

**Table 3: Evidence for Obtaining a Blood Culture for Treatment of Children with Sepsis Syndrome**

Type of Evidence	Key Findings	Level of Evidence (USPSTF Ranking*)	Citations
<b>Clinical guidelines</b>	<p>Pediatric considerations in severe sepsis: Empiric antibiotics should be administered within 1 hour of the identification of severe sepsis [p. 614]. Blood cultures should be obtained before administering antibiotics when possible, but this should not delay administration of antibiotics [p. 615].</p> <p>General considerations: At least 2 sets of blood cultures (both aerobic and anaerobic bottles) should be obtained before antimicrobial therapy with at least one drawn percutaneously and one drawn through each vascular access device, unless the device was recently (&lt;48 h) inserted [p. 588]. Obtaining appropriate cultures before administration of antimicrobials is essential to confirm infection and the responsible pathogens and to allow de-escalation of antimicrobial therapy after receipt of the susceptibility profile.</p> <p>Samples can be refrigerated or frozen if processing cannot be performed immediately. Because rapid sterilization of blood cultures can occur within a few hours after the first antimicrobial dose, obtaining those cultures before therapy is essential if the causative organism is to be identified. Obtaining blood cultures peripherally and through a vascular access device is an important strategy. If the same organism is recovered from both cultures, the likelihood that the organism is causing the severe sepsis is enhanced [p.590].</p>	III	Dellinger RP, Levy MM, Rhodes A, et al. Surviving Sepsis Campaign: International guidelines for management of severe sepsis and septic shock: 2012. <i>Crit Care Med</i> 2013;41(2): 580-637.
<b>Clinical guidelines</b>	<p>Although laboratory studies rarely affect the management of septic shock in the first hour of therapy, patients should have lab studies sent routinely assessing for hematological abnormalities, metabolic derangements, or electrolyte abnormalities that may contribute to morbidity. A peripheral white blood count may aid in the choice of a broad-spectrum antibiotics whereas a hemoglobin and platelet count will help in assessing the need for early blood transfusion [p. 246].</p> <p>In patients with sepsis, early efforts to make a microbiological diagnosis and institute appropriate therapy are important. While finding the focus of infection may be difficult, a careful history and physical exam will help narrow the suspected source. Obvious sources of infection, such as surgical wounds and indwelling bodies (e.g., central lines, shunts, and catheters) should</p>	III	Melendez E, Bachur R. Advances in the emergency management of pediatric sepsis. <i>Curr Opin Pediatr</i> 2006; 18:245-253.

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	<p>not be ignored and should be cultured as appropriate. Common sources of infection in sepsis, such as blood and urine, should be cultured.</p> <p>In cases of immunocompromised states, intra-abdominal infections, or oral/neck infections, anaerobic cultures should be considered in addition to routine aerobic cultures. If antibiotics have already been given, blood culture should be obtained immediately prior to the next scheduled dose to minimize blood drug level [p.251].</p>		
<b>Clinical protocol</b>	<p>Early identification and treatment of severe sepsis and septic shock improve outcomes. Early initiation of hemodynamic resuscitation with specified treatment endpoints, also referred to as early goal-directed therapy (EGDT), consistently has improved mortality rates in several studies [p. S9].</p> <p>Patient risk assessment based on epidemiologic considerations, screening tool results, and scoring systems can be helpful in determining whether a patient has severe sepsis or septic shock and what intervention is appropriate [p.S11].</p> <p>Cultures to identify causative organisms should be drawn before starting antimicrobial therapy, as long as sampling does not delay antibiotic administration significantly. Sampling before antibiotic therapy is important, because sterilization of blood cultures can occur within a few hours of the first dose. Identification of causative organisms facilitates adjustment of antibiotic therapy. At least two blood cultures should be drawn, and at least one should be percutaneous. One sample should also be taken from each vascular device that has been in place for at least 48 hours [p. S13].</p>	III	Rivers EP, Ahrens T. Improving outcomes for severe sepsis and septic shock: Tools for early identification of at-risk patients and treatment protocol implementation. <i>Crit Care Clin</i> 2008; S1-S47.
<b>Clinical protocol</b>	<p>In the first hour of treatment for pediatric patients diagnosed with septic shock, it is vital to:</p> <ul style="list-style-type: none"> <li>• Assess airway, breathing, and circulation</li> <li>• Establish intravenous access</li> <li>• Obtain cultures of pertinent body fluids or sites of local infections. Administer antibiotics and antivirals as indicated.</li> <li>• Aggressive fluid resuscitation: up to (and over, if needed) 60 cc/kg based on physiologic responses [p.25].</li> </ul> <p>Suspicion of invasive bacterial disease initiates an</p>	III	Saladino RA. Management of septic shock in the pediatric emergency department in 2004. <i>Clin Ped Emerg Med</i> 2004; 5:20-27.

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	<p>immediate search for the sources(s), and antimicrobial agents should be administered promptly. Blood cultures are considered for inclusion in the initial evaluation of a patient with septic shock. The clinical status of the patient will determine the extent of the evaluation. Parenteral antibiotics are administered when septic shock is suspected, preferably immediately after cultures are obtained [p.21].</p>		
<b>Descriptive study</b>	<p>The volume of blood cultured is a major determinant in the detection of bloodstream infections (e.g., two large samples = three medium) [p.45]. We have shown the practical importance of two or more sets of cultures of blood obtained by independent venipunctures for the proper evaluation of an episode of suspected sepsis. Moreover, we have documented the usefulness of antimicrobial susceptibility testing of valid blood isolates in guiding precise therapy [p. 50].</p>	III	<p>Weinstein MP, Reller LB, Murphy JR, Lichtenstein KA. The clinical significance of positive blood cultures: A comprehensive analysis of 500 episodes of bacteremia and fungemia in adults. I. Laboratory and epidemiologic observations. <i>Rev Infect Dis</i> 1983; 5(1):35-53.</p>

*Note: USPSTF criteria for assessing evidence at the individual study level are as follows: I) Properly powered and conducted randomized controlled trial (RCT); well-conducted systematic review or meta-analysis of homogeneous RCTs. II) Well-designed cohort or case-control analytic study. III) Opinions of respected authorities, based on clinical experience; descriptive studies or case reports; reports of expert committees.*