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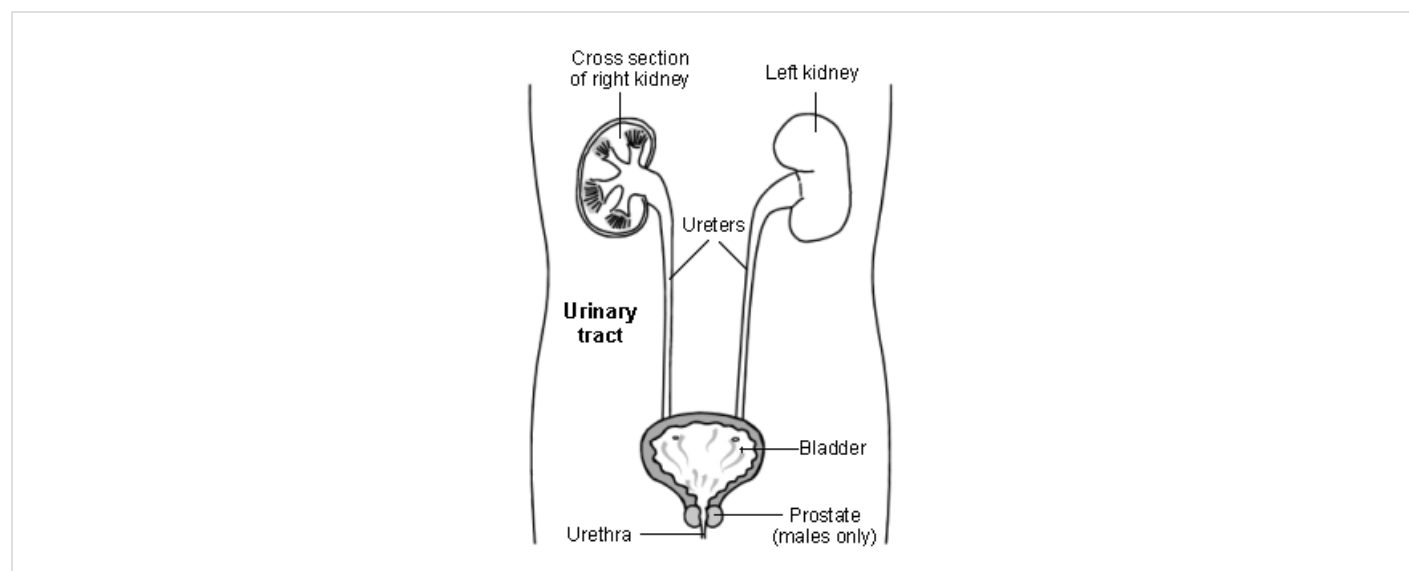
Kidney Infection (Pyelonephritis)

A kidney infection (pyelonephritis) is an unpleasant illness which is sometimes serious. Treatment usually involves medicines called antibiotics and also painkillers. If the kidney was previously healthy then you are likely to make a full recovery. Complications occur in some cases. Complications include kidney damage or a spread of infection around the body (sepsis).

This leaflet only deals with sudden-onset (acute) kidney infection in adults. The medical term for this is acute pyelonephritis. There are separate leaflets on related topics, [Cystitis in Women](#), [Urine Infection in Pregnancy](#), [Urine Infection in Men](#), [Urine Infection in Children](#) and [Urine Infection in Older People](#). Also, this leaflet does not deal with chronic pyelonephritis, which is a condition where the kidney is scarred as a result of repeated infections.

Understanding the kidneys and urinary tract

There are two kidneys, one on each side of the tummy (abdomen), towards the back. They make urine which drains down the tubes between the bladder and kidney (ureters) into the bladder. Urine is stored in the bladder and is passed out through the tube from the bladder (the urethra) from time to time when we go to the toilet.



What causes a kidney infection?

Most kidney infections develop from a bladder infection ([cystitis](#)). Bacteria travel up the tube between the bladder and kidney (ureter) to infect a kidney. These bacteria are usually those normally living in the bowel - eg, *E. coli*. Most people with cystitis don't get a kidney infection.

Some kidney infections develop without a bladder infection. This is sometimes due to a problem in the kidney. For example, people are more prone to kidney infections if they [have a kidney stone](#) or an abnormality of the kidney.

It is usually only one kidney that develops an infection. A kidney infection can occur at any age. It is much more common in women. This is because women are more at risk of developing a bladder infection (which can spread to the kidneys). In women, the urethra is closer to the anus, which makes it easier for bacteria to get from the bowel to the urethra. The urethra is also shorter in women than in men, so bacteria can reach the bladder more easily.

Kidney infections are also more common in children, in older people and during pregnancy. They are uncommon in men.

What are the symptoms of a kidney infection?

Symptoms usually develop quickly, over a few hours or so, and may include:

- Pain in a loin or flank. (This is the area at the side of your back where the kidney is located).
- High temperature (fever) which may cause shivers.
- Feeling sick (nausea) and/or being sick (vomiting).

- Diarrhoea.
- Blood in the urine.
- There will also usually be symptoms of a bladder infection - for example, pain on passing urine, and going to the toilet often.

Not all of the symptoms may develop, and sometimes a kidney infection can just cause vague symptoms. For example, just feeling generally unwell but not being able to say why.

In older people a kidney infection may cause confusion. This is why a [urine test](#) is often done when an elderly person suddenly becomes confused or appears generally unwell.

Do I need any tests?

A simple test that your doctor can do is called a [dipstick urine test](#). This involves testing a sample of your urine with a special testing strip to look for signs of infection. This test will show if a kidney infection is likely or not.

However, it is important to confirm the diagnosis and also to find out which germ (bacterium) is causing the infection. This will enable a doctor to prescribe the correct antibiotic. For this, your doctor will need to send your urine sample to the laboratory so that the bacterium can be identified and tests can be done to see which antibiotics will kill it. As this may take some days for the results, treatment is usually started straightaway.

A urine sample may be the only test that is needed if you are a woman who is otherwise healthy, but develop cystitis which progresses to a kidney infection. Further tests may be advised in some situations - for example, if you have a kidney stone or if a kidney abnormality is suspected. Tests are also usually advised if you are a man, or if you have recurring kidney infections. If further tests are needed, [an ultrasound scan](#) is often the first one which is done.

What is the treatment for a kidney infection?

- **Antibiotics** will usually clear the infection. An antibiotic is usually prescribed straightaway if a kidney infection is suspected, even before the result of the urine test is known. Some germs (bacteria) are resistant to some antibiotics. Therefore, sometimes a change of antibiotic may be needed if the urine test shows a germ (bacterium) which is resistant to the initial antibiotic. The course of antibiotics is for 7-14 days, depending on which one is used. Commonly used antibiotics for kidney infections include [ciprofloxacin](#), [cefalexin](#), [co-amoxiclav](#) or [trimethoprim](#).
- **Painkillers** such as [paracetamol](#) can ease pain and reduce a high temperature (fever). **Stronger painkillers** may be needed if the pain is more severe. **Non-steroidal anti-inflammatory painkillers** such as [ibuprofen](#) are not usually recommended for a person with a kidney infection. This is because they may possibly cause problems with the working of the kidney during a kidney infection.
- **Plenty of fluid** should be taken to prevent lack of fluid in the body (dehydration).

In many cases, the infection is not too severe, treatment can be taken at home and the infection will clear with a course of antibiotic tablets. If treatment is to be home-based, a doctor should be called if the symptoms are not improving after 24 hours, or the person is feeling more unwell.

However, some people need to be admitted to hospital - for example if:

- The infection is severe and causing them to be very unwell.
- The person is unable to take any fluids or their medicines (due to being too unwell or due to vomiting).
- Symptoms do not settle quickly with antibiotics.
- The person is a pregnant woman.
- The person is otherwise ill or frail.
- The person has underlying kidney problems.
- The person has [diabetes](#).

In hospital, antibiotics can be given straight into the vein (intravenously) for a more immediate effect. If the person is dehydrated, they may also need a drip (where fluid is put straight into a vein).

Are there any complications from a kidney infection?

Most people who develop a kidney infection make a full recovery if treatment is given promptly. Possible complications which occur in a small number of cases include:

- Sometimes germs (bacteria) from a kidney infection get into the bloodstream, particularly if treatment is delayed. This may cause [blood poisoning \(sepsis\)](#). This can be serious or even life-threatening.
- In pregnant women who develop pyelonephritis occasionally, it may result in the baby being born early or with a lower birth weight.
- A kidney abscess can (rarely) develop. This is a collection of pus that forms within the kidney.
- The infection can sometimes cause some permanent damage to kidney tissues.

These complications are uncommon but may be more likely if:

- You become severely ill with the kidney infection.
- You already have a problem with your kidneys, such as [polycystic kidney disease](#) or [chronic kidney disease](#).
- You have a condition where instead of just flowing one way, your urine can backtrack from the bladder back up to the kidney (vesicoureteric reflux).
- You have [kidney stones](#).
- [Your immune system is suppressed](#) - for example, if you have cancer, if you are taking medication such as [steroids](#) or [chemotherapy](#), or if you have [AIDS](#).
- You have poorly controlled diabetes.
- You are an older person (over the age of 65 years).
- You are pregnant.

Emphysematous pyelonephritis is also a rare complication. In this condition the kidney tissues are rapidly destroyed by the infection and the bacteria can release toxic gases which can build up in the kidneys. You become very unwell if you develop this complication. This complication seems mostly to affect people who have poorly controlled diabetes.

Can kidney infection be prevented?

Most kidney infections are caused by germs (bacteria) travelling up from a bladder infection. So the same things that can help to reduce your chances of bladder infection should reduce your chances of kidney infection. Traditionally, people who got recurring urine infections were advised about measures such as drinking plenty of fluid and taking cranberry juice, and on the way that they wiped themselves after going to the toilet. However, there is little evidence for any of these measures and they are now not usually advised. Anything which increases your risk of urine infections which can be treated, should be treated. For example, any constipation should be treated promptly, as constipation can increase your chances of a bladder or kidney infection. [See the separate leaflet called Constipation for more details](#). Doctors will try to treat anything else which might be contributing, such as kidney stones or an abnormality in the structure of the urinary system.

Pregnant women are regularly tested for urine infections and for germs (bacteria) in their urine. Even if they don't have symptoms, if urine tests positive for germs, pregnant women are usually treated with antibiotics to prevent any complications.

In some cases people who have recurring urine infections are treated with a low dose of antibiotic continually. This may help to prevent recurrences and to prevent spread to the kidney.

Further reading & references

- [Guidelines on Urological Infections](#); European Association of Urology (2019)
- [Pyelonephritis - acute](#); NICE CKS, November 2020 (UK access only)
- [Pyelonephritis \(acute\): antimicrobial prescribing](#); NICE Guidance (October 2018)

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