Applying NHSN Central Line Associated Bloodstream Infection Criteria

Case Studies

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October 2, 2012

Updated December 7, 2012

Slide Update #s

- 2- Investigating a Positive Blood Culture
- 5, 8- Ms. A
- 14- Mr. B
- 18, 19- Ms. C
- 24,25- Mr. D
- 33- Ms. F
- 41- Baby Z
- 56, 58- Mr. H
- 61,62, 63, and 64- Mr. I
- 70, 71, and 74- Baby X

* There will be an “Updated Slide” note on each slide
Ground Rules for Case Studies

- **Purposes:**
  - Training on use of definitions AS THEY EXIST
  - Optimize inter-rater reliability and data quality

- **Surveillance ≠ clinical**

- Examples highlight new criteria, common errors and difficult issues

*Remember: Today’s discussion is not to debate the correctness of the definitions but to learn how to correctly use them.*

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Investigating a Positive Blood Culture

**Ask yourself questions in this order:**

<table>
<thead>
<tr>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is it an HAI? If not HAI, stop.</td>
</tr>
<tr>
<td>2. If this is an HAI, which site-specific criterion is met?</td>
</tr>
<tr>
<td>3. Is this a device-associated HAI?</td>
</tr>
<tr>
<td>3a. If LCBI, is it primary or secondary?</td>
</tr>
<tr>
<td>4. Attributable to what location/facility/procedure?</td>
</tr>
</tbody>
</table>

*You may choose to determine earlier if the patient had a central line or was in a location for which you are performing CLABSI surveillance.*
Ms. A.

- **April 1:** Ms. A is transferred to your facility with pancreatic cancer and a PICC which is first accessed on Day 1.
- **April 7:** Blood culture collected on April 5th is growing *Providencia stuartii*. No other pathogens isolated. Patient started on antibiotics.

**Additional laboratory values as follows:**

<table>
<thead>
<tr>
<th>Admission Date</th>
<th>Blood culture collected</th>
<th>Result reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apr 2</td>
<td></td>
<td></td>
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<tr>
<td>Apr 3</td>
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<tr>
<td>Apr 4</td>
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<td>Apr 5</td>
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<td>Apr 6</td>
<td></td>
<td></td>
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<tr>
<td>Apr 7</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>WBC</th>
<th>ANC</th>
</tr>
</thead>
<tbody>
<tr>
<td>900</td>
<td>---</td>
</tr>
<tr>
<td>800</td>
<td>---</td>
</tr>
<tr>
<td>600</td>
<td>---</td>
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<tr>
<td>400</td>
<td>400</td>
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<tr>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>700</td>
<td>---</td>
</tr>
<tr>
<td>800</td>
<td>---</td>
</tr>
</tbody>
</table>

**Does patient meet criteria for an HAI?**

Yes. all elements of a CDC/NHSN site-specific infection criterion were first present together on or after the 3rd hospital day (day of hospital admission is day 1). Also attributable to your hospital for same reason.

**What specific type of HAI does Ms. A have?**

1. LCBI 1
2. LCBI 2
3. MBI-LCBI 1
4. MBI-LCBI 2
Ms. A. : Laboratory Values

<table>
<thead>
<tr>
<th>Admission Date</th>
<th>WBC</th>
<th>ANC</th>
<th>Blood culture collected</th>
<th>Pathogen in BC reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr 1</td>
<td>900</td>
<td>---</td>
<td>Apr 2</td>
<td>800</td>
</tr>
<tr>
<td>Apr 2</td>
<td>800</td>
<td>---</td>
<td>Apr 3</td>
<td>600</td>
</tr>
<tr>
<td>Apr 3</td>
<td>600</td>
<td>---</td>
<td>Apr 4</td>
<td>400</td>
</tr>
<tr>
<td>Apr 4</td>
<td>400</td>
<td>---</td>
<td>Apr 5</td>
<td>600</td>
</tr>
<tr>
<td>Apr 5</td>
<td>600</td>
<td>---</td>
<td>Apr 6</td>
<td>700</td>
</tr>
<tr>
<td>Apr 6</td>
<td>700</td>
<td>---</td>
<td>Apr 7</td>
<td>800</td>
</tr>
</tbody>
</table>

ANC or WBC < 500?

<table>
<thead>
<tr>
<th>Day -5</th>
<th>Day -4</th>
<th>Day -3</th>
<th>Day -2</th>
<th>Day -1</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Patient meets neutropenic definition: Two values of ANC or WBC < 500 on or within 3 calendar days before positive blood culture collection.

- Eligible Pathogen (Enterobacteriaceae)
- No other pathogen isolated
- Meets MBI-LCBI Criteria 1.2

Is the CLABSI attributed to your facility or the transferring facility?

✅ Your facility since the device was accessed there.

2. The transferring facility where the line was placed.

Note:
If a patient is admitted with a pre-existing central line, the line should be included in the central line day count starting with the first day that the line is accessed and BSIs with date of event on or after Day 3 are attributed to the admitting facility.
Mr. B.

- A 73 year old Caucasian male admitted to the ER on 6/10 with nausea and vomiting, abdominal pain and fever.

- History: Hypertension, hiatal hernia, esophageal reflux.

Admission Vital Signs & Labs: BP 153/73, P 69, T 38.0, Amylase 4,900, Lipase 4000, BUN 18, Cr. 1.8, WBC 22.7, HCT 39. CT suggestive of pancreatitis

- 6/10: Admitted to the Medical ICU.
- Diagnosis: Pancreatitis

Mr. B. Continued

<table>
<thead>
<tr>
<th>Date</th>
<th>Temp</th>
<th>Diagnostic Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/10</td>
<td>102 F</td>
<td>NG tube placed, NPO, IV fluids and supportive care. Blood cultures x 2.</td>
</tr>
<tr>
<td>6/13</td>
<td>Afebrile</td>
<td>Poor peripheral access, TPN. Central line placed (L subclavian), CXR verified position. Blood culture results from 6/10 negative. Transfer to 6 North Surgical (Medicine full)</td>
</tr>
<tr>
<td>6/15</td>
<td>Afebrile</td>
<td>CHF (CXR shows fluid), Lasix administered to correct</td>
</tr>
<tr>
<td>6/16</td>
<td>Afebrile</td>
<td>Increased abdominal pain &amp; vomiting, Levaquin &amp; Flagyl started</td>
</tr>
<tr>
<td>6/27</td>
<td>Afebrile</td>
<td>TPN discontinued, PO intake tolerated.</td>
</tr>
<tr>
<td>6/30</td>
<td>Afebrile</td>
<td>Central line discontinued, transferred to 5 West Medical. DC’d levaquin &amp; flagyl</td>
</tr>
<tr>
<td>7/1</td>
<td>100.8 F</td>
<td>Nausea, vomiting, Blood cultures X 2 collected.</td>
</tr>
<tr>
<td>7/2</td>
<td>Afebrile</td>
<td>1 blood culture bottle in one set, positive for Staphylococcus epidermidis; one bottle in other blood culture set positive for coagulase-negative staphylococcus. Vancomycin begun.</td>
</tr>
<tr>
<td>7/4</td>
<td>Afebrile</td>
<td></td>
</tr>
<tr>
<td>7/11</td>
<td>Afebrile</td>
<td>Discharged</td>
</tr>
</tbody>
</table>
Mr. B.

If there is an infection is it POA or HAI?
- HAI

What site-specific criteria would you consider?
- LCBI

Is it device-associated?

<table>
<thead>
<tr>
<th></th>
<th>6/10</th>
<th>6/13</th>
<th>6/30</th>
<th>7/1</th>
<th>7/2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admit ICU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer to 6N</td>
<td></td>
<td></td>
<td>Central line inserted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer to 5W</td>
<td></td>
<td></td>
<td>Central line discontinued</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100.8 F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood cultures negative</td>
<td></td>
<td></td>
<td>Blood cultures: S. epidermidis and CNS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Was a central line in place for > 2 days on Day of BSI? Yes
a) Was the central line in place at the time of the blood culture? Yes- b; next day = Device Associated
Or b) If CL discontinued was criterion for LCBI met on day of discontinuation or next day?
LCBI- Criterion 2

Patient has at least one of the following signs or symptoms: fever (>38.0°C), chills, or hypotension AND positive laboratory results are not related to an infection at another site (See Appendix 1. Secondary Bloodstream Infection Guide.) AND common commensal (i.e., diphtheroids [Corynebacterium spp. not C. diphtheriae], Bacillus spp. [not B. anthracis], Propionibacterium spp., coagulase-negative staphylococci [including S. epidermidis], viridans group streptococci, Aerococcus spp., and Micrococcus spp.) is cultured from two or more blood cultures drawn on separate occasions.

If there is/was a CLABSI to which unit should it be attributed?

A. Medical ICU 
B. 5 West Medical 
C. 6 North

Note:
If all elements of an HAI are present within 2 calendar days of transfer from one inpatient location to another in the same facility (i.e., on the day of transfer or the next day), the HAI is attributed to the transferring location.
Ms. C.

- 45-year-old female, with newly diagnosed stage IIB endometrial cancer, admitted to the Women’s Center on 11/2 for a total abdominal hysterectomy, bilateral salpingo-oophorectomy and removal of pelvic and abdominal lymph nodes. Patient is also scheduled to have a PICC placed for participation in a clinical trial.

- **History:** 3 month history of new onset pelvic pain and dysmenorrhea. The patient has had two previous c-sections, the last one ten years ago.

- **Admission Vital Signs & Labs:** BP 117/70, P 82, T 36.0, WBC 5.2, HGB 8, HCT 29.

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<table>
<thead>
<tr>
<th>Date</th>
<th>Temp</th>
<th>Diagnostic Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/2</td>
<td>36.0°C</td>
<td>Nursing admission obtained; L arm PICC line placed in interventional radiology.</td>
</tr>
<tr>
<td>11/2</td>
<td></td>
<td>Patient typed and cross matched for 2 units packed RBC for treatment of anemia. Blood transfused through PICC.</td>
</tr>
<tr>
<td>11/3</td>
<td>Afebrile</td>
<td>Surgical procedure performed with no complications reported. Patient transported back to Women’s Center from Post-op Recovery Unit.</td>
</tr>
<tr>
<td>11/4</td>
<td>Afebrile</td>
<td>Post-op antibiotics discontinued. Dressing changed on abdominal incision with no signs of erythema or drainage noted. Foley draining clear yellow urine.</td>
</tr>
<tr>
<td>11/5</td>
<td>Afebrile</td>
<td>Patient able to ambulate with assistance; Foley d/c’d. Dressing remains dry and intact. Patient reported first bowel movement post-op without difficulty. Patient medicated for abdominal pain (8 on 10 scale).</td>
</tr>
<tr>
<td>11/6</td>
<td>38.8°C</td>
<td>Patient continues to complain of abdominal pain unresolved with pain meds. Slight tenderness noted on palpation of L lower abdominal</td>
</tr>
<tr>
<td>11/7</td>
<td>39.0°C</td>
<td>Blood cultures collected x2. Patient sent for CT scan of the abdomen. Report notes: “abscess present in L lower abdominal cavity”. Drain placed in the L lower abdominal cavity and cultures of purulent material sent. IV placed and antibiotics started.</td>
</tr>
</tbody>
</table>
Ms. C.

<table>
<thead>
<tr>
<th>Date</th>
<th>Temp</th>
<th>Diagnostic Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/9</td>
<td>37.8</td>
<td>Blood culture positive for VRE and <em>Bacteroides fragilis</em> x2 and abscess culture positive for <em>Bacteroides fragilis</em>. Patient reports decreased abdominal pain.</td>
</tr>
<tr>
<td>11/12</td>
<td>36</td>
<td>Drain removed. Abdominal sounds present. Follow-up CT scan reveals that intra-abdominal abscess is resolved. Patient discharged.</td>
</tr>
</tbody>
</table>

Does the patient have an HAI?

A. Yes, the patient has an HAI.
B. No, the patient does not have an HAI.
C. Not sure.

All elements of a CDC/NHSN site-specific infection criterion were first present together on or after the 3rd hospital day (day of hospital admission is day 1).
If so, what type of HAI?

A. The patient only has an intra-abdominal infection (IAB) with *B. fragilis*.
B. The patient has an organ/space SSI-IAB with *B. fragilis* and a CLABSI with VRE and *B. fragilis*.
C. The patient has an organ/space SSI-IAB with *B. fragilis* and VRE (the BSI is secondary to the IAB).
D. The patient has an organ/space SSI-IAB and a secondary BSI with *B. fragilis* and a CLABSI with VRE.

In a patient suspected of having an infection, where blood and a site-specific specimen are collected for culture and both are positive for at least one matching organism, if the site-specific culture is an element used to meet the infection site criterion, then the BSI is considered secondary to that site-specific infection.* In this case the patient only meets IAB criterion 1 (organisms culture from purulent material from IA space by needle aspiration. A site culture is used to meet this criterion. Therefore this is patient has an SSI with secondary BSI with both organisms.

*Appendix 1 Secondary BSI Guide- NHSN Manual Chapter 4 CLABSI Event

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**Ms. C. Continued**

An organ/space SSI must meet the following criterion:

Infection occurs within 30 days after the operative procedure if no implant is left in place or within 1 year if implant is in place and the infection appears to be related to the operative procedure and

- **✓** infection involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure and
- patient has at least 1 of the following:
  - a. purulent drainage from a drain that is placed through a stab wound into the organ/space
  - organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space
  - an abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination
  - d. diagnosis of an organ/space SSI by a surgeon or attending physician.
Ms C. Continued

IAB-Intraabdominal, not specified elsewhere including gallbladder, bile ducts, liver (excluding viral hepatitis), spleen, pancreas, peritoneum, subphrenic or subdiaphragmatic space, or other intraabdominal tissue or area not specified elsewhere

Intraabdominal infections must meet at least 1 of the following criteria:

3. Patient has at least 2 of the following signs or symptoms with no other recognized cause:
   a) fever (>38°C), nausea, vomiting, abdominal pain, or jaundice
   and
   at least 1 of the following:
   a. organisms cultured from drainage from surgically placed drain (e.g., closed suction drainage system, open drain, T-tube drain)
   b. organisms seen on Gram’s stain of drainage or tissue obtained during surgical operation or needle aspiration

Mr. D.

- **May 15:** 79 year old male, admitted with gastric cancer. Central line placed day of admission for total parenteral nutrition.

- **May 16:** Partial gastrectomy performed.

- **May 21:** Patient progressing well until fever spike of 101.3. Blood cultures sent.

- **May 22:** Increasing abdominal pain. CT Scan of abdomen shows small fluid collection posterior to stomach. Fluid collection fully drained by ultrasound guided needle aspiration and fluid sent for culture. Blood cultures repeated.
Mr. D. Continued

- **May 23:** Blood cultures from May 21: 1 of 2 positive for *Staphylococcus epidermidis*. Abdominal fluid growing gram positive cocci. Antibiotics begun.

- **May 24:** Abdominal culture: *Enterobacter cloacae*. Blood cultures from May 22: 2 of 2 positive for coagulase-negative staphylococcus.

If there is an infection is it an HAI?

HAI; all elements of infection criterion were first present together on or after the 3rd hospital day (day of hospital admission is day 1).

Does this patient have a CLABSI?

A. Yes, the patient has a CLABSI with S. epidermidis.

B. No, the BSI is secondary to the abdominal infection.

C. Not sure.

When a patient suspected of having an infection has blood and a site-specific specimen cultured but the organisms do not match, if the site-specific culture is an element used to meet the infection site criterion (in this case it is, IAB cr. 1) and the blood isolate is also an element used to meet another criterion at the same infection site (in this case IAB cr 3c), then the BSI is considered secondary to that site-specific infection.

*Appendix 1 Secondary BSI Guide- NHSN Manual Chapter 4 CLABSI Event*
Ms. E.

- 8/14 A 41 year old female presents to the Emergency Room in diabetic coma and with anemia. She has a subclavian catheter inserted in the Emergency Room. The next day, in the ICU, she has a midline catheter inserted and receives blood transfusions.

- 8/17 She develops fever of 39°C and shaking chills. Two sets of blood cultures sent.

- 8/19 Blood cultures positive for *Pseudomonas aeruginosa*. Neither insertion site shows inflammation and there is no other documented infection.

Is there an LCBI?

A. No, the patient does not have an LCBI.

☑ B. Yes, the patient has an LCBI with *P. Aeruginosa*

C. Not sure.
If so, which criterion of LCBI?

1. LCBI criterion 1 – recognized pathogen cultured from 1 or more blood cultures.
2. LCBI criterion 2 – with fever, chills and 2 or more positive blood cultures.

What unit should be indicated for the Location of Device Insertion field?

A. The ED should be recorded as the Location of Device Insertion.
B. The ICU should be recorded as the Location of Device Insertion.
C. Neither location.
D. Not sure.
Mr. E. Continued

Note: Although the line was inserted in the ED, the LCBI is attributed to the ICU.

EXCEPTION TO TRANSFER RULE:
Locations which do not house patients overnight (e.g. Emergency Department or Operating Room) will have no denominator data (i.e. patient days or central line days). Therefore, CLABSI cannot be attributed to these locations. Instead, the CLABSI must be attributed to the next location in which the patient stays.

Let’s change this scenario and say that on 8/17 the patient’s subclavian catheter site is red and has a small amount of pus present.

Does this change your decision?

0%  ✔️ A. No, this patient still has a CLABSI.
0%  B. Yes, this is no longer a CLABSI.
0%  C. Not sure.
Ms. E. Continued

CVS-CARDIOVASCULAR SYSTEM INFECTION
VASC-Arterial or venous infection
Arterial or venous infection must meet at least 1 of

4. Patient has purulent drainage at involved vascular site
   and
   blood culture not done or no organisms cultured from blood

Reporting instructions
- Report infections of an arteriovenous graft, shunt,
  or fistula or intravascular cannulation site without
  organisms cultured from blood as CVS-VASC
- Report intravascular infections with organisms
cultured from the blood as BSI-LCBI.

Ms. F.

- Ms. F., who is 10 years old, has been in PICU for a week with a central line in place the entire time. 4 months ago she received an allo-SCT for AML. Currently weighs 25kg.
- April 6: The line is pulled
- April 7: She becomes disoriented and hypotensive. Blood cultures x 2 and urine cultures are collected.
- 1 blood culture is positive for Streptococcus mutans and the other is reported as Viridans Group Strep.
- Is this a BSI?
- If so, which criterion?
  Yes, LCBI Criterion 2: hypotension AND 2 or more blood cultures with CC considered to be the same organism not related to infection at another site.
Is it central line associated?

1. No
2. Yes
3. Not sure

The device was in place for >2 calendar days when all elements of a CDC/NHSN site-specific infection criterion were first present together.

Ms. F.

- What organism should be reported?

Report *S. mutans*

| Table 1: Examples of how to report species and unclassified common commensals |
|-----------------|-----------------|-----------------|
| **Culture Report** | **Companion Culture Report** | **Report as...** |
| *S. epidermidis* | Coagulate-negative staphylococci | *S. epidermidis* |
| *Bacillus sp.* (not anthrax) | *E. coli* | *E. coli* |
| *S. salivarius* | *Strep pyogenes* | *S. salivarius* |
Ms. F. Variation

- What if “GI GVHD” was documented?
  - No. Only if it is documented that it is grade III or IV GVHD would it meet criteria for MBI-LCBI (criterion 1a).

- What if on April 4 she had 625 mL of diarrhea?

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<table>
<thead>
<tr>
<th></th>
<th>Apr 3</th>
<th>Apr 4</th>
<th>Apr 5</th>
<th>Apr 6</th>
<th>Apr 7</th>
<th>Apr 6</th>
<th>Apr 7</th>
<th>Apr 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>Day -5</td>
<td>Day -4</td>
<td>Day -3</td>
<td>Day -2</td>
<td>Day -1</td>
<td>Day -1</td>
<td>Day 2</td>
<td>Day 3</td>
</tr>
<tr>
<td>Fever, chills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or hypotension</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrhea total ≥ 20 mL/kg in 24 hours</td>
<td></td>
<td></td>
<td></td>
<td>X (625)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Blood culture collected; 2/2 viridans group strep

Patient meets allogeneic hematopoietic stem cell transplant definition

+ ≥ 20 mL/kg diarrhea in 24 hours
+ Blood culture only growing viridans group streptococci
+ No other organism

Meets MBI-LCBI Criteria 2.1.b.
Ms. F.

Patient of any age meets criterion 2 for LCBI when the blood cultures are growing only viridans group streptococci with no other organisms isolated AND

patient meets at least one of the following:

1. Is an allogeneic hematopoietic stem cell transplant recipient within the past year with one of the following documented during same hospitalization as positive blood culture:
   - a. Grade III or IV gastrointestinal graft versus host disease (GI GVHD)
   - b. ≥1 liter diarrhea in a 24 hour period (or ≥20 mL/kg in a 24 hour period for patients <18 years of age) with onset on or within 7 calendar days before the date the first positive blood culture was collected.

2. Is neutropenic, defined as at least 2 separate days with values of absolute neutrophil count (ANC) or total white blood cell count (WBC) <500 cells/mm3 on or within 3 calendar days before the date the positive blood culture was collected (Day 1). (See Table 4 for example.)

Ms. F: Variations continued

What if the second blood culture also grew

Micrococcus?
- Still MBI-LCBI. Single culture of micrococcus (common commensal) does not meet LCBI criteria.

S. aureus?
- Would not meet MBI-LCBI criteria and would be classified as LCBI 1.
- S. aureus is considered "Other organism" for MBI-LCBI. “Patient of any age meets criterion 2 for LCBI when the blood cultures are growing only viridans group streptococci with no other organisms isolated”
Baby Z.

- **Day 1:** One-day-old twin male infant admitted and emergently transferred to Neonatal Intensive Care Unit. Intubated during transport. Admitted with peripheral IV in scalp, IV fluid at 1cc/hr with Prostin (0.05mcg/kg/min) started prior to transport, and umbilical venous catheter present.

- **Neonatal History:** Gestational age = term infant, birth wt. 1810 grams, Apgars 5 & 6. An echocardiogram showed transposition of the great vessels of the heart.

Baby Z.

- **Day 3:** Repair of Patent Ductus Arteriosus and Atrial Septal Defect performed; later that day the umbilical catheter site was noted to be slightly red.

- **Day 4:** Umbilical catheter site remained slightly red and a low grade temperature developed.

- **Day 5:** 1 Blood culture set drawn through umbilical line; line was discontinued and the catheter tip sent for culture. PICC line placed.
Baby Z.

- Day 6: Continued elevated temp of 38.1° (rectal) and antibiotics were started.

- Day 7: Blood cultures were negative but the umbilical catheter tip was positive for *Staphylococcus epidermidis* >15 colonies. Antibiotics adjusted.

If this patient has an infection is an HAI?

- HAI: all elements of a CDC/NHSN site-specific infection criterion were first present together on or after the 3rd hospital day (day of hospital admission is day 1).

Which criteria would you consider?

- LCBI 2 or 3; common commensal
- and ≤ 1 year of age

Would it be device associated?

- Yes; the device was in place for >2 calendar days when all elements of infection criterion were first present together.

Does this patient have an LCBI?

1. No, this patient does not have an LCBI.
2. Yes, this patient has an LCBI.
3. Not sure.

*Catheter tip cultures are not utilized for NHSN LCBI criteria*

Note:

This patient actually meets criterion 5 of VASC [arterial or venous infection]-fever, and > 15 colonies cultured from intravascular cannula tip using semiquantitative culture method and blood culture not done or no organisms cultured from blood.

(see PS Manual chapter 17)
What if the catheter tip had been negative, but the blood culture was positive for *S. epidermidis*? Would the baby have an LCBI?

A. Yes, the baby has a CLABSI with *S. epi*.
B. No, this baby does not have an LCBI.
C. Not sure

*Note:*
*There must be positive blood cultures from 2 separate blood draws to meet that portion of the LCBI criterion 2 (common commensals).*

*This baby only had 1 blood draw.*
If the patient had both the PICC and the umbilical line at the same time...how would her device-days be counted each day?
A. 1 central line day
B. 2 central line days
C. 1 umbilical line day
D. 1 central line day and 1 umbilical line day
E. Not sure

**NOTE:**
Umbilical catheters are no longer counted separately from other central lines. Therefore count only 1 central line day.

---

**Ms. G.**

- Ms. G. is a 7 year old admitted to the ICU from the E.R. on June 1, with 5 day history of fever, vomiting and diarrhea which became bloody 2 days ago. Patient’s oral intake has been very small. Pulse is weak and thready, and patient is hypotensive.

- 6/1- Foley catheter and right subclavian central line placed in ER. Urine, stool and blood cultures collected. IV hydration begun.
Ms. G. Continued

- 6/2- Occult blood in urine and output decreased. Lab reports stool culture growing, suspect *E. coli* 0157: H7

- 6/3- Patient experiencing very low urine output, which is grossly bloody. Moderate bruising present. Labs indicative of anemia, increased reticulocyte count. Left upper extremity PICC line placed. Hemodialysis begun and administered by contract staff via dedicated PICC line. Fluids continue. Corticosteroid therapy begun.

- 6/4- *E. coli* 0157:H7 infection confirmed. Organism present in blood and stool. (This is a BSI present on admission.)

Ms. G. Continued

- 6/6- Hemodialysis, and supportive therapy continues. Labs stable except for slight increase in WBC to 11,700/mm³.

- 6/10- Patient experiences BP fluctuations. Pressors instituted. WBC elevated since yesterday: 15,000/mm³; Blood and urine collected for culture. Urinalysis performed: negative leukocyte esterase and nitrite. WBC: 2/hpf of spun urine.

- 6/11- Blood cultures positive 2 of 2 for MSSA. Urine culture no growth.
Does Ms. G. have an HAI?

A. Yes, this is a CLABSI with MSSA. It meets LCBI Criterion 1.

B. No, the patient had positive blood cultures on admission.

C. No, the patient had an infection at another site.

If so, is it attributable to your facility?

A. No, this should be attributed to the dialysis company since the care and maintenance of the HD was their responsibility.

B. Yes, this should be attributed to your facility because we are responsible for care provided by contracted staff/agencies.

C. Not sure.
Ms. G.

- What if Ms. G. had been transported from her patient room to an inpatient dialysis unit within your hospital each day for her dialysis.

Would such a CLABSI be attributable to the ICU or to the dialysis unit?

A. The CLABSI should be attributed to the dialysis unit since that’s where her central line was most accessed.

B. The CLABSI should be attributed to the ICU, since the dialysis unit is not a “bedded” (inpatient) location.

C. Not sure.

Note: Facilities can create a custom event in NHSN to track such events.
Mr. H.

3/1 - Mr. H, a 66-year-old male is admitted to SICU following robotic assisted LIMA harvest and CBGB. During surgery, patient suffered a right ventricular injury which required a pump-assisted approach for repair. A left groin incision was made for this purpose. The ICD-9-CM code for this repair is 39.61. This is a non-operative procedure (NO) within NHSN. Central line placed in right subclavian vein.

3/3 - Patient progressed well, and was transferred to Intermediate Care Unit with central line.

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Mr. H.

3/5 - Left groin incision with purulent drainage, redness and tenderness. Temp. 100.8 ° F. Aseptically obtained groin wound drainage and blood cultures sent. Vancomycin begun.

3/6 - Groin wound and blood (2 of 2) positive for gram positive cocci.

3/7 - Both cultures positive for MSSA. The wound culture was pure. Antibiotics changed to match sensitivities with 2nd generation cephalosporin.

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Which of the following is true?

A. The patient has a superficial SSI and a CLABSI with MSSA. Both should be reported to NHSN.
B. The patient has a CLABSI with MSSA that should be reported to NHSN.
C. The patient has a SKIN infection with MSSA with a secondary BSI. The BSI would not be reported to NHSN.

Mr. H. Rationale

- Infection onset > 2 days (4) after admission (HAI).
- Central line in place > 2 days and at the time all elements of infection first present together. (device-associated)
- But, the patient meets criteria for infection at another site and the organisms from blood and site, match. (see next slide)

- Note: Since the ICD-9-CM code for the procedure of the involved incision is not an NHSN Operative Procedure, there can be no SSI.
What if the wound drainage was positive for MSSA, but the blood cultures (2 of 2) were positive for *Staphylococcus epidermidis*? Would the patient have an HAI and if so, what type(s)?

A. Yes, the patient has a superficial SSI with MSSA and a CLABSI with *Staphylococcus epidermidis*.

B. Yes, the patient has a SKIN with secondary BSI with both MSSA and *Staphylococcus epidermidis*.

C. Yes, the patient has a SKIN with MSSA and a CLABSI with *Staphylococcus epidermidis*.

D. Not sure.

When a patient suspected of having an infection has blood and a site-specific specimen cultured but the organisms do not match, if the site-specific culture is an element used to meet the infection site criterion (in this case it is, SKIN cr 1) and the blood isolate is also an element used to meet another criterion at the same infection site (in this case SKIN cr 2a), then the BSI is considered secondary to that site-specific infection.

*Appendix 1 Secondary BSI Guide- NHSN Manual Chapter 4 CLABSI Event*
Mr. I.

- 55-year-old male brought to the ED on 6/17 with multiple injuries from a motor vehicle accident. IV catheters (18g) were inserted (R) forearm and (L) forearm by EMS. Normal saline at 80 ml/hr infusing through each line. Foley cath inserted.

- PMH: L inguinal hernia repair 2 years ago. IDDM.


Mr. I.

- To OR on 6/17. Surgical Procedures: performed: ORIF L femur, splenectomy, repair of small bowel. Duration: 5 hr, 35 min., primary closure, general anesthesia. ASA class 4E, wound class contaminated (III).
Mr. I.

<table>
<thead>
<tr>
<th>DATE</th>
<th>TEMP</th>
<th>DIAGNOSTIC FINDINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/17/10</td>
<td>99.0</td>
<td>All dressings CDI. Foley catheter draining clear yellow urine. NG tube in place. Pt. on pain pump</td>
</tr>
<tr>
<td>6/18/10</td>
<td>99.6</td>
<td>Central line inserted in L IJ. Dressings CDI Foley draining clear yellow urine.</td>
</tr>
<tr>
<td>6/19/10</td>
<td>99.0</td>
<td>TPN started. Dressings changed. Wounds look ok. Foley draining clear yellow urine.</td>
</tr>
<tr>
<td>6/20-6/25</td>
<td>99.2</td>
<td>Pt continues to improve</td>
</tr>
<tr>
<td>6/27</td>
<td>100.0</td>
<td>Urine culture from 6/26 positive. GNR &gt;100,000 CFU/ML, BCs no growth so far.</td>
</tr>
<tr>
<td>6/28</td>
<td>99.2</td>
<td>Urine GNR ID-P. aeruginosa. Blood culture from central line positive for E. coli, set from R arm positive for E. coli.</td>
</tr>
<tr>
<td>7/1</td>
<td>98.0</td>
<td>Foley d/c and patient transfer to inpatient rehab</td>
</tr>
</tbody>
</table>

Does the patient have an HAI?

1. No, the patient does not have an HAI.
2. Yes, the patient has an HAI.

All elements of infection criterion were first present together on or after the 3rd hospital day (day of hospital admission is day 1).
If so, which type of HAI?

A. The patient only has a CLABSI with *E. coli*.
B. The patient has a SUTI with *P. aeruginosa* and a CLABSI with *E. coli*.
C. The patient only has a SUTI with *P. aeruginosa*.
D. The patient has a SUTI with both *P. aeruginosa* and *E. coli*.

In a patient suspected of having an infection, where blood and a site-specific specimen are collected for culture but the organisms do not match, if the site-specific culture is an element used to meet the infection site criterion and the blood isolate is not, then the BSI is considered a primary infection. There is no SUTI criterion utilizing a blood culture as one of the elements.

Mr. I Continued

- **Patient meets CAUTI- SUTI Criterion 1a.**
  - Indwelling urinary catheter present; fever; positive urine culture ≥ 100,000 organisms with < 2 species.

- **Patient meets LCBI- Criterion 1**
  - Patient has a recognized pathogen cultured from one or more blood cultures and organism cultured from blood is not related to an infection at another site.

**Note:**
- *Fever is a non-specific symptom of infection and maybe applied to multiple HAI criterion.*
Baby X.

10/3: A 2 week old, 26-week gestational age infant is transferred from another hospital to your level II/III nursery with a right lower extremity PICC in place. Baby was weaned from the ventilator 2 days prior to transfer and now remains on 2 liters of oxygen by hood.

KB

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Baby X.

10/5: 36 hours after transfer to your facility, the baby is irritable, and his respiration rate has slowly increased from admission rate of 46/min to current rate of 80/min. He has nasal flaring and chest retractions. Heart rate high at 175 bts/min. Rales are present in the right lung. Desaturations to 88% are noted. Oxygen is increased to 4 liters. A chest x-ray reveals probable pneumatoceles in the lower right lung. 1 set of blood cultures are collected through the PICC line and empiric antibiotics begun.

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Baby X.

- 10/6: CXR shows probable pneumatoceles in RLL. WBC: 3500/mm³.
- 10/7: Blood cultures reveal *Acinetobacter baumanii*.

Which of the following is true?

A. This is not a primary BSI; it is secondary to an infection at another site (pneumonia). The secondary BSI would not be reported to NHSN.

B. This is a primary BSI (CLABSI) and should be reported to NHSN.

C. This is a secondary BSI and should be reported to NHSN.
Should an HAI be attributed to your hospital or to the transferring facility?

A. The HAI should be attributed to your hospital.
B. The HAI should be attributed to the transferring facility.
C. The HAI should not be attributed to either facility.
D. Not sure.
Baby X.

Transfer Rule: If all elements of an HAI are present within 2 calendar days of transfer from one inpatient facility to another, the HAI is attributed to the transferring facility. Receiving facilities should share information about such HAIs with the transferring facility to enable reporting.

<table>
<thead>
<tr>
<th>Date</th>
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<th>10/4</th>
<th>10/5</th>
<th>10/6</th>
<th>10/7</th>
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</thead>
<tbody>
<tr>
<td>Location</td>
<td>Transfer to NICU (II/III) from outside hospital</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Central Line</td>
<td>PICC</td>
<td>PICC</td>
<td>PICC</td>
<td></td>
<td></td>
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<tr>
<td>PNU2 criteria</td>
<td></td>
<td></td>
<td></td>
<td>Criterion first present together</td>
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</tr>
<tr>
<td>Blood culture collected (results)</td>
<td></td>
<td></td>
<td>X (A. baumanii)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ms. Y.

4/5: Ms. Y. a 50 year old patient, has been on the unit for 7 days receiving induction chemotherapy for Diffuse Large B Cell Lymphoma and has had a central line throughout. Because of tachycardia she has blood cultures x2 drawn. No other signs/symptoms.

4/7: 1 set grows Bacillus cereus and Bacteroides fragilis. 1 bottle from the second set is positive for Bacteroides fragilis and E. coli.
Case 4: Laboratory information

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<tr>
<th></th>
<th>Mar 29</th>
<th>Mar 30</th>
<th>Mar 31</th>
<th>Apr 1</th>
<th>Apr 2</th>
<th>Apr 3</th>
<th>Apr 4</th>
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<th>Day -4</th>
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<th>Day -2</th>
<th>Day -1</th>
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<tr>
<td>ANC or WBC &lt; 500?</td>
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<td>X</td>
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<td>X</td>
<td>X</td>
<td></td>
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</tbody>
</table>

Which of the following is true?

1. No LCBI criteria are met.
2. Patient has an LCBI-1 with Bacillus cereus, Bacteroides fragilis, and E. coli reported.
3. Patient has an MBI-LCBI 1 with B. fragilis and E. coli reported only.
4. Patient has an MBI-LCBI 2 with only Bacillus cereus reported.
Ms. Y.

<table>
<thead>
<tr>
<th></th>
<th>Mar 29</th>
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<th>Apr 1</th>
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<tr>
<td>WBC</td>
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<th>-1</th>
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<th>+2</th>
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<tbody>
<tr>
<td>ANC or WBC &lt; 500?</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Is neutropenic with at least 2 days ANC or total WBC < 500 between on or within 3 calendar days before positive blood culture collected

+ Eligible Pathogen (Bacteroides spp., E. coli)
+ No other pathogen isolated (single culture of Bacillus does not exclude)

Meets criteria for MBI-LCBI 1

Well Done!
Thank you!

NHSN@cdc.gov