

# Dealing with urinary tract infections: Tips for adult men and women

Dr. Dianne Heritz  
Urologist  
Assistant Professor, McMaster University, Hamilton, ON, Canada

Dr. Mai Banakhar  
Urologist  
Assistant Professor and Consultant Urology, King Abdulaziz University, Jeddah, Saudi Arabia

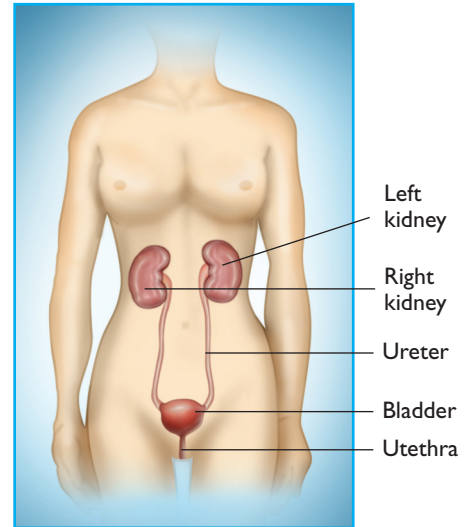
## In this chapter, you will learn:

1. What is female UTI?
2. What are the types of UTI?
3. What causes UTI?
4. Complicated UTIs
5. What are the symptoms of UTI?
6. How common are UTIs in women?
7. What to do if you develop UTI?
8. How is UTI diagnosed?
9. What is the treatment of UTI?
10. UTI during pregnancy
11. UTI Prevention
12. What is male UTI? How common is it?
13. Types of male UTI
14. Causes of male UTI
15. Symptoms of UTI
16. What to do?
17. How is it going to be diagnosed?
18. What is the treatment?
19. Special conditions regarding men and women if you are using intermittent or indwelling catheters **or** if you have a recurrent UTI

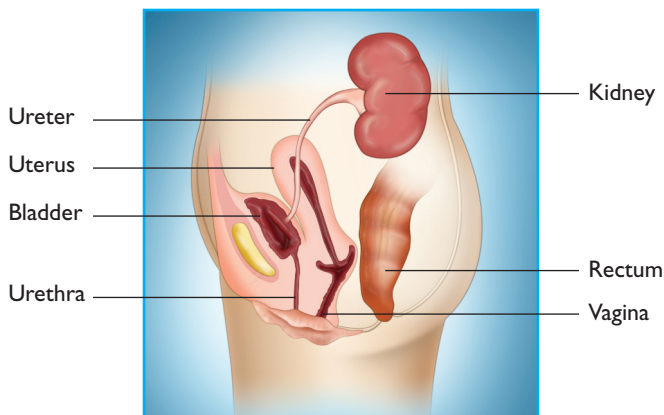
# UTIs in women

## I. What is female UTI?

- The urinary tract can be divided into upper and lower tracts.
- The **upper** tract includes the kidneys and ureters (see Figure 1). Kidneys are located in the back, on each side, underneath the lowest back ribs. The kidneys filter waste and fluid from the blood and produce urine. The ureters act like pipes that drain the urine into the bladder.
- The **lower** urinary tract includes the bladder and urethra. The bladder stores the urine and empties through the urethra. The female urethra is short and located at the top of the vagina.
- Behind the vagina is the anal opening. **UTI** is the abbreviation for **urinary tract infection**. Bacteria from the anus can travel into the vagina, urethra and make their way in the bladder causing an inflammation or infection (see Figure 2).



**Figure 1.** Looking at the female urinary tract.



**Figure 2.** A side view of the female urinary tract

## 2. What are types of UTI?

Infections in the kidneys are called pyelonephritis. Pyelonephritis is a serious infection that can affect how your kidneys work. A urinary tract infection in the bladder is called cystitis. Many health care providers will call cystitis a “UTI.” Cystitis is the most common type of UTI. If your UTI or cystitis is left untreated, it can cause an infection or pyelonephritis in one of the kidneys.

## 3. What causes UTI?

Most UTIs are caused by bacteria, such as *Escherichia coli* or *E. coli*. *E. coli* causes 80% of UTIs in adults. These bacteria live around the anus and vagina. Other types of bacteria include *Staphylococcus Saprophyticus* (which occurs in about 5-15% of cases). Fungus and other types of mycobacteria are much less common. Bacteria are found everywhere in our environment. Even on our bodies, there are bacteria that are normally found on the skin, in our mouths and our bowels (to name a few places).

Women have a bacterial protective layer in the vagina that prevents the bowel bacteria, such as *E. coli*, from entering into the urethra. This bacterial layer is made up of lactobacillus. With the help of the female hormone estrogen, the pH of the vagina is acid so the offensive bacteria, such as *E. coli*, don't grow easily. There are a few risk factors which increase your susceptibility to an infection.

***Risk factors:***

- Some girls and women don't have a substantial coating of the good bacteria, such as lactobacillus, and get frequent bladder infections. Women have a short urethra, compared to men. The bacteria travel a very short distance until they enter into the bladder. Once the bacteria enter the urethra it travels into bladder, and multiplies, and an infection occurs.
- Many women will start having infections when they become sexually active. Sexual intercourse can push bacteria from the vagina into the urethra and bladder. The bacteria are not passed between sexual partners. Contraceptive spermicides and some condoms can change the protective bacterial lining of the vagina.
- When a woman reaches menopause or no longer produces estrogen because the ovaries have been removed, there is a susceptibility to bacterial infections.
- Pregnancy does *not* increase the risk of UTI. During pregnancy there is an increased risk that a bladder infection can turn into pyelonephritis that can affect the mother and baby.
- Diabetes can predispose some women to develop UTIs caused by fungus.
- Women who are immunosuppressed are at higher risk to develop a bladder or kidney infection.

#### 4. Complicated UTIs

There are conditions in some infants, girls and women that can predispose them to infection due to congenital abnormalities (present since birth) or acquired during their lifetime. Some of these abnormalities can cause urine to go up to the kidneys instead of through the urethra when they void. This is called vesicoureteral reflux.

Another abnormality is a tight or denervated connection between the kidney and ureter that does not allow urine to be propelled down the ureter. This is called uretero pelvic junction obstruction. Incomplete drainage of the kidneys or bladder can predispose to serious infections. When urine is not evacuated from the kidneys or bladder, bacteria can multiply very quickly and cause severe infections. These infections are called complicated urinary tract infections.

Other types of complicated infections are related to changes in the female pelvis following childbirth. The vagina can become lax and not hold the bladder in the pelvis. This is called a cystocele. There can be incomplete bladder emptying when the cystocele extends beyond the vaginal opening. Some women receive radiation for the treatment of cancer. This can change the protective layer of the bladder and predispose women to complicated UTIs.

## 5. What are the symptoms of UTI?

Symptoms of lower UTI include:

- Painful burning sensation when voiding
- A strong desire to urinate
- A strong desire associated with leakage of urine or incontinence
- Frequency of urination usually with small amounts voided
- A feeling that the bladder is not empty after voiding
- Cloudy urine or blood in the urine
- Foul odour to the urine
- Lower abdominal or lower back pain
- No vaginal discharge or vaginal itchiness

**Note:** Some sexually transmitted disease and vaginal infections may cause symptoms similar to UTI.

Symptoms of an upper UTI include:

- Previous symptoms of a lower UTI
- Fever and chills
- Generalized fatigue
- Nausea and vomiting
- Intense back pain usually on one side

## 6. How common are UTIs in women?

UTIs are one of the most common problems in women. One in five women will likely develop a UTI during her lifetime, usually more than once. More women get a UTI than men during their adolescence and childbearing years. Adult women are 30 times more likely than men to develop a UTI. Men over 60 years old get a UTI to the same degree as women do (no matter what their age).

## 7. What to do if you develop UTI?

- (a) See a health care provider to confirm the diagnosis and start antibiotics.
- (b) Drink a lot of water to wash out the bacteria.
- (c) Avoid drinks and food that can irritate your bladder (until your infection goes away): drinks include alcohol, caffeine (coffee and tea) and citrus drinks; foods include spicy foods. These foods or drinks can worsen your symptoms of an infection.

## 8. How is UTI diagnosed?

When you develop symptoms of a UTI, see your health care provider. You may be asked questions about your health, medications and allergies. Some doctors will examine you to make sure there are no abnormalities in your urinary tract. Your doctor will confirm the diagnosis by urine analysis. This will show infection signs, such as pus cell or white blood cells, red blood cells, bacteria or nitrates in the urine. The diagnosis is often made with urine analysis alone.

Some health care providers will also ask for a urine culture. A positive urine culture at the time of your symptoms will confirm the diagnosis. Urine culture shows which type of bacteria caused the infection. The report will also suggest the antibiotic that is best for you. This report takes 24 to 48 hours. The urine sample should be a clean-catch urine specimen to avoid genital bacteria from contaminating the urine sample directly from the bladder.

### Instructions to obtain a clean-catch urine:

- First clean the area around the urethral opening at the top of the vagina.
- Catch the urine in the middle of stream and collect the urine in the sterile specimen container. This sample is also called a mid-stream void.

## 9. What is the treatment of UTI?

Many UTIs will resolve without treatment. Antibiotics help to reduce the irritative symptoms that can keep you from your daily activities. Bladder infections are treated by antibiotic drugs. The type of treatment depends on the type of bacteria. Most infections will respond to a variety of antibiotics. Therefore some health care providers may not request a urine culture. Many health care providers will prescribe an antibiotic instead of waiting 48 hours for a urine culture report. If the culture showed that the bacteria in the urine culture are not sensitive to the drug prescribed, you may get a call from your physician, who may review your clinical condition.

If your symptoms are not controlled, then the drug or antibiotic should be changed. Some urine cultures may be negative even though there may be bacteria causing a UTI. Most UTIs are treated with amoxicil, nitrofurantoin, trimethoprim-sulfamethoxazole, cephalexin, ciprofloxacin, noroxin or ofloxacin. Usually symptoms improve within days for uncomplicated UTIs. Treatment for upper tract UTI or pyelonephritis continues for one to two weeks. If you have pyelonephritis, you'll just need oral antibiotics; these are effective and you won't need hospitalization.

Follow up urine analysis is performed after treatment to make sure that the urine is free of bacteria.

If you develop an allergic reaction to the antibiotic, stop it immediately and report your symptoms to your doctor so that your antibiotic can be changed.

- Antibiotics may decrease the efficacy of oral contraceptive pills – so while on antibiotics (and 7 days after completing treatment), you should use condoms or other contraceptive methods.
- Not all antibiotics are safe in early pregnancy, so inform your doctor about any chance of being pregnant.
- If you develop a vaginal yeast infection while on your antibiotics, you can use over-the-counter anti-yeast medication.

If you have about three infections in one year (also called recurrent urinary tract infections) or if your doctor suspects any abnormality in the urinary tract, you may need more tests, such as:

- Ultrasound of kidney and bladder for any stones, foreign bodies, high post-voiding residual
- Kidney scan to assess the effect of recurrent infections on the kidney

Take note of these special conditions:

- If you have more than three infections in one year, you may take antibiotics for three days as soon as you develop symptoms of a UTI.
- If you develop a UTI after intercourse, you may take an antibiotic two hours after sex to prevent an infection.
- If you are postmenopausal, you may benefit from estrogen placed directly in the vagina to prevent UTIs. The estrogen hormone is needed for healthy tissue of the vagina and urethra. At menopause, you lose this hormone and you lose tissue in your urethra and it becomes less elastic and thin. Also, the vaginal pH will increase your chances of getting a UTI.

- The application of topical estrogen over the urethra and vaginal tissues will strengthen the sensitive tissue and lower vaginal pH which will reduce recurrent infections.
- 4 to 6 weeks of topical application are needed for it to be effective.
- Lower maintenance doses are needed to sustain healthy tissue changes.
- The estrogen creams placed in the vagina will work locally without any significant absorption to the blood stream.

## 10. UTI during pregnancy

- Pregnancy is associated with hormonal and anatomical changes which increase the risk of UTI.
- UTIs during pregnancy can potentially endanger the mother and fetus and result in complications, such as premature birth.

- Pregnant women should report symptoms of a UTI to their doctor.
- Asymptomatic bacteriuria (presence of significant number of bacteria in urine without any symptoms) is usually screened for and treated during prenatal visits.

- Untreated asymptomatic bacteriuria leads to the development of symptomatic cystitis in 30% of patients and pyelonephritis in 50%.
- Asymptomatic bacteriuria is associated with an increased risk of intra-uterine growth retardation and low-birth-weight infants.

Screening pregnant women for bacteriuria is important:

- Bacteriuria has serious consequences for pregnancy.
- Treatment itself could cause serious complications.

## 11. UTI prevention

Women are more susceptible to recurrence if they have already had a UTI. There is a lot of advice regarding the prevention of UTIs. Many of these ways have not been proven. We continue to recommend them since they don't seem to cause any harm.

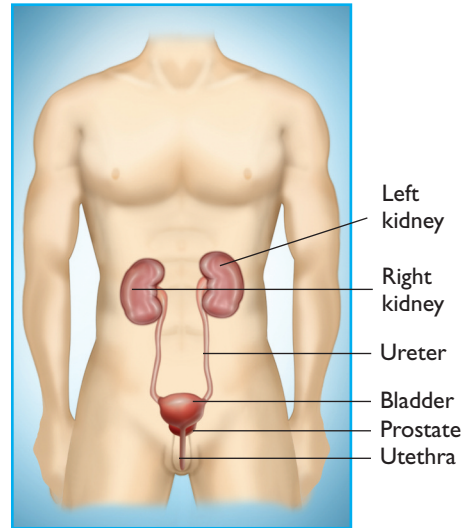
- Take the time to empty your bladder completely.
- Empty your bladder when you have the urge to void; don't withhold voiding.
- Take showers instead of baths.
- Avoid irritation of the urethra from bubble baths or strong perfumed soaps.
- Empty your bladder after sexual intercourse.
- Drink more water to flush bacteria from the bladder.
- When voiding or having a bowel movement, wipe the area from front to back to avoid contaminating the genital area with anal bacteria.
- Wear cotton underwear.
- Use condoms with plain lubricants and no spermicides.
- Treat vaginal infections.
- Eat cranberry products or take vitamin C (these will acidify the urine and may prevent infections).
- Receive low-dose long-term antibiotics to prevent recurrence (some patients may need this).

# UTIs in men

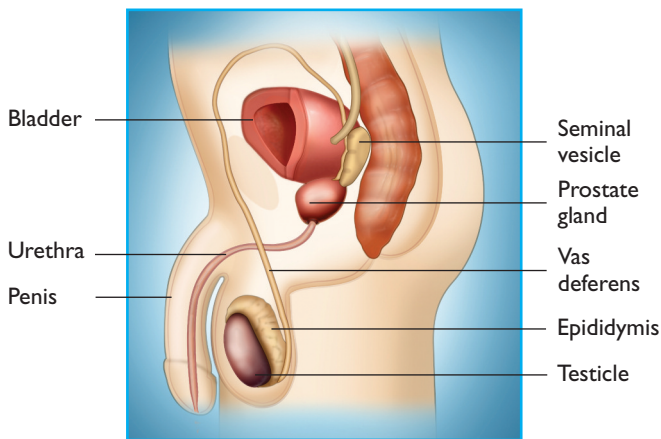
## I. What is male UTI? How common is it?

The male urinary tract includes the upper and lower tracts. While the upper urinary tract is the same in both genders, the lower tract differs (see Figure 3).

The lower urinary tract includes the urinary bladder which empties through a relatively long urethra in comparison to females. The first part of the urethra, which is close to the urinary bladder, is called the prostatic urethra. It is surrounded by the prostate gland. The male reproductive organs communicate with the urinary tract at the prostate. The ejaculatory ducts, which carry semen, open into the prostate. There are two ejaculatory ducts, one on each side, that are connected to the vas deferens which turns into the epididymis and testicle on each side (see Figure 4).



**Figure 3.** The male urinary system.



**Figure 4.** A side view of the male urinary tract system.

UTIs in men are not as common as in females because of the anatomical differences and natural barriers. The anatomical location of the rectum far from the urethra, and the long urethra make the infections in men less common. The incidence of UTI in men approaches that of women in men older than 60 years of age. If a man develops a UTI, we need to look for underlying anatomical or functional reasons.

## 2. Types of male UTI

Lower urinary tract infections in men include prostatitis and urethritis.

## 3. Causes of Male UTI

Causes of UTI in men include:

- Incomplete emptying of the bladder
- Instrumentation of the urinary tract, such as catheterization
- Urologic surgery



- In men over 50, the prostate grows naturally. This is called benign prostatic hypertrophy (or BPH). It can cause mechanical obstruction and impaired bladder emptying.
- Certain medications can weaken the bladder muscle and result in incomplete bladder emptying.

#### 4. Symptoms of UTI

Symptoms of lower UTI include:

- Painful burning sensation when voiding
- Strong desire to urinate; you may be unable to control your urine, which may lead to leakage or incontinence
- Frequency of urination (usually small amounts) day and night
- Urine become cloudy or bloody
- Foul odor to the urine
- Lower abdominal pain
- Fever
- Severe obstructive symptoms, such as a dribbling stream, a sensation that the bladder is not empty, waiting long time to initiate voiding and a weak stream

#### 5. What to do?

- When any of the symptoms occur, see your doctor immediately.
- The presence of a urethral discharge is usually associated with sexually transmitted infections.
- Pain in your scrotum or testicles is discussed in another chapter.

#### 6. How is it diagnosed?

Your doctor will ask you about your symptoms and how long you've had them. Your doctor will also want to know about your overall health, medications and drug allergies. Your exam will include a rectal exam to assess your prostate and tests to check your abdomen and external genitalia.

Urine analysis and urine culture specimen will be required. The penis should be cleaned with an antiseptic towelette prior to producing the mid stream urine specimen. If you are not circumcised, you should make sure that your foreskin is retracted and the tip of the penis cleaned to provide a sample that doesn't include bacteria from the foreskin.

You may also need an ultrasound of the bladder to determine whether there is a residual amount of urine in bladder and to assess for stones. If you also have back pain, you will need a renal ultrasound to check your kidneys.

## 7. What is the treatment?

- Ciprofloxacin (antibiotic) is commonly taken for two to four weeks.
- If you are severely ill with your infection and need hospitalization, your antibiotics will be administered intravenously and you will be carefully monitored.
- If you have any blockage, you'll need a medication called a selective alpha blocker.
- If your bladder function is impaired and not completely emptying, you will need a catheter inserted to drain the bladder.

### – If you have chronic bacterial prostatitis

- Recurrent prostate infections in men are referred to as chronic bacterial prostatitis.
- You may need more tests (special urine tests or diagnostic imaging).
- Ciprofloxacin is the drug of choice and may be prescribed for a longer period of time, such as six weeks.
- If the bacteria are not gone with the ciprofloxacin, you'll need another antibiotic.

## SPECIAL CONDITIONS REGARDING MEN AND WOMEN:

### 1-People Using Intermittent Or Indwelling Catheters

Catheterization is when your doctor inserts a small tube into the bladder through the urethra to drain urine. Catheterization causes a UTI by introducing bacteria into the urinary tract. If the catheter stays in, it's called an indwelling catheter. In some patients, the use of a catheter is to empty the bladder to prevent infection. In the some patients, the catheter is used to drain the bladder completely and then it's removed. This is called intermittent catheterization.

- If you have a catheter, your urine always contains bacteria and you usually don't have any symptoms.
- Your urine culture is always positive, but treatment is not recommended unless you have fever, change in urine colour, smell and a burning sensation.
- Unnecessary antibiotics will result in "superbugs" which may be very difficult to treat.

### 2- Recurrent UTI

Recurrent UTI is more than two UTIs in six months or three UTIs within one year. There are different causes of recurrence.

#### Causes related to the antibiotic

- If the bacteria is resistant to the antibiotic

## Causes related to the antibiotic

- Congenital anomalies, when you start developing a UTI in childhood (e.g., vesico-ureteral reflux –see the chapter on UTIs in children)
- Stones in the urinary tract: the stone will be a focus that causes recurrence of the infection even after treatment with antibiotics. To treat this, the stones should be removed.
- Fistulae (abnormal connection) between the urinary tract and the digestive system (colon) can happen in cancer cases or diverticular disease (where you have a hollow-part in your colon full of fluid). Fistula results in infection caused by colonic bacteria.
- Benign prostatic hyperplasia, (BPH) which blocks the bladder and impairs complete emptying, means that the urine collects in the bladder, which is a good place for bacteria to grow.
- Urethral stricture (when your urethra becomes too narrow) blocks the flow of urine out of the bladder and causes the urine to collect in the bladder and create bacteria.

## Causes related to functional abnormalities

### Medical problems

- Diabetes may affect both the bladder's sensation and ability to empty.
- Neurological problems involving the brain or spinal cord, such as a stroke, Parkinson's disease or multiple sclerosis, may affect the ability to completely empty the bladder. These disorders may also cause uncontrolled bladder contractions causing urine leakage. The persistence of urine in the genital area provides a place for bacteria to grow.

### Fecal incontinence

- Fecal incontinence increases the bacterial burden in the genital area.

If you have recurrent UTIs, you'll need more tests (beyond urine analysis and culture) to diagnose the reason of your condition.