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

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 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 "cystitis." If the infection travels up past the bladder and into the kidneys, it is called a kidney infection or "pyelonephritis."

Bladder infections are one of the most common infections, causing symptoms of burning with urination and needing to urinate frequently. Kidney infections are less common than bladder infections, and they 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 women have an uncomplicated bladder infection that is easily treated with a short course of antibiotics. In men, bladder infections may also affect the prostate gland, and a longer course of treatment 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 in the hospital.

This discussion will focus on bladder and kidney infections in a healthy adult. Urinary tract infections in children are discussed in a separate article. (See "[Patient information: Urinary tract infections in children \(Beyond the Basics\)](#)".)

URINARY TRACT INFECTION CAUSES

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

Factors that increase the risk of developing a urinary tract infection include:

- Having sex frequently or having a new sex partner

- Having diabetes
- Having a bladder or kidney infection in the past 12 months
- Using a spermicide for birth control

In men, not being circumcised or having anal sex increases the risk of bladder infections.

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 increasing evidence that there is a genetic predisposition to urinary tract infections.

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 healthcare 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 100.4° F or 38° 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 healthcare 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

Urinary tract infections are usually diagnosed based upon the person's symptoms, and the results of a urine test that checks for the presence of white blood cells in the urine. White blood cells are responsible for fighting infection, so their presence in the urine suggests infection.

Urine culture — A urine culture is a test that uses a sample of urine to try and grow bacteria in a laboratory. It usually requires about 48 hours to get results.

A urine culture is appropriate for anyone suspected of having a kidney infection, but it is not always required to diagnose a bladder infection.

In people suspected to have a simple bladder infection, urine culture is often recommended if they:

- Have never had a bladder infection before
- 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 frequent bladder infections
- Do not begin to feel better within 24 to 48 hours after starting antibiotics
- Are pregnant

BLADDER INFECTION TREATMENT

Bladder infection — In young, healthy adolescents and adults with a bladder infection, the usual treatment includes a single dose to seven-day course of antibiotics. The typical drugs chosen are: trimethoprim-sulfamethoxazole (Bactrim®), nitrofurantoin (Macrobid®), fosfomycin (Monurol®), ciprofloxacin (Cipro®) or levofloxacin (Levaquin®).

In men, the infection may involve the prostate gland and treatment is usually given for at least seven days.

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, call your healthcare provider.

If needed, you can take a prescription medication that numbs the bladder and urethra (phenazopyridine [Pyridium®]) to reduce the burning pain of some UTIs. A similar medication is available over the counter without a prescription (eg, Uristat). Both 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 48 hours, as there is no proven benefit beyond 48 hours and side effects may increase. These medications do not treat the urinary tract infection and must be taken along with an antibiotic.

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 and the person's general health. (See ["Acute uncomplicated cystitis and pyelonephritis in women".](#))

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 (eg, Tylenol® and others) or ibuprofen (Motrin®, Advil®).

Hospital treatment — If you have a high fever, severe pain, or cannot keep down food/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 intravenous (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, develop bladder infections frequently. In this case, it is important to confirm at least once that your symptoms (eg, pain or burning, frequency, and urgency) are caused by a bladder infection. Symptoms are usually similar from one infection to another. The best way to confirm an infection is to have a urine culture. However, if your symptoms are typical for bladder infection and you do not have vaginal irritation or discharge, it is very likely that you have a urinary tract infection, and your provider will usually treat you without ordering a urine culture. (See ["Urine culture"](#) above.)

If a urine culture is performed and is negative for infection, other causes of pain, burning, and frequency should be considered. However, some urinary tract infections are caused by small quantities of bacteriuria 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 is reported to be negative. (See ["Patient information: Diagnosis of interstitial cystitis/bladder pain syndrome \(Beyond the Basics\)"](#).)

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

Tests for these conditions may include 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 information: Blood in the urine \(hematuria\) in adults \(Beyond the Basics\)"](#).)

Preventing recurrent UTIs — Women with recurrent urinary tract infections may be advised to take steps to prevent bladder infections, 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 information: Birth control; which method is right for me? \(Beyond the Basics\)"](#).)

Cranberry products — Taking cranberry juice or cranberry tablets has been promoted as one way to help prevent frequent bladder infections. However, this has not been proven in clinical studies.

Drinking more fluid and urinating after intercourse — Although studies have not proven that drinking more fluids or urinating soon after intercourse can prevent infection, some healthcare providers recommend these measures since they are not harmful. Drinking more fluid may help to wash out bacteria that enter the bladder.

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 tablet (Vagifem®), or a cream (eg, Premarin® or Estrace®). Vaginal estrogen is discussed in more detail in a separate topic review. (See ["Patient information: Vaginal dryness \(Beyond the Basics\)"](#).)

Antibiotics — A preventive antibiotic treatment 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 urinary tract infections. Therefore, antibiotics for preventing urinary tract infections 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 for several months to several years.
- Antibiotics following intercourse – In women who develop urinary tract infections 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) to confirm that your symptoms are caused by a bladder infection; some people have symptoms of a bladder infection but do not actually have an infection. (See ["Patient information: 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 information: Urinary tract infections in adults \(The Basics\)](#)

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

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

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

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

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

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

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 information: Kidney infection \(pyelonephritis\) \(Beyond the Basics\)](#)

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

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

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

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

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

[Patient information: 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 uncomplicated cystitis, pyelonephritis, and asymptomatic bacteriuria in men](#)

[Acute uncomplicated cystitis and pyelonephritis in women](#)

[Approach to the adult with asymptomatic bacteriuria](#)

[Asymptomatic bacteriuria in patients with diabetes mellitus](#)

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

[Clinical microbiology review: Genitourinary infections](#)

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

[Management of vesicoureteral reflux](#)

[Recurrent urinary tract infection in women](#)

[Urinary tract infection associated with urethral catheters](#)

[Urinary tract infection in autosomal dominant polycystic kidney disease](#)

[Urinary tract infection in renal transplant recipients](#)

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

[Urine sampling and culture 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 Kidney and Urologic Disease Information Clearinghouse

(<http://kidney.niddk.nih.gov/kudiseases/pubs/utiadult/>)

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Literature review current through: Oct 2013. | This topic last updated: Jul 29, 2013.

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References

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