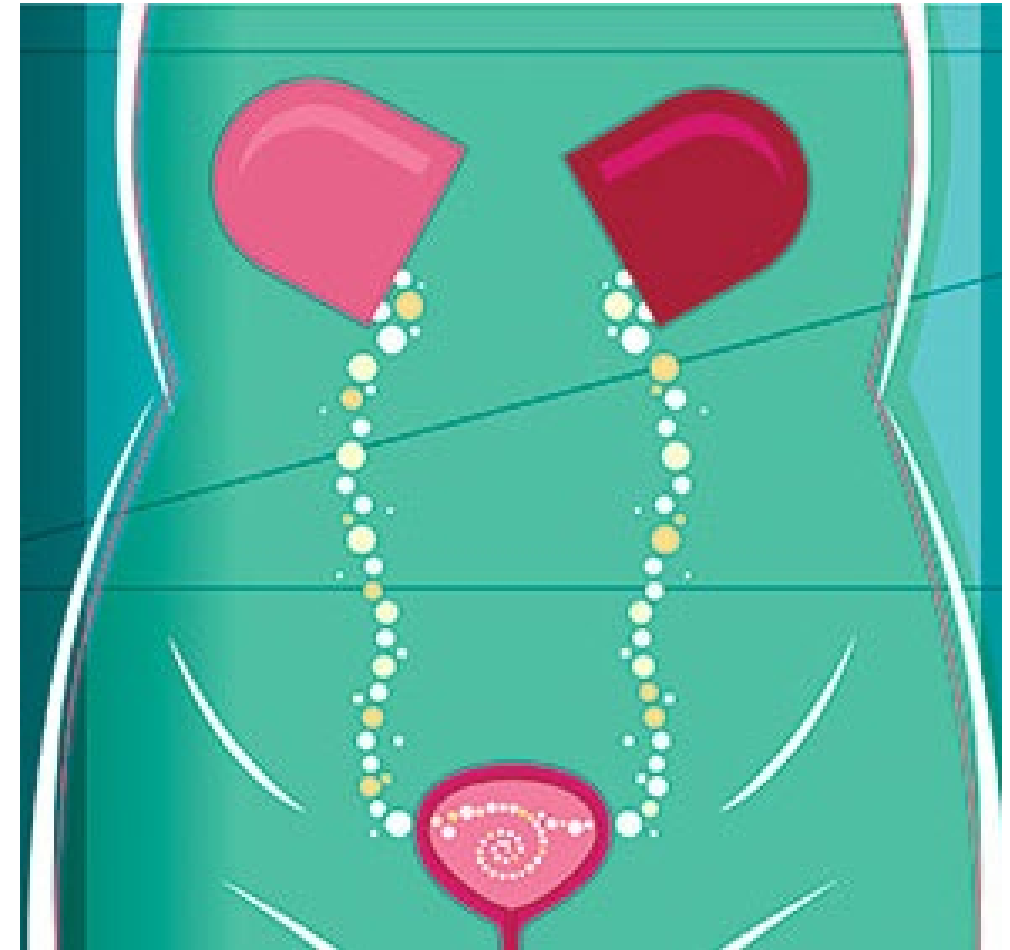


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- ▶ Gold STANDARD to guide appropriate treatment
- ▶ Results : **>100,000 colonies** of one species
- ▶ Treatment can be delayed until culture results available.
- ▶ Positive culture (bacteriuria) alone **not** a reason to treat.

Treatment /NO Treatment

- Asymptomatic bacteriuria should **NOT** be treated.
- Routine or post-treatment screening for bacteriuria is not recommended. (Infectious Diseases Society of America)
- No benefits in decreasing rates of subsequent UTIs
- Increased risk of resistance and uropathogens



CMS UTI Antibiotic Treatment

Minimum criteria for initiating antibiotics for UTI

NO indwelling catheter, include:

1. acute dysuria alone or fever ($>37.9^{\circ}\text{C}$ [100°F] or 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, or urinary incontinence.



Reference - "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.

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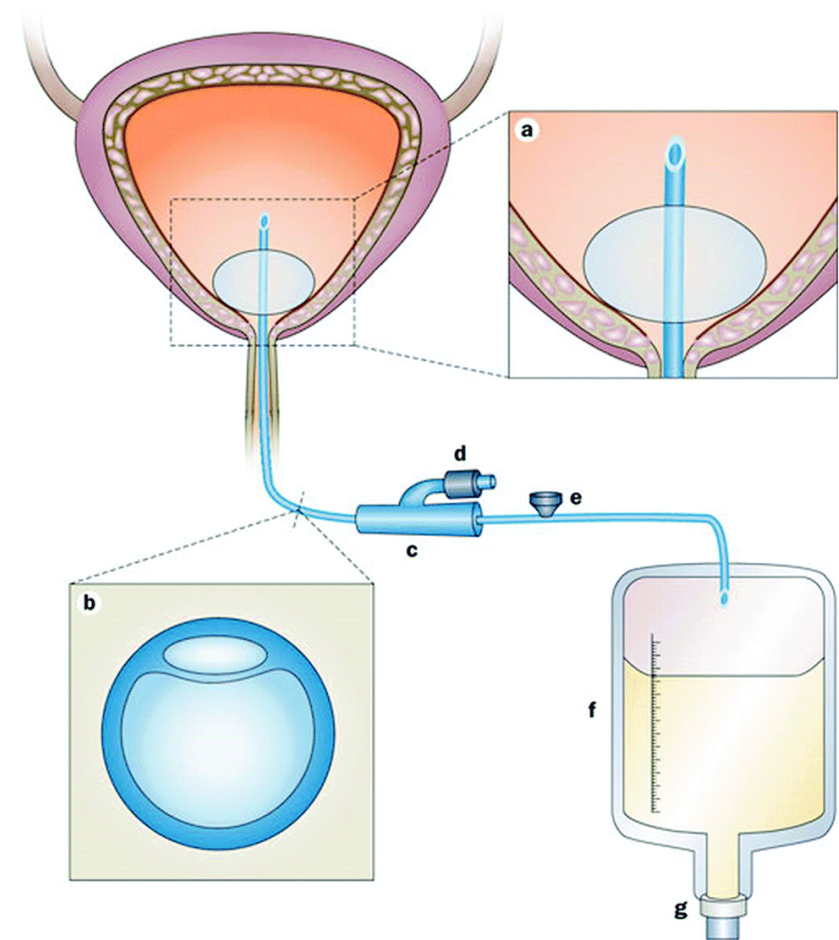
CMS UTI Antibiotic Treatment

Minimum criteria for initiating antibiotics for UTI

2. **Chronic indwelling catheter** (indwelling Foley catheter or a suprapubic catheter), includes the presence of at least one of the following:

- ▶ fever ($>37.9^{\circ}\text{C}$ [100°F] or 1.5°C [2.4°F] increase above baseline temperature),
- ▶ new costovertebral tenderness, rigors (shaking chills) with or without identified cause, or new onset of delirium.”

- ▶ Reference - “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.



USE of Urinary Catheters

APPROPRIATE

- ▶ Clinical criteria for long/short for indwelling catheter:
 - ▶ Obstruction
 - ▶ Neurogenic bladder
 - ▶ Hematuria (short term)
 - ▶ Wounds stage 3 or >
 - ▶ Aggressive diuresis / monitoring of strict I/O (short term)
 - ▶ Terminally ill for comfort measures

INAPPROPRIATE

- ▶ Used for the convenience of nursing staff.
- ▶ Used in lieu of other bladder management strategies.
- ▶ Used for specimen collection when the resident can voluntarily void

(Indwelling catheters are associated with a 5% risk/day of new UTI)

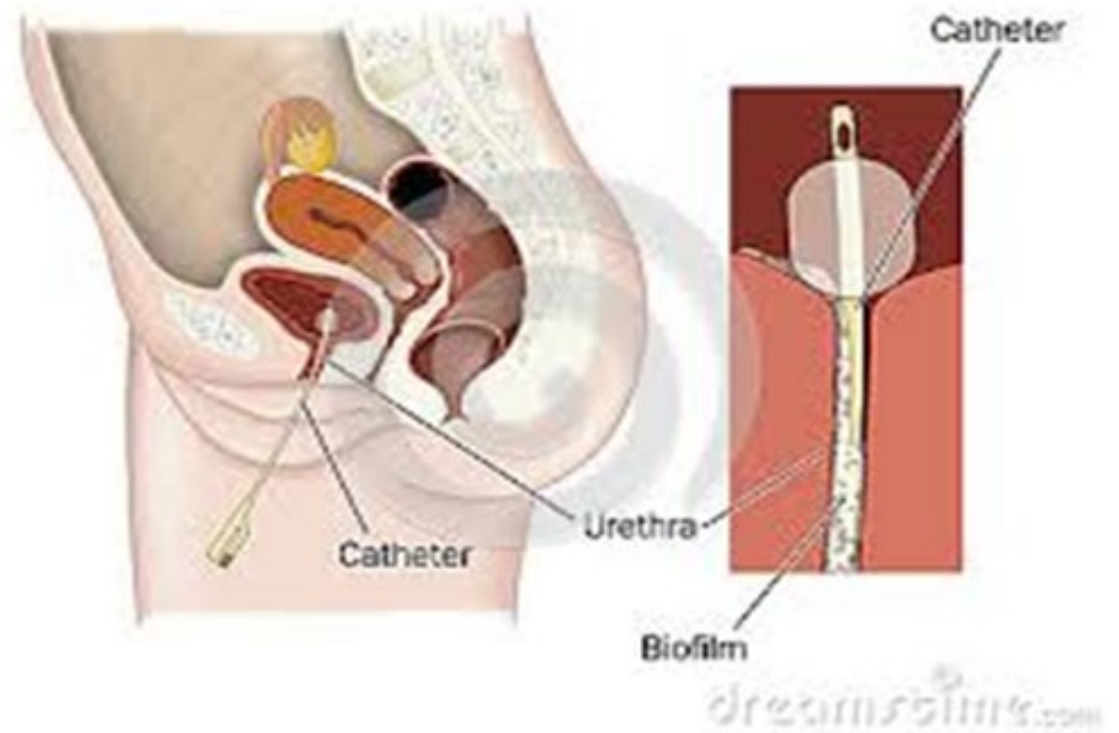
Indwelling Catheter-Associated UTI (CAUTI)

- ▶ Catheter colonization and infection is inevitable and expected!
- ▶ Once bacteria colonizes urine, concentration is 100,000 colonies within 72 hours!!



Mechanisms of Colonization

- ▶ **Colonic and perineal flora primary source**
- ▶ Extra-luminal-- women – shorter urethra
- ▶ Manipulation of the collection system
- ▶ From hands of personnel during insertion
- ▶ Ascending from drainage bag/junction



Intermittent Catheterization

- ▶ Intermittent catheterization can often manage overflow incontinence effectively.
- ▶ New onset incontinence from a transient, hypotonic/atonic bladder (usually seen following indwelling catheterization in the hospital) may benefit from intermittent bladder catheterization until the bladder tone returns (e.g., up to approximately 7 days).
- ▶ A voiding trial and post void residual can help identify when bladder tone has returned.

Nursing Home Antimicrobial Stewardship Guide

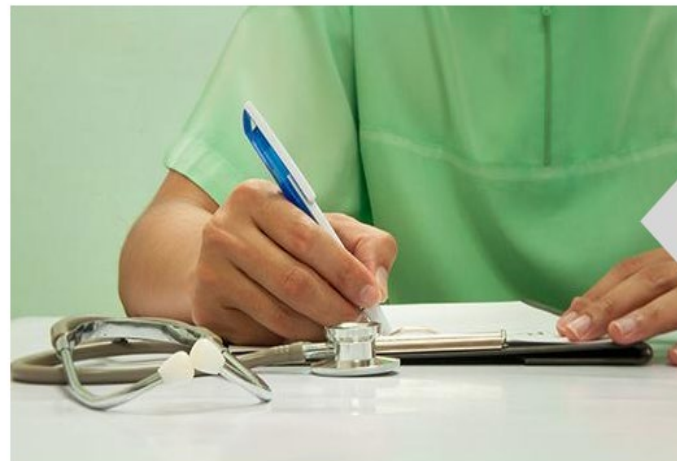


Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

Provides toolkits to help nursing homes optimize their use of antibiotics. <https://www.ahrq.gov/nhguide/index.html>



Nursing Home Antimicrobial Stewardship Guide



Overview of the Guide

The Nursing Home Antimicrobial Stewardship Guide provides toolkits to help nursing homes optimize their use of antibiotics.

Browse Antimicrobial Stewardship Toolkits

Toolkits on four topic areas are available.

Implement, Monitor, and Sustain a Program

Two toolkits help nursing homes start and maintain antimicrobial stewardship programs.

Treatment of UTI

Prophylaxis For UTI Prevention

- ▶ Cranberry juice/extract: not enough evidence
- ▶ Oral Estrogens **not** shown to be beneficial.
- ▶ Topical estrogen: some benefit
- ▶ D-mannose supplement



De-escalation in Urinary Tract Infection

1. Shorter length of therapy
 - Standard of care depends on the antibiotic choice, but is now typically 3 or 5 days.
 - Minimum necessary is best
2. Narrowing of spectrum
 - Utilize the culture results.
 - Consider awaiting treatment until these culture results return to ensure the appropriate antibiotic is being utilized.
3. Is this truly a UTI?

Prevention of UTI or Overtreatment

- ▶ Risk factor: Colonization
- ▶ Risk factor: Yeast
- ▶ Risk factor: Vaginal atrophy
- ▶ Risk factor: Indwelling Catheter
- ▶ Risk factor: Poor hygiene
- ▶ Prevention: Documentation
- ▶ Prevention: Await cultures
- ▶ Treatment: Vaginal estrogen, Vaseline
- ▶ Prevention: Remove catheter
- ▶ Prevention: Peri care and staff hand hygiene

Questions and Discussion

