Sepsis is a life-threatening reaction to an infection that can lead to tissue damage, organ failure, and death. Typically, the body's immune system fights off infection-causing germs, but sepsis occurs when the immune system has an overwhelming and abnormal response to infection that can cause severe harm to the patient. It is unclear why infections sometimes result in sepsis, but the patients at highest risk include infants, seniors, and people with chronic illnesses. Even after hospitalization, 60% of people with severe sepsis go on to experience long term cognitive and physical impairment. There is no known cure, but research can help.

**TODAY**

Sepsis affects

**1.7 million** adults

every year in the U.S.

Up to 50% of sepsis survivors experience post-sepsis syndrome, long-term effects that can include severe muscle and joint pain, panic attacks, and decreased ability to sleep and concentrate.

**Research Delivers Solutions**

Sepsis can cause a life threatening drop in blood pressure and researchers have been trying to understand why. The complexity of the disease, however, makes studying this difficult. For example, blood levels of adrenomedullin, a hormone which has been shown to lower blood pressure, are elevated during sepsis, leading to speculation that it might be involved in the drop of blood pressure seen in sepsis. But, adrenomedullin has also been shown to have anti-inflammatory and antimicrobial effects and actually improved sepsis outcomes in some preclinical tests — highlighting the need to further investigate the relationship between blood pressure, inflammation, and the immune system, and their specific roles in sepsis outcomes.

Sepsis can be difficult to differentiate from forms of mass immune response that are not due to infection. A 2018 study compared samples from children diagnosed with sepsis to patients who had undergone surgery and had symptoms of an immune response, such as inflammation, but had no infection. The researchers found differing quantities of 188 proteins between sepsis patients and surgery patients. Further research may look at whether such proteins could be used to make an accurate sepsis diagnosis.

Because sepsis is caused by an abnormal immune response to infection, many clinical trials have focused on suppressing the immune system's inflammatory response. The interventions tested, however, have largely proven unsuccessful. Data suggests that the self-regulating capabilities of the immune system are compromised during sepsis, and completely suppressing the entire immune system may be ill-advised. These results have led researchers to consider the immune response in sepsis with more nuance and to think about targeting the immune system response in a more specific way, guided by the individual patient's symptoms.
Then. Now. Imagine.

**THEN**
Historically, sepsis has been seen as a disease that should be treated similarly from patient to patient.¹⁰

**NOW**
In 2019, researchers used clinical computer algorithms to uncover four different subtypes of sepsis, pointing to a need for personalized treatments tailored to the individual patient’s sepsis disease.¹⁰

**IMAGINE**
A cure.

One study estimated sepsis causes as many as **270,000 deaths** per year.¹¹

*Death certificates often name the cause of death to be the infection rather than sepsis. This means current estimates are likely underrepresenting the burden of the disease.*¹²

2017 Age adjusted death rate due to sepsis (cases per 100,000 people)*

[Map showing state death rates]

---

1. “What is sepsis?” Sepsis Alliance. n.d.

---

ResearchAmerica 241 18th St S, Arlington, VA 22202 | 703-739-2577 www.researchamerica.org | info@researchamerica.org

The Albert and Mary Lasker Foundation is a founding partner in this series of fact sheets. www.laskerfoundation.org

We appreciate the Sepsis Alliance’s assistance in developing this fact sheet.