Management of Recurrent Urinary Tract Infections in Women

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Disclosures

- **I have no relevant financial relationships or disclosures**

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Objectives

- To understand diagnosis of recurrent UTI
- To evaluate patients for treatable sources of recurrent UTI
- To review evidence-based treatments for recurrent UTI
- Identify evidence-based prevention strategies
- Review Clinical Case Presentations

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Burden of Urinary Tract Infections

- Urinary tract infections are four times more common in women than men.
- In the United States alone, UTIs account for an estimated 10.5 million office visits and 2–3 million emergency department visits.
- Economic burden of approximately $3.5 billion/year.
- The lifetime risk of developing at least one UTI exceeds 50% in women.
- Approximately 10% of women older than age 65 years and 30% of women older than age 85 years report a UTI within the prior year.

Siddiqui Obstet Gynecol 2025 Updates in Clinical Management of Recurrent Urinary Tract Infections

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2019 Recurrent UTI Guidelines in Women

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The American/Canadian Urologic Associations and Society for Urodynamics guidelines

- Index patient is an otherwise healthy adult female, medically uncomplicated
- Uncomplicated excludes:
  - Pregnancy
  - Immunocompromised state
  - Anatomic or functional abnormalities of the urinary tract
  - Infection due to CIC or indwelling catheter
  - Signs or symptoms of systemic bacteremia (fever, flank pain)
  - Neurological disease relevant to the lower urinary tract

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Definitions:

- Acute bacterial cystitis
  - Acute-onset symptoms such as dysuria in conjunction with variable degrees of increased urinary urgency and frequency, hematuria, and new or worsening incontinence
  - Urinary tract inflammation (pyuria greater than or equal to 5 WBC/hpf on microscopic urinalysis)
  - Detection of a bacterial uropathogen

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Definitions

- Localized Urinary Tract Infection (Previously Uncomplicated urinary tract infection)
  - An infection of the urinary tract in a healthy patient with an anatomically and functionally normal urinary tract, no signs or symptoms of upper urinary tract involvement or bacteremia, and no known complicating factors that would make the patient susceptible to progression to a systemic infection
- Complicating Factors
  - Anatomic or function abnormality
  - Immunocompromise
  - Indwelling urinary tract foreign body

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Definitions:

- Recurrent urinary tract infection
  - Two separate episodes of acute bacterial cystitis and associated symptoms over a six-month period within the preceding year
- Asymptomatic bacteriuria
  - The presence of bacteria in the urine that causes no illness or symptoms
- Pyuria
  - Presence of increased number of WBC in the urine as evidence of an inflammatory response in the urinary tract.

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Diagnosis

- Acute onset symptoms
- Laboratory detection of uropathogen from the urine
  - *E. coli* (75 – 95%)
  - Other pathogens: *P. mirabilis*, *K. pneumoniae*, *S. saprophyticus*, other rare species
  - Previously 10^5 colony-forming units (CFU)/mL was published more than 60 years ago and likely represents an arbitrary cut-off
  - Lower midstream urine colony counts (>10^2 CFU/mL) have been associated with bladder bacteriuria on catheterization in symptomatic women with pyuria, suggesting that ≥10^2 CFU/mL of a single uropathogen may be a more appropriate cut-off in selected patients in whom there is strong suspicion of infection

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Urinary Microbiome and Emerging Diagnostic Tools

- Patients have a urinary microbiome
  - These bacterial communities are generally symbiotic, supporting genitourinary immunity
  - May change treatment dogma – not aimed at bacterial eradication but the amelioration of symptoms and prevention of complications
- Emerging Diagnostic Tools
  - Expanded culture techniques: longer culture period, variety of growth media, larger urine volume
  - Next generation sequencing (NGS), Polymerase chain reaction (PCR)
  - Unclear role clinically

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Guideline Statements Evaluation:

1. Clinicians should obtain a complete patient history and perform a physical examination in women presenting with rUTIs.
2. Clinicians should obtain urinalysis, urine culture and sensitivity with each symptomatic acute cystitis episode prior to initiating treatment in patients with rUTIs.
3. To make a diagnosis of rUTI, clinicians must document evidence of inflammation (pyuria) and the presence of uropathogenic bacteria in association with symptomatic episodes.

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Guideline Statements Evaluation:

4. Clinicians should obtain repeat urine studies when an initial urine specimen is suspect for contamination, with consideration for obtaining a catheterized specimen.

5. Cystoscopy and upper tract imaging should not be routinely obtained in the index patient presenting with rUTI.

6. Clinicians may offer patient-initiated treatment (self-start treatment) to select rUTI patients with acute episodes while awaiting urine cultures.

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Guideline Statements Asymptomatic Bacteriuria:

7. Clinicians should omit surveillance urine testing, including urine culture, in asymptomatic patients with rUTIs.

8. Clinicians should not treat asymptomatic bacteriuria in patients.

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Guideline Statements Antibiotic Treatment

9. Clinicians should use first-line therapy (i.e., nitrofurantoin, TMP-SMX, fosfomycin) dependent on the local antibiogram for the treatment of symptomatic UTIs in women.

10. Clinicians should treat rUTI patients experiencing acute cystitis episodes with as short a duration of antibiotics as reasonable, generally no longer than seven days.

11. In patients with rUTIs experiencing acute cystitis episodes associated with urine cultures resistant to oral antibiotics, clinicians may treat with culture-directed parenteral antibiotics for as short a course as reasonable, generally no longer than seven days.

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First-line therapy for the treatment of uncomplicated symptomatic UTI

TABLE 3: First-line therapy for the treatment of uncomplicated symptomatic UTI

Treatment effects	Nitrofurantoin	TMP-SMX	Fosfomycin
Cure rate	88-93%	90-100%	83-91%
Antimicrobial spectrum	narrow: *E. coli, S. saprophyticus*	typical uropathogens	Covers VRE, ESBL GNRs
Collateral damage	No	Minimal	No
Resistance	Low, stable X 50y	Increasing	Currently low
Dose & duration	100 mg BID X 5d	One DS BID X 3d	3 g single dose

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Guideline Statements Antibiotic Prophylaxis

12. Following discussion of the risks, benefits, and alternatives, clinicians my prescribe antibiotic prophylaxis to decrease the risk of future UTIs in women of all ages previously diagnosed with UTIs.

Continuous prophylaxis	Post-coital prophylaxis
TMP 100mg daily	TMP-SMX 40mg/200mg
TMP-SMX 40mg/200mg once daily	TMP-SMX 80mg/400mg
TMP-SMX 40mg/200mg thrice weekly	Nitrofurantoin 50-100mg
Nitrofurantoin 50mg daily	Cephalexin 250mg
Nitrofurantoin 100mg daily	
Cephalexin 125mg daily	
Cephalexin 250mg daily	
Fosfomycin 3g every 10 days	

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Guideline Statements Non-Antibiotic Prophylaxis

13. Clinicians may offer cranberry prophylaxis for women with rUTI
14. Clinicians should inform patients with rUITs that D-mannose alone for prophylaxis may not be effective in UTI prevention.
15. Clinicians may offer methenamine hippurate for prophylaxis for women with rUTIs.
16. When women with rUTIs have a water intake below 1.5 L/day (50 oz), clinicians may offer increased water intake for prophylaxis.

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Guideline Statements Follow-up Evaluation:

17. Clinicians should not perform a post-treatment test of cure urinalysis or urine culture in asymptomatic patients.

18. Clinicians should repeat urine cultures to guide further management when UTI symptoms persist following antimicrobial therapy.

19. For patients with persistent UTI symptoms after microbiological cure, clinicians should evaluate for alternative causes to patient symptoms.

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Guideline Statements Estrogen:

20. In peri- and post-menopausal women with rUTIs, clinicians should recommend vaginal estrogen therapy to reduce the risk of future UTIs if there is no contraindication to estrogen therapy.

TABLE 5: Commonly used vaginal estrogen therapy

Formulation	Composition	Strength and Dosage
Vaginal tablet	Estradiol hemihydrate*	10 mcg per day for 2 weeks, then 10 mcg 2 to 3 times weekly
Vaginal ring	17b-estradiol	2 mg ring released 7.5 mcg per day for 3 months (changed by patient or provider)
Vaginal cream	17b-estradiol	2 g daily for 2 weeks, then 1 g 2 to 3 times per week
	Conjugate equine estrogen	0.5 g daily for 2 weeks, then 0.5 g twice weekly

* Estradiol hemihydrate comes in a 4 mcg tablet; however, this has not been studied for prevention of rUTI.

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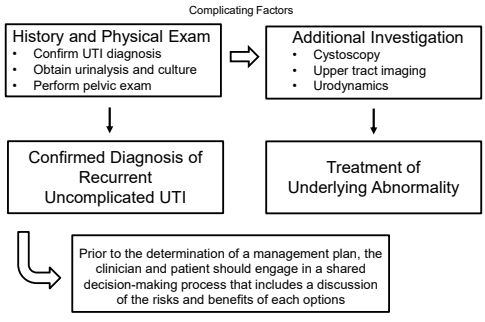
AUA Treatment Algorithm



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AUA Treatment Algorithm

Confirmed Diagnosis: Symptoms, Urinalysis, Urine culture

Prophylaxis		Antibiotic Treatment
Non-Antibiotic Prophylaxis • Cranberry • Behavioral modification • Vaginal Estrogen (post/peri menopause) • Methenamine	Antibiotic Prophylaxis • Continuous dosing – no longer than 12 months • Intermittent dosing – UTI-predisposing conditions	Self-Start Therapy • Reliable/compliant patients • Modify treatment after culture results if needed Episodic • First-line drugs • Short duration Resistance • Culture-directed parenteral antibiotics

Supportive care: NSAIDS, urinary analgesics, increase fluids

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Case Presentations

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Case 1

36 year old female
CC: recurrent UTIs
History:
-UTIs are ongoing for several years
-She checks her urine at home with store-bought dipsticks
-She is treated with antibiotics either from her PCP, Gyn, or urgent care
-"They always check my urine"
-Mother has history of rUTI and is on a daily antibiotic, requests an antibiotic
-Otherwise healthy
- Sexually active – uses Condoms
Exam: Normal

Clinical questions:
- What are her risk factors for recurrent UTIs?
  - Are they modifiable?
- Can we give her a daily antibiotic without cultures?
- What about home dip sticks?
- What about office UA?

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Patient Counseling/Management

- Education:
  - Hygiene
  - Antibiotic stewardship
  - Test of cure
  - Risk Factors
  - Importance of urine cultures
- Standing order for urine culture
- Care with one provider
- Prevention measures:
  - Antibiotics
  - Cranberry, methenamine
  - Water intake

Risk factors for recurrent UTI:
- Family history
- Spermicide use
- Recent sexual intercourse

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Case 2

80 year old female

CC: recurrent UTIs

History:

-Lives in a nursing facility

-Not sexually active

-Struggles with urinary incontinence / Occasional fecal incontinence

-UTIs are treated with escalating doses of antibiotics, most recently x 2 weeks

-Cultures always positive for same organism and show escalating resistance

Exam: Vaginal atrophy, normal support

Clinical questions:

- What are her risk factors for recurrent UTIs?
  - Are they modifiable?
- Is this patient "complicated"?
  - Does she need imaging?
  - What might imaging show?

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Patient Counseling/Management

- Education:
  - Hygiene
  - Atrophy
  - Antibiotic stewardship
  - Importance of urine cultures
- Standing order for urine culture
- Care with one provider
- Prevention measures:
  - Hygiene
  - Estrogen
  - Cranberry
  - Water intake
  - Methenamine
  - Antibiotics

Risk factors for recurrent UTI:

- Post-menopausal status
- Urinary incontinence
- Fecal incontinence
- Functional disability

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Case 3

72 year old female

CC: My Urologist said I need my bladder prolapse repaired

History:

-HTN, osteoporosis, hyperlipidemia

-Not sexually active

-UTIs are culture-proven

Exam: Stage 3 anterior vaginal prolapse, vaginal atrophy

-Office PVR 10 mL

Clinical questions:

- What are her risk factors for recurrent UTIs?
  - Are they modifiable?
- Is the prolapse the cause of her UTIs?

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Patient Counseling/Management

- Education:
  - Atrophy
  - Potential impact of prolapse
- Standing order for urine culture
- Care with one provider
- Assessment:
  - Emptying function (PVR)
- Prevention measures:
  - Address emptying prn
  - Estrogen
  - Cranberry
  - Water intake
  - Methenamine
  - Antibiotics

Risk factors for recurrent UTI:

- Post-menopausal status
- Anterior compartment prolapse

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Case 4

55 year old female

CC: recurrent UTIs

History:

-Sexually active; peri-menopausal

-UTIs are sometimes associated with intercourse

-Variable symptoms response to antibiotics

-1 positive culture (10-50k E coli), 2 negative cultures

Exam: Vaginal atrophy, normal support

-Normal office PVR

Clinical questions:
- Does she have recurrent UTIs?
- What are her risk factors for rUTI?
  - Are they modifiable?
- How should she be managed?

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Patient Counseling/Management

- Education:
  - Importance of urine cultures
  - GSM, OAB, BPS
  - Atrophy
  - Antibiotic stewardship
- Standing order for urine culture
- Care with one provider
- Prevention measures:
  - Keeping a diary
  - Estrogen
  - Cranberry
  - Water intake
  - Methenamine
  - Antibiotics

Risk factors for recurrent UTI:
- Peri-menopausal status
- Sexually active

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Case 5

82 year old female

CC: Positive TOC urine cultures despite appropriate tx

History:

-Multiple positive urine cultures: Klebsiella, E coli, Enterobacter

Exam: Vaginal atrophy, normal support (no prolapse)

-Normal office PVR

-Normal cystoscopy and CT urogram

Clinical questions:
- What are the patient's symptoms?
- What are the appropriate treatment options?
- What are the risks of antibiotic use?

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Patient Counseling/Management

- Education:
  - Concept of carrier status
  - Importance of urine cultures done with symptoms
  - Unresponsive to appropriate care some imaging appropriate
- Care with one provider
- Prevention measures:
  - Hygiene
  - Estrogen
  - Cranberry
  - Water intake
  - Methenamine/D-Mannose

Risk factors for recurrent UTI:
- Post-menopausal status

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