

# Pediatric Sepsis & Septic Shock Pathway

**Pathway Purpose:** Timely and evidence-based treatment of pediatric inpatients with suspected sepsis and septic shock.

**Inclusion Criteria:**  
As below

**Exclusion Criteria:**

- NICU patients
- No concern for infection

Manage off pathway

Clinical concern or Vital signs concerning for Sepsis ([see page 4](#))

Phoenix Sepsis Score  $\geq 2$  ([see page 4](#))

Acute Care Team Huddle: MD/APP, RN, Risk RN

Concern for infection?

no

Manage off pathway

yes

Septic Shock

yes

Hypotension?

no

Suspected Sepsis

60 MINUTES

Call RRT

- Establish IV/IO access
- Draw Labs: Blood culture, CBC with Diff, CMP, POC glucose, lactate, iStat Blood Gas, INR, Fibrinogen, D-dimer
- Consider type & screen, CRP, ESR, Procalcitonin, Ferritin
- **Administer / broaden antibiotics**

3 HOURS

**Administer Fluid Bolus #1**

- 10-20 mL/kg, max 1L, LR (alternative NS)
- 5 mL/kg in cardiac patients

*If Shock - administer over 5-10 min*

*If Sepsis - administer over 30-60 min*

Continued\* Hypotension

Continued\* Tachycardia?

**Administer Fluid Bolus #2**

- 10-20 mL/kg, max 1L, LR (alternative NS)
- 5 mL/kg in cardiac patients

Continued\* Hypotension

Continued\* Tachycardia?

**Administer Fluid Bolus #3**

- 10-20 mL/kg, max 1L, LR (alternative NS)
- 5 mL/kg in cardiac patients
- **Transfer to ICU if not already there**

*\*If tachycardia and hypotension resolve, resume previous management*

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Associated Order Set: Sepsis Management Pathway

Associated Policies: n/a

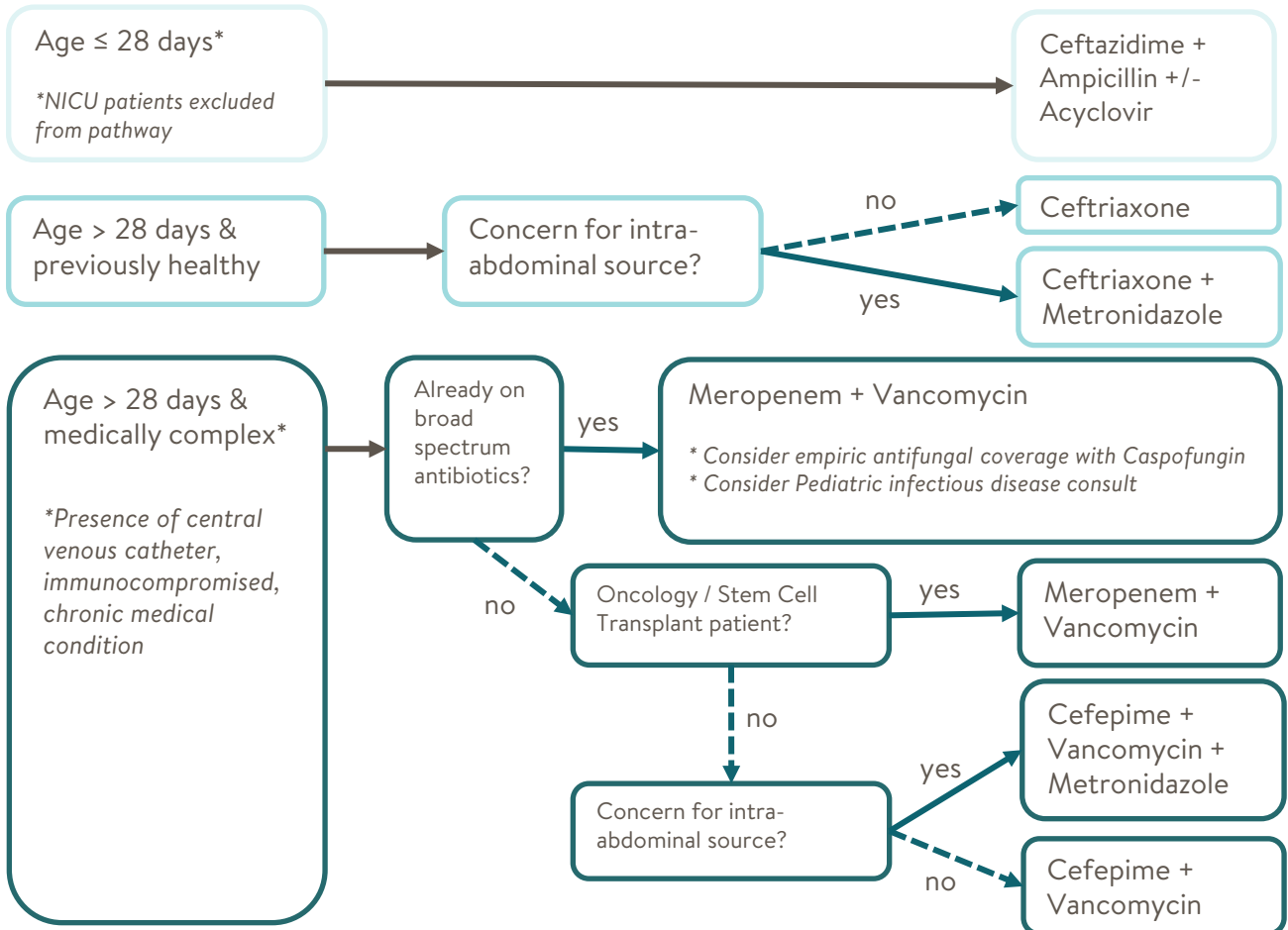
Packard Clinical  
Pathway Program



# Pediatric Sepsis & Septic Shock Pathway

## Antibiotic Recommendations for Severe Sepsis / Septic Shock

Discuss Narrowing antibiotic coverage within 48 hours once the culture results have returned.



Drug Name	Pediatric Dosing	Adult/Max Dose	Dose Frequency
Acyclovir*	20 mg/kg	N/A	8 hours
Ampicillin*	100 mg/kg	2 g	6 hours
Caspofungin†	70 mg/m <sup>2</sup> loading dose, followed by 50 mg/m <sup>2</sup>	70 mg loading dose, followed by 50 mg	24 hours
Cefepime*	50 mg/kg	2 g	8 hours
Ceftazidime*	50 mg/kg	2 g	8 hours
Ceftriaxone	50 mg/kg	2 g	24 hours
Ciprofloxacin*	10 mg/kg	400 mg	8 hours
Meropenem*	20 mg/kg	1 g	8 hours
Metronidazole*†	13 mg/kg	500 mg	8 hours
Vancomycin*	15 mg/kg	1 g (<12yo), 1.5 g (≥12yo)	6 hours (<12yo), 8 hours (≥12yo)

\* Renal dose adjustment—consider one-time dose and contact pharmacy for maintenance dosing

† Hepatic dose adjustment—consider one-time dose and contact pharmacy for maintenance dosing

# Pediatric Sepsis & Septic Shock Pathway

## ICU Management

### General ICU Considerations:

- Establish emergent source control
- Target age appropriate / patient's baseline BP
- Trend blood lactate to guide resuscitation
- Consider Ketamine/Atropine for procedural sedation
- Consider echocardiogram
- Target normal range of CI, SVRI and Scvo<sub>2</sub>
  - Cardiac Index (CI): 3.5-5.5 L/min/m<sup>2</sup>
  - Systemic Vascular Resistance Index (SVRI): 800-1600dynes-s/cm<sup>5</sup>/m<sup>2</sup>
  - Central Venous Oxygen Saturation (Scvo<sub>2</sub>): >70%

### Fluid Refractory Septic Shock

- **Initiate Epinephrine or Norepinephrine:** 0.05-0.3mcg/kg/min
  - Can initiate via peripheral access while establishing central access
  - Can be initiated by ICU team on any unit until ICU bed available

### Fluid-Refractory, Catecholamine-Resistant Septic Shock

- **Initiate hydrocortisone:** 2 mg/kg initial dose (max 100 mg) followed by 0.5 mg/kg Q6hr (max 50 mg)
- **Consider Vasopressin** if continues hypotensive on high dose Epi & Norepi: 0.5-2 milli-units/kg/min (max of 40 milli-units/min)
- Patients may or may not require intubation
- Consider PRBC transfusion for Hgb < 7g/dL; May consider higher Hgb with specific disease processes: cardiac disease, prematurity, Oncology, SCT.
- Initiate Renal Replacement Therapy to prevent or treat fluid overload if unresponsive to fluid restriction & diuretics
- Consider VA ECMO if patient on maximal medical therapy

### **Patients at high risk for Adrenal Insufficiency:**

- Catecholamine resistant shock
- Chronic steroid use
- Steroid administration within the past 12 months
- Known adrenal hyperplasia

### Consider ECMO if:

- Use of 2 pressors at high dose for prolonged period (e.g. Epi & Norepi of 0.2mcg/kg/min for >6 hours)
- Addition of 3<sup>rd</sup> vasoactive agent for persistent hypotension
- Lactate levels of >6 for >6 hours



# Pediatric Sepsis & Septic Shock Pathway

## Definitions:

**Sepsis<sup>1</sup>:** Phoenix Sepsis Score  $\geq 3$

**Septic Shock<sup>1</sup>:** Phoenix Sepsis Score with  $\geq 1$  point from cardiovascular system

Variables	0 Points	1 Point	2 Points	3 Points
<b>Respiratory, 0-3 points</b>				
	PaO <sub>2</sub> /Fio <sub>2</sub> $\geq 400$ or SpO <sub>2</sub> /Fio <sub>2</sub> $\geq 292^b$	PaO <sub>2</sub> /Fio <sub>2</sub> $< 400$ on any respiratory support or SpO <sub>2</sub> /Fio <sub>2</sub> $< 292$ on any respiratory support <sup>c,d</sup>	PaO <sub>2</sub> /Fio <sub>2</sub> 100-200 and IMV <sup>e</sup> or SpO <sub>2</sub> /Fio <sub>2</sub> 148-220 and IMV <sup>e</sup>	PaO <sub>2</sub> /Fio <sub>2</sub> $< 100$ and IMV <sup>e</sup> or SpO <sub>2</sub> /Fio <sub>2</sub> $< 148$ and IMV <sup>e</sup>
<b>Cardiovascular, 0-6 points</b>				
		1 Point each (up to 3)	2 Points each (up to 6)	
	No vasoactive medications <sup>f</sup>	1 Vasoactive medication <sup>f</sup>	$\geq 2$ Vasoactive medications <sup>f</sup>	
	Lactate $< 5$ mmol/L <sup>g</sup>	Lactate 5-10.9 mmol/L <sup>g</sup>	Lactate $\geq 11$ mmol/L <sup>g</sup>	
<b>Age based<sup>h</sup></b>	Mean arterial pressure, mm Hg <sup>g</sup>			
$< 1$ mo	$> 30$	17-30	$< 17$	
1 to 11 mo	$> 38$	25-38	$< 25$	
1 to $< 2$ y	$> 43$	31-43	$< 31$	
2 to $< 5$ y	$> 44$	32-44	$< 32$	
5 to $< 12$ y	$> 48$	36-48	$< 36$	
12 to 17 y	$> 51$	38-51	$< 38$	
<b>Coagulation (0-2 points)<sup>i</sup></b>		1 Point each (maximum 2 points)		
	Platelets $\geq 100 \times 10^3/\mu\text{L}$	Platelets $< 100 \times 10^3/\mu\text{L}$		
	International normalized ratio $\leq 1.3$	International normalized ratio $> 1.3$		
	D-dimer $\leq 2$ mg/L FEU	D-dimer $> 2$ mg/L FEU		
	Fibrinogen $\geq 100$ mg/dL	Fibrinogen $< 100$ mg/dL		
<b>Neurological (0-2 points)<sup>j</sup></b>	Glasgow Coma Scale score $> 10$ ; pupils reactive <sup>k</sup>			
	Glasgow Coma Scale score $\leq 10^l$		Fixed pupils bilaterally	
<b>Phoenix sepsis criteria</b>				
Sepsis	Suspected infection and Phoenix Sepsis Score $\geq 2$ points			
Septic shock	Sepsis with $\geq 1$ cardiovascular point(s)			

**Fluid Refractory Septic Shock:** septic shock with ongoing cardiovascular dysfunction despite at least 40 to 60 mL/kg of fluid resuscitation.

**Fluid-Refractory, Catecholamine-Resistant Septic Shock:** fluid refractory septic shock with ongoing cardiovascular dysfunction despite escalating doses of epinephrine and / or norepinephrine.

## Vital Signs Concerning for Sepsis<sup>2</sup>

### Temperature

$< 36^\circ\text{C}$

$> 38.5^\circ\text{C}$  or  $> 38^\circ\text{C}$  if immunocompromised

Age	HR	RR	SBP
0-1 M	$> 205$	$> 60$	$< 60$
$\geq 1\text{M} - 2\text{M}$	$> 205$	$> 60$	$< 70$
$\geq 3\text{M} - 11\text{M}$	$> 190$	$> 60$	$< 70$
$\geq 12\text{M} - 23\text{M}$	$> 190$	$> 40$	$< 72$
$\geq 2\text{Y} - 3\text{Y}$	$> 140$	$> 40$	$< 74$
$\geq 4\text{Y} - 5\text{Y}$	$> 140$	$> 34$	$< 78$
$\geq 6\text{Y} - 9\text{Y}$	$> 140$	$> 30$	$< 82$
$\geq 10\text{Y} - 12\text{Y}$	$> 100$	$> 30$	$< 90$
$\geq 13\text{Y}$	$> 100$	$> 16$	$< 90$

## References:

1. Luregn JS, et al. International Consensus Criteria for Pediatric Sepsis and Septic Shock. JAMA. 2024; 331(8): 665-674.
2. Davis A, et al. American College of Critical Care Medicine Clinical Practice Parameters for Hemodynamic Support of Pediatric and Neonatal Septic Shock. Crit Care Med. 2017; 45(6): 1061-1093.
3. Weiss S, Et al. Surviving Sepsis Campaign International Guidelines for the Management of Septic Shock and Sepsis-Associated Organ Dysfunction in Children. Pediatr Crit Care Med. 2020; 21(2):e52-e106.

