

## BLOOD STREAM INFECTION (BSI)

## LCBI – Laboratory-Confirmed Blood Stream Infection

**DEFINITION:** LCBI must meet at least **ONE** ☐ of the following criteria:

☐ **Criterion 1:** (Last updated June, 2008)

- Patient of any age has a recognized pathogen cultured from one or more blood cultures

**AND**

- The organism cultured from blood is not related to an infection at another site (see notes 1 and 2 below)

☐ **Criterion 2:** (Last updated June, 2008)

- Patient of any age has at least **ONE** ☐ of the following signs or symptoms:

- ☐ fever ( $>38^{\circ}\text{C}$ )

- ☐ chills

- ☐ hypotension

**AND**

- The signs and symptoms and positive laboratory results are not related to an infection at another site

**AND**

- The common skin contaminant is cultured from two or more blood cultures drawn on separate occasions.

**EXAMPLES OF COMMON SKIN CONTAMINANT:**

diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] spp., *Propionibacterium* spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.

☐ **Criterion 3:** (Last updated June, 2008)

- Patient  $\leq 1$  year of age has at least **ONE** ☐ of the following signs or symptoms:

- ☐ fever ( $>38^{\circ}\text{C}$  rectal)

- ☐ hypothermia ( $<36^{\circ}\text{C}$  rectal)

- ☐ apnea

- ☐ bradycardia

**AND**

- The signs and symptoms and positive laboratory results are not related to an infection at another site

**AND**



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- The common skin contaminant is cultured from two or more blood cultures drawn on separate occasions. (see Notes 3, 4 and 5 below).

### **EXAMPLES OF COMMON SKIN CONTAMINANT:**

diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] spp., *Propionibacterium* spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.

### **NOTES: (Last updated June, 2008)**

1. In Criterion 1, the phrase “1 or more blood cultures” means that at least one bottle from a blood draw is reported by the laboratory as having grown organisms (i.e. is a positive blood culture).
2. In Criterion 1, the term “recognized pathogen” does not include organisms considered common contaminant (see Criteria 2 and 3 for a list of common contaminant). A few of the recognized pathogens are *S. aureus*, *Enterococcus* spp., *E. coli*, *Pseudomonas* spp., *Klebsiella* spp., *Candida* spp., and others.
3. In Criteria 2 and 3, the phrase “two or more blood cultures drawn on separate occasions” means (1) that blood from at least two blood draws were collected within two days of each other (e.g. blood draws on Monday and Tuesday or Monday and Wednesday would be acceptable for blood cultures drawn on separate occasions, but blood draws on Monday and Thursday would be too far apart in time to meet this criterion) and (2) that at least one bottle from each blood draw is reported by the laboratory as having grown the same common skin contaminant organism (i.e. is a positive blood culture). (See Note 4 for determining sameness of organisms.)
  - a. For example, an adult patient has blood drawn at 8 AM and again at 8:15 AM of the same day. Blood from each blood draw is inoculated into two bottles and incubated (four bottles total). If 1 bottle from each blood draw set is positive for coagulase-negative staphylococci, this part of the criterion is met.
  - b. For example, a neonate has blood drawn for culture on Tuesday and again on Saturday, and both grow the same common contaminant. Because the time between these blood cultures exceeds the 2-day period for blood draws stipulated in Criteria 2 and 3, this part of the criteria is not met.
  - c. A blood culture may consist of a single bottle for a pediatric blood draw because of volume constraints. Therefore, to meet this part of the criterion, each bottle from two or more draws would have to be culture positive for the same contaminant
4. There are several issues to consider when determining sameness of organisms.
  - a. If the common skin contaminant is identified to the species level from one culture, and a companion culture is identified with only a descriptive name (e.g., to the genus level), then it is assumed that the organisms are the same. The speciated organism should be reported as the infecting pathogen (see table 1).

**Table 1. Examples of how to report speciated and unspeciated common skin contaminate organisms**

Culture Report	Companion Culture Report	Report as...
<i>S. epidermidis</i>	<i>Coagulase-negative staphylococci</i>	<i>S. epidermidis</i>
<i>Bacillus</i> spp. (not <i>anthracis</i> )	<i>B. cereus</i>	<i>B. cereus</i>
<i>S. salivarius</i>	<i>Strep viridans</i>	<i>S. salivarius</i>



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**Table 2. Examples of how to interpret the sameness of two skin contaminate isolates by comparing antimicrobial susceptibilities**

Culture Report	Isolate A	Isolate B	Interpret as...
<i>S. epidermidis</i>	All drugs <b>S</b>	All drugs <b>S</b>	Same
<i>S. epidermidis</i>	OX <b>R</b> GENT <b>R</b>	OX <b>S</b> GENT <b>S</b>	Different
<i>Corynebacterium</i> spp.	PEN G <b>R</b> CIPRO <b>S</b>	PEN G <b>S</b> CIPRO <b>R</b>	Different
<i>Strep viridans</i>	All drugs <b>S</b>	All drugs <b>S</b> except ERYTH <b>R</b>	Same
<b>S = Sensitive R = Resistant</b>			

- b. If common skin contaminant organisms from the cultures are speciated but no antibiograms are done or they are done for only 1 of the isolates, it is assumed that the organisms are the same (see examples in table 1)
  - c. If the common skin contaminants from the cultures have antibiograms that are different for 2 or more antimicrobial agents, it is assumed that the organisms are *not* the same (see examples in table 2)
  - d. For the purpose of NHSN antibiogram reporting, the category interpretation of intermediate (I) should not be used to distinguish whether two organisms are the same.
5. LCBI criteria 1 and 2 may be used for patients of any age, including patients  $\leq 1$  year of age.

### **SPECIMEN COLLECTION CONSIDERATIONS:** (Last updated June, 2008)

Ideally, blood specimens for culture should be obtained from 2 to 4 blood draws from separate venipuncture sites (e.g., right and left antecubital veins), not through a vascular catheter. These blood draws should be performed simultaneously or over a short period of time (i.e., within a few hours). If your facility does not currently obtain specimens using this technique, you may still report BSIs using the criteria and notes above, but you should work with appropriate personnel to facilitate better specimen collection practices for blood cultures.

### **REPORTING INSTRUCTIONS:** (Last updated June, 2008)

- Purulent phlebitis confirmed with a positive semiquantitative culture of a catheter tip, but with either negative or no blood culture is considered a CVS-VASC, not a BSI.
- Report organisms cultured from blood as BSI – LCBI when no other site of infection is evident.

### **CSEP – Clinical Sepsis** (Last updated June, 2008)

**DEFINITION:** Clinical sepsis must meet at least **ONE** ☐ of the following criteria:

#### ☐ **Criterion:**

- Patient  $\leq 1$  year of age has at least **ONE** ☐ of the following signs or symptoms with no other recognized cause:
  - △ fever ( $>38^{\circ}\text{C}$  rectal)



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△ hypothermia (<37°C rectal)

△ apnea

△ bradycardia

**AND**

- Blood culture are **not** done or **no** organisms detected in blood

**AND**

- There is no apparent infection at another site

**AND**

- The physician institutes treatment for sepsis

**EXAMPLES OF COMMON SKIN CONTAMINANT:**

diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] spp., *Propionibacterium* spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.

**REPORTING INSTRUCTIONS:** (Last updated June, 2008)

- Report culture positive infections of bloodstream as BSI-LCBI