Criteria to Define CLABSI and SSI

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Objectives

- Review BSI and SSI criteria
- Review definition of central line
- Review secondary BSI definition
- Identify resources needed accurately identify CLABSI and SSI
Healthcare-associated Infection (HAI)

- A localized or systemic condition resulting from an adverse reaction to the presence of an infectious agent(s) or its toxin(s) that
  - Occurs in a patient in a healthcare setting and
  - Was not present or incubating at the time of admission, unless the infection was related to a previous admission

- When the setting is a hospital, meets the criteria for a specific infection (body) site as defined by CDC (Chapter 17 of NHSN Manual)
Central Line-associated Bloodstream Infection (CLABSI)

- Major Event Type: BSI
- Specific Event Type: Laboratory Confirmed Bloodstream Infection (LCBI)
Central Line-associated Bloodstream Infection (CLABSI)

- **CLABSI** = Primary BSI that develops in a patient that had a central line within the 48 hours prior to the infection onset

- **Primary BSI** = BSI that is not secondary to an infection at another site

**NOTE:** There is no minimum time period that the central line must be in place in order for the BSI to be considered central line-associated.
Central Line Definition

- Central line: An intravascular catheter that terminates at or close to the heart or in one of the great vessels which is used for infusion, withdrawal of blood, or hemodynamic monitoring.

- The following are considered great vessels for the purpose of reporting central line-associated BSI and counting central line days in the NHSN system:
  - Aorta
  - Pulmonary artery
  - Superior vena cava
  - Inferior vena cava
  - Brachiocephalic veins
  - Internal jugular veins
  - Subclavian veins
  - External iliac veins
  - Common iliac veins
  - Femoral veins
  - In neonates, umbilical artery/vein
Central Line Definition

Infusion: The introduction of a solution through a catheter lumen into a blood vessel

Includes:

- Continuous infusions such as nutritious fluids or medications
- Intermittent infusions such as flushes or IV antimicrobial administration
- Administration of blood or blood products in the case of transfusion or hemodialysis
Central Line Definition

- An introducer is considered an intravascular catheter, and depending on the location of its tip, may be a central line.
- Pacemaker wires and other non-lumened devices inserted into central blood vessels or the heart are not considered central lines, because fluids are not infused, pushed, nor withdrawn through such devices.
- The following devices are not considered central lines: extracorporeal membrane oxygenation (ECMO), femoral arterial catheters, and Intraaortic balloon pump (IABP) devices.
- *If you have a question about whether a device qualifies as a central line, please email us at NHSN@cdc.gov.*
BSI Secondary to Infection at Another Site

- A culture-confirmed BSI associated with a documented HAI at another site

- Primary infection site must meet one of criteria found in the CDC/NHSN definitions (Chapter 17)

Secondary BSI

- If the criterion met for the primary infection site requires a culture, then at least one organism from that site must match an organism in the blood culture (antibiograms of the isolates do not have to match)

  - Example: Patient grows *E. coli* in her deep incision and in her blood. The SSI is reported with a secondary BSI.

Secondary BSI (cont.)

- If criterion met for the primary infection site does not require a culture and the blood isolate is a logical pathogen for the site, report as secondary BSI.

Example: 6 days postoperatively, patient had fever, vomiting, and an abdominal abscess confirmed by CT scan. On the same day, his blood was drawn and grew *Bacteroides fragilis*. The infection was reported as an SSI-IAB with a secondary BSI. The organism was reported as *B. fragilis*.

Secondary BSI Guide

Positive Blood Culture

Does patient meet the criteria for HAI at another site? (If infection is CA, or if NHSN criteria for the specific site HAI have not been met, answer "No").

CA or HA?

NO

HA

Primary BSI

CA

This CA infection with secondary BSI is not reported through NHSN nor is the BSI

YES

Is blood isolate a logical pathogen for this site?

YES

Primary BSI

NO

Site infection with secondary BSI

Legend

BSI= bloodstream infection
CA= Community acquired
HA= Healthcare associated
HAI= healthcare-associated infection

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.

Example: Mr. Smith had a PICC line inserted on admission (June 1). On hospital day 4, he became confused and experienced chills. Blood cultures were drawn which grew *E. faecalis*.

Mr. Smith meets the criteria for LCBI Criterion 1.
One 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).

“Recognized pathogen” does not include organisms considered common commensals.

A few of the recognized pathogens are *Staphylococcus aureus*, *Enterococcus* spp., *E. coli*, *Pseudomonas* spp., *Klebsiella* spp., *Candida* spp., etc.
LCBI Criterion 2

Patient has at least one of the following signs or symptoms: fever (>38°C), chills or hypotension and signs and symptoms and positive laboratory results are not related to an infection at another site and

common commensal* is cultured from two or more blood cultures drawn on separate occasions.

*Diphtheroids [Corynebacterium spp.]
Bacillus [not B. anthracis] spp.
Propionibacterium spp.
Coagulase-negative staphylococci [including S. epidermidis]
Viridans group streptococci
Aerococcus spp.
Micrococcus spp.
LCBI Criterion 3

Patient ≤ 1 year of age has at least one of the following signs or symptoms: fever (>38°C core), hypothermia (<36°C core), apnea, or bradycardia

and

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

and

common commensal* is cultured from two or more blood cultures drawn on separate occasions.

*Diphtheroids [Corynebacterium spp.]
Bacillus [not B. anthracis] spp.
Propionibacterium spp.
Coagulase-negative staphylococci [including S. epidermidis]
Viridans group streptococci
Aerococcus spp.
Micrococcus spp.
Common Commensal List

- www.cdc.gov/nhsn → Resource Library → NHSN Codes and Variables → Common Skin Contaminant List (June 2011)

- 62 choices!
Note

- LCBI criteria 1 and 2 may be used for patients of ANY age, including those 1 year old or less.

- LCBI criterion 3 only applies to patients who are 1 year old or less.
Collecting Blood Culture Specimens

Ideally, blood specimens for culture should be obtained from two to four 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 NHSN criteria, but you should work with appropriate personnel to facilitate better specimen collection practices for blood cultures.
The phrase “two or more blood cultures (BC) drawn on separate occasions” means:
1. That blood from at least two blood draws were collected within two days of each other,
   And
2. That at least one bottle from each blood draw is reported by the laboratory as having grown the same common commensal(s) (i.e., is a positive BC)
More details for Criteria 2 and 3

Determining “sameness” of two organisms

Assume that the organisms are the same if the organism from one blood culture is identified to both genus and species level and the companion culture identifies only the genus with or without other attributes.

Example:

– Culture 1: *S. epidermidis*
  
  Culture 2: *Coagulase-negative staphylococci*
  
– Report the genus/species as *S. epidermidis* to NHSN

<table>
<thead>
<tr>
<th>Culture</th>
<th>Companion Culture</th>
<th>Report as...</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Bacillus spp. (not anthracis)</em></td>
<td><em>B. cereus</em></td>
<td><em>B. cereus</em></td>
</tr>
<tr>
<td><em>S. salivarius</em></td>
<td><em>Strep viridans</em></td>
<td><em>S. salivarius</em></td>
</tr>
</tbody>
</table>
More details for Criteria 2 and 3

Determining “sameness” of two organisms (cont.)

- Antibiograms are no longer utilized to determine the sameness of two organisms.
- Report the more resistant organism.

Examples:

<table>
<thead>
<tr>
<th>Organism Name</th>
<th>Isolate A</th>
<th>Isolate B</th>
<th>Interpret as...</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>S. epidermidis</em></td>
<td>All drugs $S$</td>
<td>All drugs $S$</td>
<td>Same</td>
</tr>
<tr>
<td><em>S. epidermidis</em></td>
<td>OX $R$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GENT $R$</td>
<td>OX $S$</td>
<td>GENT $S$</td>
</tr>
</tbody>
</table>
Criteria for Surgical Site Infections

Superficial Incisional SSI

A superficial incisional SSI (SIP or SIS) must meet the following criterion:

Infection occurs within 30 days after the operative procedure and involves only skin and subcutaneous tissue of the incision and patient has at least one of the following:

a. purulent drainage from the superficial incision
b. organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision
c. at least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat, and superficial incision is deliberately opened by surgeon, and is culture-positive or not cultured. A culture-negative finding does not meet this criterion.
d. diagnosis of superficial incisional SSI by the surgeon or attending physician.
SIP and SIS

**Superficial incisional primary (SIP)**

A superficial incisional SSI that is identified in the primary incision in a patient that has had an operation with one or more incisions. Examples:
- C-section incision
- Chest incision for coronary artery bypass graft with a donor site [CBGB]

**Superficial incisional secondary (SIS)**

A superficial incisional SSI that is identified in the secondary incision in a patient that has had an operation with more than one incision. Example:
- Donor site incision for coronary artery bypass graft with a donor site [CBGB]
Example

Patient delivers a baby by C-Section on August 23. On her first postpartum visit to her surgeon on September 20, she notes yellow purulent drainage in the superficial incision.

Does Gretchen have a surgical site infection?
Example

Patient underwent a coronary artery bypass graft (CBGB) in which the surgeon obtained a donor vessel from a site in the patient’s left leg.

5 days postoperatively, patient had pain and edema in the leg incision. The surgeon opened the superficial incision, drained the pus, and irrigated the wound.

Does the patient have a superficial incisional SSI?
Deep Incisional SSI

A deep incisional SSI (DIP or DIS) must meet the following criterion:

Infection occurs within 30 days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure and involves deep soft tissues (e.g., fascial and muscle layers) of the incision and patient has at least one of the following:

a. purulent drainage from the deep incision but not from the organ/space component of the surgical site
b. a deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or not cultured when the patient has at least one of the following signs or symptoms: fever (>38°C), or localized pain or tenderness. A culture-negative finding does not meet this criterion.
c. an abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination
d. diagnosis of a deep incisional SSI by a surgeon or attending physician.
Deep incisional primary (DIP)
A deep incisional SSI that is identified in the primary incision in a patient that has had an operation with one or more incisions.
Examples:
- C-section incision
- Chest incision for coronary artery bypass graft with a donor site [CBGB]

Deep incisional secondary (DIS)
A deep incisional SSI that is identified in the secondary incision in a patient that has had an operation with more than one incision.
Example:
- Donor site incision for coronary artery bypass graft with a donor site [CBGB]
Endoscope

- If more than one of the endoscopic/robotic incisions becomes infected, report only one SSI
  - If one is a superficial incisional SSI and another is a deep incisional SSI, report as a deep incisional SSI
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 one 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 one of the following:

a. purulent drainage from a drain that is placed through a stab wound into the organ/space
b. organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space
c. 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.
### Organ/Space SSI

<table>
<thead>
<tr>
<th>Organ/Space</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BONE</td>
<td>Osteomyelitis</td>
</tr>
<tr>
<td>JNT</td>
<td>Joint or bursa</td>
</tr>
<tr>
<td>BRST</td>
<td>Breast abscess/mastitis</td>
</tr>
<tr>
<td>LUNG</td>
<td>Other infections of respiratory tract</td>
</tr>
<tr>
<td>CARD</td>
<td>Myocarditis/pericarditis</td>
</tr>
<tr>
<td>MED</td>
<td>Mediastinitis</td>
</tr>
<tr>
<td>DISC</td>
<td>Disc space</td>
</tr>
<tr>
<td>ORAL</td>
<td>Oral cavity</td>
</tr>
<tr>
<td>EAR</td>
<td>Ear, mastoid</td>
</tr>
<tr>
<td>OREP</td>
<td>Other respiratory</td>
</tr>
<tr>
<td>EMET</td>
<td>Endometritis</td>
</tr>
<tr>
<td>OUTI</td>
<td>Other urinary</td>
</tr>
<tr>
<td>ENDO</td>
<td>Endocarditis</td>
</tr>
<tr>
<td>SA</td>
<td>Spinal abscess</td>
</tr>
<tr>
<td>EYE</td>
<td>Eye, other than conjunctivitis</td>
</tr>
<tr>
<td>SINU</td>
<td>Sinusitis</td>
</tr>
<tr>
<td>GIT</td>
<td>GI tract</td>
</tr>
<tr>
<td>UR</td>
<td>Upper respiratory</td>
</tr>
<tr>
<td>IAB</td>
<td>Intraabdominal, NOS</td>
</tr>
<tr>
<td>VASC</td>
<td>Arterial or venous</td>
</tr>
<tr>
<td>IC</td>
<td>Intracranial</td>
</tr>
<tr>
<td>VCUF</td>
<td>Vaginal cuff</td>
</tr>
</tbody>
</table>

Specific sites of infection must be used to differentiate organ/space SSI and their criteria must also be met. Use Chapter 17.
CDC/NHSN Surveillance Definition of Healthcare-Associated Infection and Criteria for Specific Types of Infections in the Acute Care Setting

This chapter contains the CDC/NHSN surveillance definition of healthcare-associated infection (HAI) and criteria for all specific types of HAI. These criteria include those for the “Big Four” infection types (surgical site infection [SSI], pneumonia [PNEU], bloodstream infection [BSI] and urinary tract infection [UTI]), outlined in earlier chapters of this manual, as well as criteria for other types of HAI. Of particular importance, this chapter provides further required criteria for the specific event types that constitute organ/space SSIs (e.g., mediastinitis [MED] that may follow a coronary artery bypass graft, intra-abdominal abscess [IAB] after colon surgery). Additionally, it is necessary to refer to the criteria in this chapter when determining whether a positive blood culture represents a primary BSI or is secondary to a different type of HAI. A BSI that is identified as secondary to another site of infection must meet one of the criteria of HAI detailed in this chapter. Secondary BSIs are not reported as separate events in NHSN, nor can nor should they be associated with a central line.
Chapter 17

NOTE: Some CDC/NHSN definitions and criteria have been updated since the table contained in this chapter was published. In such cases, the criteria which are no longer valid have been listed and the updated criteria listed in the table below. For the “big 4” infections, i.e., CLABSI, SSI, hospital-acquired pneumonia (HAP), and ventilator-associated pneumonia (VAP), it may be simpler to refer to the specific protocol chapter in the manual, e.g., Chapter 4 for CLABSI surveillance.

<table>
<thead>
<tr>
<th>Section</th>
<th>Update</th>
<th>Document/Article Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added 1/1/2012:</td>
<td>In those situations where a patient meets criteria for more than one specific site of infection within a major infection site category (e.g., meets criteria for both SKIN and ST within the SST category), report only the more “serious” specific site of infection (e.g., ST).</td>
<td></td>
</tr>
<tr>
<td>UTI-Urinary Tract Infection:</td>
<td>Changed as of 1/1/2009. See Appendix, pages 17-27 through 17-30.</td>
<td>310</td>
</tr>
<tr>
<td>• SUTI-Symptomatic urinary tract infection</td>
<td>1) SUTI- criteria dependent on current, recent or no presence of indwelling urinary catheter and age of patient.</td>
<td></td>
</tr>
<tr>
<td>• ASB-Asymptomatic bacteriuria</td>
<td>2) ASB- removed as specific infection type.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3) Specific infection type - (progressive symptoms)</td>
<td></td>
</tr>
</tbody>
</table>
Resources for CLABSI and SSI Surveillance

National Healthcare Safety Network (NHSN)

The National Healthcare Safety Network (NHSN) is a secure, internet-based surveillance system that integrates and expands legacy patient and healthcare personnel safety surveillance systems managed by the Division of Healthcare Quality Promotion (DHQP) at CDC. NHSN also includes a new component for hospitals to monitor adverse reactions and incidents associated with receipt of blood and blood products. Enrollment is open to all types of healthcare facilities in the United States, including acute care hospitals, long term acute care hospitals, psychiatric hospitals, rehabilitation hospitals, outpatient dialysis centers, ambulatory surgery centers, and long term care facilities. For more information, click on the topics below.

Topics
- Join NHSN
- About NHSN
- Forms
- NHSN Manuals
- Resource Library
- Enrollment Requirements
- Training
- Patient Safety Component
- Biovigilance Component
- Healthcare Personnel Safety Component
- Dialysis Facilities
- Data & Statistics
- Communication Updates
- Contact NHSN

http://www.cdc.gov/nhsn/index.htm
Resources for CLABSI Surveillance

- NHSN Forms (January 2012)
  - 57.106: Monthly Reporting Plan
  - 57.108: Urinary Tract Infection
  - 57.116: Denominator for NICU
  - 57.117: Denominator for SCA
  - 57.118: Denominator for ICU/Other

http://www.cdc.gov/nhsn/forms/Patient-Safety-forms.html
Resources for CLABSI Surveillance

  - Ch 3: Monthly Reporting Plan
  - Ch 4: CLABSI Protocol
  - Ch 14: Tables of Instructions - Tables 1, 2, 2a, 6, 7, and 8
  - Ch 16: Key Terms
  - Ch 17: Criteria for Specific Infections

http://www.cdc.gov/nhsn/TOC_PSCManual.html
Resources for CLABSI Surveillance

- Interactive Training Courses
  - Introduction to the Device-associated Module
  - CLABSI
    http://www.cdc.gov/nhsn/Training/patient-safety-component.html#

- Operational guidance document for Acute Care Hospitals to report CLABSIs for CMS
Resources for SSI Surveillance

- NHSN Forms (January 2012)
  - 57.106: Monthly Reporting Plan
  - 57.120: Surgical Site Infection
  - 57.121: Denominator for Procedure

http://www.cdc.gov/nhsn/forms/Patient-Safety-forms.html
Resources for SSI Surveillance

  - Ch 1: NHSN Overview: Surveillance Techniques and Procedure-Associated Module
  - Ch 3: Monthly Reporting Plan
  - Ch 9: SSI Protocol
  - Ch 14: Tables of Instructions - Tables 2a, 12, and 13
  - Ch 16: Key Terms
  - Ch 17: Infection Site Definitions

http://www.cdc.gov/nhsn/TOC_PSCManual.html
Resources for SSI Surveillance

- Mapping of ICD-9-CM Procedure Codes to NHSN Operative Procedure Categories
  http://www.cdc.gov/nhsn/XLS/ICD-9-cmCODEScurrent.xlsx

- Interactive Training Courses
  - Introduction to the Procedure-associated Module
  - SSI
  http://www.cdc.gov/nhsn/Training/patient-safety-component.html#

- Operational guidance document for Acute Care Hospitals to report SSIs for CMS
Customize Chart Review Process for You/Your Facility

Questions to ask/explore:

- What computer databases does the facility have (lab, pharmacy, etc.)?
- Is the medical record paper, on-line or both? What is available where?
- Where do I obtain the information needed to assess the criteria?
- Do you have access to the information you need? If not, get access. Develop a collaborative relationship with someone in IS/IT who knows the databases.
Chart Review

- Maintain focus on criteria. Don’t deviate from the process you have established.

- Standardized chart review helps with learning and time efficiency.
CLABSI Chart Review

Process

Organize: What are you going to look at first and where is it in the record?

1. Blood culture results (lab database)
2. Central line in place within criteria? (Nursing documentation? Graphic sheet?)
3. If Yes to the above, are there signs suggestive of an underlying infection at another site? (Nurse & MD notes; procedure notes; lab reports; radiology reports)
SSI Surveillance Methods

- Determine which surgical patients you will monitor
- Review admission and OR logs
- Review patient charts for signs and symptoms of SSI, risk factors
- Review lab, Xray, other diagnostic test data and reports
- Review nurses and physician notes
- Visit the ICU and wards – talk to primary care staff
Post-discharge SSI Surveillance Methods

- Surgeon and/or patient surveys by mail or phone
  - Develop a tool that includes the SSI and most common specific infection site criteria for the operative procedures being monitored
  - Train surgeons and their office staff
- Review of postoperative clinic records

Criteria must be met regardless of where the SSI is detected!