

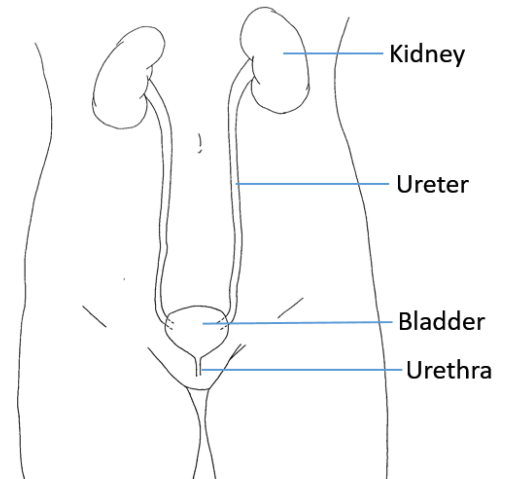
Urinary Tract Infections

Pakeeza Alam, MD

Introduction

Urinary tract infections (UTIs) affect 11% of women in the United States every year and nearly 50% of women will experience a UTI in their lifetime. The urinary system includes:

- Kidneys, which remove waste products from the bloodstream and produce urine
- Ureters, which bring urine from the kidneys to the bladder
- Bladder, which stores urine
- Urethra, which is the opening for the urine to leave the bladder.



A urinary tract infection is an infection that can occur along the parts of the urinary system. This article is focused on UTIs in adult women who are not pregnant. Common symptoms that you may experience with a UTI are pain or burning with urination, lower abdominal pain just above the pubic area, a strong urge to urinate, urinating more often than usual, and cloudy or foul-smelling urine.

The most common location of infection is the lower part of your urinary system, or the bladder and urethra. When you have an infection in the bladder, it is also known as *cystitis*. If the infection is not treated, it can worsen to a kidney infection, also known as *pyelonephritis*. Symptoms that you may experience with a kidney infection include fevers, chills, back pain, nausea, and vomiting in addition to the symptoms listed above.

A urinary tract infection (UTI) is an infection that can occur along the parts of the urinary tract, which include the kidneys, ureters, bladder, and urethra. UTIs most commonly affect the bladder.

Risk Factors and Cause

There are many factors that may increase your risk of getting a UTI:

- Sexual intercourse and increased frequency of sexual intercourse
- New sexual partner in the last year
- Spermicide use
- A recent UTI in the last year
- Family history of UTIs

- Menopause

UTIs are most commonly caused by bacteria that travel from the outside of the body through the urethra and into the bladder. *Escherichia coli* (E. coli) is the most common bacteria that causes a UTI and it causes 80-90% of all infections. Other bacteria that can cause UTIs are *Staphylococcus saprophyticus*, *Proteus mirabilis*, *Klebsiella pneumonia*, and *Pseudomonas aeruginosa*. UTIs can also be caused by a fungus, but this happens less often. Patients who have a UTI caused by a fungus typically have other risks, such as diabetes that is not well-controlled.

Complicated Urinary Tract Infections

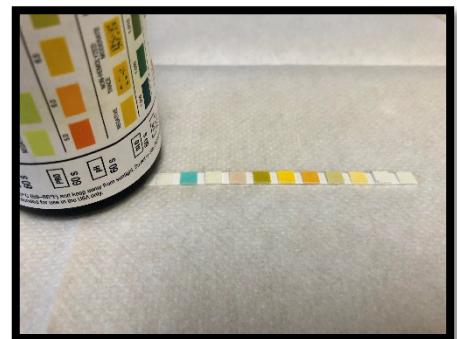
It is important for doctors to know when a patient has a more serious UTI, because it may change the evaluation and treatment. A serious UTI usually occurs when the infection goes beyond the bladder, such as to the kidneys or blood stream.

It is important to tell your doctor if you have a history of the following conditions as it may suggest a more serious UTI:

- Fevers, chills, back pain, nausea, vomiting (because this may mean a kidney infection)
- Kidney stones
- Diabetes or other medical conditions that causes your immune system to be weaker
- Conditions you might have that make it more difficult to empty your bladder (such as spinal cord injury or certain neurological conditions)
- Urinary tract abnormality that you were born with
- Recent urinary tract procedure (such as office procedures using instruments in the urinary tract)
- Foley catheter (a tube that is placed through the urethra that helps drain the bladder) or stent in the ureter (a tube that helps keep the ureter open to drain urine)

Diagnostic Testing:

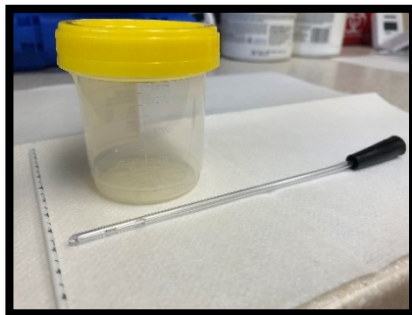
UTIs can usually be diagnosed and treated based on symptoms alone without needing an exam or testing. For example, if someone experiences burning with urination and lower abdominal pain and does not have other medical conditions, she can be treated with an antibiotic without getting an exam or testing.



When the diagnosis is not clear, a urinalysis (UA) and/or urine culture may be obtained. A UA is a test that takes a closer look at the urine. It is usually done in the office using a tool called a dipstick or it can be done in a lab using a microscope. If certain substances are present in the UA, such as *leukocyte esterase* (an enzyme formed by the body's immune cells), *nitrites* (present when there is bacteria in the urine), and blood, this may mean a UTI is present.

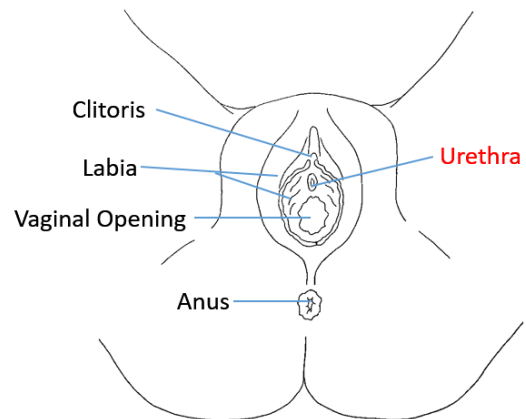
A urine dipstick is a quick test that can be performed in the office to help diagnose a UTI.

A **urine culture** is another test that is done that looks for specific bacteria. It is obtained if the diagnosis of a UTI is unclear based on symptoms alone or with UA testing. A urine culture can also be obtained if an individual continues to have symptoms even after treatment and has a risk for more complicated infections.



Urine samples can either come from a clean catch or a directly from the bladder using a small catheter.

There are two different ways to get a urine sample for a UA or a urine culture. This can be obtained either from a clean catch or from catheterization. In the clean catch method, you will be given wipes in the office to clean the urethra and you will use a cup to catch a urine sample at the middle of the stream. In the catheterized method, a health care provider will clean the outside of the urethra with a cleaning solution, and place a catheter (or a small tube) in through the urethra to gather urine directly from the bladder.



For the initial diagnosis of a UTI, most patients do not need imaging studies (i.e., x-ray, ultrasound or CT scan). However, if there is a concern for a more serious UTI or antibiotics does not seem to be resolving the UTI, you may need to have imaging studies done.

Treatment:

UTIs are usually treated with a short course of antibiotics taken by mouth. Three commonly used antibiotics are:

1. Trimethoprim-sulfamethoxazole
2. Nitrofurantoin
3. Fosfomycin

The urethra is the opening through which urine leaves the bladder. It is located above the vaginal opening.

For serious UTIs, such as a kidney infection, it is important to get a urine culture. If you have a kidney infection, you may need intravenous (IV) antibiotics in the hospital and/or a longer course of antibiotics taken by mouth. The antibiotics that are chosen are specific to each individual and the bacteria that grow from the culture.

Recurrent Urinary Tract Infections and Prevention

Some people may experience frequent UTIs. If you experience 3 or more UTIs in a year or 2 or more UTIs in the past 6 months, you have a condition called **recurrent UTIs**.

There are a few things that can prevent UTIs in people who experience recurrent UTIs. These include the use of vaginal estrogen for post-menopausal women and using antibiotics.

After menopause, estrogen hormone levels fall, which may change the acidity of the vagina and the bacteria that normally live in the vagina. These changes make women more likely to get UTIs after menopause. Topical vaginal estrogen cream, or estrogen cream that is applied directly to the skin of the vagina, can decrease UTIs. Topical vaginal estrogen works well on vaginal tissue, and less estrogen gets absorbed into the rest of the body. To use, a small amount of vaginal estrogen cream is applied nightly for 2 weeks, then twice weekly.

Antibiotics can be used on a regular basis to prevent recurrent UTIs. They can be used in several ways. In the first way, a small dose of antibiotics is taken every day for at least 6 months.

The second way, a one-time dose of antibiotics can be taken right after intercourse. This helps people who get UTIs mainly after intercourse.

In the third way, individuals are given a prescription for a course of antibiotics to keep on hand. They can start the antibiotics if and when they start to experience symptoms of a UTI without needing to be seen by a health care provider.

Other ways to prevent UTIs include:

- Not using spermicide
- Urinating after intercourse

- Wiping from front to back after urination and bowel movements
- Increase fluid intake
- Cranberry supplementation

The first of these is using a different kind of contraception if you are using spermicides. It is important to stop using spermicides especially if using it with a diaphragm, because spermicides can increase the risk of getting UTIs. It may also be helpful to urinate after intercourse, wipe from front to back after urinating and after bowel movements, and to drink enough fluids.

The current scientific studies do not show for certain if cranberry prevents UTIs, but it does little harm to health to try it. Cranberry can be taken in either juice or tablet form. If juice form is taken, it is important to be mindful of the increased calorie and sugar intake when taking juice.

Some scientific studies show that probiotic tablets containing a bacteria called *lactobacillus* may be helpful. However, some people also reported side effects while taking these tablets. It is also unclear whether it is best taken by mouth or as a vaginal suppository. If trying probiotics to prevent UTIs, it would be most helpful to try probiotics that contain *lactobacillus* and to monitor for side effects.

Take Home Points:

- Urinary tract infections (UTIs) are a common type of infection, most often caused by the bacteria *Escherichia coli* (*E. coli*).
- Most UTIs can be treated based on symptoms alone. A urinalysis and urine culture may help if diagnosis and treatment choice is unclear.
- Treatments for UTIs may include antibiotics such as trimethoprim-sulfamethoxazole, nitrofurantoin, or fosfomycin.
- Prevention of recurrent UTIs include the use of vaginal estrogen for post-menopausal women and antibiotics. It may also be helpful to avoid spermicides, urinate after intercourse, wipe from front to back, and to drink adequate fluids. Cranberry or probiotic supplements may also be considered to prevent UTIs.

Useful Websites:

- <https://www.niddk.nih.gov/health-information/urologic-diseases/bladder-infection-uti-in-adults/treatment>

References:

- Foxman B. Urinary tract infection syndromes: occurrence, recurrence, bacteriology, risk factors, and disease burden. *Infect Dis Clin North Am* 2018; 281:1–13.
- Hooton TM, Gupta K. Recurrent urinary tract infection in women. Edited by Calderwood SB and Bloom A. UpToDate. Nov 21, 2018. Available at: https://www.uptodate.com/contents/recurrent-urinary-tract-infection-in-women?search=recurrent%20uti&source=search_result&selectedTitle=1~145&usage_type=default&display_rank=1. Accessed on May 27, 2018.

About the Author:



Pakeeza Alam, MD, FACOG graduated from Stony Brook School of Medicine. She completed her residency in Obstetrics and Gynecology at the University of Rochester. She went on to complete a 3-year fellowship in Female Pelvic Medicine and Reconstructive Surgery at Georgetown University/MedStar Washington Hospital Center. She is currently a Urogynecologist in a private practice in Westchester, NY.

The author reports no conflicts of interest.