

INVESTMENT IN RESEARCH SAVES LIVES AND MONEY

Sepsis

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.¹ It is unclear why infections sometimes result in sepsis, but the patients at highest risk include infants, seniors, and people with chronic illnesses.² Even after hospitalization, 60% of people with severe sepsis go on to experience long term cognitive and physical impairment.³ There is no known cure, but research can help.

TODAY

Sepsis affects

1.7 million adults every year in the US.⁴

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**.⁵

COST

Sepsis results in hospital inpatient costs of about

\$27 billion per year.¹

17.5% of patients with sepsis are readmitted within **30 days** of discharge, with each readmission costing

\$16,500 on average.⁶

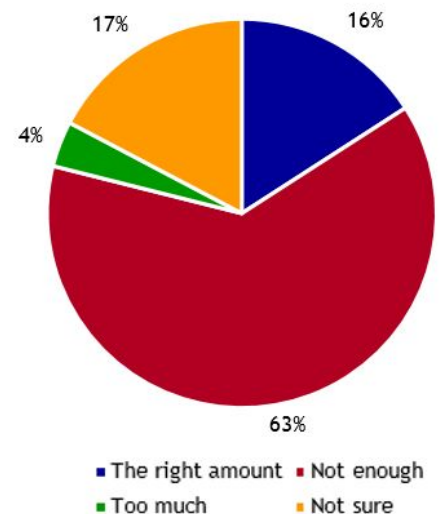
Research Delivers Solutions

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.⁷

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.⁸

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.⁹

The U.S. spends about 5 cents of each health dollar on research to prevent, cure and treat disease and disability. Do you think that this is too much, the right amount, or not enough?



Source: A Research!America poll of U.S. adults conducted in partnership with Zogby Analytics in January 2019

Sepsis

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

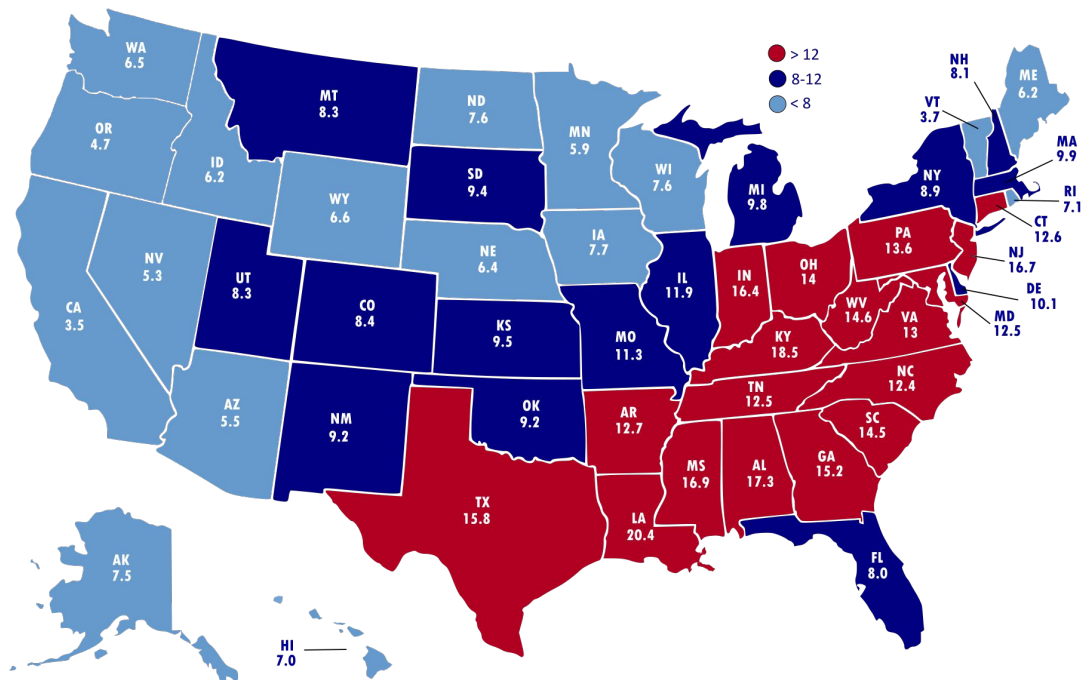
IMAGINE

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)*



SOURCE: "Septicemia Mortality by State", National Center for Health Statistics, Centers for Disease Control.

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3. Iwashyna et al. "Long-term cognitive impairment and functional disability among survivors of severe sepsis." *JAMA*. 2010;304(16):1787-94.
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5. "Post sepsis syndrome." Sepsis Alliance. n.d.
6. Gadre et al. "Epidemiology and predictors of 30-day readmission in patients with sepsis." *Chest*. 2019;155(3):483-490.
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