

# Current Diagnosis and Management of Urinary Tract Infections



Tia Solh, PA-C, MT(ASCP), MPAS<sup>a,\*</sup>,  
Rebekah Thomas, PA-C, PharmD, BCPS, BC-ADM<sup>b</sup>,  
Christopher Roman, PA-C, MA, MMS<sup>c</sup>

## KEYWORDS

- Urinary tract infection • UTI • Cystitis • Pyelonephritis • Complicated UTI
- Asymptomatic bacteriuria

## KEY POINTS

- Urinary tract infections (UTIs) are classified as complicated and uncomplicated, which dictates their management; a majority of UTIs are uncomplicated and occur in previously healthy, nonpregnant women.
- Urinalysis results must be interpreted carefully, because several indicators, if used individually, do not have adequate sensitivity or specificity for confirmation of UTI.
- First-line agents for the empirical treatment of acute, uncomplicated cystitis in the United States are nitrofurantoin, trimethoprim/sulfamethoxazole, and fosfomycin.
- Asymptomatic bacteriuria does not require treatment in most patients, with the exceptions of pregnancy and prior to urologic procedures.
- Asymptomatic candiduria is not an immediate indication for treatment in most patients but should be investigated further.

## INTRODUCTION

The term, *urinary tract infection*, encompasses a broad spectrum of infections along the urinary tract, from simple cystitis to severe pyelonephritis. UTIs are the most commonly encountered bacterial infection in the ambulatory setting in the United States.<sup>1</sup> Although most UTIs are uncomplicated, they are also a leading cause of gram-negative sepsis. The estimated annual cost of treatment of UTIs exceeds \$2

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<sup>a</sup> Department of Physician Assistant Studies, Mercer University, 3001 Mercer University Drive, Atlanta, GA 30341, USA; <sup>b</sup> Department of Physician Assistant Studies, Philadelphia College of Osteopathic Medicine, 625 Old Peachtree Road Northwest, Suwanee, GA 30024, USA;

<sup>c</sup> Physician Assistant Program, Butler University, 4600 Sunset Avenue, Indianapolis, IN 46208, USA

\* Corresponding author.

E-mail address: [Solh\\_tm@mercer.edu](mailto:Solh_tm@mercer.edu)

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billion in the United States.<sup>1</sup> This article reviews the epidemiology, risk factors, pathophysiology, and current diagnosis and treatment of UTIs.

## **DEFINITIONS**

### ***Urinary Tract Infection***

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A UTI results from microbial invasion of the urinary tract, which is normally sterile.<sup>1</sup> Lower tract infections result from invasion of the urethra and bladder, respectively termed urethritis and cystitis. Upper tract infections involve the ureters and kidney, respectively termed ureteritis and pyelonephritis. Both lower tract infections and upper tract infections can be considered uncomplicated or complicated.

### ***Uncomplicated Urinary Tract Infection***

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A majority of UTIs are uncomplicated and are defined as infection in otherwise healthy, nonpregnant women with urinary tracts of normal structure and function.<sup>2</sup> By age 24, 1 in 3 women are treated for a UTI.<sup>1</sup> Uncomplicated UTIs can rarely occur in men, but a vast majority of urinary tract infections in men are considered complicated.<sup>3</sup>

### ***Complicated Urinary Tract Infection***

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UTIs are considered complicated when they are associated with any underlying condition that increases the risk of treatment failure. Conditions associated with complicated UTIs include<sup>2</sup>

- Pregnancy
- Diabetes
- HIV
- Immunosuppression
- Infection with multidrug-resistant pathogen
- Functional or anatomic abnormalities of the urinary tract
- Renal insufficiency
- Renal transplant
- Obstruction of the urinary tract (eg, calculi or stenosis)
- Presence of instrumentation (eg, indwelling urinary catheter, stent, or nephrostomy tube)

### ***Recurrent Urinary Tract Infection***

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Recurrent UTIs are defined as 2 uncomplicated infections within 6 months or as 3 infections within 12 months, with clearance of the initial infection demonstrated by negative urine culture. Despite adequate antimicrobial treatment of the initial infection, a patient has a 25% probability of developing a second UTI within 6 months and 46% probability of recurrence over 12 months.<sup>1</sup>

### ***Asymptomatic Bacteriuria***

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Asymptomatic bacteriuria is defined as the presence of bacteria in an appropriately collected urine sample from a patient without any urinary symptoms or signs of a UTI.<sup>3</sup> It usually does not warrant antimicrobial treatment except in special populations, as discussed later.

### ***Pyuria***

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Pyuria is defined as the presence of an increased amount of polymorphonuclear lymphocytes in the urine and indicates inflammation of the urinary tract.<sup>3</sup> It is not necessarily an indication of a UTI, as discussed later.

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