American College of Emergency Physicians®
ADVANCING EMERGENCY CARE

ACEP 48

Title: Sepsis Management: Septic Shock: Lactate Level Measurement, Antibiotics Ordered, and Fluid Resuscitation
Description: Percentage of emergency department visits resulting in hospital admission or transfers for patients aged 18 years and older with septic shock who had an order for all the following during the emergency department visit: a serum lactate level, antibiotics, and >= 1 L of crystalloids.
Measurement Period: January 1, 2024, through December 31, 2024
Measure Steward: American College of Emergency Physicians (ACEP)
Measure Developer: American College of Emergency Physicians (ACEP)
Measure Scoring: Proportion
Measure Type: Process

Initial Population	All emergency department visits resulting in hospital admission or transfers for patients aged 18 years and older with septic shock
Denominator	All emergency department visits resulting in hospital admission or transfers for patients aged 18 years and older with septic shock

Denominator Exclusions	Patients with any of the following:
	- Transferred into the emergency department from another acute care facility or other in-patient hospital setting
	- Left before treatment was complete
	- Died during the emergency department visit
	- Cardiac arrest within the emergency department visit
	- Patient or surrogate decision maker declined care
	- Advanced care directives present in patient medical record for comfort care
	- Severe Heart Failure (LVEF < 20%)
	- Left Ventricular Assist Device (LVAD)
	- Acute Pulmonary Edema
	- Toxicological emergencies
	- Burn
	- Seizures
	- Anuria
	- End stage renal disease
	- Secondary diagnosis of:
	  - Gastrointestinal bleeding
	  - Stroke
	  - Acute myocardial infarction
	  - Acute trauma
	- COVID -19

Numerator	Emergency department visits for patients who had an order for all of the following during the emergency department visit: - Serum lactate level - Antibiotics - >= 1 L of crystalloids
Numerator Exclusions	Patient is admitted within 1 hour of ED Arrival

Denominator Exceptions	Patient is admitted to the hospital within one hour of ED arrival

Stratification: None
Risk Adjustment: None
Improvement Notation: Higher score indicates better quality

Rationale

LACTATE MEASUREMENT - As soon as patients presenting to the emergency department with sepsis-induced tissue hypoperfusion are identified, protocolized, quantitative resuscitation is recommended. Early resuscitation strategies, including evidence-based treatments to normalize elevated lactate, are associated with improved survival rates in emergency department patients. In order to achieve lactate normalization in patients with elevated levels, an initial lactate measurement must be obtained.
An association between elevated lactate with morbidity and mortality in diverse populations of critically ill patients including patients with septic shock. Clinically, patients with sepsis experience elevated serum lactate due to impaired clearance or excessive production of lactate manifested by a dysfunction in the hepatic, renal, and other organ functions. For patients presenting to the emergency department with sepsis, a measurement of serum lactate is a suitable and timely strategy for confirming patients at-risk for poor outcomes and initiating treatment.
Obtaining a lactate level is associated with improved outcomes in patients with sepsis as it is critical to identifying tissue hypoperfusion in patients who are not yet hypotensive but who are at risk for severe sepsis or septic shock. In a large-scale, multicenter study of compliance with the Surviving Sepsis Campaign guidelines, only 61% of patients had an initial lactate value measured in the first quarter of the study. In the final quarter, only 78.7% of patients had an initial lactate measurement.

ANTIBIOTIC ORDER - The emergency physician should order antibiotics for patients with septic shock in order to ameliorate patient decline. Delay in delivery of antibiotics in the emergency department puts the patient at high-risk for adverse outcomes such as drug reactions, increase length of hospital stay, and mortality.
Multiple studies demonstrate reduced mortality and improved outcomes for septic shock patients receiving timely antibiotics in the emergency department. In addition, a delay in administration of antibiotics is associated with higher mortality, higher cost, and increased length of in-patient hospital stay. Kumar et al found a 7.6% increase in mortality for every hour hypotensive patients with septic shock experienced a delay of receiving antimicrobials in the Intensive Care Unit.
Clinically, an increase in the duration of hypotension and elevated lactate in the absence of antibiotics in septic shock patients with gram-positive and gram-negative bacteremia has a demonstrated association with poor outcomes and death). There is a mortality benefit with the delivery of anti-infective therapeutic drugs that combat activity against all likely pathogens and presumed sources of septic shock.
Results from a multicenter observational study including 15,022 patients from 165 hospitals demonstrated that patients with septic shock were given broad spectrum antibiotics 60.4% in the first quarter of the study. At the final quarter, the increase of compliance on providing antibiotics only increased 7.5% to 67.9%. Clearly, the opportunity to provide comprehensive and timely care to septic shock patients exists.

A multi-center randomized controlled trial of early sepsis resuscitation found mortality was significantly increased in patients who received initial antibiotics after septic shock recognition compared with

before septic shock recognition. Only 59% of patients received the initial dose of antibiotics after recognition of septic shock. This demonstrates that delay to antibiotics is harmful and persists

FLUID RESUSCITATION - In sepsis patients, failure to deliver intravenous fluids can lead to extended length of in-patient hospital stay, long-term health complications, and mortality.
Persistence of elevated lactate, even in the absence of hypotension, is associated with poor outcomes and requires intravenous fluids to improve circulation volume and restore perfusion levels throughout the body. Prompt fluid resuscitation to septic shock patients during the emergency department stay is associated with a stabilized condition and improved survival rate.
A prospective observational study on over one hundred consecutive adult patients with severe sepsis or septic shock found that only 84% of patients with documented hypotension received immediate fluid administration (0.5L). The amount considered adequate in this study is lower than the threshold outlined in this measure (greater than or equal to 1 liter of crystalloids), which may indicate critically ill patients with septic shock receive appropriate fluids at an even lower rate.

Clinical Recommendation Statement

The following evidence statements are quoted verbatim from the referenced clinical guidelines and other references:

- We recommend that hospitals and hospital systems have a performance improvement program for sepsis, including sepsis screening for acutely ill, high-risk patients [best practice statement (BPS)]. (Surviving Sepsis Campaign, 2017)
- Measure Lactate Level. Obtaining a lactate level is essential to identifying tissue hypoperfusion in patients who are not yet hypotensive but who are at risk for septic shock. (Surviving Sepsis Campaign 3-Hour Bundle, 2015)
- We recommend that administration of IV antimicrobials be initiated as soon as possible after recognition and within one hour for both sepsis and septic shock (strong recommendation, moderate quality of evidence). (Surviving Sepsis Campaign, 2017) We recommend empiric broad-spectrum therapy with one or more antimicrobials for patients presenting with sepsis or septic shock to cover all likely pathogens (including bacterial and potentially fungal or viral coverage) (strong recommendation, moderate quality of evidence). (Surviving Sepsis Campaign, 2017)
- We recommend that antimicrobial therapy is narrowed once pathogen identification and sensitivities are established and/or adequate clinical improvement is noted (BPS). (Surviving Sepsis Campaign, 2017)
- We recommend that, in the resuscitation from sepsis-induced hypoperfusion, at least 30mL/kg of IV crystalloid fluid be given within the first 3 hours (strong recommendation, low quality of evidence). (Surviving Sepsis Campaign, 2017)
- We recommend that, following initial fluid resuscitation, additional fluids be guided by frequent reassessment of hemodynamic status (BPS). (Surviving Sepsis Campaign, 2017) We recommend crystalloids as the fluid of choice for initial resuscitation and subsequent intravascular volume replacement in patients with sepsis and septic shock (strong recommendation, moderate quality of evidence). (Surviving Sepsis Campaign, 2017)

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Definition

For purposes of this measure, patients with septic shock will be identified with any of the following criteria:
- Diagnosis of septic shock
- Diagnosis of sepsis and hypotension
- Diagnosis of infection and hypotension

Guidance

The data elements ["Laboratory Test, Order": "Serum Lactate"], ["Medication, Order": "IV Antibiotics for Sepsis"], and ["Medication, Order": "Sepsis Crystalloid Fluids"] are intended to be limited to instances where they are ordered by an emergency care provider to satisfy the measure and specifications' intent. This level of attribution at the data element level to a provider's specialty is not able to be demonstrated in current eCQM standards and tools.

References

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Cook DJ, Jaeschke R, Annane D. Fluid resuscitation in sepsis: a systematic review and network meta-analysis. Ann Intern Med. 2014. 161(5):347-355.

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Disclaimer

These performance measures are not clinical guidelines and do not establish a standard of medical care and have not been tested for all potential applications.

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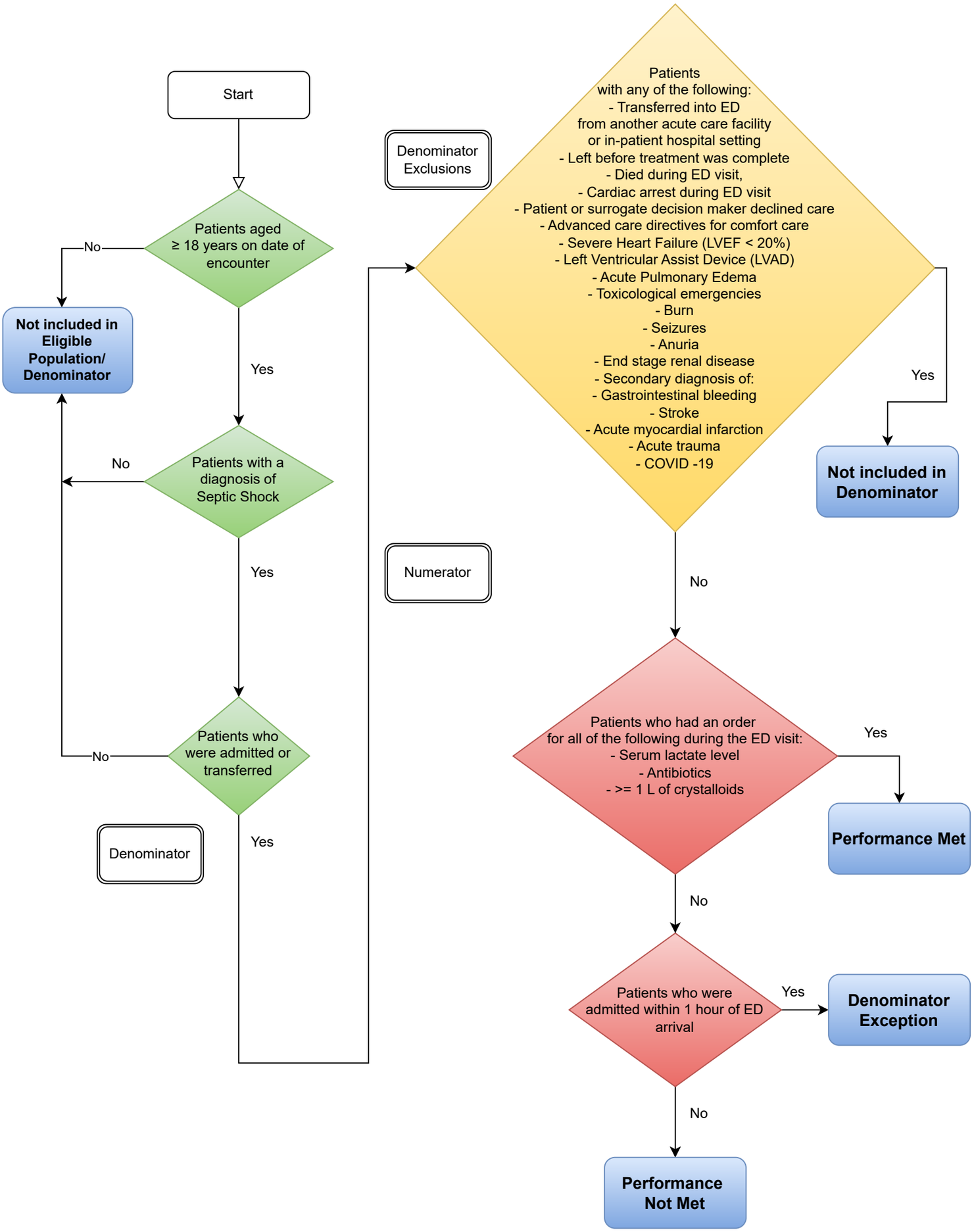
Start
Patients aged ≥ 18 years on date of encounter
No
Not included in Eligible Population/ Denominator
Yes
Patients with a diagnosis of Septic Shock
No
Yes
Patients who were admitted or transferred
No
Yes
Denominator
Denominator Exclusions
Patients with any of the following:
- Transferred into ED from another acute care facility or in-patient hospital setting
- Left before treatment was complete
- Died during ED visit,
- Cardiac arrest during ED visit
- Patient or surrogate decision maker declined care
- Advanced care directives for comfort care
- Severe Heart Failure (LVEF < 20%)
- Left Ventricular Assist Device (LVAD)
- Acute Pulmonary Edema
- Toxicological emergencies
- Burn
- Seizures
- Anuria
- End stage renal disease
- Secondary diagnosis of:
- Gastrointestinal bleeding
- Stroke
- Acute myocardial infarction
- Acute trauma
- COVID -19
Yes
Not included in Denominator
Numerator
No
Patients who had an order for all of the following during the ED visit:
- Serum lactate level
- Antibiotics
- >= 1 L of crystalloids
Yes
Performance Met
No
Patients who were admitted within 1 hour of ED arrival
Yes
Denominator Exception
No
Performance Not Met