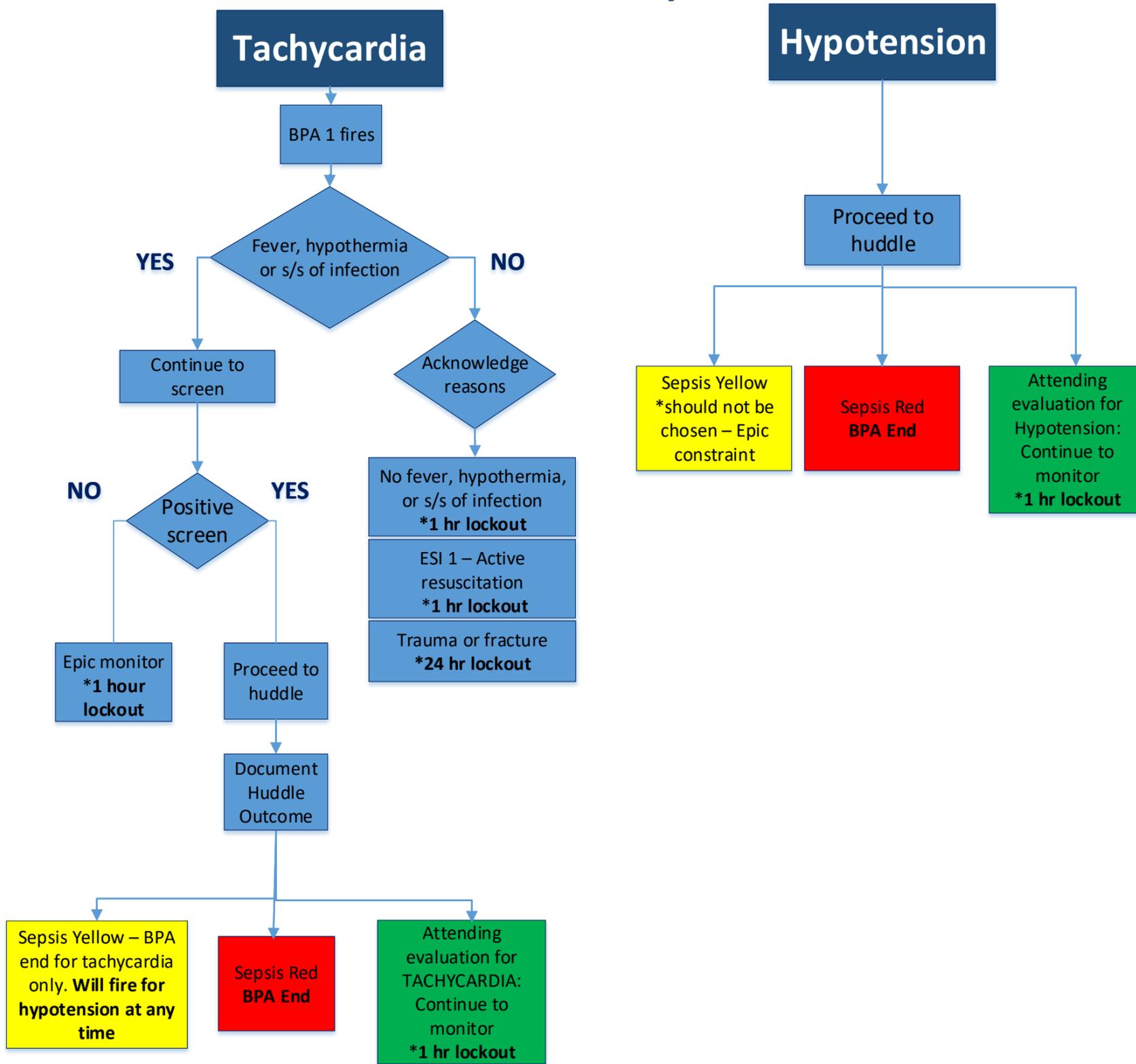




## ED Sepsis Best Practice Advisory



\* Once lockout time expires, patient re-enters system to monitor for tachycardia and hypotension

TABLE 1: VITAL SIGN LIMITS		
AGE	HEART RATE	SYSTOLIC BP
0-<3 mo	>180	<50
3mo-<1yr	>170	<70
1yr-<4yr	>150	<75
4yr-<12yr	>130	<80
12yr-<18yr	>120	<85
≥18yr	>90	<90



**SEPSIS RED KEY POINTS**

- PIV, as large as possible
- Consider IO in severely ill patients
- If port, access immediately (do not wait for LMX)
- All fluid boluses are rapid (push/pull, pressure bag, or rapid infuser)
- Neutropenic patients – NO urine catheters or rectal temps
- Antibiotics should not be delayed for any reason
- Consider stress dose steroids for patients with recent prolonged steroid course or known cortisol deficiency
- Adjust fluid boluses for known cardiac and renal dysfunction

**RESPIRATORY SUPPORT RECOMMENDATIONS**

- Consider trial of noninvasive mechanical ventilation in children without a clear indication for intubation and who are responding to initial therapies
- Indications for intubation: refractory hypoxemia and/or inadequate oxygen delivery and/or refractory shock

**Signs/Symptoms of Fluid Overload :**

- Development or worsening of the following: rales, pleural effusions, increased body weight, soft tissue swelling, ascites, hepatomegaly

**Fluid Overload Considerations:**

- Consider early initiation of vasoactives for hypotension
- Acute worsening may reflect heart dysfunction

**DETERMINING DISPOSITION**

**INPATIENT FLOOR**

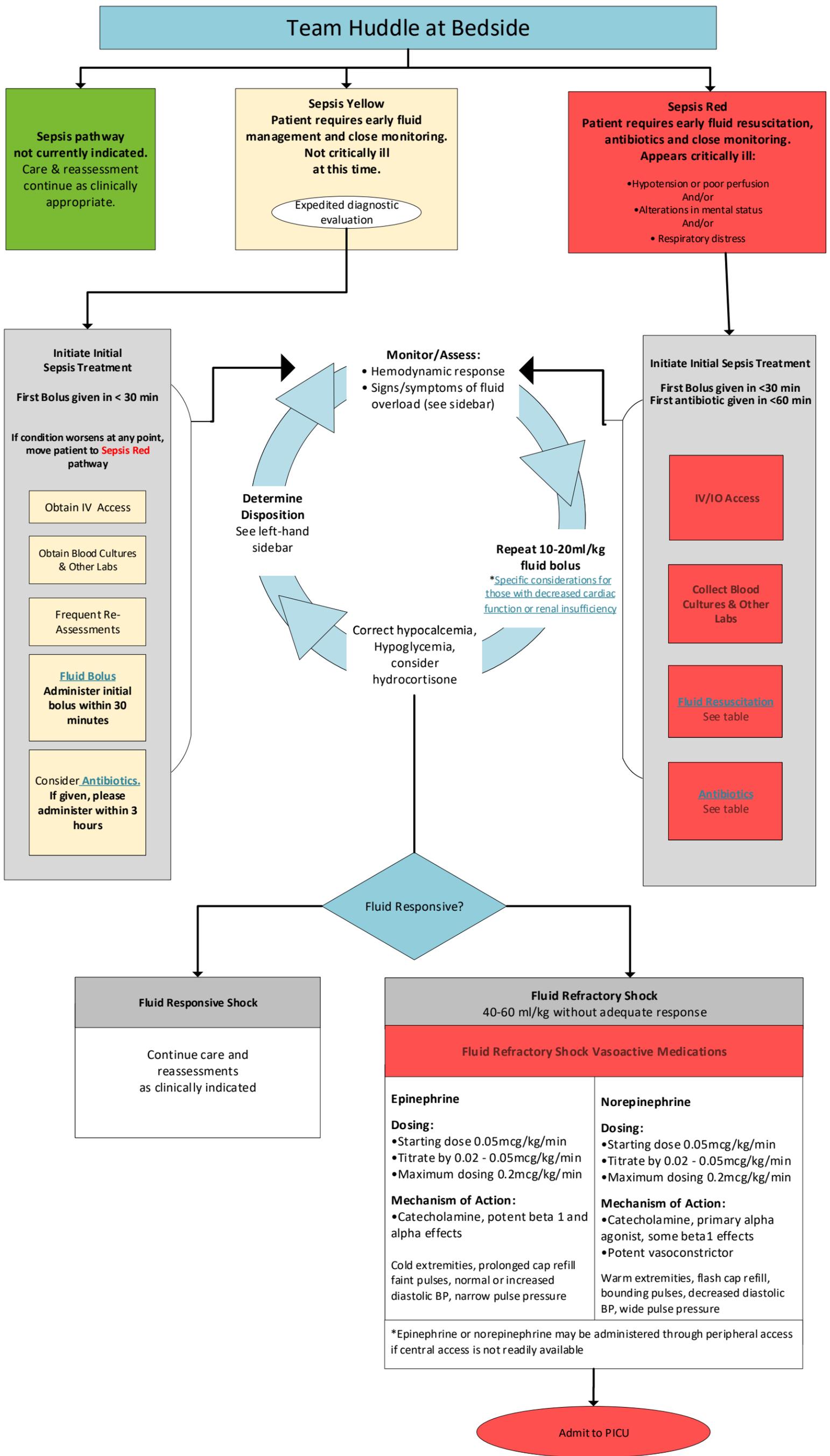
- Substantial and consistent improvement over a period of observation
- Normal mental status

**ICU ADMISSION**

- Concern for hemodynamic or respiratory instability
- Any vasopressor use
- Altered mental status

Additional Resources:

- [Link to Acute Care Algorithm](#)
- [Link to Known/Suspected Cardiac Disease Algorithm](#)
- [Link to PICU Algorithm](#)



## Fluid Bolus and Resuscitation

Fluids	Electrolyte Concentration								
	Na (135-145 mEq/L)	K (4.5-5 mEq/L)	Cl (94-110 mEq/L)	Ca* (2.2-2.6 mEq/L)	Mg (0.8-1.0 mEq/L)	Buffer (Bicarbonate 23-27)	pH 7.4	Osm/L 291	Price
<b>0.9% Saline</b>	154	0	154	0	0	0	5.0	308	\$2.14
<b>Lactated Ringers</b>	130	4	109	2.7	0	Lactate 28	6.5	273	\$2.32
<b>Plasmalyte</b>	140	5	98	0	3	Acetate 27 Gluconate 23	7.4	294	\$4.10

\*Ca is represented here in mEq/L. Serum Ca concentrations are reported as mg/dl, where normal range is 8.6-10.3.

- Administer fluid boluses push-pull, reassessing perfusion after each bolus. Stop for rales, crackles or hepatomegaly.
- In patients with high intracranial pressure (ICP), consider the use of PlasmaLyte or 0.9% saline rather than LR to maintain normal sodium levels
- In patients with metabolic crises (organic acidemias), consider the use of PlasmaLyte or 0.9% saline rather than LR due to potential concern for inappropriate lactate metabolism

### Fluid Refractory Shock Vasoactive Medications

#### Epinephrine

**Dosing:**

- Titrate by 0.02-0.05mcg/kg/min
- Maximum dosing 0.2mcg/kg/min

**Mechanism of Action:**

- Catecholamine, potent beta 1 and alpha effects

#### Norepinephrine

**Dosing:**

- Titrate by 0.02-0.05mcg/kg/min
- Maximum dosing 0.2mcg/kg/min

**Mechanism of Action:**

- Catecholamine, primary alpha agonist, some beta1 effects
- Potent vasoconstrictor

[Return to Sepsis Yellow & Red Algorithm](#)

## Antibiotic Recommendations

Category	Sepsis Yellow* and early Sepsis Red: without refractory hypotension or organ dysfunction	Sepsis Red: fluid refractory hypotension; severe sepsis/shock	Penicillin and/or Cephalosporin Allergy (Either Pathway)**
<b>Neonates (&lt;28 days)</b>	ampicillin + gentamicin OR cefotaxime	<p>•For patients with severe skin or soft tissue infections or history of resistant gram positive infections (e.g., MRSA), add vancomycin</p> <p>•For suspected urinary source with gram positive organism in urine, add ampicillin</p>	cefotaxime + vancomycin + acyclovir
<b>Previously healthy ≥28 days</b>	ceftriaxone		ceftriaxone + vancomycin
<b>Immunocompromised:</b> chemotherapy-induced neutropenia, solid organ transplant, bone marrow transplant, receipt prednisone 2 mg/kg/day or 20 mg day > 2 weeks or corticosteroid equivalent, other immunomodulating therapies (monoclonal antibodies, chemotherapy)	cefepime		cefepime + vancomycin + tobramycin
<b>Oncology patients without neutropenia</b>	ceftriaxone		cefepime + vancomycin + tobramycin
<b>Other chronic medical condition:</b> short bowel syndrome, complex urologic abnormalities, presence of indwelling catheter, ICU hospitalization in the past 3 months	cefepime		cefepime + vancomycin + tobramycin
			Call ID
			aztreonam + vancomycin

\*Please note, not all Sepsis Yellow patients need antibiotics

\*\*Add tobramycin for severe sepsis/shock

**In the event of an antibiotic shortage, please call ID**

Additional Clinical Conditions	
Suspected <b>toxic shock syndrome</b>	Add clindamycin
Suspected <b>intra-abdominal infection</b> and/or to provide anaerobic coverage	<ul style="list-style-type: none"> <li>• If cephalosporin already given, add metronidazole</li> <li>• Avoid concurrent use of vancomycin and piperacillin/tazobactam due to risk of renal injury. Can substitute vancomycin + cefepime + metronidazole.</li> <li>• If penicillin and/or cephalosporin allergy, vancomycin + aztreonam + metronidazole</li> </ul>
<b>Short gut syndrome</b>	Consider addition of micafungin, please call ID for suspected fungal infection
Recent or current receipt of 3 <sup>rd</sup> /4 <sup>th</sup> generation cephalosporins, history of antibiotic resistance (e.g. ESBL, VRE), or suspected meningitis	Please call ID

[Return to Sepsis Yellow & Red Algorithm](#)

## SEPSIS CLINICAL CARE GUIDELINE ADDENDUM

This guideline is developed from the best available evidence. When evidence is inconclusive, recommendations were developed from local expert consensus. Please refer to table for further details.

### Sepsis CCG Overview

**Background:** Sepsis is a leading cause of death in hospitalized children<sup>1</sup>. Prompt recognition and treatment remain mainstay approaches to reducing morbidity and mortality<sup>2,3</sup>.

**Outcome measures:**

- Sepsis Attributable Mortality 3 and 30 days
- Organ Dysfunction 3 and 30 days
- Length of stay (days)
- ICU length of stay (days)
- Vasoactive free days
- Positive pressure free days

**Process measures:**

- Time to first fluid bolus (minutes)
- Time to first antibiotic (minutes)
  - Septic Shock  $\leq$  60 minutes
  - Sepsis without shock  $\leq$  180 minutes
- Time to first vasoactive agent (minutes)
- Sepsis recognition tool (screening tool and/or huddle) utilization
- Sepsis Orderset utilization

**Balancing measures:**

- Total antibiotic days

**Recommendation Table:** The recommendation table below uses the Surviving Sepsis Campaign (SSC) International Guidelines for the Management of Septic Shock and Sepsis-Associated Organ Dysfunction as a reference. Strength of recommendations and quality of evidence included in this guideline mirror this publication. Not all SSC recommendations are included, reference for full details listed below<sup>4</sup>.

Recommendation	Strength of recommendation	Quality of evidence
Implement systematic screening for timely recognition of septic shock and other sepsis-associated organ dysfunction <sup>3,4,5,6,7</sup>	Weak	Very low
Implement a guideline/protocol for management of children with septic shock or other sepsis-associated organ dysfunction <sup>3,4,8</sup>	Strong	Best Practice Statement
Obtain blood cultures before initiating antimicrobial therapy in cases when this does not substantially delay antimicrobial administration <sup>4,9,10</sup>	Strong	Best Practice Statement
Administer antimicrobial therapy as soon as possible, within 1 hour of recognition, of septic shock <sup>2,3,4,10</sup>	Strong	Low
Administer antimicrobial therapy as soon as possible after appropriate evaluation, within 3 hours of recognition, of sepsis attributable organ dysfunction without shock <sup>4,10,11</sup>	Weak	Very low
Narrow empiric antibiotic regimen once pathogen(s) and sensitivities are available <sup>4,12,13</sup>	Strong	Best Practice Statement
Daily assessment (clinical, laboratory) for de-escalation of antimicrobial therapy <sup>4,13</sup>	Strong	Best Practice Statement
Emergent source control intervention should be implemented as soon as possible after a diagnosis of an infection amenable to source control procedure is made <sup>4,14,15</sup>	Strong	Best Practice Statement
Fluid resuscitation with 40-60 ml/kg in bolus fluid (10-20 ml/kg per bolus) over the first hour, titrated to clinical markers of cardiac output and discontinued if signs of fluid overload, for the initial resuscitation of septic shock or sepsis-associated organ dysfunction <sup>2,3,4</sup>	Weak	Low
Recommend initiation of vasoactive infusion for patients with fluid refractory septic shock (norepinephrine OR epinephrine rather than dopamine) <sup>4,16,17</sup>	Strong	Low

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