Sepsis Awareness Month

FLUID MANAGEMENT IS PROVEN TO:

- **Impact Your Clinical and Financial Outcomes**
- **Improve Your SEP-1 Compliance**

2019 SEPTEMBER SEPSIS
SAY SEPSIS SAVE LIVES
SEPSISAWARENESSMONTH.ORG

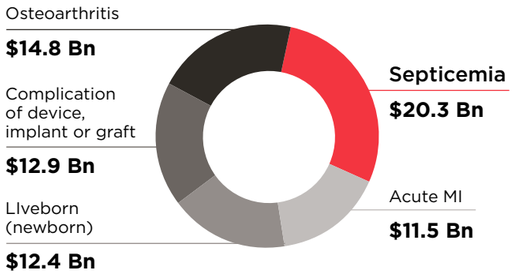
cheetah medical™

A recent University of Kansas Medical Center Study[1] in Severe Sepsis and Septic Shock Patients shows that:

ICU LOS	-2.89 DAYS
Fluid Balance	-3.59L
Pressor use	-32.78 HOURS
Risk of Mechanical Ventilation	-51%
Initiation of Acute Dialysis Therapy	-13.25%

SEPSIS IS A KEY HEALTHCARE CONCERN

MOST EXPENSIVE CONDITIONS TREATED IN U.S. HOSPITALS[2]



DID YOU KNOW?
IV FLUIDS CAN CAUSE HARM...

- Fluid is an independent predictor of mortality.[7]
- Only ~50% of hemodynamically unstable patients will respond to IV fluid by increasing cardiac output and perfusion.[8]
- Assessing whether fluid may help or harm a patient is a critical step in optimizing treatment.

- Sepsis is the body's life-threatening response to infection that can lead to tissue damage, organ failure, and death
- Treatment includes IV fluids and medications
- In the US, 1.6M cases of sepsis arise each year, resulting in 258K deaths
- Sepsis remains the most expensive reason for hospitalization,[2] costing more than 20Bn annually in the U.S.
- Patients with Severe Sepsis admitted to the ICU have an average length of stay of approx. 7 days[3]
- Average ICU cost of sepsis per patient is between $25,000 – $50,000[4]
- Increased sepsis bundle compliance is correlated with decreased sepsis mortality[5]
- Sepsis is a leading cause of hospital readmission[6]
- 19% of people hospitalized with sepsis are re-hospitalized within 30 days[6]

THE SOLUTION: 100% NON-INVASIVE FLUID MANAGEMENT

CHEETAH MEDICAL TECHNOLOGY CAN HELP YOU IMPROVE YOUR SEPSIS BUNDLE COMPLIANCE

- **Cheetah is the only device that will allow your hospital to meet the reassessment of volume status and tissue perfusion of the 6-hour bundle, with a simple and easy to use nurse-driven PLR**
- Works in mechanically ventilated and spontaneously breathing patients[9]
- Not affected by vasoactive drugs or arrhythmias
- Moves seamlessly across the continuum of care: **ED > ICU > OR > RRT > Floor**

Simplified User-Interface

Simplified User Interface

- Everything you need on one Home screen
- Flexibility to choose preferred view and parameters displayed on the screen

Dynamic Assessment: PLR/Fluid Bolus

- Quickly get your Dynamic Assessment Results by seeing where the patient resides on the Starling Curve
- Option to end Dynamic Assessment as soon as patient's ΔSVI climbs ≥10%

Educational and training tools built into the monitor for easy access to training videos, clinical tools and quick guides

Passive Leg Raise (PLR) LIFT to Assess for Fluid Responsiveness

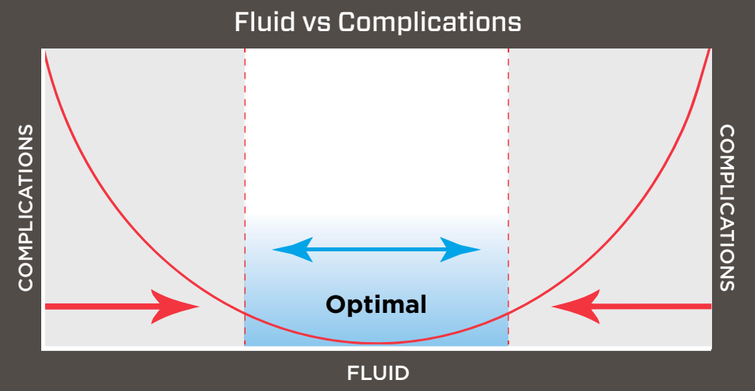
Passive Leg Raise (PLR) technique translocates 250 – 300 cc of blood from lower extremities into the heart, providing a reversible challenge of the heart's response to increased fluid load.

* ΔSVI = Change in Stroke Volume Index

USE CHEETAH AND DYNAMIC ASSESSMENTS TO GUIDE YOUR FLUID DECISIONS

TOO LITTLE FLUID[9-10] [Hypovolemia]

Possible complications:
Tissue Hypoperfusion, Tissue Hypoxia, Organ Failure, Insufficient Perfusion



Too Little Fluid[9-10] [Hypervolemia]

Too Much Fluid[12-14] [Hypervolemia]

TOO MUCH FLUID[12-14] [Hypervolemia]

Possible complications:
Tissue Edema, Organ Failure, Increased ICU/ Ventilator Days, Increased Mortality

Hospital Reluctant to Give Fluid to CHF Patient

THE PATIENT

78 yo male from Skilled Nursing Facility arrived at the ED with hypotension, malaise. Work up for possible aspiration pneumonia.

PMHx: CHF, Stage 3 Chronic Kidney Disease, IDDM

FLUIDS ADMINISTERED:

- Patient had received a **500ml bolus from EMS**
- 09:30am arrival to **ED**, **500ml bolus infused**. BP 91/47 (58), HR 105
- 10:30am: **250ml ED bolus infused**. BP 87/47(56), HR 107

Although the patient was still hypotensive, RN stated no plans for more IVF due to CHF and Kidney Disease.

The ED team decided not to guess whether the patient was fluid responsive, and a PLR was completed to assess if patient is fluid responsive:

- SVI increase of 15.7% indicated patient is still fluid responsive.
- **One liter** of NS given, patient became normotensive in ED after infusion completed.

Checking for fluid responsiveness gave permission to give more fluids that were needed in this situation, when otherwise IVF may have been held.

Studies show that giving too little or too much fluid can lead to serious complications and increased mortality.[10-11]

Sepsis Patient is No Longer Fluid-Responsive

THE PATIENT

70 yo male presented to the ED with malaise and possible sepsis.

FLUIDS ADMINISTERED:

- Patient received **1L NS from EMS and 2L NS in ED**. BP 97/61
- Lactic Acid: 5, **Sepsis Protocol initiated**.

3L

Cheetah Monitoring initiated at start of 4th liter IVF:

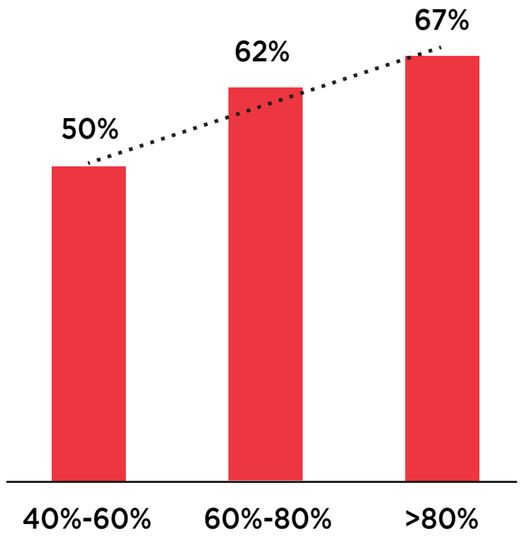
- **After the first 500ml (of the 4th liter)** a PLR was performed to assess whether the patient was fluid responsive.
- The patient ΔSVI increase by 11%, which indicated that the patient was still fluid responsive.
- **After 4th Liter infused**, a second PLR was performed, which indicated that the patient was not fluid responsive (ΔSVI = 5%), and therefore would not likely benefit from .further IV fluids at this time.
- Fluids stopped and patient was admitted to hospital with a stable blood pressure 102/76.

Checking for fluid responsiveness allowed the clinical team to titrate fluid according to patient response:

- **Give more fluids when the patient benefited from additional fluids**
- **Stop giving additional fluids after 4L and prevent potential complications associated with fluid overload**

HOSPITALS WIDELY ADOPTING CHEETAH MEDICAL TECHNOLOGY ACHIEVE BETTER SEP-1 COMPLIANCE

AVG SEP-1 COMPLIANCE RATES OF HOSPITALS UTILIZING CHEETAH TECHNOLOGY



Percent of Sepsis patients treated using Cheetah technology

There is a statistically significant correlation between Cheetah sensor usage and SEP-1 compliance![15]

- SEP-1 is a Quality Measure issued by CMS, stipulating a protocol for the treatment of severe sepsis or septic shock patients.
- **Your hospital SEP-1 compliance levels are now publicly reported at Medicare.gov Hospital Compare: medicare.gov/hospitalcompare/search.html**
- **Cheetah is the only device with demonstrated outcome data that will allow your hospital to meet the reassessment of volume status and tissue perfusion of the 6-hour bundle... with a nurse-performed PLR!**

PUBLISHED DATA HIGHLIGHTS CLINICAL AND ECONOMIC BENEFITS

A recent University of Kansas Medical Center study in Severe Sepsis and Septic Shock Patients shows that optimized fluid management can lead to improved patient outcomes:[1]

FINANCIAL BUSINESS CASE

Variable	Cheetah Stroke Volume Fluid Therapy (n=100)	Usual Care (Control, n=91)	Δ/p Value	Costs Assumptions	Cost Avoidance
ICU LOS (Days)	5.98 ± 0.68	8.87 ± 1.18	2.89 days p=0.03	$US 4,004/ICU day[16] $US 906/floor day[17]	**$8,953**
Fluid Balance (Liters)	1.77L ± 0.60	5.36L ± 1.01	3.59L[1] p=0.002		
Pressor Use (Hours)	32.08 ± 5.22	64.86 ± 8.39	32.78 hours p=0.001		
Mechanical Ventilation (Relative Risk)	29%	57%	RR=0.51 p = 0.001	$US 1,522/day[18] 5.1 days[17]	**$1,940**
Acute Dialysis Therapy Initiated	6.25%	19.5%	13.25% P = 0.01	$27,182 X (12.73 cases avoided/ 96 total patients)	**$3,605**
ESTIMATED SAVINGS PER TREATED PATIENT					**$14,498**

COST ASSUMPTIONS

ICU Length of Stay (LOS): 2.89 days x ($4,004 [Avg ICU Day] – $906 [Avg Floor Day]) = $8,953
Mechanical Ventilation (MV): $1,522 x 5.1 days x .25 = $1,940
Assumes:
1. Incremental cost of MV $1,522/day
2. Average duration of MV in septic shock 5.1 days.
3. Assumes an absolute 25% reduction of patients receiving mechanical ventilation.

Acute Dialysis Therapy: $27,182 (avg. dialysis-related hospital costs) X (12.73 cases avoided/96 total patients) = $3,605

"These finding underscore the importance of stroke volume guided fluid management in the high risk severe sepsis and septic shock patient population.

By reducing length of stay, vasopressor use, and the requirement for mechanical ventilation using dynamic assessments provided by the Cheetah Medical system, sepsis patients may benefit by an improved quality of care and reduced healthcare costs."

Dr. Steven Q. Simpson Acting Director,
Division of Pulmonary Disease and Critical Care Medicine at the University of Kansas Medical Center

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Cheetah Medical, Inc.
600 SE Maritime Ave Suite 220, Vancouver, WA 98661 USA
866.751.9097 • 360.828-8685 • cheetah-medical.com

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