

# SEPSIS: Situation Critical

EACH YEAR  
nearly



**1.7M** patients  
are diagnosed with sepsis<sup>1</sup>



**38** amputations  
occur **per day**  
due to sepsis<sup>2</sup>

SEPSIS IS THE  
**#1 cause**  
OF HOSPITAL



**readmission**<sup>3</sup>

**1 in 3**  
HOSPITAL  
**deaths**  
are due to sepsis<sup>1</sup>



Sepsis is the  
**#1 cost of hospitalization**<sup>4</sup>



## Impact of Fluid Resuscitation



Early fluid resuscitation for sepsis has been proven to reverse shock and hypotension<sup>5,6,7</sup> and improve outcomes.<sup>6,7,8</sup>



Duration of hypotension is a predictor of adverse outcomes,<sup>8</sup> length of ICU stay<sup>9</sup> and mortality.<sup>9</sup>



Early reversal of shock has been shown to reduce additional interventions such as vasopressors and mechanical ventilation by up to 37% in sepsis patients.<sup>10</sup>



Adherence to pediatric fluid resuscitation guidelines has been shown to increase survival by 50% in sepsis patients.<sup>11</sup>

<sup>1</sup> CDC Data and Reports 2019, Sepsis page. <https://www.cdc.gov/sepsis/data/reports/index.html>

<sup>2</sup> Sepsis Alliance. Sepsis.org. 2019. <https://www.sepsis.org/sepsisandamputations/>.

<sup>3</sup> Finger K. Trends in Hospital Readmissions for Four High-Volume Conditions, 2009-2013. *Statistical Brief #196*. Healthcare Cost and Utilization Project. November 2015.

<sup>4</sup> Paoli CJ, et al. (2018). Epidemiology and Costs of Sepsis in the United States-An Analysis Based on Timing of Diagnosis and Severity Level. *Critical Care Medicine*. 46(12), 1889-1897.

<sup>5</sup> Lee S, et al. (2014). *Chest* 146(4): 908-915.

<sup>6</sup> Leisman D., et al. (2016). *Ann Emerg Med* 68(3): 298-311.

<sup>7</sup> Williams JM, et al. (2018). *Eur J Emerg Med* 25(2): 97-104.

<sup>8</sup> Jones AE, et al. (2004) *Shock*. Nov;22(5):410-4.

<sup>9</sup> Zenati MS, et al. (2002) *J Trauma*. Aug;53(2):232-6; discussion 236-7.

<sup>10</sup> Leisman D, et al. (2017). *Crit Care Med*. Oct;45(10):1596-1606.

<sup>11</sup> Han Y, et al. (2003). *Pediatrics*. 112.4 793-799.

# Case Studies: Fluid Resuscitation for Sepsis

## 3-year old male with sepsis and delayed hypotension treated with LifeFlow

A 3-year old male with no previous medical history presented to the Emergency Department (ED) with altered mental status and fever. The patient had recently suffered symptoms of a cold with congestion and fever 8-10 days prior. For the previous 3 days he had been febrile and fussy at home. The parents had a difficult time rousing him from sleep and elected to take him to the hospital.

Upon arrival at the ED the patient's blood pressure (BP) was 104/61 with a heart rate (HR) of 153. He was pale, lethargic and confused with a rash on his lower extremities. He showed no signs of respiratory distress but was tachypneic. Capillary refill on exam was delayed about 4 seconds. Differential diagnoses included meningitis, sepsis and myocarditis. An IVC ultrasound was performed that showed grossly normal to slightly diminished contractility, also revealing significant

volume depletion. BP dropped to 73/52, evidence of late presentation of hypotension as can be observed with pediatric septic shock patients.

Two IV-lines were placed with labs drawn. The patient received rapid IV fluids via the LifeFlow® rapid infuser, a total of 70ml/kg of NS with careful assessments performed between each bolus (vital signs and evaluating for rales and hepatomegaly). The patient also received antibiotics. Following ten minutes of fluid resuscitation, the patient's BP resolved to 97/55. Blood pressure readings remained stable and the child became more responsive, speaking in short sentences. Capillary refill time improved. Heart rate remained tachycardic, and he was admitted to PICU for further treatment. The patient remained in the hospital for 7 days and was released at his normal baseline mental status, without any complications from his illness.

## 70-year old female with sepsis treated with LifeFlow

A 70-year old female was found unresponsive in her rehab facility. On arrival EMS reported that she was diaphoretic and a BP reading could not be obtained. Patient had a history of diabetes, hemorrhagic stroke, chronic kidney disease, and coronary artery disease with stents placed. The patient's "last known well" (baseline mental status) was 3 hours prior to EMS arrival. EMS found her unresponsive and reported she had a Glasgow Coma Score of 3, was staring straight ahead and demonstrating left-sided facial droop. The patient experienced multiple episodes of vomiting with EMS. Blood pressure was hypotensive with a reading of 60/30. EMS gave her minimal fluids via IV, with mild improvement in BP to the high 60s.

On arrival to the ED, "code stroke" was activated due to risk factors and symptoms. The CT scan did not reveal any bleeding. Immediately following CT, IV fluid resuscitation was initiated with LifeFlow. The patient's initial lactic acid was 4.6 and BP was 62/47 prior to fluids. The patient received a total of 2 liters of normal saline in under 15 minutes. Following fluid resuscitation via LifeFlow, the patient was much more alert, talking and following commands. Blood pressure rose to 83/51 and code stroke was cancelled and sepsis pathway initiated.

Systolic pressures remained in high 80s until the patient was put on vasopressors. She was admitted for supportive care but was later discharged from the hospital at her baseline neurological status.