

# Challenges in Sepsis Care

## New Sepsis Definitions and Fluid Resuscitation Beyond the Central Venous Pressure

Maureen A. Seckel, RN, APRN, MSN, ACNS-BC, CCNS, CCRN<sup>a,\*</sup>,  
Thomas Ahrens, PhD, RN<sup>b,1</sup>

### KEYWORDS

• Fluid responsiveness • Sepsis • Fluid challenge • Stroke volume

### KEY POINTS

- Despite many advances, sepsis remains a diagnosis with high mortality and morbidity and is the most costly condition in the United States.
- The new 2016 Sepsis-3 definitions describe patients who have higher risk for mortality. Sepsis is described as a life-threatening organ dysfunction caused by a dysregulated host response. Septic shock is a subset of sepsis in which underlying circulator and cellular metabolism abnormalities are profound enough to substantially increase mortality.
- Criteria that may be useful in identifying sepsis patients with an increased risk for mortality include the Sequential (formerly Sepsis-related) Organ Failure Assessment (SOFA) score for patients in the intensive care unit and quick SOFA or qSOFA for patients outside the intensive care unit.
- Sepsis causes physiologic changes that occur in stages, and fluids may or may not be indicated; measures that should be used to assess whether fluid is helpful or the patient is fluid responsive should be based on stroke volume changes.
- Blood pressure and central venous pressure are not reliable measures of fluid responsiveness; passive leg raise is one method for assessing fluid responsiveness and should be done in conjunctions with measuring stroke volume changes.

*Because of the persistent, alarming figures for sepsis and associated mortality rates, it is urgent that dissemination of the newly released sepsis guidelines reaches the largest critical care audience possible. Seckel and Ahrens graciously agreed to an expeditious timeline in bringing this Hot Topic to Critical Care*

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The authors have nothing to disclose.

<sup>a</sup> Christiana Care Health Services, Affiliated Faculty, College of Nursing, University of Delaware, 4755 Oglethorpe-Stanton Road, Newark, DE 19711, USA; <sup>b</sup> Barnes-Jewish Hospital, St Louis, MO 63110, USA

<sup>1</sup> Present address: 7006 Woodbridge Creek Court, St. Louis, MO 63129.

\* Corresponding author.

E-mail address: [Mseckel@christianacare.org](mailto:Mseckel@christianacare.org)

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*Nursing Clinics* readers to augment the pulmonary topics provided in this issue. They provide a historical perspective on the consensus work done since 1991 on sepsis definitions, criteria for early recognition, and recommendations for management. They go on to explain in detail the 2016 guidelines, along with rationale for the changes using a physiologic framework, based on the most recent evidence from three major studies. It is our hope that improved outcomes for patients will occur sooner rather than later as clinicians implement these recommended practice changes.

—Jan Foster, PhD, APRN, CNS, Consulting Editor

## INTRODUCTION

Despite many improvements in sepsis care over the past 25 years, sepsis remains a diagnosis with high mortality and morbidity. Sepsis is the sixth most common reason for hospitalization in the United States.<sup>1</sup> One of every 23 patients in the hospital or 4.2% has a primary or secondary diagnosis of sepsis upon discharge, and sepsis is the most costly condition.<sup>2</sup> Patients with sepsis or septicemia are 8 times more likely to die during hospitalization (17%), have longer hospital stays, are twice as likely to be discharged to short-term care, and are 3 times likely to be discharge to long-term care than any other discharge diagnosis.<sup>3</sup>

Two important changes regarding sepsis care have occurred recently and are reviewed. The first is the 2016 release of the third international consensus definitions for sepsis and septic shock or Sepsis-3.<sup>4</sup> The new Sepsis-3 definitions and criteria are intended not only to help with earlier recognition and management but also to provide standard terminology and criteria for research, outcomes, and reporting quality measures. The terms sepsis, septicemia, and severe sepsis in the past have been used interchangeably, leading to discrepancy in reporting outcomes. It is important to have an understanding of the new information in order to incorporate the language into the everyday work with sepsis patients.

The second change involves management of fluid resuscitation and measures of volume responsiveness. It is known from the recent PROCESS, ProMISE, and ARISE studies that early goal-directed therapy did not decrease sepsis mortality versus usual care treatment protocols.<sup>5–7</sup> In addition, patients in the usual care treatment protocols received fewer fluids, and decreased use of central venous pressure (CVP).<sup>5,6</sup> A large volume of research has shown a poor relationship between CVP and fluid responsiveness, establishing that the long-term assumptions about the usefulness of CVP measures were incorrect. CVP is unreliable in most critically ill patients and is not a reliable surrogate for stroke volume (SV) or left ventricular preload and has a poor predictive value of 0.55.<sup>8,9</sup> CVP measures were de-emphasized in the Surviving Sepsis Campaign and Centers for Medicare and Medicaid Services Sep-1 bundle measures in 2015, and an emphasis was placed on other suggested measures of volume status and tissue perfusion assessments (**Table 1**).<sup>10,11</sup> Because use of the CVP is not a reliable measure of fluid responsiveness, it is crucial to have an understanding of what the research is suggesting are effective markers.

## NEW SEPSIS DEFINITIONS

In 1991, the first international consensus conference to establish sepsis definitions and criteria published their findings.<sup>12</sup> Goals of that first consensus workgroup were to improve early bedside detection, enabling earlier therapeutic interventions along with establishing standard definitions for future research (**Table 2**). There were varying definitions and terminology in the literature at the time, which made it confusing to speak about sepsis in a common language. The consensus work also established

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