

# Sepsis

Sepsis is the most preventable cause of death worldwide.

Sepsis is a complication caused by the body's overwhelming and life-threatening response to infection. It can lead to tissue damage, organ failure, and death.

Sepsis is difficult to diagnose, and it is deadly when it's not quickly recognized and treated.

<https://www.cdc.gov/vitalsigns/sepsis/>

The most common illnesses leading to sepsis are...

35% pneumonia

25% urinary tract infections

11% gastrointestinal infections

# 1,600,000

Number of infants and children worldwide  
who die from sepsis annually.

## THE HEALTHCARE CHALLENGES WITH SEPSIS

The most common illness leading to sepsis is pneumonia (35%), followed by urinary tract infections (25%), and then gastrointestinal infections (11%).

Sepsis is the leading cause of death in infants and children worldwide with an annual mortality of approximately 1.6 million.

Sepsis is ranked in the top four most costly conditions for hospitals.

Survivors of sepsis use greater healthcare resources post-discharge:

- ▶ The profound immune suppression results in increased morbidity.
- ▶ Survivors consistently demonstrate an impaired quality of life.
- ▶ There are reports of substantial depressive symptoms of 28% among survivors.

Pediatric sepsis is estimated to cost between \$29,829 - \$65,639 per case.

Morbidity and Mortality Weekly Report (MMWR);  
<https://www.cdc.gov/mmwr/index.html>

## UNIQUE POPULATION CHALLENGES

Sepsis occurs most often in people 65 years or older or younger than 1 year.

While less common, even healthy infants, children, and adults can develop sepsis from an infection.<sup>1</sup>

The increasing number of sepsis cases in the United States may be due to:<sup>2</sup>

- ▶ The increased longevity of people with chronic diseases.
- ▶ Greater use of invasive procedures that introduce microorganisms into the body.
- ▶ Broader use of immunosuppressive drugs, chemotherapy, and transplantation.
- ▶ The spread of antibiotic-resistant organisms.
- ▶ Improved clinical awareness and diagnosis of sepsis.

**Incidence of sepsis is higher than that of breast cancer, AIDS, or first myocardial infarction.**



**Sepsis occurs most often in people 65 years or older or younger than 1 year.**

1 Trends in Hospital Inpatient Stays in the United States, 2005-2014; <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb225-Inpatient-US-Stays-Trends.jsp>

2 CDC Vital Signs; <https://www.cdc.gov/vitalsigns/sepsis/>

## Sepsis, average hospital cost per incident

Pediatric cost per case  
\$29,829 to \$65,639

Adult cost per case, 2014 \$21,000  
Adult cost per case, 2011 \$20,000

Av. cost per readmission \$10,070



## STATISTICS

### US Incidence & Health Statistics

The rate of sepsis increased 71% from 2003 to 2007.

Sepsis caused more than 1.5 million hospital stays.

More than 750,000 cases occur annually—making the incidence of sepsis higher than that of breast cancer, AIDS, or first myocardial infarction.

More than 210,000 patients with severe sepsis die annually in the US.

### Impact to Healthcare in the United States

Sepsis accounted for \$23.7 billion in healthcare expenditures in 2013.

Sepsis contributes to 5.2% of total aggregate cost for all hospitalizations in the United States.

The direct costs of intensive care management and risk factors for financial burden of patients with severe sepsis and septic shock; <https://www.ncbi.nlm.nih.gov/pubmed/26051981>

The Cost of Sepsis; <https://blogs.cdc.gov/safehealthcare/the-cost-of-sepsis/>

Sepsis trumps CMS's four medical conditions tracked for readmission rates; <https://www.sciencedaily.com/releases/2017/01/170123151425.htm>

Diagnostic Accuracy and Effectiveness of Automated Electronic Sepsis Alert Systems: A Systematic Review; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4477829/pdf/nihms670565.pdf>

Trends in Hospital Inpatient Stays in the United States, 2005-2014; <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb225-Inpatient-US-Stays-Trends.jsp>

### Impact to Hospitals

Adult sepsis cost hospitals \$20,000 per patient in 2011 and approximately \$21,000 in 2014.

Pediatric sepsis is estimated to cost between \$29,829 - \$65,639 per case.

Sepsis accounts for 12.2 percent of readmissions to the hospital.

The average cost for a sepsis readmission \$10,070.

In 2013, \$5.5 billion was spent on 400,000 Medicare beneficiaries who were hospitalized with sepsis

Severely septic patients spend almost twice as long in the hospital as patients without severe sepsis (16.5 vs. 8.5 days) and more than twice as long in the ICU (10 vs. 4.6 days).

### Impact to Patients

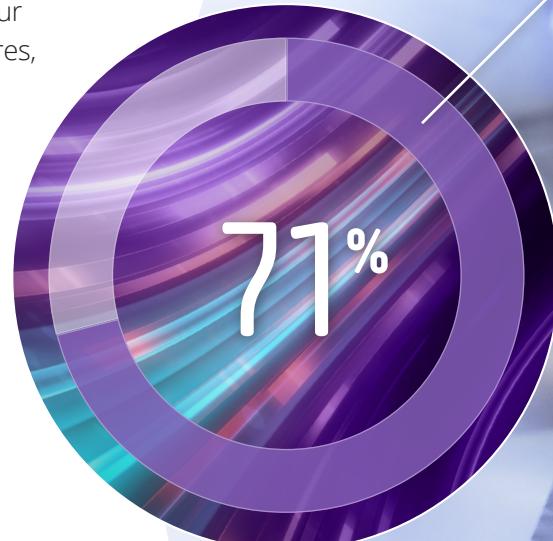
Mortality increases 8% for every hour that treatment is delayed.

## REGULATORY IMPACT

The Centers for Medicare & Medicaid Services (CMS) has adopted the National Quality Forum (NQF) sepsis care bundles, which include the Early Management Bundle and Severe Sepsis/Septic Shock. As of October 2015, this requirement covers all patients discharged with severe sepsis or septic shock.

Hospitals must fully adopt the NQF performance measure or risk accreditation status and reimbursements. Compliance is critical, especially for facilities with a high proportion of Medicare and Medicaid patients. Additionally, sepsis could affect value-based purchasing in three of its four components: process of care and core measures, cost efficiency, and 30-day mortality rates.

Sepsis is ranked in the  
TOP FOUR most costly  
conditions for hospitals.



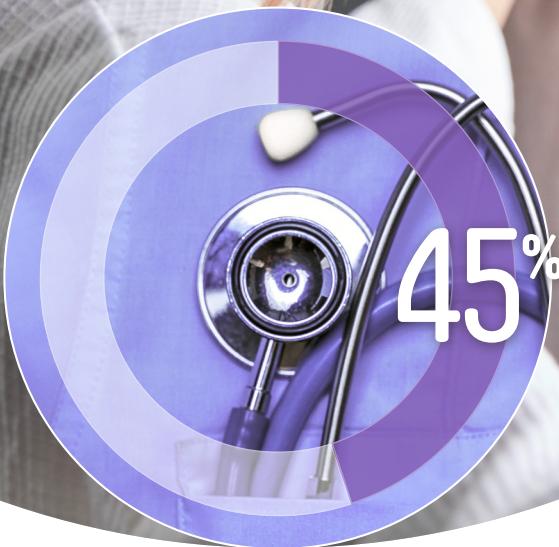
The rate of sepsis increased  
71% from 2003 to 2007.

Core Measures: CMS; <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityMeasures/Core-Measures.html>

Sepsis: The New Core Measure in 2016. Is your Hospital Ready?; <http://www.vbpmonitor.com/news/item/48-sepsis-the-new-core-measure-in-2016-is-your-hospital-ready>

nationwide cognitive  
machine potential sepsis  
cases avoided

75,000



45%

Cognitive Machine can  
effect a 45% reduction  
in resource demands.

## MACHINE PERFORMANCE

With Jvion's Cognitive Machine, hospitals have **a sepsis solution** that **outperforms all other modalities** and provides the recommended actions that will reduce risk. The machine is identifying at-risk patients *before* any clinical signs are present. This performance is leading to:

- ▶ A 10% reduction in sepsis incidences within the hospital setting.
- ▶ The primary prevention of sepsis within the community setting.
- ▶ A 45% reduction in resource demands because of greater precision and better insights into who is at risk and how to stop the onset of sepsis.

## INDUSTRY IMPACT

The average cost estimate per adult inpatient sepsis case is approximately \$20,000. By preventing a minimum of 10% of cases (based on Jvion sepsis inpatient vector performance) of the approximate 750,000 reported cases per year, Jvion would prevent 75,000 cases annually, totaling to a \$1,575,000,000 in total (potential) cost avoidance.

cognitive machine potential sepsis cost avoidance nationwide

\$1,575,000,000