NYC HEALTH+ HOSPITALS | Kings County

Emergency Department Clinical Guidelines

ED/CCT Sepsis Guidelines

Clinical Context and Purpose

The purpose of this clinical practice guideline is to provide guidance regarding triage and screening of patients presenting to Kings County Hospital Center (KCHC) with suspected sepsis and to further direct the interdisciplinary treatment of patients with sepsis, severe sepsis, and septic shock.

Background

Sepsis, severe sepsis, and septic shock are medical emergencies associated with increased morbidity and mortality that require prompt identification and initiation of treatment. While the definitions of sepsis syndromes have evolved overtime, the underlying pathophysiology involves a dysregulated host response to infection with associated acute organ dysfunction. See Table 1 for sepsis definitions.

Table 1. Evolution of sepsis definitions.

	First Consensus Definitions (1991)[21]	Second Consensus Definitions (2001)[22]	Third Consensus Definitions (2016)[23]
Infection	Pathology caused by invasion of normally sterile environment by pathogenic microorganisms	No change	Not defined
Sepsis	Inflammatory response from infection with the SIRS criteria proposed to define an inflammatory response	Suspected or confirmed infection with ≥2 SIRS criteria, as defined below: - Temperature of >38 °C or <36 °C - Heart rate >90 beats/min - Respiratory rate >20 breaths/min or PaO_2 <32 mm Hg - White blood cell count >12,000 or <4,000 cells/mm^3 or >10% band neutrophils	Organ dysfunction (defined by increase in SOFA score of ≥2) caused by dysregulated response to infection with a threat to survival
Severe sepsis	Sepsis associated with organ dysfunction	Sepsis with organ dysfunction, defined as any of the following: - Hypotension - Lactate 2 mmol/L or greater - International normalized ratio > 1.5 - Creatinine > 2.1 mg/dL or urine output < 0.5 mL/kg per hour - Platelet count < 110,000/L - Oxygen saturation < 90%	Eliminated (now redundant with "sepsis")
Septic shock	Sepsis with concurrent hypotension despite adequate fluid resuscitation plus perfusion abnormalities, such as elevated lactate levels, low urine output, or altered mental status	Sepsis with concurrent hypotension despite adequate fluid resuscitation	Sepsis with vasopressors required to maintain MAP >65 mm Hg and lactate >2 mmol/L after fluid resuscitation

Early detection of severe sepsis and septic shock patients is key to initiating appropriate resuscitation and antimicrobial therapy. The goal of sepsis screening is to identify patients with, or at risk for, severe sepsis/septic shock. Sepsis screening is a process that takes place during triage of patients presenting to the KCHC Emergency Department. Since sepsis is a challenging diagnosis to make, some patients may also be suspected of having, or developing, sepsis after the triage process later on during their course of care. Severe sepsis and septic shock patients

benefit from early identification and prompt administration of intravenous fluids and antimicrobial therapy.

Components of severe sepsis and septic shock resuscitation:

Intravenous fluids (IVFs): Absent signs of fluid overload, patients with hypotension/shock and/or signs of sepsis-induced hypoperfusion should receive a fluid bolus of crystalloids. While many patients may benefit from a pre-specified volume of 30 mL/kg IVFs, it is important to assess the patient's response to fluids, balancing the risks versus benefits, and applying clinical judgement on a case by case basis, particularly in patients with medical comorbidities (e.g. heart failure and end-stage kidney disease) that increase risk for volume overload. Regarding volumes of intravenous fluid administered, in patients who may be at risk for fluid overload, and in whom less than 30 mL/kg isotonic crystalloids are administered, be sure to document this rationale. Bedside ECHO and POCUS assessments may guide further titration of IVFs. See below for clinical features that may indicate risk for fluid overload, when smaller volumes of IV fluid boluses may be considered based on the provider's assessment and clinical judgement of the risks versus benefits.

Table 4. Signs that can assist clinicians with evaluating patient volume status.

Clinical Signs of Hypoperfusion	Clinical Signs of Fluid Overload
SBP <100 mm Hg (or less than baseline SBP for patients with baseline SBP <100 mm Hg)[23]	Development of pulmonary crackles with fluid administration
MAP <65 mm Hg (or less than baseline MAP for patients with baseline MAP <65 mm Hg)	Increased jugular venous distention with fluid administration
Heart pulse rate >110 beats/min	Increased work of breathing with fluid administration
Shock index (pulse rate/SBP) >1.0	Increased hypoxemia with fluid administration
Elevated serum lactate levels	Chest x-ray signs of pulmonary edema
Peripheral capillary refill time >3 seconds[124]	Ultrasound signs consistent with pulmonary edema (eg, B-lines)
Depressed mental status	
Decreased urine output (<0.5 mL/kg per hour)	

Antimicrobial therapy: Prompt administration of antibiotics is important, especially in patients with severe sepsis and septic shock. Prior to administering antibiotics, blood cultures should be drawn. For patients with severe sepsis/septic shock without an obvious source of infection following a focused history and physical examination broad spectrum antibiotics should be given. In patients with a source of infection (e.g. urinary tract infection, pneumonia, etc), antibiotics can be targeted to the site of infection based on local antibiograms and source-specific guidelines.

Source Control: In addition to antimicrobial therapy sources of infection amenable to procedural and/or surgical drainage should be sought out when present and the appropriate surgical consultant and/or proceduralist consulted.

Vasoactive medications: Norepinephrine is a preferred first choice vasopressor in septic shock and can be initiated peripherally through a large-bore IV catheter (see institutional guidelines). Vasopressor support may be initiated early concurrent with fluid administration in patients with severe hypotension and in shock targeting a mean arterial pressure (MAP) >65 mmHg. In patients with persistent shock and inadequate MAP despite fluid resuscitation and norepinephrine, consider adding vasopressin. As with IVFs, bedside ECHO and POCUS assessments may guide further titration of vasoactive medications.

Steroids: For patients in septic shock with ongoing requirements for vasoactive medications to achieve target MAPs, consider IV corticosteroids (e.g. hydrocortisone).

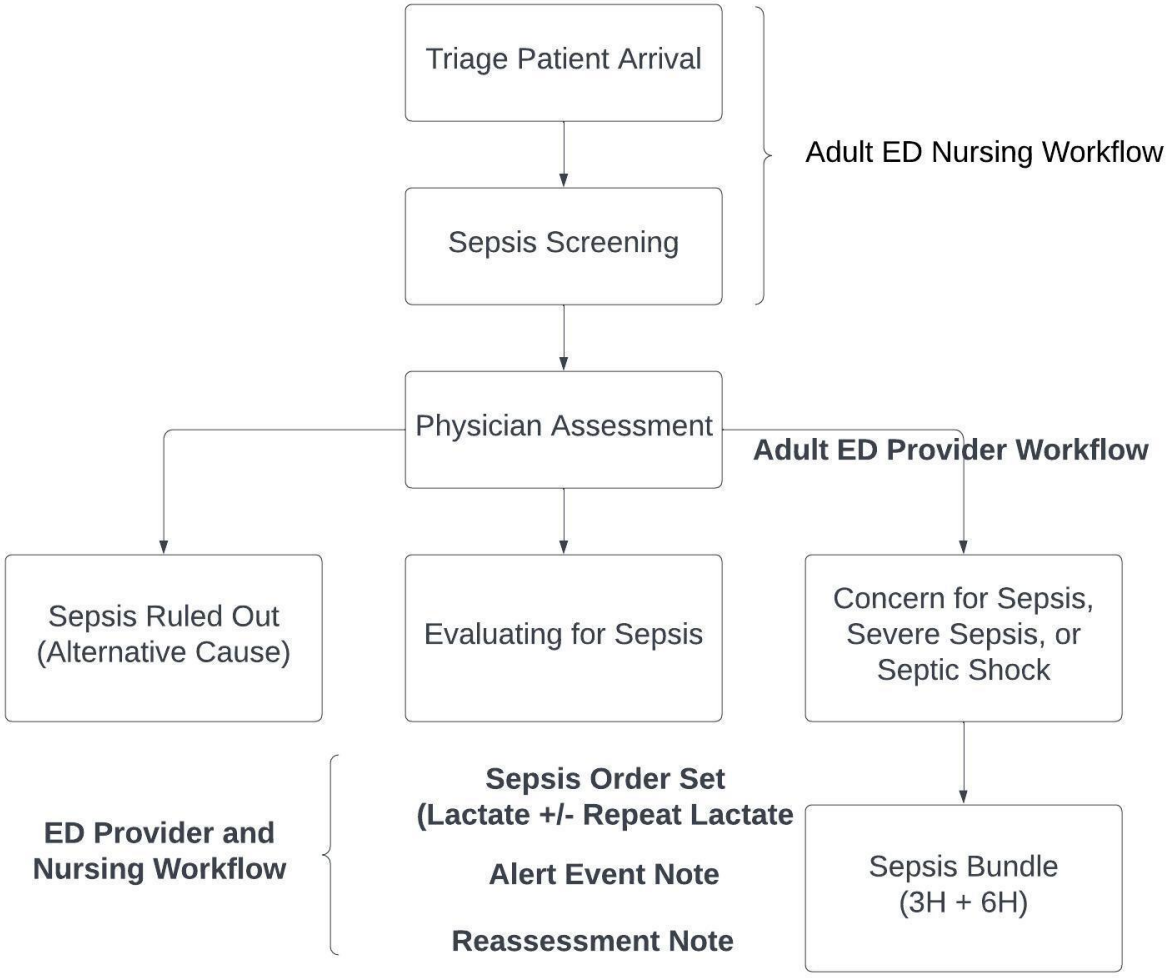
Documentation of care should include an initial assessment note and later reassessment note assessing volume status and tissue perfusion status. See below for further details.

NYC HEALTH+ HOSPITALS | Kings County

Emergency Department Clinical Guidelines

Sepsis Workflow and Guideline

General Overview of ED Sepsis Nursing and Physician Workflows:



Nursing Responsibility:

- To perform sepsis screening at triage, to notify a provider based on pre-specified clinical parameters, and to initiate sepsis work up and resuscitation

Physician Responsibility:

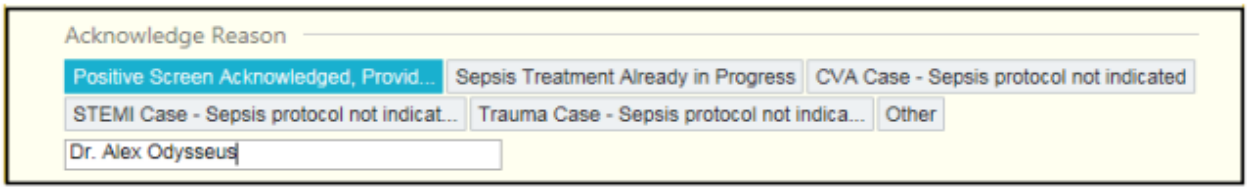
- To assess patients who screen positive for possible sepsis, severe sepsis, or septic shock and to initiate Severe sepsis/septic shock work up and resuscitation in collaboration with nursing when clinically indicated
- To document initial sepsis assessment and reassessment notes

NYC HEALTH+ HOSPITALS | Kings County

Emergency Department Clinical Guidelines

Nursing Triage, Screening, and Workflow:

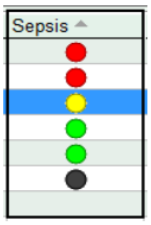
Temp: greater than 100.4F or less than 96.8F	Sp02: less than 90%
Heart Rate: greater than 90	Respirations: greater than 20
Systemic Blood Pressure: less than 90	
Is there a suspected or current infection?	Suspected/Known Immunocompromise
Does the patient have altered mental status from last assessment?	



Notify a Provider if at least 1 of the following criteria is present:

- SBP<90 mmHg
- O2 Sat<90%

Positive Sepsis Screen Physician Workflow:

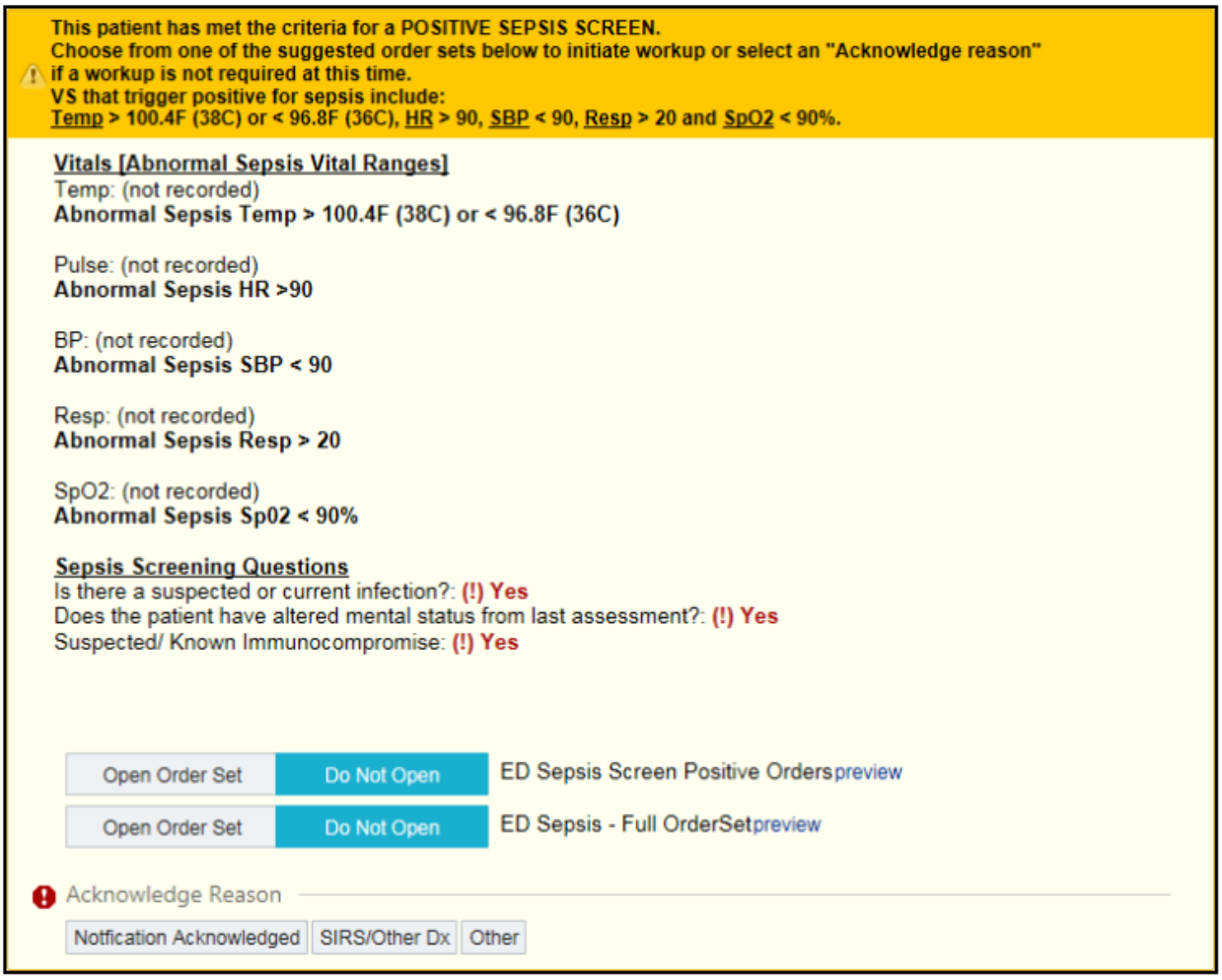


Screen and treat potential septic patients by monitoring the **Sepsis** column on the **Track Board**. Any patient screening positive for Sepsis will have some kind of icon in the column.
Red = Positive Sepsis Screen Alert has fired (Triage or Post Triage)
Yellow = Sepsis Protocol Started, Alert Note filed
Green = Sepsis Protocol Finished, Reassessment Note filed
Black = One of the following three acknowledgement reasons has been filed after the Sepsis Alert has fired or the provider has documented that the patient has SIRS/Other DX within the

Patients who screen positive for possible sepsis will appear with a red filled in circle in the sepsis icon column on the Track Board. These patients will have a Best Practice Advisory (BPA) triggered once their chart is opened (see below). The BPA will show what parameters and documentation triggered the positive sepsis screen. The provider must satisfy the BPA before beginning any documentation. Selecting ***Notification acknowledged*** will accept the positive screen documentation, while selecting ***SIRS/Other Dx*** will allow the provider to determine that the screen was a possible false positive. This will turn the sepsis column icon black. For patients with severe sepsis/septic shock filing a Sepsis Alert Event Note will change the color of the icon yellow, while filing the sepsis reassessment note will change the color of the icon green. See the key above for actions taken that alter the color of the sepsis column icons. Sepsis orders may be placed directly from the BPA. Alternatively, sepsis orders can be placed in the EPIC orders tab.

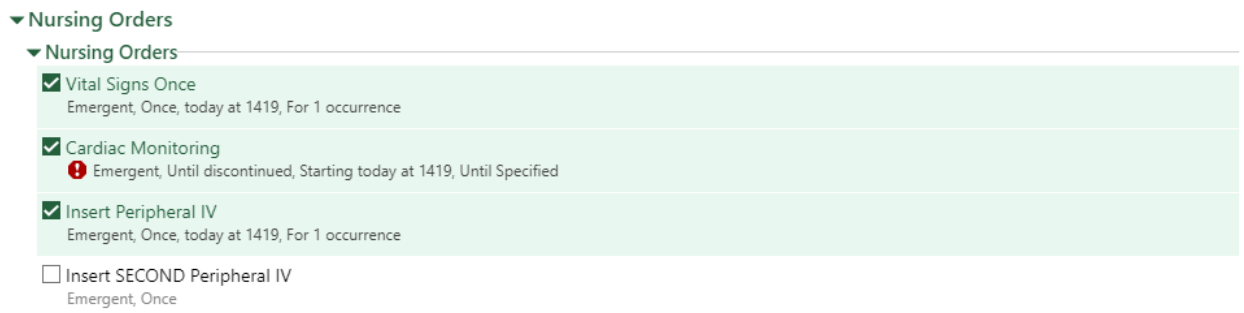
NYC HEALTH+ HOSPITALS | Kings County

Emergency Department Clinical Guidelines



The following sections demonstrate the components included in the EPIC ED Sepsis Order sets.

ED Sepsis Screen Positive Orders include:



NYC HEALTH+ HOSPITALS | Kings County

Emergency Department Clinical Guidelines

- Lab
  - POC Glucose — Click for more
    - POC GLUCOSE CAPILLARY
      Once, today at 1419, For 1 occurrence
  - POC Lactate — Click for more
  - Hematology
    - CBC and differential
      Once, today at 1419, For 1 occurrence
  - Chemistry
    - BASIC METABOLIC PANEL
      Once, today at 1419, For 1 occurrence
    - HEPATIC FUNCTION PANEL
      Once, today at 1419, For 1 occurrence
  - Shock Panel
    - Blood Gas/Chem Coox Lactate Venous
      Once, today at 1419, For 1 occurrence
    - Blood Gas/Chem Coox Lactate Venous - Repeat (conditional order)
      Once, Conditional, For 1 occurrence
    - Blood Gas/Chem Coox Lactate Arterial
      Once
  - Coagulation
    - Protime-INR
      Once, today at 1419, For 1 occurrence
    - APTT
      Once, today at 1419, For 1 occurrence
- Microbiology
  - Blood Culture: Recommend NOT from existing central line
    Once, today at 1419, For 1 occurrence
  - Blood Culture: Recommend NOT from existing central line
    Once, today at 1419, For 1 occurrence
  - Urine culture - CLEAN CATCH
    Once, today at 1419, For 1 occurrence
  - Urine culture - CATHETER SPECIMEN
    Once, Starting 3/20/23
- Urine Tests
  - UA w/Rflx Microscopic
    Once, today at 1419, For 1 occurrence

ED Sepsis Full Order Set includes:

- Nusing Orders
  - Nursing Orders — Click for more
    - Vital Signs Per Unit Routine
      Routine, Per unit routine, Starting today at 1429, Until Specified
    - Cardiac Monitoring
      Emergent, Until discontinued, Starting today at 1429, Until Specified
      Set monitor to Q15 minute vital signs when fluid bolus started.
    - Continuous Pulse Oximetry
      Emergent, Until discontinued, Starting today at 1429, Until Specified
    - Insert Peripheral IV
      Emergent, Once, today at 1429, For 1 occurrence

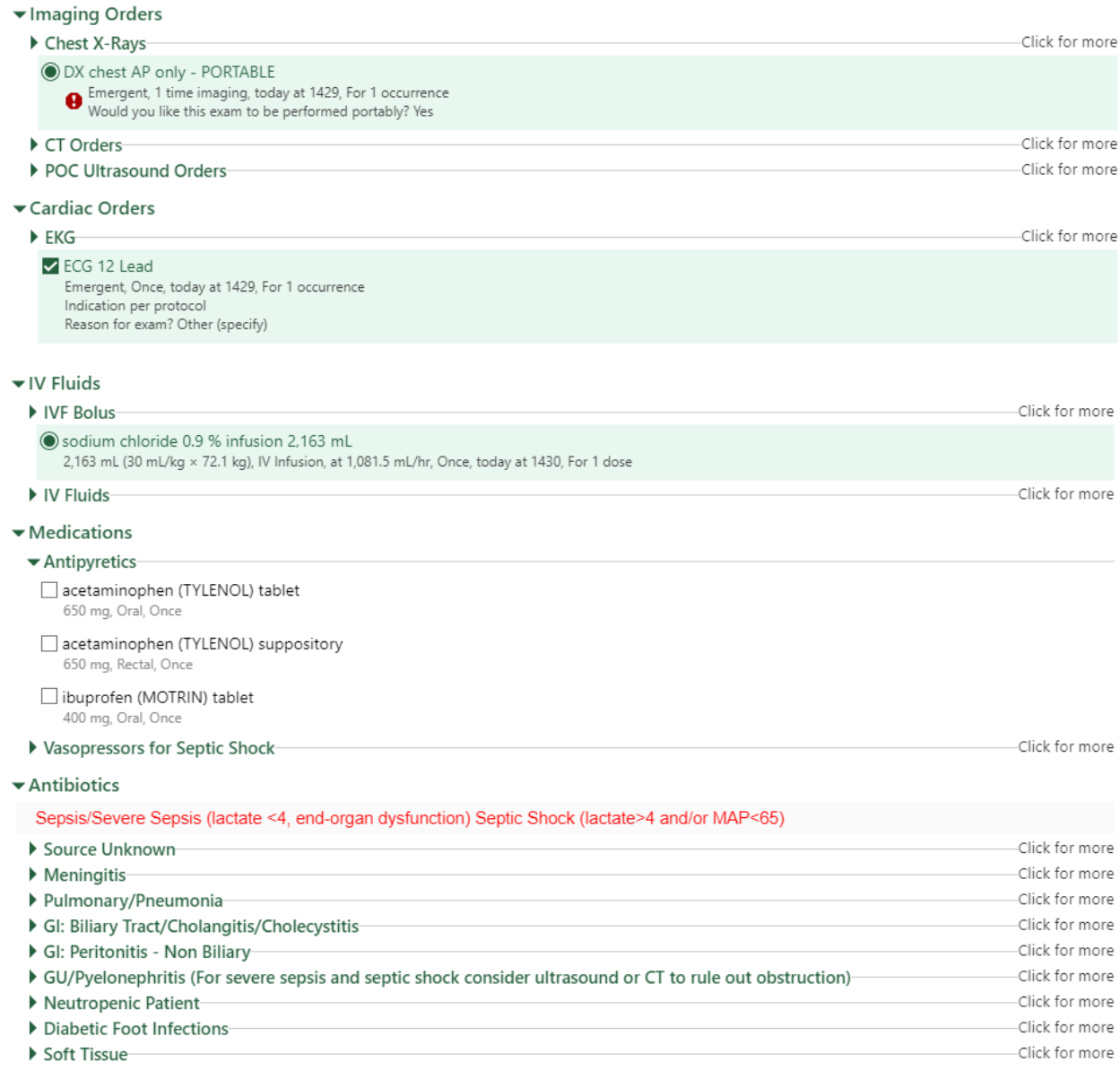
Reviewed as of January 3, 2024

NYC HEALTH+ HOSPITALS | Kings County

Emergency Department Clinical Guidelines

- Lab
  - POC Glucose
    - [x] POC GLUCOSE CAPILLARY
      Once, today at 1429, For 1 occurrence
  - POC Urine Dip — Click for more
  - POC Lactate — Click for more
  - Hematology
    - [x] CBC and differential
      Once, today at 1429, For 1 occurrence
  - Shock Panel
    - [x] Blood Gas/Chem Coox Lactate Venous
      Once, today at 1429, For 1 occurrence
    - [x] Blood Gas/Chem Coox Lactate Venous - Repeat (conditional order)
      Once, Conditional, For 1 occurrence
    - [ ] Blood Gas/Chem Coox Lactate Arterial
      Once
  - Chemistry
    - [x] Basic metabolic panel (BMP)
      Once, today at 1429, For 1 occurrence
    - [x] Hepatic function panel
      Once, today at 1429, For 1 occurrence
  - Cardiac Lab — Click for more
    - [x] Troponin T
      Once, today at 1429, For 1 occurrence
  - Coagulation — Click for more
    - [x] Protime-INR
      Once, today at 1429, For 1 occurrence
    - [x] APTT
      Once, today at 1429, For 1 occurrence
  - Blood Bank (TO ORDER BLOOD PRODUCTS USE BLOOD TRANSFUSION ORDER SET) — Click for more
    - [x] Type and Screen
      Once, today at 1429, For 1 occurrence
  - Urine Tests — Click for more
    - [x] UA w/Rflx Microscopic
      STAT, today at 1429, For 1 occurrence
  - Pregnancy — Click for more
  - Microbiology — Click for more
    - [x] Blood Culture: Recommend NOT from existing central line
      Once, today at 1429, For 1 occurrence
    - [x] Blood Culture: Recommend NOT from existing central line
      Once, today at 1429, For 1 occurrence
    - [x] Urine culture - CLEAN CATCH
      Once, today at 1429, For 1 occurrence
  - CSF Panels — Click for more

Emergency Department Clinical Guidelines



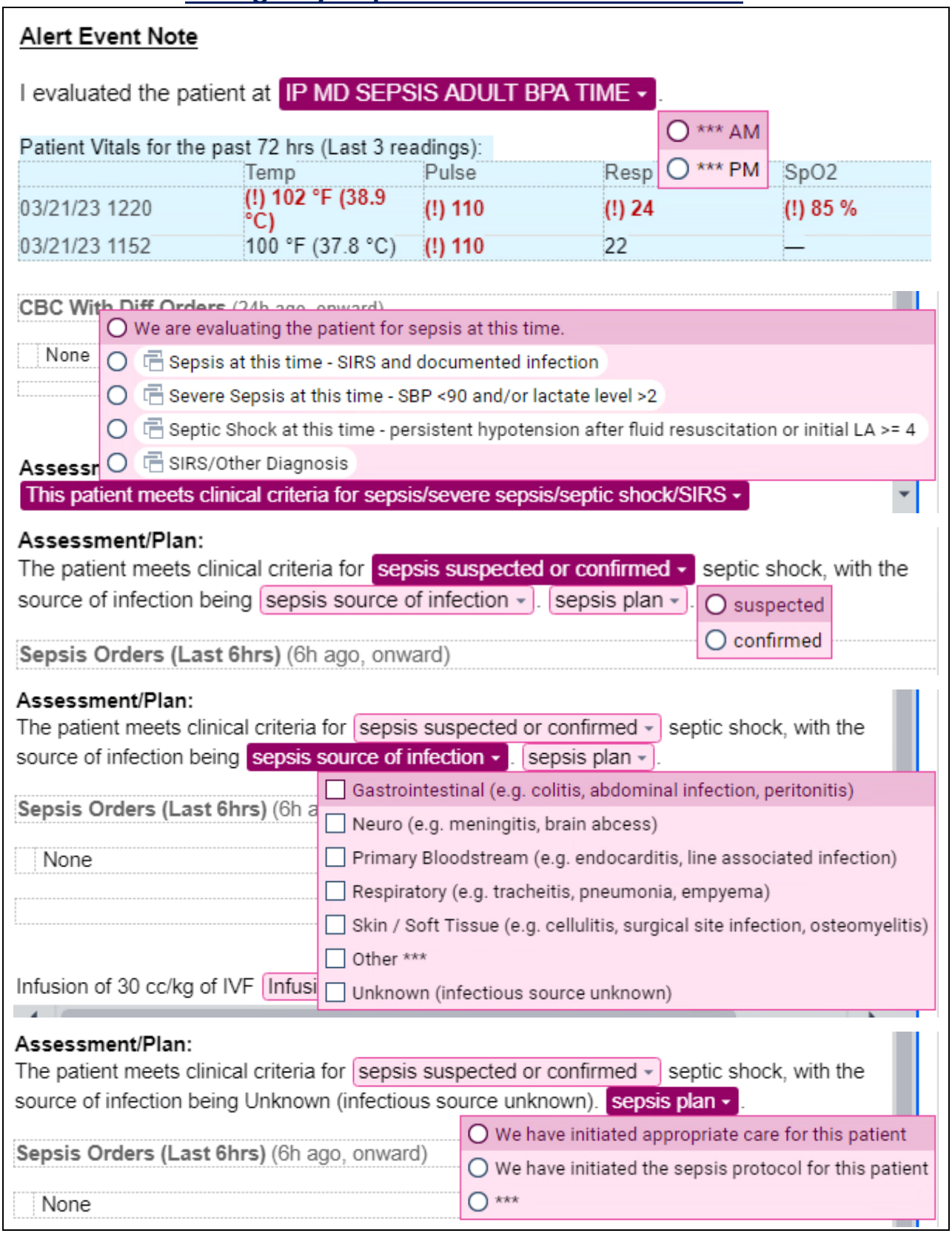
Antibiotic choices may be empiric and broad-spectrum or site-specific; the EPIC ED Sepsis order set allows providers to order antibiotics for common sources and sites of infection (See above).

Important ED Sepsis Care Documentation:

During the course of caring for patients with severe sepsis/septic shock it is important to document in a timely fashion, and to include core components of severe sepsis/septic shock resuscitation according to best available evidence in the plan of care. As part of the initial patient assessment, providers should document an initial **Sepsis Alert Event Note** based on a BPA (see below). The Sepsis Alert Event Note will offer the provider the following options to choose from:

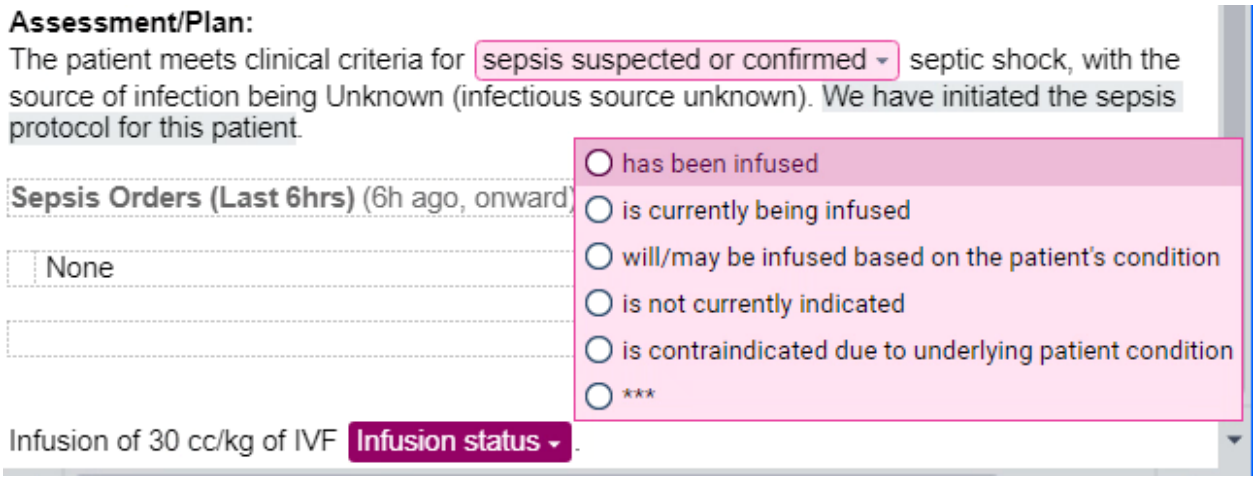
NYC HEALTH+ HOSPITALS | Kings County

Emergency Department Clinical Guidelines



Reviewed as of January 3, 2024

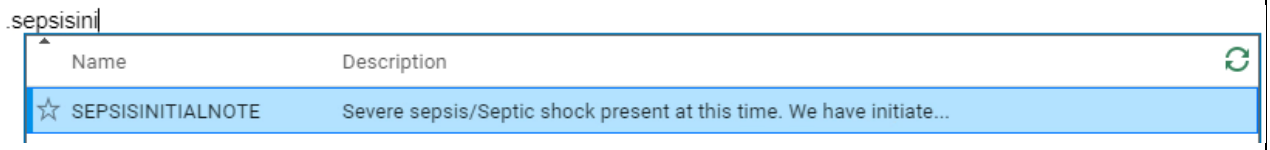
Emergency Department Clinical Guidelines



The above important documentation elements may also be satisfied with an EPIC Sepsis Initial Note Smart Phrase.

Sepsis Initial Note Smart Phrases:

Sepsis initial notes and reassessment notes can be completed by using EPIC SmartPhrases. The EPIC Sepsis Initial Note Smart Phrase will allow the provider to pick from one of two options with regards to treatment with or without 30 cc/kg IVF bolus based on clinician judgement of the risks versus benefits. One of the following two brief notes will be generated. See below:



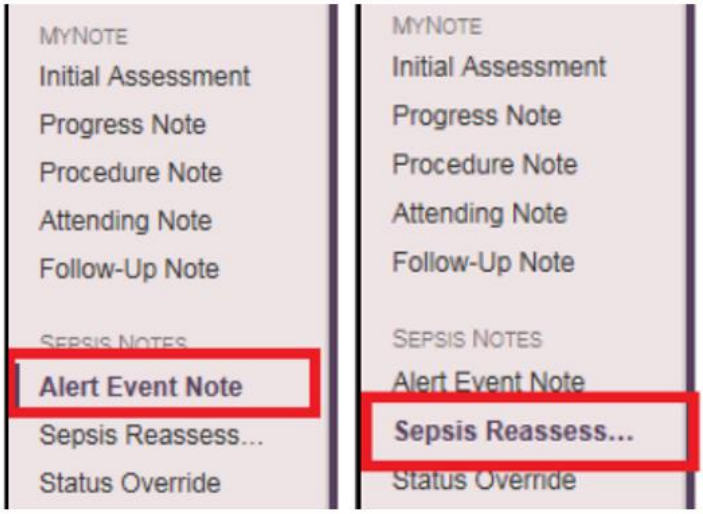
Severe sepsis/Septic shock present at this time. We have initiated the sepsis protocol for this patient. Initial lactate and blood cultures have been drawn. 30 cc/kg of IVF will be infused and antibiotics will be administered. The patient will be reassessed.

Severe sepsis/Septic shock present at this time. We have initiated the sepsis protocol for this patient. Initial lactate and blood cultures have been drawn. 30 cc/kg of IVF will not be infused because risks outweigh benefits due to patient risk for, or presence of, fluid overload, and antibiotics will be administered. The patient will be reassessed.

NYC HEALTH+ HOSPITALS | Kings County

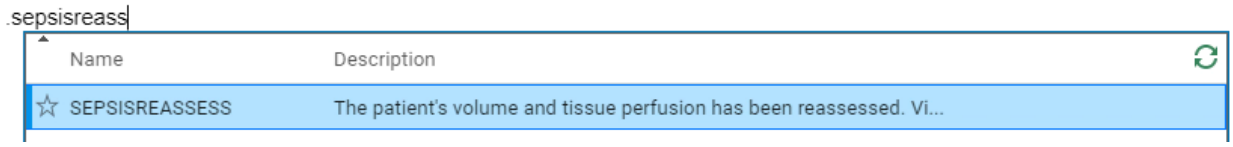
Emergency Department Clinical Guidelines

Sepsis Alert Event Note and Sepsis Reassessment Note:



Following initial sepsis work up and initiation of intravenous fluids and antimicrobial therapy, the provider team should document a Sepsis Reassessment Note to include an assessment of volume and tissue perfusion status; the reassessment note should include whether or not the patient is fluid responsive, and if not, whether or not vasoactive medications have been started. It should also include a focused exam, documenting at least 5 of the following 7 elements: Vital signs, cardiopulmonary examination, capillary refill, peripheral pulse exam, skin exam, pulse oximetry, and urine output. These documentation elements may also be satisfied with an EPIC Sepsis Reassessment Note Smart Phrase.

Sepsis Reassessment Note Smart Phrase:



The patient's volume and tissue perfusion has been reassessed. Vital signs have been monitored, a cardiopulmonary exam has been performed, capillary refill, peripheral pulse exam, and skin perfusion have been reassessed. The patient is/is not fluid responsive. The patient has/has not been started on vasopressors.

See below for the 3- and 6-hour sepsis bundles, Core CMS Quality Measures, and Surviving Sepsis Campaign Guidelines.

NYC HEALTH+ HOSPITALS | Kings County

Emergency Department Clinical Guidelines

Sepsis 3H and 6H Bundles

Within 3 hours of presentation of severe sepsis/septic shock:
- Initial lactate measurement
- Blood cultures drawn prior to antibiotics
- Broad spectrum or site-specific antbiotics administered
- Administer 30 mL/kg isotonic crystalloids IBW within 3 hours of initial hypotension or identification of septic shock or lactate>4*

Within 6 hours of presentation of severe sepsis/septic shock:
- Only if initial lactate is elevated, repeat lactate measurement
- Only if hypotension/shock persists despite fluid administration, vasoactive medications are administered
- If hypotension persists despite initial fluid administration or lactate>4, document a repeat volume status and tissue perfusion assessment

*Regarding volumes of intravenous fluid administered, in patients who may be at risk for fluid overload, and in whom less than 30 mL/kg isotonic crystalloids are administered, be sure to document the rationale.

Type of Measure: Process

Improvement Noted As: An increase in the rate

Numerator Statement: Patients who received ALL of the following:
Within three hours of presentation of severe sepsis:
- Initial lactate level measurement
- Broad spectrum or other antibiotics administered
- Blood cultures drawn prior to antibiotics

AND received within six hours of presentation of severe sepsis. ONLY if the initial lactate is elevated:
- Repeat lactate level measurement

AND within three hours of initial hypotension:
- Resuscitation with 30 mL/kg crystalloid fluids

OR within three hours of septic shock:
- Resuscitation with 30 mL/kg crystalloid fluids

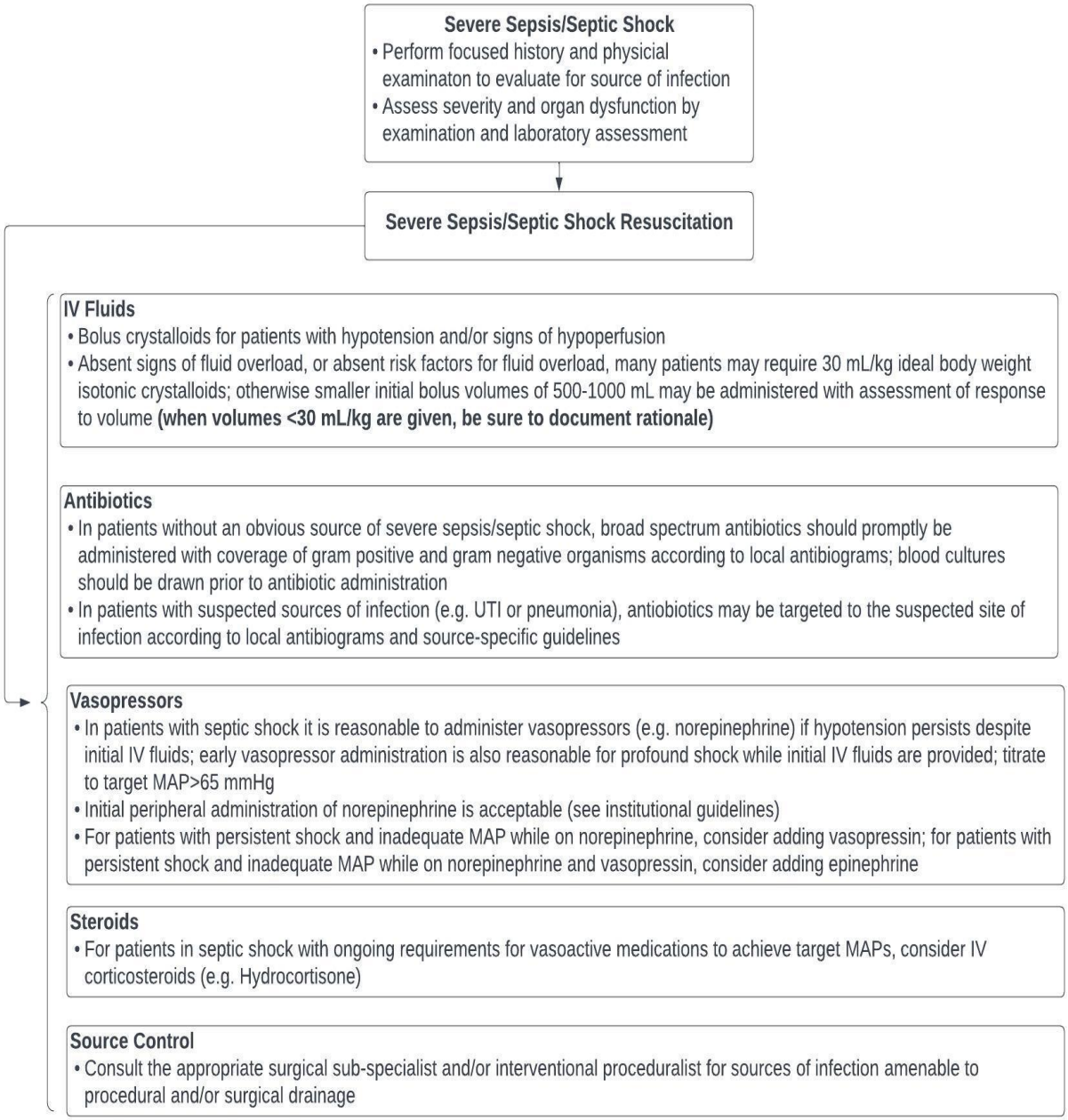
AND within six hours of septic shock presentation, ONLY if hypotension persists after fluid administration:
- Vasopressors are administered

AND within six hours of septic shock presentation, if hypotension persists after fluid administration or initial lactate >= 4 mmol/L:
- Repeat volume status and tissue perfusion assessment is performed

NYC HEALTH+ HOSPITALS | Kings County

Emergency Department Clinical Guidelines

Clinical Practice Guidelines for Severe Sepsis/Septic Shock:



*Regarding volumes of intravenous fluid administered, in patients who may be at risk for fluid overload, and in whom less than 30 mL/kg isotonic crystalloids are administered, be sure to document the rationale.

NYC HEALTH+ HOSPITALS | Kings County

Emergency Department Clinical Guidelines

Resources/References

Yealy, D. et al. Early Care of Adults With Suspected Sepsis in the Emergency Department and Out-of-Hospital Environment: A Consensus-Based Task Force Report. *Annals of Emergency Medicine*. 2021; 78(1): 1-19.

Evans, L. et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock 2021. *Critical Care Medicine.* 2021; e1063-e1143.

Rivers, E. et al. Early Goal-Directed Therapy in the Treatment of Severe Sepsis and Septic Shock. *NEJM.* 2001; 345(19): 1368-1377.

ARISE Investigators, ANZICS Clinical Trials GroupPeake SL, et al. Goal-directed Resuscitation for Patients with Early Septic Shock. *NEJM.* 2014; 371: 1496-1506.

ProCESS Investigators, Yealy, DM, Kellum, JA, et al. A Randomized Trial of Protocol-based Care for Early Septic Shock. *NEJM*. 2014; 370: 1683-1693.

Mouncey, PR, Osborn, TM, Power, GS, et al. Trial of Early, Goal-directed Resuscitation for Septic Shock. *NEJM*. 2015; 372: 1301-1311.