Ann & Robert H. Lurie Children's Hospital of Chicago

Sepsis Algorithm
Emergency Department

Team Huddle at Bedside

Sepsis pathway not currently indicated.
Care & reassessment continue as clinically appropriate.

Sepsis Yellow
Patient requires early fluid management and close monitoring.
Not critically ill at this time.

Expedited diagnostic evaluation

Sepsis Red
Patient requires early fluid resuscitation, antibiotics and close monitoring.
Appears critically ill:

- Hypotension or poor perfusion
  And/or
- Alterations in mental status
  And/or
- Respiratory distress

Initiate Initial Sepsis Treatment

First Bolus given in < 30 min

If condition worsens at any point, move patient to Sepsis Red pathway

- Obtain IV Access
- Obtain Blood Cultures & Other Labs
- Frequent Re-Assessments
- Fluid Bolus **Administer initial bolus within 30 minutes**
- Consider Antibiotics. **If given, please administer within 3 hours**

Monitor/Assess:
- Hemodynamic response
- Signs/symptoms of fluid overload (see sidebar)

Determine Disposition
See left-hand sidebar

Repeat 10-20ml/kg fluid bolus
*Specific considerations for those with decreased cardiac function or renal insufficiency

Correct hypocalcemia, Hypoglycemia, consider hydrocortisone

Initiate Initial Sepsis Treatment

First Bolus given in <30 min
First antibiotic given in <60 min

- IV/IO Access
- Collect Blood Cultures & Other Labs
- Fluid Resuscitation
- Antibiotics

Fluid Responsive?

Fluid Responsive Shock

Continue care and reassessments as clinically indicated

Fluid Refractory Shock
40-60 ml/kg without adequate response

Fluid Refractory Shock Vasoactive Medications

Epinephrine	Norepinephrine
Dosing: •Starting dose 0.05mcg/kg/min •Titrate by 0.02 - 0.05mcg/kg/min •Maximum dosing 0.2mcg/kg/min	**Dosing:** •Starting dose 0.05mcg/kg/min •Titrate by 0.02 - 0.05mcg/kg/min •Maximum dosing 0.2mcg/kg/min
Mechanism of Action: •Catecholamine, potent beta 1 and alpha effects	**Mechanism of Action:** •Catecholamine, primary alpha agonist, some beta1 effects •Potent vasoconstrictor
Cold extremities, prolonged cap refill faint pulses, normal or increased diastolic BP, narrow pulse pressure	Warm extremities, flash cap refill, bounding pulses, decreased diastolic BP, wide pulse pressure

*Epinephrine or norepinephrine may be administered through peripheral access if central access is not readily available

Admit to PICU

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

Last update: 05.13.2021 KB

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[1]. Prompt recognition and treatment remain mainstay approaches to reducing morbidity and mortality[2,3].

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 ≤ 60 minutes
  - Sepsis without shock ≤ 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[4].

Recommendation	Strength of recommendation	Quality of evidence
Implement systematic screening for timely recognition of septic shock and other sepsis-associated organ dysfunction[3,4,5,6,7]	Weak	Very low
Implement a guideline/protocol for management of children with septic shock or other sepsis-associated organ dysfunction[3,4,8]	Strong	Best Practice Statement
Obtain blood cultures before initiating antimicrobial therapy in cases when this does not substantially delay antimicrobial administration[4,9,10]	Strong	Best Practice Statement
Administer antimicrobial therapy as soon as possible, within 1 hour of recognition, of septic shock[2,3,4,10]	Strong	Low
Administer antimicrobial therapy as soon as possible after appropriate evaluation, within 3 hours of recognition, of sepsis attributable organ dysfunction without shock[4,10,11]	Weak	Very low
Narrow empiric antibiotic regimen once pathogen(s) and sensitivities are available[4,12,13]	Strong	Best Practice Statement
Daily assessment (clinical, laboratory) for de-escalation of antimicrobial therapy[4,13]	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[4,14,15]	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[2,3,4]	Weak	Low
Recommend initiation of vasoactive infusion for patients with fluid refractory septic shock (norepinephrine OR epinephrine rather than dopamine)[4,16,17]	Strong	Low

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Authors/Contributors:

Elizabeth Alpern	Matthew Barhight	Jacqueline Elegant	Kate Morrow	Rebecca Stephen
Brooke Baldi	Jacqueline Corboy	Emily Goldhar	Sameer Patel	Carly Schwab
Daniel Balcarcel	Catherine Collins	Kate Lucey	Jillian Rojas	Lindsey Swigart
Kate Balsley	Kimberly Denicolo	Leena Mithal	Lazaro Sanchez-Pinto	Ariel Warren