

What Is Sepsis?

Sepsis occurs when your body develops overwhelming inflammation as a reaction to infection. The problems that develop with sepsis can affect multiple organs in the body. Sepsis can be life-threatening and requires prompt and skilled medical care.



How does sepsis develop?

Sepsis is caused by severe infection due to increasing microbes in the blood that result in overwhelming inflammation.

Infections can be due to bacteria, viruses, or fungi. Common types of infections include:

- Cellulitis, a skin infection
- Urinary tract infection, an infection of the bladder or kidneys
- Dental abscess, an infection of the gums
- Viral respiratory illness, an infection caused by a virus such as influenza (flu) or SARS-CoV-2
- Pneumonia, an infection of the lungs that can be caused by bacteria, viruses, or fungi. Also see ATS fact sheet on pneumonia at www.thoracic.org/patients/

Most often, we have infections that our body's **immune system** can manage, along with simple self-care strategies, such as resting, drinking fluids, or cleaning cuts and scrapes well. Some infections may require extra care, like pulling a tooth or opening up an infected wound so that it can drain.

Your immune system uses white blood cells and proteins in your blood to fight infection. More serious infections are more difficult for your immune system to fight alone, and may need medications such as antibiotics to kill bacteria.

As your immune system fights infection, the infected area may become red, swollen, tender, and sometimes warm to the touch. Inflammation is the damage caused by the fight between your immune system and the infection. Inflammation usually resolves with time as the body heals, but sometimes can cause further damage and problems beyond where the infection first started.

Sepsis occurs when inflammation spreads through your entire body. When the inflammation is severe, the organs in your body may be injured (**severe sepsis**) and your blood pressure may be very low (**septic shock**).

Is sepsis dangerous?

Sepsis is dangerous. More than a quarter of million (250,000) people die from sepsis every year in the U.S. **Most people with sepsis need medical attention immediately.** Without early and aggressive treatment, people with sepsis get worse quickly, and can develop severe sepsis, septic shock, and death.

Who is at risk for Sepsis?

Anyone is at risk for sepsis. People who are at higher risk for sepsis include:

- The elderly
- People with diabetes
- People on dialysis for kidney failure
- People who have cancer, especially those getting chemotherapy
- People who have had an organ transplant
- People who have a weakened immune system or are taking medications that affect the immune system
- People with severe or hard-to-treat infections on long-term antibiotics
- People with severe burns or skin disorders
- Any one who has a history of sepsis in the past

What are common signs and symptoms of sepsis?

Sepsis affects your whole body. Common signs and symptoms include:

- Shivering, fever, or chills
- Pain and discomfort: usually aching all over the body
- Pale, clammy skin, that can change colors
- Difficulty breathing
- Feeling sleepy, "appearing like you are drunk," agitated, or confused
- A feeling of dread that "I'm going to die"

If a person has several of these signs or symptoms, **he or she may have severe sepsis** and needs immediate medical attention.

What happens to the body in sepsis?

Any organ can have serious problems or fail in sepsis.

Common organs that fail in sepsis include:

- **The Lungs (Respiratory System):** It can be hard to breathe with sepsis. Oxygen levels drop and a person will need oxygen therapy. People with severe sepsis can develop **Acute Respiratory Distress Syndrome (ARDS)**. People who have ARDS often need more support, such as a mechanical ventilator (breathing machine). (See ATS fact sheet on ARDS at www.thoracic.org/patients/)

- **The Heart and Blood Vessels and Arteries (Cardiovascular System):** In septic shock, the blood pressure can drop too low to keep the person alive. A person with septic shock can develop chest pain, heart failure, and may appear like he or she is having a heart attack. Medications known as pressors may be needed to keep up heart function and blood pressure for survival.
- **The Kidneys (Renal System):** People with severe sepsis may have kidney failure, called acute kidney injury (AKI). A person with severe sepsis may stop making urine, and the body becomes unable to control levels of important elements in the blood. Dialysis may be needed in cases of severe sepsis.
- **The Brain and Nerves (Neurologic System):** People with sepsis develop *delirium* or *encephalopathy*. They can appear drunk, drowsy, or agitated. People with severe sepsis become hard to arouse and can fall into coma. If a patient needs aggressive life support measures, the healthcare team may need to give medications to keep him or her calm.

How do we treat sepsis? Is there a cure?

There is no cure for sepsis. The goal of sepsis treatment is to support the patient's body and organs while the immune system fights the infection and inflammation. Supportive treatments to help sepsis survival include:

- Antibiotics to help the immune system fight bacterial, viral or fungal infection causing sepsis
- Procedures, when possible, to drain pus or remove infected tissues that are the source of the sepsis
- Giving IV fluids to support the blood pressure and cardiovascular system
- Life support measures, such as mechanical ventilation, oxygen, dialysis, and pressor medications to support organs when they fail
- Nutrition therapies, often given through a *nasogastric* tube (through the nose to the stomach) or *orogastric* tube (through the mouth into the stomach) to provide nutrition

Surviving sepsis very much depends on the body's ability to fight the infection, then heal and recover from the inflammation and organ failure caused by sepsis. For more on life support therapies such as oxygen, mechanical ventilation and dialysis, see ATS patient handouts at www.thoracic.org/patients.

Do patients with sepsis go to the Intensive Care Unit (ICU)?

Intensive care units (ICUs) are where patients receive aggressive treatments for critical illness, such as severe sepsis and septic shock. In the ICU, patients are closely monitored to allow healthcare providers to treat them quickly and adjust therapies to try to prevent death. Life support measures are provided in the ICU. Although ICU care doesn't cure sepsis and septic shock, this aggressive support offers the best hope of survival and recovery.

What is the prognosis for patients with sepsis?

Even with the best of care, sepsis can be deadly. We don't have reliable methods to forecast who will survive sepsis. However, medical studies have found that the longer one has symptoms, and the more severe the sepsis is, the harder it is to survive and recover. If your loved one has sepsis, communicate often with the healthcare team about their status and anticipated prognosis.

What happens after sepsis? What does recovery from sepsis look like?

After acute sepsis has resolved, the body has to heal and recover. The organs and tissues injured by sepsis may take weeks or months to heal. People recovering from sepsis often need long stays in the ICU and hospital. Being so sick and in bed can result in muscle weakness, requiring physical therapy. Patients often need to stay in a nursing facility or a rehabilitation unit once they leave the hospital before they are able to return home. Even with best care, many people can't return home after severe sepsis due to debility.

Studies show that people who suffer from severe sepsis or septic shock can have long-term impairment of brain function called cognitive impairment. They may not be able to return to work or school in the same role as before they were sick. Research is being done on how to prevent cognitive impairment and how to help people recover brain function as best they can.

Questions to ask the healthcare team about sepsis

If your loved one has sepsis, talk to the medical team every day. Questions you might ask include:

1. How well are his/her organs working? How severe is the organ damage?
2. If he/she is on some type of life support, is he/she making progress to get off of it?
3. Have you found the cause of the sepsis? What infection are you treating?
4. If a cause has not been found, what else can be done to look for a cause?
5. What can be done to help prevent muscle and skin breakdown and ICU-acquired weakness?
6. If he/she is on a mechanical ventilator, are you trying to see how well he/she can breathe off the machine?
7. After he/she completes the ICU stay, what are the next steps for him/her to be able to get well and go home?
8. How do you see his/her recovery? What kind of disability might we expect?

Please view the companion glossary of terms and table:

"How Do My Organs Fail in Sepsis?" available from the online supplement for this fact sheet: http://www.atsjournals.org/doi/suppl/10.1164/rccm.19611P21/suppl_file/sepsis_supplement.pdf

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Resources:

American Thoracic Society

<https://www.thoracic.org/patients/patient-resources/topic-specific/critical-illness.php>

Centers for Disease Control

<https://www.cdc.gov/sepsis/basic/qa.html>

U.S. National Library of Medicine- Medline Plus

<https://medlineplus.gov/sepsis.html>

Sepsis Alliance

<http://www.sepsis.org/>

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