

Presence of symptoms suggestive of UTI (i.e. frequency, urgency, dysuria, or suprapubic pain)** 4
AND/OR
 Mental status changes, worsening of psychiatry symptoms, or delirium¹⁰⁻¹⁵
AND
 Positive urine analysis and/or culture* 1-3

*Positive UA/UC: Leukocyte esterase (+), nitrite (+), >10 WBC/hpf, or culture ≥ 10⁵ organisms /mL (≥ 10³ organisms /mL in catheter urine specimen)

**Presentation variable dependent on host factors (i.e. elderly may only present with mental status changes, catheterized patients may only have fever, & quad/paraplegics may have fever and increased spasticity or autonomic dysreflexia)

No

Yes

Treatment of asymptomatic bacteriuria is generally NOT recommended.

Exceptions:

- Pregnancy → refer to **Table 3**
- Neutropenic
- History of kidney transplant
- Require GU instrumentation
- Before transurethral resection of prostate

Complicating factors?

Diabetes, renal failure, hospital acquired infection, symptoms >= 7 days before seeking care, urinary tract obstruction, renal transplantation, immunosuppression, men > 50 years old¹⁶

OR

Fever, flank pain, or suspect pyelonephritis → refer to **Table 1**

Urinary Catheter → refer to **Table 2**

Pregnancy → refer to **Table 3**

No

Yes

Uncomplicated Acute Bacterial Cystitis¹⁷

Women (in order of preference)

- Nitrofurantoin 100 mg PO BID x 5 days*
- Cephalexin 500 mg PO QID x 3-7 days⁵
- TMP/SMX 1 DS tab PO BID x 3 days
- Ciprofloxacin 500 mg PO BID x 3 days
- Levofloxacin 750 mg PO daily x 3 days

*Avoid if CrCl < 50 mL/min (drug will not reach bladder to adequately treat cystitis)

Men (in order of preference)

- TMP/SMX 1 DS tab PO BID x 3 days*
- Ciprofloxacin 500 mg PO BID x 5-7 days
- Levofloxacin 750 mg PO daily x 5-7 days

*Avoid if resistance exceeds 20% or if patient has taken TMP/SMX within preceding 3 months

Complicated Urinary Tract Infection^{7,16}

Internal medicine consult and/or ED evaluation. Initial intravenous (IV) therapy is often preferred until patient remains afebrile x 48 hrs. Then, PO therapy can be initiated.

Candiduria

- For asymptomatic patients, candiduria often represents colonization. Removal of risk factors, i.e. indwelling catheters, is often sufficient to eradicate candiduria
- Consider ID-consult for non-*C. albicans* candiduria

Note: All antibiotics listed (except Ceftriaxone) must be adjusted for renal insufficiency.

The above guidelines are recommendations based on the available literature and are not intended to replace clinical judgment. Please note these recommendations reflect local antimicrobial susceptibility patterns and may differ from published guidelines.

Table 1. Pyelonephritis

Empiric Outpatient: Consider initial dose of a parenteral agent

- Ceftriaxone 1-2 g IM x 1

Followed by

- Ciprofloxacin 500 mg PO BID
- Levofloxacin 750 mg PO daily
- Cefuroxime 500 mg PO BID

Duration of Treatment:

- If treated with Ciprofloxacin: 7 days total
- If treated with Levofloxacin: 5 days total
- If treated with beta-lactam: 10-14 days total

Empiric Inpatient⁶: Parenteral treatment

Table 2. Catheter-Associated UTI

- Treatment of asymptomatic bacteriuria is NOT recommended
- Indwelling urinary catheters should be removed as soon as they are no longer required
- If an indwelling catheter has been in place for >2 weeks at the onset of CA-UTI and is still indicated, replacing the catheter is recommended
- If treatment required, please refer to recommendations for complicated UTI

Table 3. Asymptomatic Bacteriuria/ Acute Cystitis and Pyelonephritis in Pregnancy⁷

For asymptomatic bacteriuria/acute cystitis:

First line:

- Nitrofurantoin 100 mg PO BID x 5-7 days (avoid near-term⁸)*
- Cephalexin 500 mg PO QID x 5-7 days⁵

Second line:

- Cefuroxime 250-500 mg PO BID x 5-7 days
- TMP/SMX 1 DS tab PO BID x 5-7 days (avoid in 1st trimester and near term; supplement with multivitamin containing folic acid)

For Group B Strep:

- Penicillin VK 500 mg PO QID x 5-7 days
- Amoxicillin 500 mg PO TID x 5-7 days

For pyelonephritis: Parenteral treatment

* Avoid nitrofurantoin if 38-42 weeks gestation in G6PD-deficient mothers due to risk of maternal & fetal hemolytic anemia

Note: All antibiotics listed (except Ceftriaxone) must be adjusted for renal insufficiency.

Monitoring and Reassessing Treatment

- Only perform urine cultures if patient is symptomatic OR in patients who cannot provide history (i.e. intubated, dementia) and have sepsis without another source
- Once culture and sensitivities are available, switch to narrow spectrum if possible
- Cephalexin susceptibility testing unreliable for MIC>4, please refer to cefuroxime susceptibilities or switch to another agent
- If culture MRSA positive, consider presentations of staphylococcal bacteremia (ID consult recommended)
- Cultures showing mixed gram-positive bacteria, lactobacilli, and Staphylococcus species (other than *S. saprophyticus*) may be presumed to be contaminants and may not be treated
- Follow-up cultures are NOT necessary if patient shows clinical improvement
- Utilize resolution of delirium and/or improvement of psychiatric symptoms as a proxy of successful UTI treatment.¹⁰⁻¹⁴

The above guidelines are recommendations based on the available literature and are not intended to replace clinical judgment.

Please note these recommendations reflect local antimicrobial susceptibility patterns and may differ from published guidelines.

Frequently Asked Questions:**Q: Is it necessary to repeat urine cultures after treatment with antibiotics?**

A: Follow up cultures are NOT necessary if the patient is clinically improving and/or is asymptomatic as it may lead to unnecessary antibiotic use.

Q: Is antibiotic prophylaxis recommended for recurrent UTIs?

A: Antibiotic prophylaxis may be considered in women with ≥ 2 urinary tract infections in 6 months or ≥ 3 urinary tract infections in 12 months. The decision must take into consideration frequency and severity of UTI versus adverse effects, such as adverse drug reactions, *C. difficile* colitis, and antibiotic resistance. Several types of management strategies exist (i.e. continuous antimicrobial prophylaxis, post-coital prophylaxis, and patient self-treatment). The type of strategy depends on patient-specific factors, as well as physician/patient preference.

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