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Patient education: Urinary tract infections in adolescents and adults (Beyond the Basics)

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URINARY TRACT INFECTION OVERVIEW

The urinary tract includes the kidneys (which filter the blood to produce urine), the ureters (the tubes that carry urine from the kidneys to the bladder), the bladder (which stores urine), and the urethra (the tube that carries urine from the bladder to the outside) ([figure 1](#)). Urinary tract infections (UTIs) happen when bacteria get into the urethra and travel up into the bladder.

If the infection stays just in the bladder, it is called a bladder infection, or "simple cystitis." If the infection travels up past the bladder and into the kidneys, it is called a kidney infection, or "pyelonephritis." Bladder and kidney infections are both types of UTI.

Bladder infections are one of the most common infections, causing symptoms like a burning feeling with urination and the need to urinate frequently. Kidney infections are less common than bladder infections, and can cause similar symptoms, but they can also cause fever, back pain, and nausea or vomiting.

Both bladder and kidney infections are more common in women than men. Most cases of bladder infection in women are uncomplicated and easily treated with a short course of antibiotics. In men, bladder infections may also affect the prostate gland, and a longer course of antibiotics may be needed. Kidney infections can also usually be treated at home with antibiotics, but treatment typically lasts longer. In some cases, kidney infections must be treated with intravenous antibiotics, which may need to be given in the hospital.

This discussion will focus on bladder and kidney infections in healthy adults and adolescents. UTIs in children are discussed separately. (See "[Patient education: Urinary tract infections in children \(Beyond the Basics\)](#)".)

URINARY TRACT INFECTION CAUSES

Bacteria that cause urinary tract infections (UTIs) do not normally live in the urinary tract, but they do live in the gastrointestinal tract and close to the urethra in women and men who are not circumcised. UTIs occur when these bacteria get into the urethra and travel up into the urinary tract.

Factors that increase the risk of developing a UTI include:

- Having sex frequently
- Having diabetes
- Having a bladder or kidney infection in the past 12 months
- Using a spermicide for birth control
- For men, not being circumcised or having insertive anal sex

In men and women, having a condition (such as kidney stones or ureteral reflux) that blocks or changes the flow of urine in the kidneys increases the risk of a kidney infection.

There is also increasing evidence that there is a genetic predisposition to UTIs; that is, some people might just be more likely to get them regardless of their behaviors or other health conditions.

BLADDER INFECTION SYMPTOMS

The typical symptoms of a bladder infection include:

- Pain or burning when urinating
- Frequent need to urinate

- Urgent need to urinate
- Blood in the urine
- Discomfort in the lower abdomen

Is it a bladder infection or something else? — Burning with urination can also occur in women with vaginal infections (such as a yeast infection) or in people with urethritis (inflammation of the urethra). For this reason, it is important to call your health care provider before assuming you have a bladder infection.

KIDNEY INFECTION SYMPTOMS

Kidney infections can sometimes cause the same symptoms as those of a bladder infection (listed above), but they can also cause:

- Fever (temperature higher than 99.9°F or 37.7°C)
- Pain in the flank (one or both sides of the lower back, where the kidneys are located)
- Nausea or vomiting

If you have one or more of the symptoms of a kidney infection, you should see a health care provider as soon as possible. Although most kidney infections do not cause permanent damage, delaying treatment can lead to serious complications.

URINARY TRACT INFECTION DIAGNOSIS

A doctor can often diagnose a urinary tract infection (UTI) based on your symptoms. In some cases, no tests are needed. If you are a woman and have symptoms that are typical for bladder infection, and you do not have vaginal irritation or discharge, it is very likely that you have a UTI. In this case, your provider will often prescribe antibiotics without ordering urine tests.

In other cases, a urinalysis and/or a urine culture are needed to help diagnose a UTI. A urinalysis checks for white blood cells in the urine. (White blood cells are responsible for fighting infection, so their presence in the urine suggests infection.) A urine culture is a test that uses a sample of urine to try and grow bacteria in a laboratory. It can identify the type of bacteria that is causing the UTI and determine which antibiotics are active against that bacteria. It usually requires about 48 hours to get results.

A urinalysis and urine culture are often performed in men and in women who:

- Are experiencing their very first episode of UTI symptoms

- Have a suspected kidney infection
- Have symptoms that are not typical for bladder infection
- Have had "resistant" bladder infections before (meaning the infections did not get better with standard antibiotics)
- Have used antibiotics recently
- Have frequent bladder infections
- Do not begin to feel better within 24 to 48 hours after starting antibiotics
- Are pregnant

BLADDER INFECTION TREATMENT

Medications — In young, healthy adolescents and women with a bladder infection, the usual treatment includes a course of antibiotics. The typical drug options are [nitrofurantoin](#) (sample brand name: Macrobid), [trimethoprim-sulfamethoxazole](#) (sample brand name: Bactrim), and [fosfomycin](#) (brand name: Monurol). Depending on which antibiotic your doctor prescribes, you may need a single dose or up to a five-day course.

In men, the same antibiotics can be used as long as there is no concern about early involvement of the prostate gland. Treatment is usually given for a slightly longer duration in men.

If a urine culture has been performed and is negative for infection, other causes of pain, burning, and frequency should be considered. However, some urinary tract infections (UTIs) are caused by small amounts of bacteria that may not be detected on a typical urine culture. Therefore, in some cases your provider may choose to continue you on antibiotics even if the culture comes back negative. (See "[Patient education: Diagnosis of interstitial cystitis/bladder pain syndrome \(Beyond the Basics\)](#)".)

Your symptoms should begin to resolve within one day after starting treatment. It is important to take the full course of antibiotics to completely eliminate the infection. If your symptoms persist for more than two or three days after starting treatment or if they worsen at any time, call your health care provider.

If needed, you can take a prescription medication that numbs the bladder and urethra, such as [phenazopyridine](#) (brand name: Pyridium). This can help reduce the burning pain of some UTIs. A similar medication is available over the counter without a prescription (eg, Uristat). These medications change the color of the urine (usually to orange or red), can interfere with laboratory testing, and may stain fabric and contact lenses. You should not take these

medications for more than two days, as there is no proven benefit beyond this; if used for longer, the medications can also mask symptoms that may require different treatment. These medications do not treat the UTI and must be taken along with an antibiotic to kill the bacteria.

Some providers recommend drinking more fluids while treating bladder infections to help flush bacteria from the bladder. No studies have been performed to address this issue. There are also no good studies on the effectiveness of cranberry juice for treating a bladder infection; we do not recommend using cranberry juice to treat bladder infections.

Follow-up care — Follow-up testing is not needed in healthy, young men or women with a bladder infection if symptoms resolve. Pregnant women are usually asked to have a repeat urine culture one to two weeks after treatment has ended to make sure the bacteria are no longer in the urine.

KIDNEY INFECTION TREATMENT

The optimal treatment for a kidney infection depends upon the severity of the infection as well as your general health and risk for infection with antibiotic-resistant bacteria.

Home treatment — If your fever and pain are mild and you are able to eat and drink, you will probably be given a one to two week course of antibiotics to take by mouth at home. The first dose of antibiotics may be given as an injection in the office, clinic, or emergency department. Let your healthcare provider know if you do not begin to feel better within one to two days after starting treatment.

For fever and pain, you can take a nonprescription medication like [acetaminophen](#) (sample brand name: Tylenol) or [ibuprofen](#) (sample brand names: Motrin, Advil).

Hospital treatment — If you have a high fever, severe pain, or cannot keep down food or fluids, you will need to be hospitalized and given intravenous (IV) antibiotics and fluids. As you begin to improve, you will be allowed to go home and continue taking oral antibiotics there.

Most pregnant women with a kidney infection are hospitalized and treated with IV antibiotics and fluids. (See "[Urinary tract infections and asymptomatic bacteriuria in pregnancy](#)".)

RECURRENT BLADDER INFECTIONS

Bladder infections versus other causes — Some adults, especially women, get bladder infections frequently. In this case, it is important to confirm at least once that your symptoms

(eg, burning, frequency, and urgency) are caused by a bladder infection. As noted above, the best way to confirm an infection is through urine tests, including a urine culture. Recurrent bladder infections are usually treated the same way as the initial infection, unless your infection is known or thought to be caused by a resistant bacteria. (See ['Urinary tract infection diagnosis'](#) above.)

Need for further testing — If you continue to get bladder infections, you may require further testing. This is especially true if there is a chance you could have an abnormality in your kidneys, ureter, bladder, or urethra ([figure 1](#)), or if you could have a kidney stone. (See ["Patient education: Kidney stones in adults \(Beyond the Basics\)"](#).)

Tests for these conditions may include imaging tests such as a computed tomography (CT) scan, ultrasound, or cystoscopy (looking inside the bladder with a thin, lighted telescope-like instrument).

If you continue to notice blood in your urine after your bladder infection has cleared, you should have further testing. (See ["Patient education: Blood in the urine \(hematuria\) in adults \(Beyond the Basics\)"](#).)

Preventing recurrent UTIs in women — Women with recurrent UTIs may be advised to take steps to help prevent them, including one or more of the following:

Changes in birth control — Women who develop frequent bladder infections and use spermicides, particularly those who also use a diaphragm, may be encouraged to use an alternate method of birth control. (See ["Patient education: Birth control; which method is right for me? \(Beyond the Basics\)"](#).)

Over-the-counter products — Taking cranberry juice, cranberry tablets, or a supplement called "D-mannose" has been promoted as one way to help prevent frequent bladder infections. However, several studies demonstrate no benefit with cranberry, and those studies showing that cranberry and D-mannose reduce the risk of recurrent bladder infections are not convincing.

Drinking more fluid — Increasing your fluid intake can help prevent bladder infections.

Urinating after intercourse — Some health care providers recommend this, because it might help flush out germs that could get into the bladder. There is no proof it is effective in preventing bladder infections, but it also is not harmful.

Postmenopausal women — Postmenopausal women who develop recurrent bladder infections may benefit from using vaginal estrogen. Vaginal estrogen is available in a flexible

ring that is worn in the vagina for three months (eg, Estring), a small vaginal insert (Vagifem), or a cream (eg, Premarin or Estrace). Vaginal estrogen is discussed in more detail in a separate topic review. (See "[Patient education: Vaginal dryness \(Beyond the Basics\)](#)".)

Antibiotics — Preventive antibiotics may be recommended if you repeatedly develop bladder infections and have not responded to other preventive measures. Antibiotics are highly effective in preventing recurrent bladder infections but can cause side effects and promote the growth of resistant bacteria, which are more difficult to treat if they cause subsequent UTIs. Therefore, antibiotics for preventing UTIs should only be considered after trying the above preventive approaches. Preventive antibiotics can be taken in several different ways:

- Continuous antibiotics – You can take a low dose of an antibiotic once per day or three times per week. The antibiotic prophylaxis regimen, if tolerated, is usually assessed at three to six months to determine whether it has been helpful. If so, it may be continued for several more months to years.
- Antibiotics following intercourse – In women who develop UTIs after sex, taking a single low-dose antibiotic after intercourse can help to prevent bladder infections. This usually results in less antibiotic use than continuous antibiotics.
- Self-treatment – A plan to begin antibiotics at the first sign of a bladder infection may be recommended in some situations. Before starting this regimen, it is important that you have had testing (urine cultures) at least once in the past to confirm that your symptoms were caused by a bladder infection. This is because it's possible to have symptoms of a bladder infection but not actually have an infection, in which case antibiotics would not be helpful. (See "[Patient education: Diagnosis of interstitial cystitis/bladder pain syndrome \(Beyond the Basics\)](#)".)

WHERE TO GET MORE INFORMATION

Your healthcare provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for healthcare professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient education: Urinary tract infections in adults \(The Basics\)](#)

[Patient education: Urinary tract infections in pregnancy \(The Basics\)](#)

[Patient education: Group B streptococcal disease \(The Basics\)](#)

[Patient education: Paraplegia and quadriplegia \(The Basics\)](#)

[Patient education: Vesicoureteral reflux in adults \(The Basics\)](#)

[Patient education: Vancomycin-resistant enterococci \(The Basics\)](#)

[Patient education: Urethritis \(The Basics\)](#)

[Patient education: Diabetes and infections \(The Basics\)](#)

[Patient education: Asymptomatic bacteriuria \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

[Patient education: Kidney infection \(pyelonephritis\) \(Beyond the Basics\)](#)

[Patient education: Urinary tract infections in children \(Beyond the Basics\)](#)

[Patient education: Diagnosis of interstitial cystitis/bladder pain syndrome \(Beyond the Basics\)](#)

[Patient education: Kidney stones in adults \(Beyond the Basics\)](#)

[Patient education: Blood in the urine \(hematuria\) in adults \(Beyond the Basics\)](#)

[Patient education: Birth control; which method is right for me? \(Beyond the Basics\)](#)

[Patient education: Vaginal dryness \(Beyond the Basics\)](#)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[Acute simple cystitis in men](#)

[Acute simple cystitis in women](#)

[Asymptomatic bacteriuria in adults](#)

[Bacterial adherence and other virulence factors for urinary tract infection](#)

[Approach to infectious causes of dysuria in the adult man](#)

[Management of vesicoureteral reflux](#)

[Recurrent simple cystitis in women](#)

[Catheter-associated urinary tract infection in adults](#)

[Autosomal dominant polycystic kidney disease \(ADPKD\): Evaluation and management of urinary tract infections](#)

[Kidney transplantation in adults: Urinary tract infection in kidney transplant recipients](#)

[Urinary tract infections and asymptomatic bacteriuria in pregnancy](#)

[Sampling and evaluation of voided urine in the diagnosis of urinary tract infection in adults](#)

The following organizations also provide reliable health information.

- National Library of Medicine

(www.nlm.nih.gov/medlineplus/healthtopics.html)

- Centers for Disease Control and Prevention (CDC)

Toll-free: (800) 311-3435

(www.cdc.gov)

- Infectious Diseases Society of America

(www.idsociety.org)

- National Institute of Diabetes and Digestive and Kidney Diseases

(www.niddk.nih.gov/health-information/urologic-diseases/bladder-infection-uti-in-adults)

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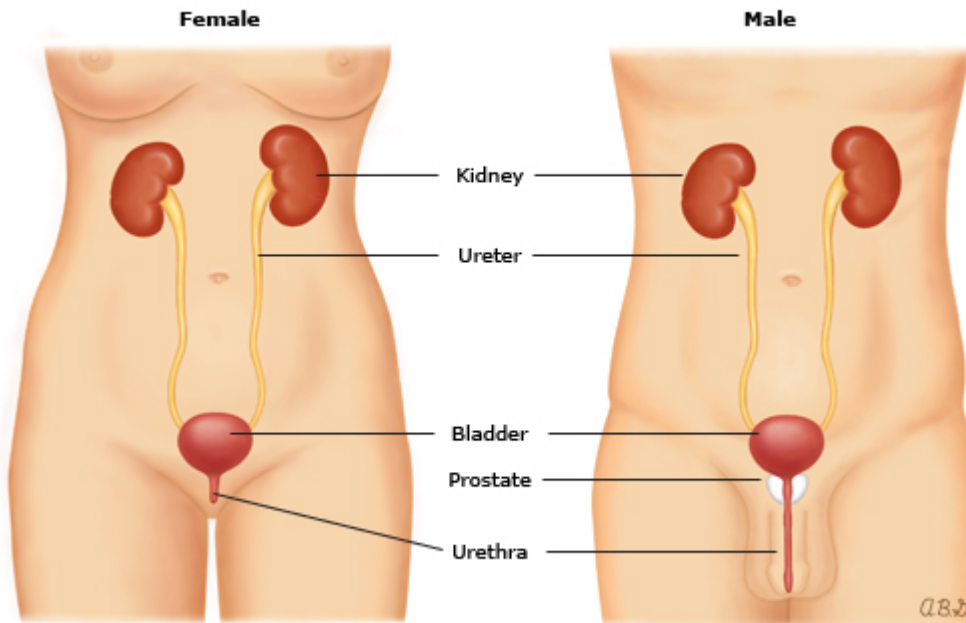
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GRAPHICS

Anatomy of the urinary tract



Urine is made by the kidneys. It passes from the kidneys into the bladder through two tubes called the ureters. Then it leaves the bladder through another tube called the urethra.

Graphic 79864 Version 7.0

Contributor Disclosures

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