

# When are empiric antibiotics appropriate for urinary tract infection symptoms?

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## EVIDENCE-BASED ANSWER

Healthy, nonpregnant women presenting with the triad of frequency, dysuria, and *no* vaginal symptoms have about a 96% chance of having an urinary tract infection (UTI) (positive likelihood ratio [LR+]=24.6). Since no urinalysis result would substantially change the high likelihood of disease for these patients, empiric therapy is appropriate (strength of recommendation [SOR]: **B**).

A triage system based only on having 1 or more urinary symptoms is more sensitive but less specific: the chance of having a UTI drops to 50% (LR+ =19). While empiric therapy is still likely

to be appropriate, rates of false positives and inappropriate antibiotic use may rise (SOR: **B**).

Empiric treatment by telephone may also be considered (SOR: **C**). While no studies have specifically addressed the diagnostic value of UTI symptoms reported by phone, no increase in pyelonephritis or other adverse events has been seen with telephone treatment protocols. And while telephone treatment protocols can increase the use of guideline-recommended antibiotics and decrease costs, they may increase unnecessary antibiotic use overall. Contraindications to empiric therapy are listed in **TABLE 1**.

## CLINICAL COMMENTARY

### Telephone protocol for UTI reduces unnecessary office visits and lab testing

We have 10 years of experience with a telephone treatment protocol we developed for uncomplicated UTI; it has since been adopted by the Institute for Clinical Systems Improvement (ICSI). The protocol reduces unnecessary office visits and lab testing. We believe the protocol actually increases our prescribing of preferred first-line antibiotics for UTI. While it is convenient

for our patients, its use has resulted in patients wanting to be treated over the phone even if they have “failed” the protocol. Overall, our patients are thankful we have a telephone protocol for uncomplicated UTI. We enjoy the use of a handful of other telephone protocols and hope to move toward web-based protocols in the future.

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### ■ Evidence summary

An evidence-based review<sup>1</sup> found 5 high-quality studies on the diagnosis of acute uncomplicated UTI among women. (“Uncomplicated” was defined as normal urinary tract and no contributing medical problems, such as diabetes, neurogenic bladder, renal stones.) UTIs were defined as the presence of significant bacteriuria ( $\geq 10^4$  to  $10^5$  colony-forming units) on culture. A patient presenting to a clinician with 1 or more UTI symptoms had approximately a 50% chance of having significant bacteriuria on culture.<sup>1</sup> The

authors estimated the pretest probability of UTI as 5% from the incidence of asymptomatic bacteriuria among healthy women.<sup>1,2</sup> This produced a LR+ of 19 simply for presenting to a clinician with 1 or more UTI symptoms.<sup>1</sup> The summary LR+ for clinical signs and symptoms in the prediction of UTI after presentation to the office are found in **TABLE 2**. A history of a vaginal discharge or irritation has a LR- of 0.3, decreasing the probability of UTI for a patient presenting to the office from approximately 50% to 20%, so further testing would be indicated.<sup>1</sup>

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No single sign or symptom accurately predicted UTI. However, the triad of dysuria with frequency but without vaginal symptoms increased the probability of significant bacteriuria on culture from 50% to 96% (LR+ =24.6).<sup>1</sup> In contrast, a 1999 review of 51 studies calculated that if both the nitrites and leukocyte esterase are positive on urine dipstick testing, the LR+ is 4.2; if both are negative the LR- is 0.3.<sup>1,3</sup> Since the probability of UTI for patients with the symptom triad is so high, dipstick urinalysis is unlikely to alter management regardless of whether nitrites and leukocyte esterase were both positive or negative (posttest probability=98%–99% and 80%, respectively). If urine dipstick or other office-based tests are not needed to make the diagnosis of uncomplicated UTI for a patient with the classic triad of symptoms, then telephone treatment based on symptoms may be reasonable. Women who have recurrent UTIs (2 or more culture positive UTIs over the previous 12 months) can accurately self-diagnose subsequent UTIs based on symptoms (LR+ =4.0).<sup>4,5</sup>

A recent retrospective case series<sup>6</sup> evaluated a telephone guideline for the empiric treatment of UTI for 4177 women in a California HMO. UTI criteria were  $\leq 10$  days of dysuria; frequency, urgency, pressure, or increased nocturia; or gross hematuria. Women were excluded if they had any one of a variety of contraindications (TABLE 1). Upper tract infection occurred in 21 patients (1.1%) within 60 days of telephone treatment, two thirds of which likely represented treatment failures. This is similar to rates in control groups of other studies. Fourteen women (1.5%) received care for sexually transmitted diseases or other gynecologic conditions, primarily bacterial vaginitis, within 60 days of telephone treatment. Of note, 6% of the cohort were elderly, diabetic, taking glucocorticoids or early in pregnancy and are typically excluded from other studies. This higher-risk group did not have an increased incidence of either sepsis or pyelonephritis.<sup>6</sup> No increase in adverse outcomes was seen in another study of a telephone treatment protocol.<sup>7</sup>

TABLE 1

### Contraindications to empiric antibiotics for urinary tract infection (telephone treatment)

Vaginal discharge
Prolonged symptoms
Severe or intolerable flank, side, or abdominal pain
Inability to urinate for more than 4 hours
Body temperature higher than 38.1°C (100.5°F) with flank pain, chills, nausea, or abdominal pain
Pregnancy
Recent urologic surgery, procedure, or bladder catheterization; UTI within the last 6 weeks or frequent UTI ( $\geq 3$ times) in the last 12 months
Any symptoms that warrant urgent office-based evaluation according to the clinician

Adapted from Vinson and Quesenberry, *Arch Intern Med* 2004.<sup>8</sup>

Several studies<sup>6–8</sup> have noted that telephone treatment protocols increase the use of protocol-recommended antibiotics (eg, generally less expensive agents such as trimethoprim-sulfamethoxazole), which may help limit resistance to fluoroquinolones. However, specific data are not available.

McIssac et al<sup>9</sup> reviewed a cohort of 231 women presenting to family physicians' offices with uncomplicated cystitis symptoms. Empiric therapy resulted in approximately 40% of women unnecessarily receiving antibiotics. Treating only women with classic cystitis symptoms and pyuria would have decreased the unnecessary use of antibiotics to 26.2%, but fewer women with confirmed cystitis would have received immediate antibiotics (66.4% vs 91.8%). They derived a clinical decision rule designed to balance false positives and false negatives. It recommends immediate antibiotic treatment if women have  $\geq 2$  of 4 signs or symptoms: dysuria, leukocyte esterase (greater than trace), positive nitrites, or blood (greater than trace) on dipstick (LR+ =2.29). Otherwise the rule recommends a culture to guide antibiotic

#### FAST TRACK

**Empiric therapy is appropriate in nonpregnant women with the triad of frequency, dysuria, and no vaginal symptoms**

TABLE 2

Diagnosis of urinary tract infection

DIAGNOSTIC CRITERIA	LR+	LR-	SUMMARY LR
<b>Presenting to medical care with possible UTI</b>			19.0
Dysuria	1.5	0.5	
Frequency	1.8	0.6	
Hematuria	2.0	0.9	
Recurrent UTI symptoms for a woman with history of UTI	4.0	0.0	
Vaginal discharge or irritation	0.2–0.3	2.7–3.1	
<b>Dysuria, frequency, and absence of vaginal discharge or irritation</b>			24.6
Dysuria absent, + vaginal discharge			0.3
<b>Dysuria and + vaginal discharge</b>			0.7
+ Leukocytes* or + nitrate on urine dipstick analysis	4.2	0.3 <sup>†</sup>	
“UTI Rule” <sup>‡</sup>			2.3

\* Leukocyte greater than trace on dipstick  
 † Leukocytes negative and nitrite negative  
 ‡ “UTI Rule”—positive if 2 or more present: dysuria, + leukocytes, + nitrate, + heme (> trace)

LR, likelihood ratio; UTI, urinary tract infection.  
 Adapted from Bent et al, *JAMA* 2002.<sup>1</sup>

therapy. This decision rule would have reduced unnecessary antibiotic use by 27.5% while ensuring that more women with confirmed UTIs received immediate antibiotics (81.3%).

In 1999, Saint et al<sup>8</sup> estimated savings of \$367,000 for 147,000 women enrolled over 1 year after widespread guideline implementation. Two cost-effectiveness studies<sup>10,11</sup> of office treatment concluded that empiric treatment without additional testing is the least costly option in this setting. However, a recent, comprehensive cost-effectiveness study<sup>11</sup> concluded that if

a patient presents to an office, the marginal cost of performing a pelvic examination and urine culture for women with a negative dipstick was relatively low (\$4 to \$32 per symptom day avoided).

Recommendations from others

A 2002 Institute for Clinical Systems Improvement guideline<sup>12</sup> advised offering telephone treatment of uncomplicated UTI for low-risk patients if preferred by both provider and patient.

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