Urinary Tract Infections in Long Term Care Facilities:
A Diagnostic and Therapeutic Dilemma

UTI Prevention Collaborative
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Is there any benefit in treating residents with asymptomatic bacteriuria? Harm?
## Treating Asymptomatic Bacteriuria

Prospective randomized trials of screening for or treating asymptomatic bacteriuria have shown:
- No decrease in the rate of symptomatic infection.
- No improvement in survival.
- No change in chronic genitourinary symptoms.


## Asymptomatic UTI Nursing Home

- 172 nursing home residents with an abnormal urinalysis and no Foley catheter.
- 146 did not meet criteria for treatment, 76 were not treated.
- None developed adverse consequences.
- No deaths or hospitalizations attributed to worsening infection or sepsis occurred during the following 3 months.

Chronic Incontinence
Ouslander et al Ann Int Med 122: 753

Randomized, placebo controlled trial of antibiotic therapy

![Graph showing the percentage of patients experiencing urinary symptoms before and after antibiotic therapy.]

Detrimental Effects of Treating Asymptomatic UTI

- By 6-8 weeks after treating asymptomatic patients with bacteriuria, 60-80% will have recurrence with the same or a new infecting organism.

Subjects who receive antimicrobial therapy for asymptomatic bacteriuria have:
- Increased frequency of adverse events from the antibiotics.
- Increased reinfection with resistant organisms.
- Increased cost.
**UTI and *C. difficile***

- 172 nursing home residents with an abnormal urinalysis and no Foley catheter.
- 85% did not meet criteria for treatment, but 41% of them were started on antibiotics.
- 12% who received inappropriate antibiotics developed *C. difficile* infection within 3 weeks.
- Overall, those who received inappropriate antibiotics were 8-fold more likely to develop *C. difficile* within 3 months.


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**Mortality, Elderly Men**

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Asymptomatic Bacteriuric: Elderly Women

Treatment of Asymptomatic Bacteriuria in Chronically Catheterized Residents

- Asymptomatic bacteriuria is universal in subjects with long term indwelling catheters.
- Antimicrobial therapy will not prevent bacteriuria or symptomatic infection.
- Antimicrobial therapy will lead to side effects, increasing resistance and cost.

- Asymptomatic bacteriuria should not be treated.
<table>
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<tr>
<th><strong>Treat Asymptomatic UTI? No Way.</strong></th>
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“Thus, antibiotics are not indicated for the treatment of asymptomatic UTI in residents of long term care facilities.”


<table>
<thead>
<tr>
<th><strong>How do I decide which resident to treat for suspected UTI?</strong></th>
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<tbody>
<tr>
<td>Is It a UTI ? No easy Answers.</td>
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<td>• For residents of LTCFs without a foley, 25-50% of women and 15-40% of men have significant bacteriuria but no symptoms.</td>
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<td>• At the same time, UTI is also the most common cause of bacteremia in LTCF residents.</td>
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<td>• Common cause of transfer to acute care facilities.</td>
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How do I separate the large number of asymptomatic patients with bacteria in their urine who don’t need treatment from those with serious infections that need treatment?

<table>
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<tr>
<th>Does Pyuria Help ?</th>
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<tr>
<td>• 90% of residents with asymptomatic bacteriuria will have white blood cells in their urine (pyuria).</td>
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<td>• In fact, 30% of all residents without bacteriuria will have pyuria.</td>
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<td>• High rates are related to genital, bladder, prostatic or renal inflammation, usually non-infectious.</td>
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<tr>
<td>• Absence of pyuria essentially excludes UTI, but the presence of white cells is not helpful.</td>
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</table>
Does Appearance or Smell Help?

- Foul smelling and cloudy urine have been used in the past to help determine who to treat.

- Neither foul smell or cloudy urine have been clearly associated with symptomatic UTI.

Fever and Asymptomatic Bacteriuria

- A common diagnostic dilemma is the presence of fever with no localizing findings in a resident with bacteriuria and pyuria.

- Only 10% of these episodes are attributable to a urinary source in residents who do not have an indwelling foley catheter.

Clinical Deterioration and UTI

- UTI has been used as an explanation for nonspecific symptoms, such as “clinical deterioration”
- UTI was a cause of clinical deterioration in only 11% of episodes.
- If UTI was the cause, all were febrile.


Acute Change in Function and UTI’s

- “An acute deterioration in stable chronic symptoms may indicate an acute infection. Multiple co-existing findings such as fever with hematuria are more likely to be from a urinary source.
- In someone with nonspecific symptoms such as a change in function or mental status, bacteriuria alone does not necessarily warrant antibiotic treatment.
- Although sepsis, including urosepsis, can cause dizziness or falling, there is not clear evidence linking bacteriuria or a localized UTI to an increased fall risk.” F315
### Not Enough and May or May Not

- “Urinary Tract Infection” (UTI) is a clinically detectable condition associated with invasion by disease causing microorganisms of some part of the urinary tract.
- A positive urine culture will show bacteriuria, but that alone is not enough to diagnose a symptomatic UTI.
- A negative leukocyte esterase or the absence of pyuria strongly suggests that a UTI is not present. A positive leukocyte esterase test alone does not prove that the individual has a UTI.”

### The Never Ending Dilemma

Clinically, the health care provider is faced with a difficult dilemma:

- Indwelling bladder catheters are the #1 risk for bacteremia in LTCFs, but...
- Essentially all urine cultures will be positive in residents with chronic catheterization.
Who Do You Treat?

- Urinalysis and urine culture are only really helpful if negative (excludes a UTI).
- **Fever** is the most frequent clinical presentation of UTI in the chronically catheterized resident.
- **Catheter obstruction** is often a precipitating event for fever and systemic infection.
- **Fever** with **hematuria** or **catheter obstruction** has a high probability of being from a urinary source.

F315

- “Because many residents have chronic bacteriuria, the research-based literature suggests treating only symptomatic UTIs.

- Symptomatic UTIs are based on the following criteria:
## F315: Indications to Treat a UTI

**Residents without a catheter** should have at least *three* of the following signs and symptoms:

- Fever (increase of $>2$ degrees F/rectal T $>99.5$ F/single T $>100$ F).
- New or increased burning, pain on urination, frequency or urgency.
- New flank or suprapubic pain/tenderness.
- Change in character of urine (new bloody urine, foul smell or amount of sediment) or lab report (new pyuria or microscopic hematuria).
- Worsening of mental or functional status (confusion, lethargy, unexplained falls, recent onset incontinence, decreased activity or appetite).

## F315: Indications to Treat a UTI

**Residents with a catheter** should have at least *two* of the following signs and symptom:

- Fever or chills.
- New flank pain or suprapubic pain/tenderness.
- Change in character of urine.
- Worsening of mental status or function.

Local findings such as obstruction, leakage or mucosal trauma (hematuria) may also be present.
How should I treat?
Remove the Foley catheter?
Which antibiotic?

Treatment of Symptomatic UTI

- When a patient has fever and the source is felt to be the urinary tract in a patient with a chronic Foley catheter, there is a more rapid response and a lower rate of recurrent symptoms if the Foley catheter is changed prior to initiation of antibiotics.
- Suggests removal of the biofilm laden catheter is beneficial.

Catheter Change in Suspected UTI

- If urine culture is obtained from the old catheter, culture is polymicrobial in 52% vs. only 11% after changing the catheter.

- Patients who had catheter changes responded faster to treatment and had a lower relapse rate at 28 days (11% vs. 41%).


Antibiotics for UTI

- Be aware of local antimicrobial sensitivity patterns.
- Balance efficacy and collateral damage (resistance, C. difficile).
- Use of an antibiotic in the last 3-6 months increases the risk of resistance.
- For acute cystitis, avoid antibiotics with > 20% resistance
- For pyelonephritis, avoid antibiotics with >10% expected resistance.

### Antibiotics for UTI

#### First-line therapy: Cystitis/Bladder infection

- **Nitrofurantoin (Macrodantin, Macrobid, Furadantin susp):** 100 mg twice daily for 5 days.
- Common side effects: N, V
- Rare: acute, subacute chronic pulmonary reactions 1 or less/100,000.
- Contraindicated for CrCl < 60 (minimal levels in urine).
- Not used for pyelonephritis/possible urosepsis (low or undetectable serum levels).

### Antibiotics for UTI

- **Trimethoprim-sulfamethoxazole DS** one 160 mg-800 mg tablet twice daily for 3 days.
- One 80 mg-400 mg tablet twice daily for CrCl < 30; not recommended for CrCl < 15. (sulfamethoxazole may be subtherapeutic with CrCl < 50)
- Trimethoprim 100 mg twice daily; 100 mg every 18 h for CrCl 30. (excellent levels in urine even with low CrCl)
Bactrim (TMP-SMZ) Resistance

- 104 women with a TMP-SMZ resistant isolate who were treated with TMP-SMZ vs. 33 with a sensitive isolate.
- Clinical failure rate of TMP-SMZ was 46% if the isolate was resistant vs. 4% if the isolate was sensitive.
  
- Peak serum levels after DS (160 mg TMP-800 mg SMZ) is 2 ug of TMP and 40 ug for SMZ, urine concentrations of TMP are 100-fold higher than serum and 30-200 ug of free SMX (70% of SMZ in urine are metabolites).

Antibiotics for UTI

Alternatives: More resistance and collateral damage (C. difficle, MRSA colonization).

- Ciprofloxacin hydrochloride 250 mg twice daily for 3 days; 250 mg every 18 h for CrCl <30; 250 mg/d for CrCl <10.
- Levofloxacin 250 mg/d for 3 days; 250 mg every 48 h for CrCl <20.
Ciprofloxacin Resistance

- 87 adult patients with UTI with an organism resistant to ciprofloxacin who were treated with ciprofloxacin.
- 75% had a microbiologic cure, 77% had a clinical response.
- Pseudomonas had a lower response than other pathogens (46 vs. 82%).


Ciprofloxacin Resistance

- CLSI breakpoints for ciprofloxacin are $\leq 1$ ug/ml (susceptible), 2 ug/ml (intermediate) and $\geq 4$ ug/ml (resistant).
- Breakpoints are the same for UTI and systemic infections.
- At 500 mg bid of ciprofloxacin, a peak of 255 – 518 ug and a minimum of 105-174 ug is obtained in urine.
- Mean serum peak after 500 mg is 2.4 ug/ml with a trough of 0.2 ug/ml.
## Antibiotics for UTI

### Alternative therapies:

- Amoxicillin-clavulanate 875 mg every 12 h;
- 500 mg every 12 h for CrCl 10-50; 500 mg every 24 h for CrCl <10.

### Alternative therapies (for 3-7 days): Decreased efficacy and collateral damage

- Cefuroxime axetil 125-500 mg twice daily; 125-500 mg/d for CrCl <10.
- Cefixime 200-400 mg once or twice daily; 75% of dose for CrCl 20-60; 50% of dose for CrCl <20.
- Ceftibuten 400 mg once daily; 200 mg once daily for CrCl <50.
- Cefpodoxime proxetil 400 mg twice daily; 400 mg once daily for CrCl <30.
Fosfomycin (Monurol)

- Phosphonic acid antimicrobial, bactericidal, inhibits peptidoglycan synthesis disrupting cell wall.
- Available as 3 gm packet, mixed in water.
- Very well tolerated, long half life, good tissue levels, excreted unchanged in urine, high levels in urine (100 ug for 48 hours).
- Very broad spectrum (VRE, MRSA, most GNR, including ESBL).
- Approved for treatment of uncomplicated UTI (single dose 3 gm) and off label use for complicated UTI (3 gm every 2-3 days x 3 doses), prostatitis (3 gm q3d x 21 days).

Duration of Treatment

- Most experts recommend that antimicrobial treatment should be for as short a period as possible; 5-7 days for catheter associated UTI.

- Rationale is to decrease emergence of resistance, but will also decrease cost.
Pyelonephritis

Residents not requiring hospitalization:
• Ciprofloxacin 500 mg bid x 7 days.
• If ciprofloxacin resistance exceeds 10%, initial long acting parenteral antimicrobial (ceftriaxone 1 gm or single daily dose aminoglycoside (gentamicin or tobramycin 4-7 mg/kg q24h).
• Tailor antibiotics according to sensitivity.
• Duration: 10-14 days

Should I do a test of cure culture?
**F315: Follow-Up of UTIs**

“The goal of treating a UTI is to alleviate systemic or local symptoms, not to eradicate all bacteria. Therefore, a post-treatment culture is not routinely necessary but may be useful in certain situations.

Continued bacteriuria without residual symptoms does not warrant repeat or continued antibiotic therapy.”

**Exception for Follow Up Culture**

- If the resident is in contact isolation because of a resistant organism, such as an extended spectrum beta lactamase (ESBL) producing *E. coli* or *Klebsiella* or another highly resistant gram negative rod (such as *Acinetobacter*), MRSA, or VRE, then a negative culture is required to remove them from contact isolation.
- If the repeat urine culture is positive, treatment is only indicated if the resident is symptomatic.
- Retreatment is not used to eradicate colonization or in an asymptomatic resident.
### F315: Follow-Up of UTIs

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