

SIRS, Sepsis, and Septic Shock Criteria

Megan Soliman, MD, MSc, Kamal Medlej, MD

Evidence to Action: Official Journal of MDCalc

Vol. 012025, Issue 01, 2025

Article Information

Keywords: SIRS calc, SIRS score, SIRS criteria, SIRS mdcalc, SIRS sepsis, SIRS septic, SIRS septic shock, SIRS septic shock criteria, SIRS sepsis criteria, septic shock criteria, septic shock calc, septic shock score, sepsis criteria, sepsis score, sepsis calc, sepsis mdcalc, shock sepsis calc, shock sepsis guideline, r/o sepsis, w/u sepsis, SIRS r/o sepsis, sepsis precautions, sepsis precautions calc, sepsis precautions criteria, prognosis sepsis, prognosis septic shock, sepsis severity, sepsis severity calc, septic shock severity, septic shock severity calc

<https://doi.org/10.65357/001c.154405>

Submitted: December 01, 2024 EST

Accepted: January 01, 2025 EST

Published: January 08, 2025 EST

Abstract

This calculator defines the severity of sepsis and septic shock to help guide screening and management of patients with potential sepsis.

I. HOW TO USE

When to Use

- Patients that present with two or more *SIRS* criteria and a suspected or confirmed infection should be screened for Severe Sepsis.
- Currently many institutions encourage or even mandate obtaining a lactic acid level on these patients. A lactate ≥ 2 mmol/L is considered elevated and the initiation of standard sepsis care is warranted if the patient meets other diagnostic criteria for sepsis.
- Patients who meet the above criteria but are persistently hypotensive despite the initiation of intravenous fluid resuscitation are in septic shock and aggressive resuscitation measures should be initiated immediately.

Pearls / Pitfalls

- SIRS, sepsis, severe sepsis, and septic shock criteria were chosen by a panel of experts and not prospec-

tively or retrospectively derived from large-scale population studies ([SCCM 2021 guidelines](#)).

- There remains controversy over the sensitivity and specificity of these criteria, even though they have been largely adopted for the purpose of research and in clinical practice.
- Clinical judgment remains important since a significant number of patients presenting to emergency departments will meet criteria for *Sepsis* but do not require further screening or management.

For example, a 21 year old healthy male with a viral illness can present with a fever and tachycardia. While this patient meets the definition of *Sepsis*, one can easily argue further investigation and aggressive interventions are likely unnecessary if the patient is well appearing.

Why Use

- Early initiation of broad spectrum antibiotics and aggressive resuscitative measures have been shown to decrease mortality in patients with severe sepsis

and septic shock. The early recognition of these conditions is therefore of the utmost importance.

- *SIRS* criteria are mostly used as a screening tool to identify patients that may need further workup for sepsis and severe sepsis.
- Severe sepsis and septic shock are universally accepted as indications to initiate standard sepsis management protocols.

Having clearly defined criteria for *SIRS*, *Sepsis*, *Severe Sepsis*, and *Septic Shock* is also important in order to standardize clinical research, as well as institutional protocols for the management of these conditions.

II. NEXT STEPS

Management

- When a patient presents with two or more *SIRS* criteria but with hemodynamic stability (i.e. blood pressure at baseline), a clinical assessment must be made to determine the possibility of an infectious etiology.
- If an infection is suspected or confirmed, the patient is diagnosed with sepsis and a lactate level is obtained to determine the degree of hypoperfusion and inflammation. A lactate level ≥ 2 mmol/L is considered elevated and may warrant further investigation. Aggressive management with broad spectrum antibiotics, intravenous fluids, and vasopressors should be initiated, especially in patients with lactate ≥ 4 mmol/L.
- Patients that present with a suspected or confirmed infection AND hemodynamic instability should immediately be treated for septic shock. While *SIRS* criteria will likely be present in these patients, aggressive management should not be delayed while waiting for laboratory values such as the WBC or lactate.
- Early recognition of sepsis, severe sepsis, and septic shock, and early administration of broad spectrum and organism specific antibiotics are the most critical actions.
- There remains controversy in the type of fluids that should be used, their quantity, and the timing of vasopressors and/or inotropes.

Critical Actions

- Assess all patients presenting with two or more *SIRS* criteria for the possibility of an infectious etiology.
- Screen for severe sepsis by obtaining a lactate level on patients with sepsis, that are elderly, immunocompromised, or ill appearing.
- Some experts recommend obtaining a lactate level on all patients in whom blood cultures are sent.

Formula

SIRS Criteria	Points
Temp $>38^{\circ}\text{C}$ (100.4°F) or $< 36^{\circ}\text{C}$ (96.8°F)	Y/N
Heart Rate > 90	Y/N
Respiratory Rate > 20 or $\text{PaCO}_2 < 32$ mm Hg	Y/N
WBC $> 12,000/\text{mm}^3$, $< 4,000/\text{mm}^3$, or $> 10\%$ bands	Y/N
Sepsis Criteria (SIRS + Source of Infection)	
Suspected or Present Source of Infection	Y/N
Severe Sepsis Criteria (Organ Dysfunction, Hypotension, or Hypoperfusion)	
Severe Sepsis with Hypotension, despite adequate fluid resuscitation	Y/N
Multiple Organ Dysfunction Syndrome Criteria	
Evidence of ≥ 2 Organs Failing	Y/N

This is institution dependent however and not mandated in any guidelines.

- When severe sepsis or septic shock are identified, initiate broad spectrum antibiotics immediately. These antibiotics should be organism specific and therefore institutional antibiograms should be used.

The *Surviving Sepsis Campaign Guidelines* recommend initiation of antimicrobials within one hour from the time of recognition of *Severe Sepsis* or *Septic Shock*, or within three hours of the patient's arrival to the hospital.

III. EVIDENCE

Evidence Appraisal

- [This paper](#) was released after the first consensus conference in 1991. The goal of this conference was to standardize the use of terms such as “*SIRS*”, “*sepsis*”, “*severe sepsis*”, and “*septic shock*” to facilitate enrollment of patients in clinical trials.
- In 2001, the International Sepsis Definitions Conference expanded on these definitions by adding additional elements such as laboratory data. See [here](#).
- The [Third Consensus Conference](#) is the most recent iteration of this guidance.

Facts & Figures

- *SIRS* - 2 YES answers meets criteria.
- Sepsis Criteria - 2 YES of *SIRS* + Suspected Source of Infection.
- Severe Sepsis Criteria - 2 YES of *SIRS* + Lactic Acidosis, SBP.
- Multiple Organ Dysfunction Syndrome - 2 YES of *SIRS* + Evidence of ≥ 2 Organs Failing.

Check with your own hospital for its sepsis guidelines, sepsis ‘bundle’, or sepsis algorithm

Literature

Original/Primary Reference

International Guidelines for Management of Severe Sepsis and Septic Shock: 2012

Bone RC, Balk RA, Cerra FB, Dellinger RP, Fein AM, Knaus WA, Schein RM, Sibbald WJ. Definitions for sepsis and organ failure and guidelines for the use of innovative therapies in sepsis. The ACCP/SCCM Consensus Conference Committee. American College of Chest Physicians/Society of Critical Care Medicine. *Chest*. 1992 Jun;101(6):1644-55.

Evans L, Rhodes A, Alhazzani W, et al. Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021. *Intensive Care Med*. 2021;47(11):1181-1247.

Clinical Practice Guidelines

Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: Critical Care Medicine

Other References

Levy MM, Fink MP, Marshall JC, et al. 2001 SCCM/ES-ICM/ACCP/ATS/SIS International Sepsis Definitions Conference. *Crit Care Med*. 2003;31(4):1250–1256.

Singer M, Deutschman CS, Seymour CW, et al. The third international consensus definitions for sepsis and septic shock (Sepsis-3). *JAMA*. 2016;315(8):801-810.