



Other Recommendations:

Blood Cultures:

- Obtain blood cultures prior to antibiotic administration unless this would result in substantial delay of antimicrobial therapy initiation.

Antibiotic Stewardship

- Reassess antimicrobials with new microbiologic data and daily
- Use the most narrow spectrum agent possible

Steroids

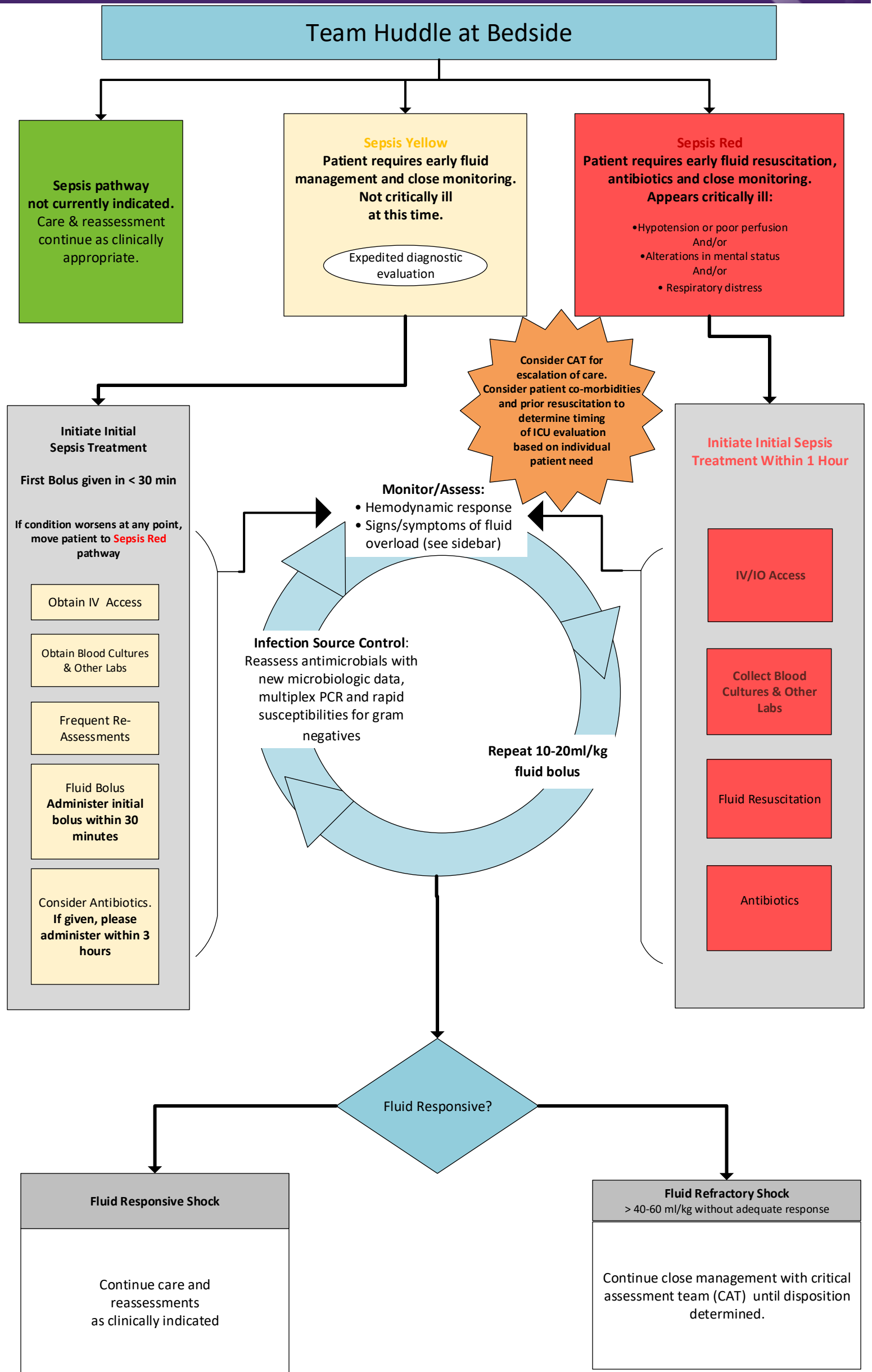
- Consider stress dose steroids (hydrocortisone) for patients with recent prolonged steroid course or known cortisol deficiency

Signs/Symptoms of Fluid Overload :

- Development or worsening of the following: rales, pleural effusions, increased body weight, soft tissue swelling, ascites, hepatomegaly
- For inpatients, increased body weight from baseline or a large positive fluid balance are most sensitive signs

Fluid Overload Considerations:

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



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 children¹. 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 \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 below⁴.

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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SEPSIS CLINICAL CARE GUIDELINE ADDENDUM

References:

1. Tan B, Wong JJ-M, Sultana R, et al. Global case-fatality rates in pediatric severe sepsis and septic shock: A systematic review and meta-analysis. *JAMA Pediatrics* 2019; 173: 352-62.
2. Evans IVR, Phillips GS, Alpern ER, et al. Association between the New York Sepsis Care Mandate and In-Hospital Mortality for Pediatric Sepsis. *JAMA* 2018; 32: 358.
3. Paul R, Melendez E, Stack A, et al: Improving adherence to PALS septic shock guidelines. *Pediatrics* 2014; 133:e1358-E1366.
4. Weiss SL, Peters MJ, Alhazzani W et al. Surviving Sepsis Campaign International Guidelines for the Management of Septic Shock and Sepsis-Associated Organ Dysfunction in Children. *PCCM* 2020; 21: e52-e106.
5. Balamuth F, Alpern ER, Abbadessa MK et al. Improving recognition of pediatric severe sepsis in the emergency department: Contributions of a vital sign-based electronic alert and bedside clinician identification. *Ann Emerg Med* 2017; 70: 759-768.
6. Bradshaw C, Goodman I, Rosenberg R et al. Implementation of an inpatient pediatric sepsis identification pathway. *Pediatrics* 2016;137:320144082.
7. Balamuth F, Alpern ER, Gruncmeier RW, et al. Comparison of two sepsis recognition methods in a pediatric emergency department. *Acad Emerg Med* 2015; 22:1298-1306.
8. Balamuth F, Weiss SL, Fitzgerald JC, et al. Protocolized treatment is associated with decreased organ dysfunction in pediatric severe sepsis. *Pediatr Crit Care Med* 2016; 17: 817-822.
9. McMullan BJ, Bowen A, Blyth CC, et al. Epidemiology and mortality of *Staphylococcus aureus* bacteremia in Australian and New Zealand children. *JAMA pediatr* 2016: 170:979-986.
10. Weiss SL, Fitzgerald JH, Balamuth F, et al: Delayed antimicrobial therapy increases mortality and organ dysfunction duration in pediatric sepsis. *Crit Care Med* 2017: 42:2409-2417.
11. Schlapbach LJ, Weiss SL, Wolf J: Reducing collateral damage from mandates for time to antibiotics in pediatric sepsis-primus non nocere. *JAMA Pediatr* 2019: 173:409-410.
12. Guo Y, Gao W, Yang H et al: De-escalation of empiric antibiotics in patients with severe sepsis or septic shock: A meta-analysis. *Heart Lung* 2016; 45:454-459.
13. Godbout EJ, Pakyz AL, Markley JD, et al. Pediatric antimicrobial stewardship: State of the art. *Curr Infect Dis Rep* 2018; 20:39.
14. Endorf FW, Garrison MM, Klein ML, et al: Characteristics, therapies, and outcomes of children with necrotizing soft tissue infections. *Pediatr Infect Dis J* 2012; 31:221-223.
15. Vasudevan C, Oddie SJ, McGuire W: Early removal versus expectant management of central venous catheters in neonates with blood stream infection. *Cochrane Database Syst Review* 2016; 4:CD008436.
16. Ventura AM, Shieh HH, Bousso A, et al. Double-blind prospective randomized controlled trial of dopamine versus epinephrine as first-line vasoactive drugs in pediatric septic shock. *Crit Care Med* 2015;43:2292-2302.
17. Ramaswamy KN, Singhi S, Jayshree M, et al. Double blind- randomized clinical trial comparing dopamine to epinephrine in pediatric fluid-refractory hypotensive septic shock. *Pediatr Crit Care Med* 2016;17:e502-E512.

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