UWTASP

tele-antimicrobial stewardship program

October 4, 2022

Agenda

- Didactic: Sepsis QI and Regulatory Requirements
- Cases and questions

Invited Commentary | Critical Care Medicine

December 20, 2021

SEP-1—Taking the Measure of a Measure

Foster Gesten, MD[1]; Laura Evans, MD, MSc[2]

» Author Affiliations | Article Information

JAMA Netw Open. 2021;4(12):e2138823. doi:10.1001/jamanetworkopen.2021.38823

Brief History

- 1991, ACCP/SCCM published sepsis definition (incl. SIRS)
- 2001, ESICM/ACCP/ATS/SIS, Sepsis-2
- RCTs of critically ill patients published, increasing visibility of "know-do" gap (EGDT, insulin, steroids…)
- 2004, Surviving Sepsis Campaign(GLs and bundles)
- 2013, New York State "Rory's Regulations"
- 2015, SEP-1 introduced
- 2016, Sepsis-3 update
- 2018, SEP-1 reporting begins

citations

SIRS + Sepsis

- <36 degrees C or >38 degrees
- HR > 90/minute
- RR >20/minute
- PaCO2 32 mmHg and
- WBC <4,000 or 12,000 and/or >10% bands

➢2 or more + concern for infection =

Sepsis

Sepsis to Severe Sepsis and Shock

- **Sepsis** +
  - End-organ dysfunction
  - <90 mmHg
  - And/or lactate >4 mmol/L

= Severe Sepsis

- Persistent hypotension, end-organ damage **= Septic Shock**

SEP-1*– 3 hour bundle

- Measure lactate level
- Blood cultures prior to antibiotics
- Administer broad spectrum **or other** antibiotics
- Administer 30 mL/kg crystalloid if hypotensive or lactate ≥4 mmol/L

***Lactate >2 or organ dysfunction (2 SIRS + suspected infection)**

Antibiotic Therapy for Severe Sepsis/Septic Shock

ABX choice should be based on site of infection and risk factors for drug resistant organisms (prior abx, SNF, LTACH, h/o MDROs)

Single drug therapy options:

- Ceftriaxone
- Cefepime
- Piperacillin/Tazobactam
- Ertapenem
- Meropenem
- Levofloxacin

(ADD VANCOMYCIN if risk factors for MRSA present)

For patients with severe beta-lactam allergy:

Aztreonam OR Ciprofloxacin OR Aminoglycoside

PLUS Vancomycin regardless of risk factors for MRSA

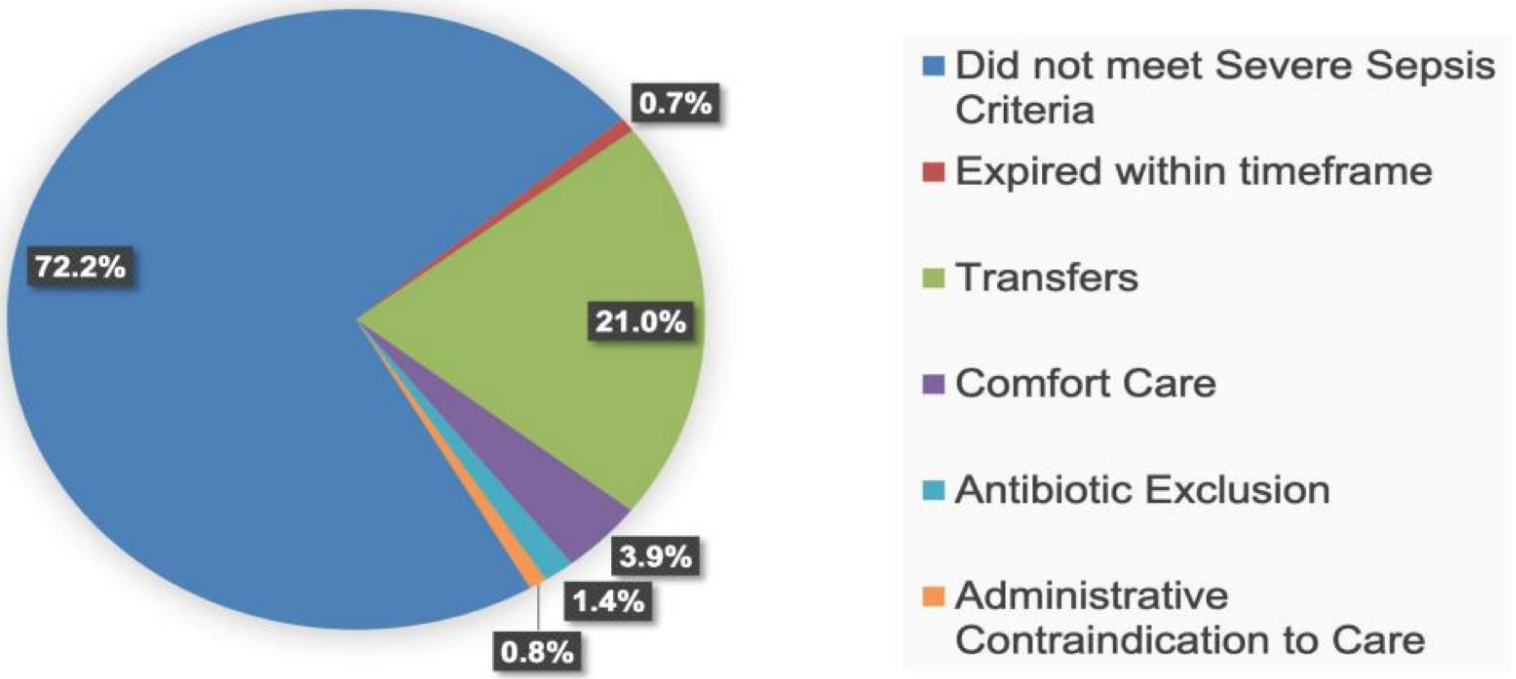
Contact Infectious Disease Consult or Antimicrobial Stewardship with questions

SEP-1*– 6 hour bundle

- Repeat lactate if initial >2
- Vasopressor administration (if hypotension persists after fluid)
- Repeat volume status assessment

***Lactate >2 or organ dysfunction (2 SIRS + suspected infection)**

Exceptions



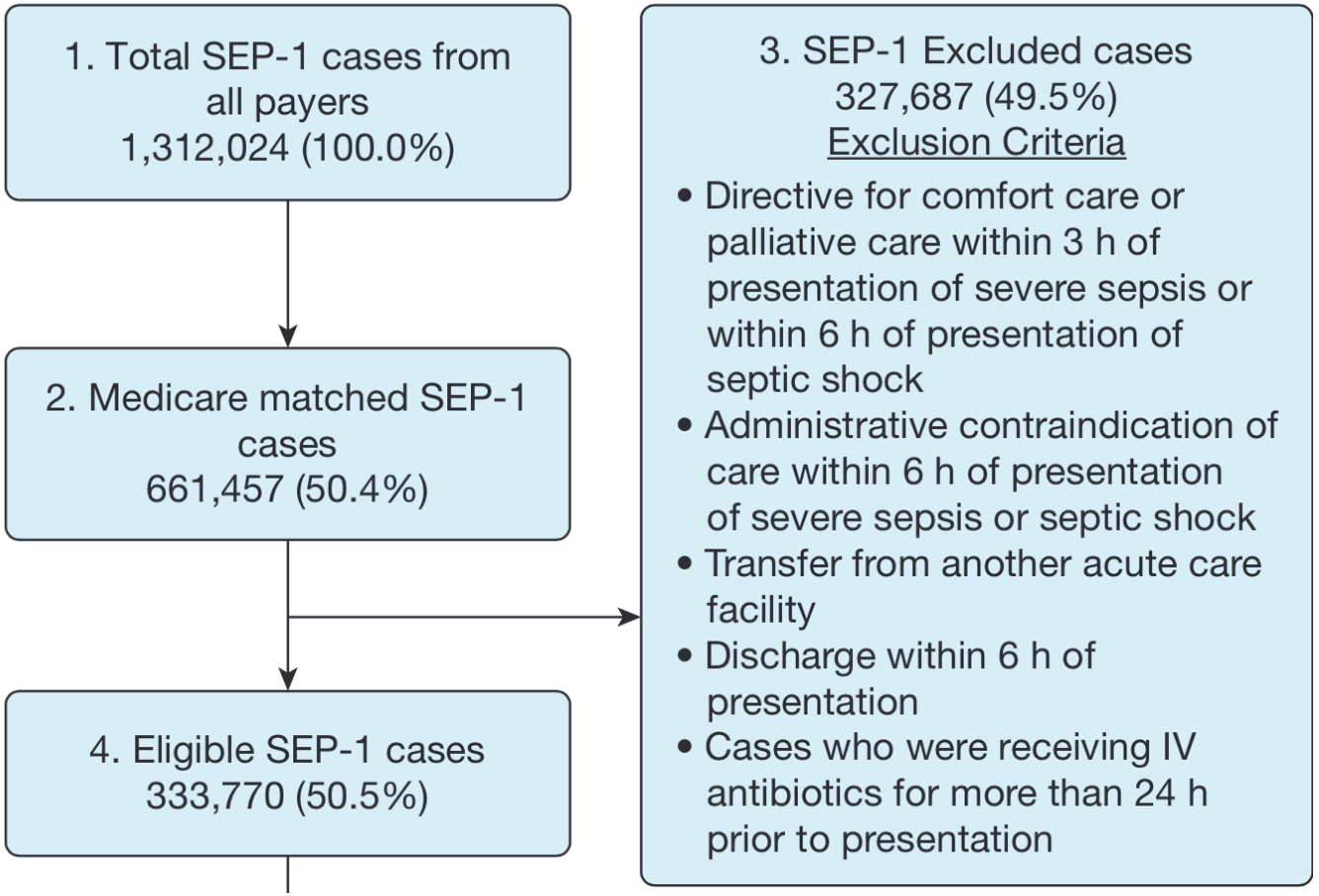
Note: Data from January 2017–December 2017
(444,489 total exclusions for cases)

Source: https://www.wha.org/Quality-Patient-Safety/Partners-for-Patients/Shared-Resources/Infections/Sepsis/CMS-Sepsis-Update-2019-(1)

Effects of Compliance With the Early Management Bundle (SEP-1) on Mortality Changes Among Medicare Beneficiaries With Sepsis

A Propensity Score Matched Cohort Study

Sean R. Townsend, MD, FCCP; Gary S. Phillips, MAS; Reena Duseja, MD; Lemeneh Tefera, MD; Derek Cruikshank, PSM; Robert Dickerson, RRT, MSHSA; H. Bryant Nguyen, MD; Christa A. Schorr, DNP, RN; Mitchell M. Levy, MD, FCCP; R. Phillip Dellinger, MD, FCCP; William A. Conway, MD; Warren S. Browner, MD, MPH; and Emanuel P. Rivers, MD, MPH, FCCP



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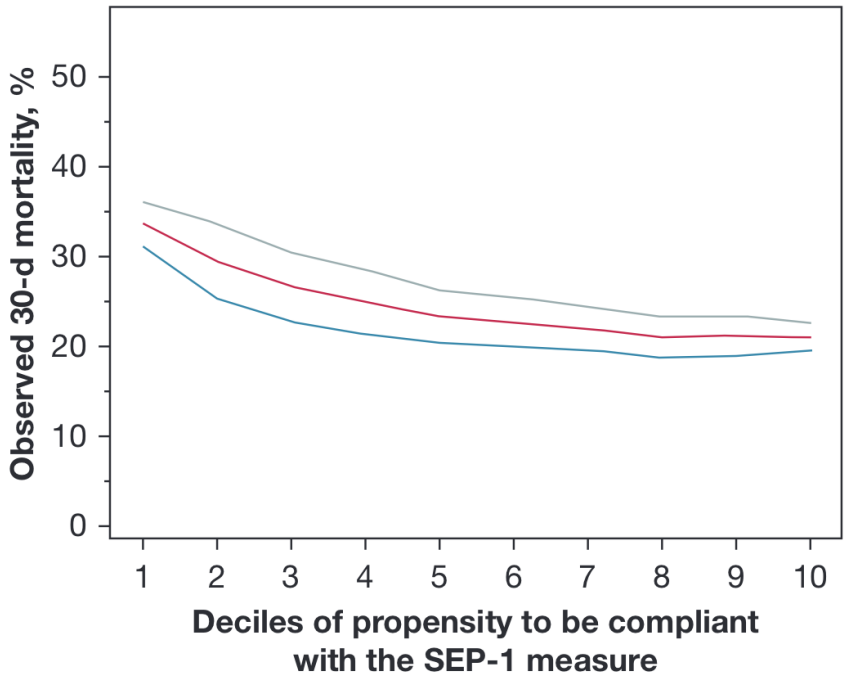
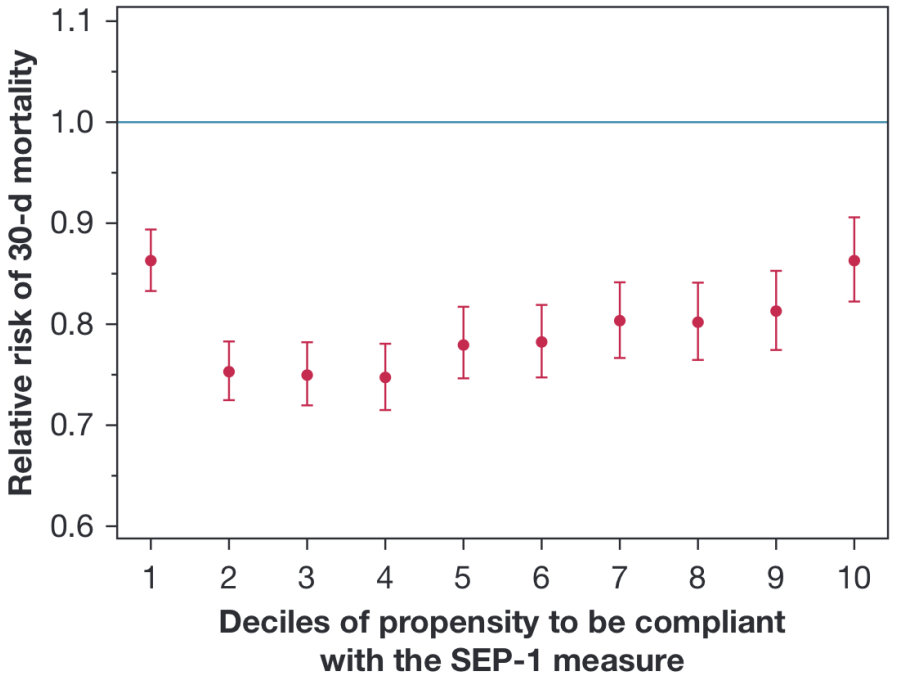
All subjects
Subjects that passed SEP-1
Subjects that failed SEP-1



Standard-match: observed 30-d mortality by decile of propensity to comply with SEP-1.



Standard-match: 30-d mortality relative risks by decile of propensity to comply with SEP-1.

Townsend, Chest, Feb 2022

CRITICAL CARE

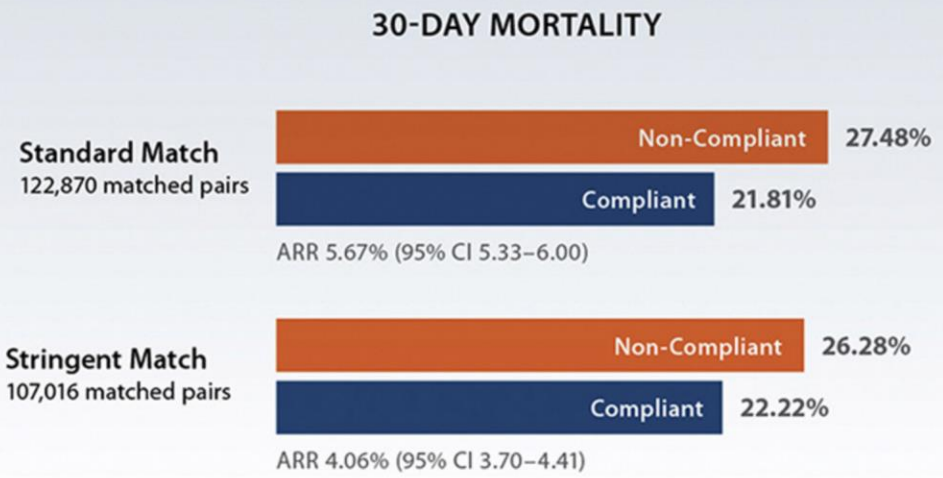
What Is the Association Between Compliance With SEP-1 and 30-Day Mortality?

CHEST

STUDY DESIGN

- Cohort study of **patient-level data reported to Medicare** by 3,241 hospitals from October 1, 2015 to March 31, 2017
- Compliance was defined as **completion of all qualifying SEP-1 elements**
- To evaluate population-level treatment effects, **two matches** (standard match and stringent match) were conducted
- Standard match targeted covariate absolute standardized mean differences of ≤ 0.25 and stringent match targeted ≤ 0.10

RESULTS



Compliance with SEP-1 was associated with lower 30-day mortality. Rendering SEP-1 compliant care may reduce the incidence of avoidable deaths.

Townsend SR, et al. *CHEST* February 2022 | @journal_CHEST | https://doi.org/10.1016/j.chest.2021.07.2167

Townsend, Chest, Feb 2022

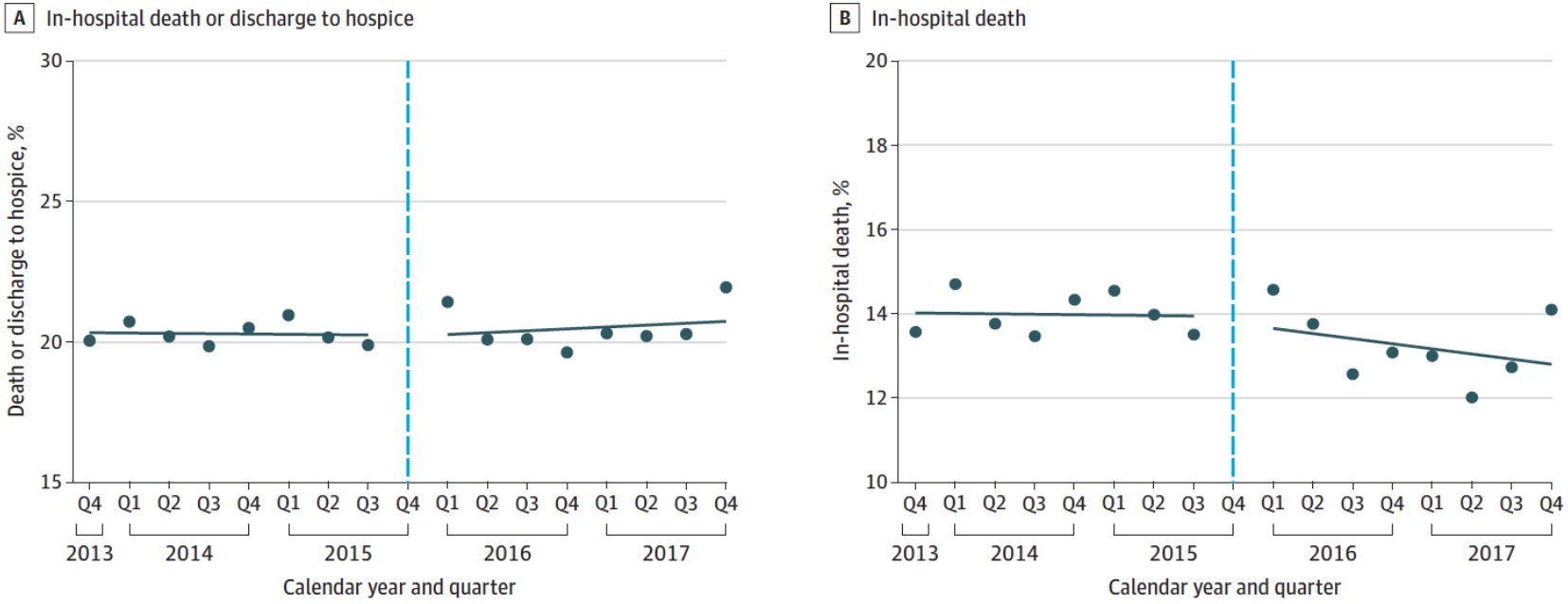
JAMA Network Open

Original Investigation | Critical Care Medicine

Association Between Implementation of the Severe Sepsis and Septic Shock Early Management Bundle Performance Measure and Outcomes in Patients With Suspected Sepsis in US Hospitals

Chanu Rhee, MD, MPH; Tingting Yu, PhD; Rui Wang, PhD; Sameer S. Kadri, MD, MSc; David Fram, BA; Huai-Chun Chen, PhD; Michael Klompas, MD, MPH; for the CDC Prevention Epicenters Program

Figure 3. Changes in Risk-Adjusted Outcomes of Patients With Suspected Sepsis Before and After Severe Sepsis and Septic Shock Early Management Bundle (SEP-1) Implementation



Rhee, JAMA Network Open, Dec 2021

Emergency Medicine Practice
Evidence-Based Education
Practical Application

Updates and Controversies in the Early Management of Sepsis and Septic Shock (Pharmacology CME)

Table 2. Definitions of Sepsis, Severe Sepsis, and Septic Shock

Sepsis Category	Sepsis-3	2001 Sepsis	CMS SEP-1
Sepsis	SOFA score ≥ 2 + suspected infection	2 of 4 SIRS criteria + suspected infection	2 of 4 SIRS criteria + suspected infection
Severe sepsis	Not applicable	Sepsis + organ dysfunction, hypoperfusion, or hypotension	Sepsis + sepsis-induced organ dysfunction*
Septic shock	Vasopressor requirement to maintain MAP ≥ 65 mm Hg + serum lactate level > 2 mmol/L in the absence of hypovolemia	Sepsis-induced hypotension persisting after adequate IV fluid resuscitation + presence of perfusion abnormalities or organ dysfunction	• Lactate > 4 mmol/L • SBP < 90 mm Hg, not responsive to IV fluids **or** • MAP < 70 mm Hg, not responsive to IV fluids

Source: https://www.ebmedicine.net/topics/infectious-disease/sepsis-septic-shock

Sepsis definitions

	Previous (1991-2016)	Sepsis 3 (2016-)
Sepsis	Systemic Inflammatory Response Syndrome (SIRS) + suspected infection.	Suspected or documented infection + ≥ 2 of qSOFA (systolic blood pressure < 90 mmHG; GCS ≤ 13; respiratory rate ≥ 22 per minute) *or* Rise in SOFA score ≥ 2 points
Severe Sepsis	Sepsis + any of the following: Systolic blood pressure < 90 mmHG or MAP < 65; lactate > 2.0 mmol/L; INR > 1.5 or PTT > 60s; bilirubin ≥ 2.0 mg/dL; creatinine 2.1 > mg/dL urine output < 0.5mL/kg/hour (≥ 2 hours); platelets 100 x 10^9/L; spO2 < 90% (room air).	Removed from official nomenclature
Septic Shock	Sepsis + hypotension after adequate fluid resuscitation	Sepsis + vasopressors required to maintain MAP > 65 *and* *lactate > 2.0 mmol/L after adequate fluid resuscitation*

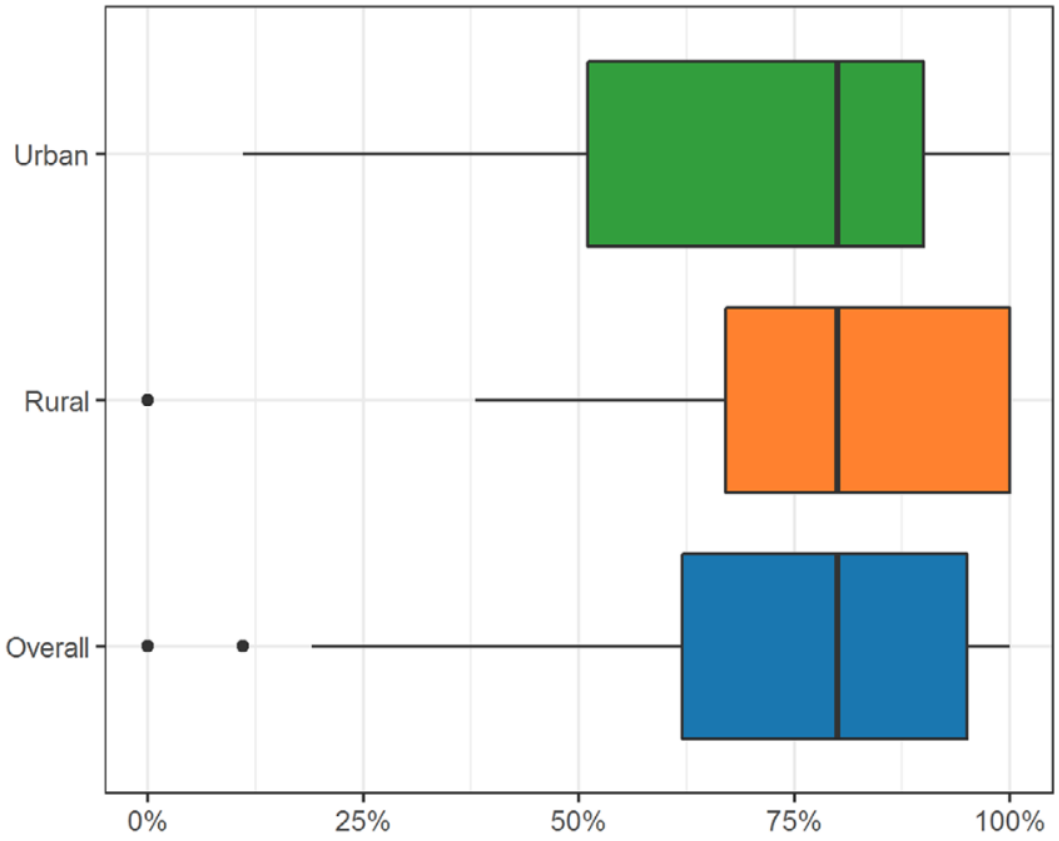
Source: https://www.acep.org/globalassets/uploads/uploaded-files/acep/quality/sepsis-webinars/may.sepsis-3-acep.pdf

Sepsis-3

‘life-threatening organ dysfunction caused by a dysregulated host response to infection’

Singer, JAMA, 2016

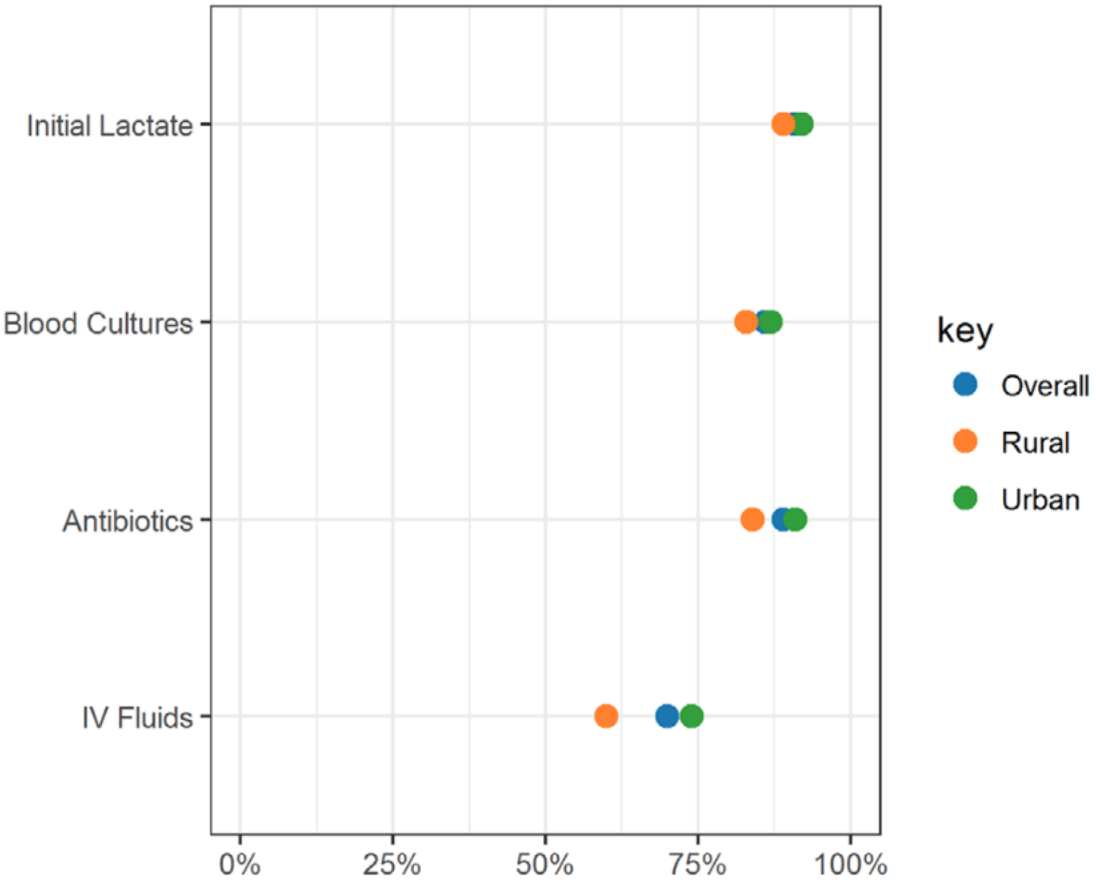
SEP-1 Performance, All EDs



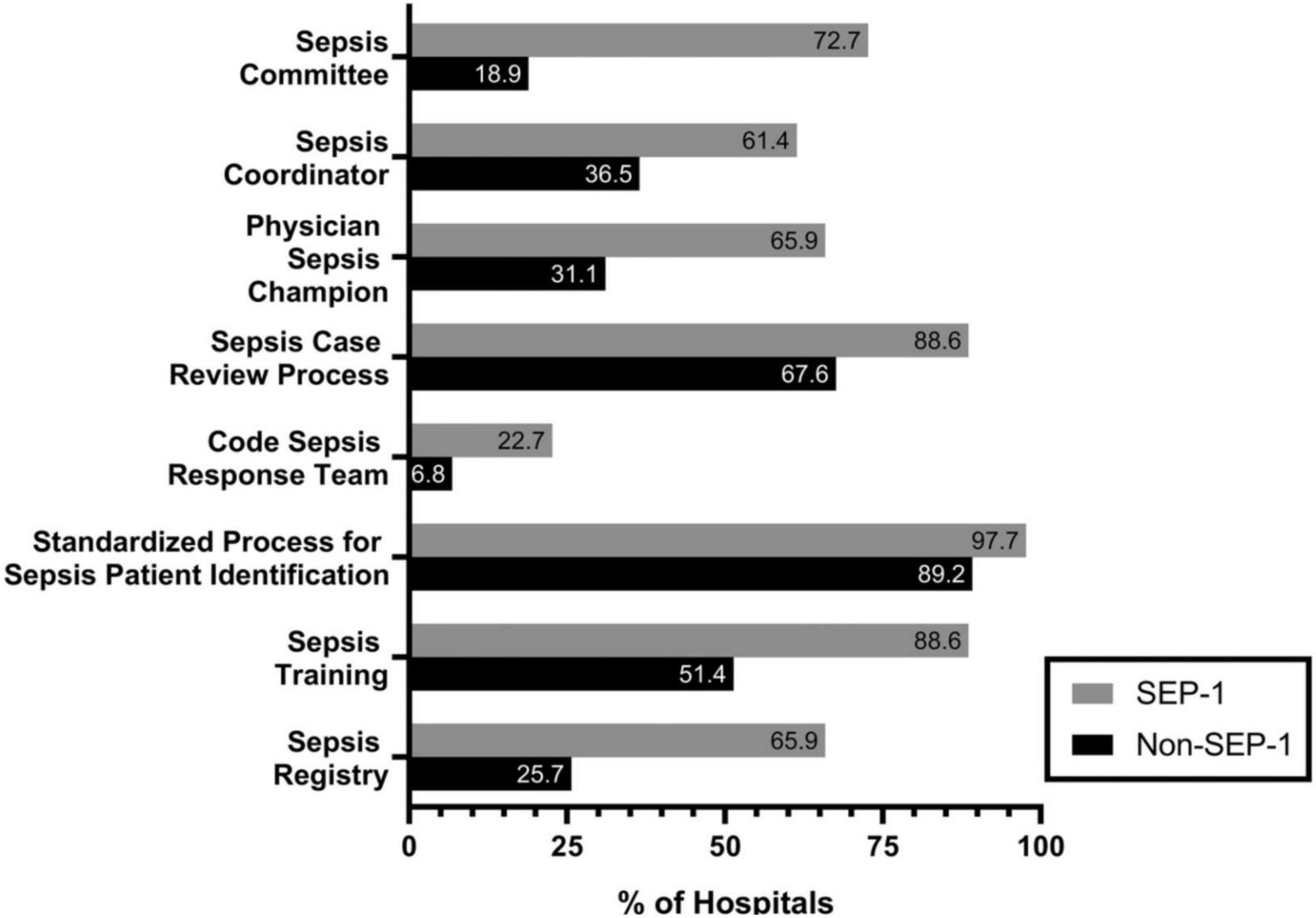
Median SEP-1 performance with Interquartile Range (IQR).

Greenwood-Ericksen, J Rural Health, 2018

ACEP ED Sepsis Performance, All EDs



Greenwood-Ericksen, J Rural Health, 2018



Bolte, J Patient Safety, July 2022

Discussion, questions, comments?