

# Avoid volume overload in **Septic patients** with the **100% noninvasive STARLING™ SV**

Quickly obtain dynamic fluid assessments for Septic patients with the Starling SV™

The Starling SV is a 100% non-invasive measure of stroke volume, a left ventricular function, enabling confident and precise volume management decisions.



**Approximately 50%** of hemodynamically unstable patients will not respond to fluids.<sup>1</sup>

**1000**  
PATIENTS

**Studies involving over 1000 patients** indicate CVP is not reliable for determining fluid responsiveness.<sup>2</sup>



**Excess fluids can lead to** increased length of stay, increased mortality and increased complications.<sup>4-6</sup>

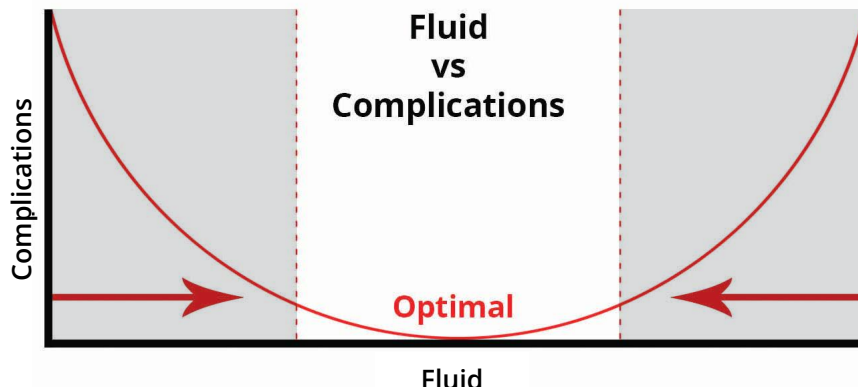
# 100% noninvasive STARLING™ SV

Patients with **sepsis** and **septic shock** have unique and continuously changing fluid requirements and complications can occur from both under and over-resuscitation.

## Optimal volume in Sepsis

### Insufficient Fluid Volume<sup>3</sup>

- Tissue Hypoxia
- Organ failure



### Excess Fluid Volume<sup>4-6</sup>

- Volume overload
- Organ failure
- Increased ventilator days
- Increased mortality

## Relevant clinical studies regarding volume overload in Sepsis

- **Kelm et al (2015)<sup>4</sup> — “Fluid overload in patients with severe sepsis and septic shock treated with early goal-directed therapy is associated with increased need for fluid-related medical interventions and hospital death.”**
  - n=405, Fluid overload in 67% day 1, 48% day 3; Mortality OR 2.27 day 1, 1.92 day 3
  - Patient volume status and day 3 weights increased compared to day 1, suggesting that patients may continue to receive fluid administration well out of EGDT window
- **Boyd et al (2011)<sup>5</sup> — Vasopressin in Septic Shock Trial (VASST)**
  - More positive fluid balance both early in resuscitation and cumulatively over 4 days is associated with increased 28-day mortality
- **Vincent et al (2006)<sup>6</sup> — Sepsis in European ICU: Results of the SOAP Study**
  - Positive balance is a strong predictor for mortality (cumulative fluid balance per liter increase 1.1 OR 1.0-1.1, p=0.001)
  - Positive fluid balance second most important prognostic factor even when adjusting for severity illness

## References

1. Michard F. Predicting fluid responsiveness in ICU patients: a critical analysis of the evidence. *Chest*. 2002; 121(6):2000-2008.
2. Marik PE, Cavallazzi R. Does the central venous pressure predict fluid responsiveness? An updated meta analysis and a plea for some common sense. *Crit Care Med* 2013; 41:1774-1781
3. Rivers, E (2001). Early goal directed therapy in the treatment of severe sepsis and septic shock. *NEJM* 1345: 1368-1377
4. Kelm et al (2015). Fluid overload in patients with severe sepsis and septic shock treated with early goal-directed therapy is associated with increased acute need for fluid-related medical interventions and hospital death. *Shock* 42:68073.
5. Boyd et al (2011). Vasopressin in Septic Shock Trial (VASST). *Critical Care Med* 34:259-265.
6. Vincent et al (2006). Sepsis in European ICU: Results of the SOAP Study. *Critical Care Med* 34:344-353.

The Starling SV is a trademark of Cheetah Medical, Inc.

R-MRK-027 rev 2