

# Sepsis

## Introduction

### Sepsis, septicaemia and blood poisoning

Sepsis is often referred to as either blood poisoning or septicaemia, although it could be argued that both terms are not entirely accurate. Sepsis is not just limited to the blood and can affect the whole body, including the organs.

Septicaemia (another name for blood poisoning) refers to a bacterial infection of the blood, whereas sepsis can also be caused by viral or fungal infections.

Sepsis is a life-threatening illness caused by the body overreacting to an infection.

The body's immune system goes into overdrive, setting off a series of reactions that can lead to widespread inflammation (swelling) and blood clotting.

Symptoms usually develop quickly and include:

a fever or high temperature over 38C (100.4F)

chills

a fast heartbeat

fast breathing

In severe cases you may notice:

you feel dizzy when you stand up

confusion or disorientation

nausea and vomiting

Read more about the symptoms of sepsis.

Although anybody can develop sepsis from a minor infection, some people are more vulnerable, such as those:

with a medical condition or receiving medical treatment that weakens their immune system

who are already in hospital with a serious illness

who are very young or very old

who have just had surgery or who have wounds or injuries as a result of an accident

### Stages of sepsis

Sepsis develops in three stages, described below.

Uncomplicated sepsis is caused by infections, such as flu or dental abscesses. It is very common and does not usually require hospital treatment.

Severe sepsis occurs when the body's response to infection has started to interfere with the function of vital organs, such as the heart, kidneys, lungs or liver.

Septic shock occurs in severe cases of sepsis, when your blood pressure drops to a dangerously low level, preventing your vital organs from receiving enough oxygenated blood.

If it is not treated, sepsis can progress from uncomplicated sepsis to septic shock and can eventually lead to multiple organ failure and death.

If you think you have sepsis, it is important to get it diagnosed and treated as quickly as possible.

If you think that you or someone in your care has severe sepsis or septic shock, phone and ask for an ambulance.

### Treating sepsis

If sepsis is detected early and has not yet affected vital organs, it may be possible to treat the infection at home with antibiotics. Most people with uncomplicated sepsis make a full recovery.

Severe sepsis and septic shock are considered medical emergencies and normally require admission to an intensive care unit, where the body's organs can be supported while the infection is treated.

Because of problems with vital organs, people with severe sepsis are likely to be very ill, and approximately 30-50% will die as a result of the condition.

How common is it?

### Symptoms of sepsis

The symptoms of sepsis may develop after a localised infection (infection limited to one part of the body) or an injury.

In some cases, sepsis may develop when you are already in hospital, for example if you have recently had surgery and a drip or catheter has been connected to your body. Read more about the causes of sepsis.

The symptoms of sepsis usually develop quickly and include:

a fever or high temperature over 38C (100.4F)

chills

a fast heartbeat

fast breathing

confusion or delirium

Symptoms of severe sepsis or septic shock include:

low blood pressure that makes you feel dizzy when you stand up

a change in your mental state, such as confusion or disorientation

diarrhoea

nausea and vomiting

cold, clammy and pale skin

The most common sites of infection leading to sepsis are the lungs, urinary tract, abdomen and pelvis.

Severe sepsis and septic shock are medical emergencies. If you think that you or someone in your care has these conditions, phone and ask for an ambulance.

### Causes of sepsis

Sepsis can be triggered by an infection in any part of the body. The most common sites of infection leading to sepsis are the lungs, urinary tract, abdomen and pelvis.

### Sources of infection

Types of infection associated with sepsis include:

lung infection (pneumonia)

flu (influenza)

appendicitis

infection of the lining of the digestive system (peritonitis)

an infection of the bladder, urethra or kidneys (urinary tract infection)

skin infections, such as cellulitis, often caused when an intravenous drip or catheter has been inserted into the body through the skin

post-surgical (after surgery) infections

infections of the nervous system, such as meningitis or encephalitis

In approximately one in five cases, the infection and source of sepsis cannot be detected.

What causes the symptoms of sepsis?

Usually, your immune system will keep the infection limited to one place (known as a localised infection). Your body will produce white blood cells, which travel to the site of the infection to destroy the germs causing infection. A series of biological processes occur, such as tissue swelling, which helps fight the infection and prevents it spreading. This process is known as inflammation.

If your immune system is weakened or an infection is particularly severe, it can spread through the blood into other parts of the body. This causes the immune system to go into overdrive, and the process of inflammation affects the entire body.

This can cause more problems than the initial infection, as widespread inflammation damages tissue and interferes with the flow of blood, leading to a dangerous drop in blood pressure, which stops oxygen reaching your organs and tissue.

### People at risk

Everybody is potentially at risk of developing sepsis from minor infections, such as flu. However, some people are more vulnerable, including people who:  
have a medical condition, such as HIV or leukaemia, that weakens their immune system

are receiving medical treatment, such as chemotherapy, that weakens their immune system

are very young or very old

have just had surgery, or have wounds or injuries as a result of an accident

are on mechanical ventilation

with drips or catheters attached to their skin

are genetically prone to infection

Sepsis is a particular risk for people already in hospital due to another serious illness. Despite the best efforts of doctors and nurses, secondary infections acquired in hospital are always a potential risk.

Hospital-acquired bacterial infections, such as MRSA, tend to be more serious as the bacteria causing the infection have often developed a resistance to antibiotics.

### Diagnosing sepsis

Sepsis is most often diagnosed by a blood test. Other tests may help determine the type of infection, where it is located and which body functions have been affected.

To diagnose sepsis, several tests may be carried out, including:

blood tests

urine tests

stool sample tests

blood pressure tests

a wound culture test (where a small sample of tissue, skin or fluid is taken from the affected area for testing)

respiratory secretion testing (which involves testing a sample of your saliva, phlegm or mucus)

imaging studies such as an X-ray or computerised tomography (CT) scan

kidney, liver and heart function tests

a lumbar puncture (spinal tap) where a sample of cerebrospinal fluid is extracted from your back for testing

In the case of suspected sepsis, it is important to get a diagnosis as soon as possible so that appropriate treatment can be given. This can help stop the progress of sepsis and any long-term damage to the body.

## Treating sepsis

Treatment of severe sepsis will vary for each patient depending on the initial infection, the organs affected and the extent of damage.

If your sepsis is detected early enough and has not affected organ or tissue function (uncomplicated sepsis), it may be possible to treat the condition at home. You will be prescribed a course of antibiotic tablets.

If the sepsis is severe, or you develop septic shock, you will need emergency hospital treatment, usually in an intensive care unit (ICU). ICUs are able to support any affected body function, such as breathing or blood circulation, while the medical staff focus on treating the infection.

## Antibiotics

Severe sepsis is treated with intravenous antibiotics (given directly into a vein). There will not usually be time to wait until a specific type of infection has been identified, so 'broad-spectrum' antibiotics will initially be given. Broad-

spectrum antibiotics are designed to work against a wide range of known infectious bacteria, and can also treat some fungal infections.

Once a specific bacterium has been identified, a more 'focused' antibiotic can be used. This has the advantage of reducing the chance of the bacteria becoming resistant to antibiotics.

Intravenous antibiotics usually have to be given for 7 to 10 days.

If the sepsis is caused by a virus, antibiotics will not work. However, it is likely that antibiotics will be started anyway. This is because it would be too dangerous to delay antibiotic treatment until an accurate diagnosis is made. You will then need to wait until your body develops resistance to the effects of the virus. In some cases, antiviral medication may be given.

### Source control

Source control means treating the source of the infection, such as an abscess or infected wound. This may require draining pus from infected tissue. In more serious cases, surgery may be required to remove the infected tissue and repair any damage.

### Vasopressors

Vasopressors are medicines used to treat low blood pressure. The two types of vasopressors used in the treatment of sepsis are dobutamine and noradrenaline.

They can help to increase blood pressure by stimulating the muscles involved in pumping blood around the body and constricting (narrowing) the blood vessels.

Vasopressors are normally given intravenously. Extra fluids may also be given intravenously to help increase blood pressure.

### Other treatments

Depending on your condition and the effect sepsis has had on your body, you may also require:

medication, such as steroids or insulin

a blood transfusion

mechanical ventilation to help you breathe

dialysis (a machine to filter your blood) to help with kidney function.