MAYO CLINIC

Diseases and Conditions

Urinary tract infection (UTI)

By Mayo Clinic Staff

A urinary tract infection (UTI) is an infection in any part of your urinary system — your kidneys, ureters, bladder and urethra. Most infections involve the lower urinary tract — the bladder and the urethra.

Women are at greater risk of developing a UTI than men are. Infection limited to your bladder can be painful and annoying. However, serious consequences can occur if a UTI spreads to your kidneys.

Doctors typically treat urinary tract infections with antibiotics. But you can take steps to reduce your chances of getting a UTI in the first place.

Urinary tract infections don't always cause signs and symptoms, but when they do they may include:

- A strong, persistent urge to urinate
- A burning sensation when urinating
- Passing frequent, small amounts of urine
- Urine that appears cloudy
- Urine that appears red, bright pink or cola-colored — a sign of blood in the urine
- Strong-smelling urine
- Pelvic pain, in women — especially in the center of the pelvis and around the area of the pubic bone

UTIs may be overlooked or mistaken for other conditions in older adults.

Types of urinary tract infection

Each type of UTI may result in more-specific signs and symptoms, depending on which part of your urinary tract is infected.

Part of urinary tract affected	Signs and symptoms

Kidneys (acute pyelonephritis)	Upper back and side (flank) pain High fever Shaking and chills Nausea Vomiting
Bladder (cystitis)	Pelvic pressure Lower abdomen discomfort Frequent, painful urination Blood in urine
Urethra (urethritis)	Burning with urination Discharge

When to see a doctor

Contact your doctor if you have signs and symptoms of a UTI.

Urinary tract infections typically occur when bacteria enter the urinary tract through the urethra and begin to multiply in the bladder. Although the urinary system is designed to keep out such microscopic invaders, these defenses sometimes fail. When that happens, bacteria may take hold and grow into a full-blown infection in the urinary tract.

The most common UTIs occur mainly in women and affect the bladder and urethra.

- **Infection of the bladder (cystitis).** This type of UTI is usually caused by Escherichia coli (E. coli), a type of bacteria commonly found in the gastrointestinal (GI) tract. However, sometimes other bacteria are responsible. Sexual intercourse may lead to cystitis, but you don't have to be sexually active to develop it. All women are at risk of cystitis because of their anatomy — specifically, the short distance from the urethra to the anus and the urethral opening to the bladder.
- **Infection of the urethra (urethritis).** This type of UTI can occur when GI bacteria spread from the anus to the urethra. Also, because the female urethra is close to the vagina, sexually transmitted infections, such as herpes, gonorrhea, chlamydia and mycoplasma, can cause urethritis.

Urinary tract infections are common in women, and many women experience more than one infection during their lifetimes. Risk factors specific to women for UTIs include:

- **Female anatomy.** A woman has a shorter urethra than a man does, which shortens the distance that bacteria must travel to reach the bladder.
- **Sexual activity.** Sexually active women tend to have more UTIs than do women who aren't sexually active. Having a new sexual partner also increases your risk.

- **Certain types of birth control.** Women who use diaphragms for birth control may be at higher risk, as well as women who use spermicidal agents.
- **Menopause.** After menopause, a decline in circulating estrogen causes changes in the urinary tract that make you more vulnerable to infection.

Other risk factors for UTIs include:

- **Urinary tract abnormalities.** Babies born with urinary tract abnormalities that don't allow urine to leave the body normally or cause urine to back up in the urethra have an increased risk of UTIs.
- **Blockages in the urinary tract.** Kidney stones or an enlarged prostate can trap urine in the bladder and increase the risk of UTIs.
- **A suppressed immune system.** Diabetes and other diseases that impair the immune system — the body's defense against germs — can increase the risk of UTIs.
- **Catheter use.** People who can't urinate on their own and use a tube (catheter) to urinate have an increased risk of UTIs. This may include people who are hospitalized, people with neurological problems that make it difficult to control their ability to urinate and people who are paralyzed.
- **A recent urinary procedure.** Urinary surgery or an exam of your urinary tract that involves medical instruments can both increase your risk of developing a urinary tract infection.

When treated promptly and properly, lower urinary tract infections rarely lead to complications. But left untreated, a urinary tract infection can have serious consequences.

Complications of a UTI may include:

- Recurrent infections, especially in women who experience three or more UTIs.
- Permanent kidney damage from an acute or chronic kidney infection (pyelonephritis) due to an untreated UTI.
- Increased risk in pregnant women of delivering low birth weight or premature infants.
- Urethral narrowing (stricture) in men from recurrent urethritis, previously seen with gonococcal urethritis.
- Sepsis, a potentially life-threatening complication of an infection, especially if the infection works its way up your urinary tract to your kidneys.

Your family doctor, nurse practitioner or other health care provider can treat most urinary tract infections. If you have frequent recurrences or a chronic kidney infection, you may be referred to a doctor who specializes in urinary disorders (urologist) or kidney disorders (nephrologist) for an evaluation.

What you can do

To prepare for your appointment:

- **Ask if there's anything you need to do in advance,** such as collect a urine specimen.
- **Take note of your symptoms,** even if you're not sure they're related to a UTI.
- **Make a list of all the medications,** vitamins or other supplements that you take.
- **Write down questions to ask** your doctor.

For a UTI, basic questions to ask your doctor include:

- What's the most likely cause of my signs and symptoms?
- Are there any other possible causes?
- Do I need any tests to confirm the diagnosis?
- What factors do you think may have contributed to my UTI?
- What treatment approach do you recommend?
- If the first treatment doesn't work, what will you recommend next?
- Am I at risk of complications from this condition?
- What is the risk that this problem will recur?
- What steps can I take to reduce my risk of a recurrence?
- Should I see a specialist?

Don't hesitate to ask other questions as they occur to you during your appointment.

What to expect from your doctor

Your doctor will likely ask you several questions, including:

- When did you first notice your symptoms?
- Have you been treated for a bladder or kidney infection in the past?
- How severe is your discomfort?
- How often do you urinate?
- Are your symptoms relieved by urinating?
- Do you have low back pain?
- Have you had a fever?
- Have you noticed vaginal discharge or blood in your urine?
- Are you sexually active?
- Do you use contraception? What kind?
- Could you be pregnant?
- Are you being treated for any other medical conditions?
- Have you ever used a catheter?

Tests and procedures used to diagnose urinary tract infections include:

- **Analyzing a urine sample.** Your doctor may ask for a urine sample for lab analysis to look for white blood cells, red blood cells or bacteria. To avoid potential contamination of the sample, you may be instructed to first wipe your genital area with an antiseptic pad and to collect the urine midstream.
- **Growing urinary tract bacteria in a lab.** Lab analysis of the urine is sometimes followed by a urine culture. This test tells your doctor what bacteria are causing your infection and which medications will be most effective.
- **Creating images of your urinary tract.** If you are having frequent infections that your doctor thinks may be caused by an abnormality in your urinary tract, you may have an ultrasound, a computerized tomography (CT) scan or magnetic resonance imaging (MRI). Your doctor may also use a contrast dye to highlight structures in your urinary tract.
- **Using a scope to see inside your bladder.** If you have recurrent UTIs, your doctor may perform a cystoscopy, using a long, thin tube with a lens (cystoscope) to see inside your urethra and bladder. The cystoscope is inserted in your urethra and passed through to your bladder.

Antibiotics usually are the first line treatment for urinary tract infections. Which drugs are prescribed and for how long depend on your health condition and the type of bacteria found in your urine.

Simple infection

Drugs commonly recommended for simple UTIs include:

- Trimethoprim/sulfamethoxazole (Bactrim, Septra, others)
- Fosfomycin (Monurol)
- Nitrofurantoin (Macrodantin, Macrobid)
- Ciprofloxacin (Cipro)
- Levofloxacin (Levaquin)
- Cephalexin (Keflex)
- Ceftriaxone (Rocephin)
- Azithromycin (Zithromax, Zmax)
- Doxycycline (Monodox, Vibramycin, others)

Often, symptoms clear up within a few days of treatment. But you may need to continue antibiotics for a week or more. Take the entire course of antibiotics as prescribed.

For an uncomplicated UTI that occurs when you're otherwise healthy, your doctor may recommend a shorter course of treatment, such as taking an antibiotic for one to three days. But whether this short course of treatment is enough to treat your infection depends on your particular symptoms and medical history.

Your doctor may also prescribe a pain medication (analgesic) that numbs your bladder

and urethra to relieve burning while urinating, but pain usually is relieved soon after starting an antibiotic. One common side effect of urinary tract analgesics is discolored urine — orange or red.

Frequent infections

If you have frequent UTIs, your doctor may make certain treatment recommendations, such as:

- Low dose antibiotics, initially for six months but sometimes longer
- Self-diagnosis and treatment, if you stay in touch with your doctor
- A single dose of antibiotic after sexual intercourse if your infections are related to sexual activity
- Vaginal estrogen therapy if you're postmenopausal

Severe infection

For a severe UTI, you may need treatment with intravenous antibiotics in a hospital.

Urinary tract infections can be painful, but you can take steps to ease your discomfort until antibiotics treat the infection. Follow these tips:

- **Drink plenty of water.** Water helps to dilute your urine and flush out bacteria.
- **Avoid drinks that may irritate your bladder.** Avoid coffee, alcohol, and soft drinks containing citrus juices or caffeine until your infection has cleared. They can irritate your bladder and tend to aggravate your frequent or urgent need to urinate.
- **Use a heating pad.** Apply a warm, but not hot, heating pad to your abdomen to minimize bladder pressure or discomfort.

Many people drink cranberry juice to prevent UTIs. There's some indication that cranberry products, in either juice or tablet form, may have infection-fighting properties. Researchers continue to study the ability of cranberry juice to prevent UTIs, but results are not conclusive.

If you enjoy drinking cranberry juice and feel it helps you prevent UTIs, there's little harm in it, but watch the calories. For most people, drinking cranberry juice is safe, but some people report an upset stomach or diarrhea.

However, don't drink cranberry juice if you're taking blood-thinning medication such warfarin, medications that affect the liver or aspirin.

You can take these steps to reduce your risk of urinary tract infections:

- **Drink plenty of liquids, especially water.** Drinking water helps dilute your urine and ensures that you'll urinate more frequently — allowing bacteria to be flushed from your urinary tract before an infection can begin.
- **Drink cranberry juice.** Although studies are not conclusive that cranberry juice

prevents UTIs, it is likely not harmful.

- **Wipe from front to back.** Doing so after urinating and after a bowel movement helps prevent bacteria in the anal region from spreading to the vagina and urethra.
- **Empty your bladder soon after intercourse.** Also, drink a full glass of water to help flush bacteria.
- **Avoid potentially irritating feminine products.** Using deodorant sprays or other feminine products, such as douches and powders, in the genital area can irritate the urethra.
- **Change your birth control method.** Diaphragms, or unlubricated or spermicide-treated condoms, can all contribute to bacterial growth.

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