Using the National Healthcare Safety Network for CLABSI Surveillance

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October 2, 2012

Updated November 28, 2012

Nothing to Disclose

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

Slide Update #s

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* There will be an “Updated Slide” note on each slide.

Objectives

1. **Identify requirements for CLABSI reporting to CMS through the National Healthcare Safety Network (NHSN)**
2. **Identify the protocol, definitions, and criteria for central line-associated bloodstream infections (CLABSI) including the new criteria for Mucosal Barrier Injury-Laboratory Confirmed Bloodstream Infection (MBI-LCBI).**
3. **State the correct definitions of new Key Terms for healthcare-associated and device-associated infections.**
4. **State the method to correctly identify central line days in different types of facility locations.**

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CLABSI Epidemiology

- **Estimated 12 million central line days in US ICUs each year**
- **Estimated 41,000 CLABSI annually hospital wide**
  - 18,000 CLABSI annually in ICUs
- **Increased length of stay and morbidity**
- **Cost varies (2007 dollars): $7,000 to $29,000 per episode**

Vital Signs: Central line-associated bloodstream infections -- United States, 2001, 2008, and 2009. MMWR March 4, 2011; 60(08);243-248.

Scott, Douglas II (2008). The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention. March 2009. http://www.cdc.gov/hai/pdfs/hai/scott_costpaper.pdf

CMS Reporting via NHSN – Current

HAI Event	Facility Type	Reporting Start Date
CLABSI	Acute Care Hospitals Adult, Pediatric, and Neonatal ICUs	January 2011
CAUTI	Acute Care Hospitals Adult and Pediatric ICUs	January 2012
SSI	Acute Care Hospitals Colon and Abdominal Hysterectomy	January 2012
I.V. antimicrobial start	Dialysis Facilities	January 2012
Positive blood culture	Dialysis Facilities	January 2012
Signs of vascular access infection	Dialysis Facilities	January 2012
CLABSI	Long Term Care Hospitals *	October 2012
CAUTI	Long Term Care Hospitals *	October 2012
CAUTI	Inpatient Rehabilitation Facilities	October 2012
MRSA Bacteremia	Acute Care Hospitals	January 2013
C. difficile LabID Event	Acute Care Hospitals	January 2013
HCW Influenza Vaccination	Acute Care Hospitals	January 2013
HCW Influenza Vaccination	ASCs	October 2014
SSI *(TBD)*	Outpatient Surgery/ASCs	TBD
* Long Term Care Hospitals are called **Long Term Acute Care Hospitals** in NHSN		

Centers for Medicare and Medicaid Services Inpatient Prospective Payment System (CMS IPPS)

- **Facilities participating in the Hospital Quality Reporting Program must submit the data quarterly, whether or not they have central-line days.**
- **Acute care facilities that do not have ICU beds currently are not required to enroll in the NHSN but must sign a waiver. Check with state QIO.**
- **For more on the IPPS requirements visit http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/FY-2012-IPPS-Final-Rule-Home-Page.html**
- **For information on training and enrollment requirements for NHSN visit www.cdc.gov/nhsn/cms-ipps-rule_training.html**

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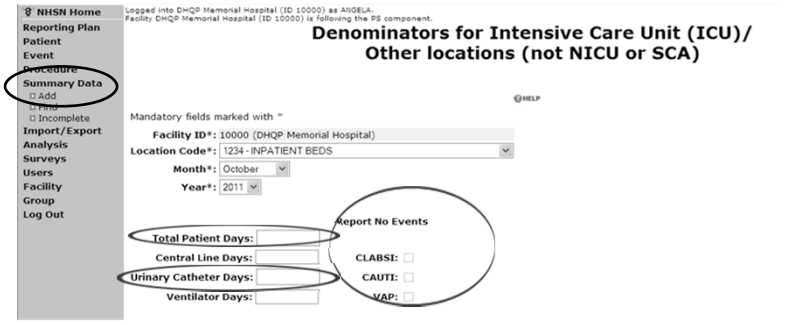
Reporting Numerator and Denominator Data

- CMS reportable data MUST be included in monthly reporting plans.
- Report each CLABSI detected or indicate that no CLABSI occurred for reporting locations. **(Found on Denominator screen).**
- Report total device days and total patient days for reporting locations, including months in which no CLABSIs were identified and/or no patient days or central line days occurred.



NHSN and CMS

- Data must be reported to NHSN by means of manual data entry into NHSN web-based application or via file imports using the Clinical Document Architecture (CDA) file format.
- Data must be submitted monthly (within 30 days of the end of the month in which it is collected) so it has the greatest impact on infection prevention activities.
- For data to be shared with CMS, each quarter's data must be entered into NHSN no later than 4 ½ months after the end of the quarter.
- E.g. Q1 (January-March) data must be entered into NHSN by August 15; Q2 by November 15; Q 3 by February 15 and Q4 by May 15 (frozen @00:00 on 16th).

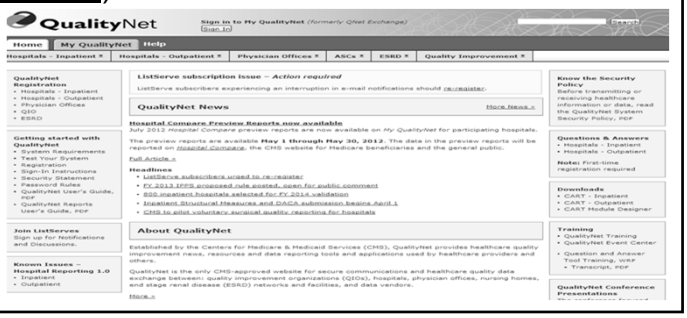
NHSN and CMS

- CLABSI data submitted to NHSN by HQRP hospitals that completed Annual Payment Update (APU) pledges as well as LTACs will be reported by CDC to CMS.
- CDC will provide the following hospital specific data:
  - number of observed CLABSIs
  - number of expected CLABSIs calculated using NHSN database
  - number of central line days
  - hospital-specific CLABSI standardized infection ratio (SIR)
  - 95% CI

http://www.cdc.gov/nhsn/PDFs/FINAL-ACH-CAUTI-Guidance.pdf

NHSN and CMS

- Hospitals can view their own HAI summary statistics at a secure CMS website where the APU Dashboard is posted (for more information see http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetBasic&cid=1228694346716) .



NHSN and CMS
Long Term Acute Care Facilities

- Each LTAC with a separate CCN number must enroll in NHSN as a separate facility.
- Map each of their inpatient locations to the appropriate CDC-defined location type (see Chapter 15 of NHSN manual).
- All other operational guidelines described with Acute Care guidance.

CLABSI Prevention and Control begins with thorough surveillance and quality data!!!

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Surveillance Methodology

CLABSI Surveillance requires:

- Active
- Prospective
- Priority-directed surveillance that will yield risk-adjusted incidence rates

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Consistency is a Must!

- Surveillance criteria is designed to look at a population at risk
- Identify patients meeting the criteria
- Consistently apply the criteria
- Ensures the comparability of the data-- protects your facility and others

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What If There is Clinical Disagreement?

- Surveillance vs. clinical definitions
  - Different purposes: population/trends/prevention vs. individual/diagnosis/treatment
  - May not agree
  - Comments section useful to note important factors

Surveillance determination "TRUMPS" clinical determination

- Can submit questions to nhsn@cdc.gov

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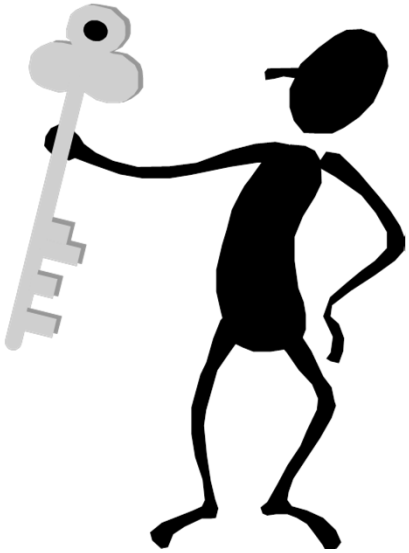
Key Terms



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Investigating an Infection

Ask yourself questions in this order:
1. Is it a HAI? If not, stop.
2. If an HAI, which site-specific criterion is met?
3. Is this a device-associated HAI?
4. Attributable to what location/facility/procedure?

Depending on the specifics of your surveillance, i.e., only device-associated, only certain locations, the order may differ.

Key Terms

Healthcare-associated Infection (HAI)	An infection is considered an HAI if 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). For an HAI, an element of the infection criterion may be present during the first 2 hospital days as long as it is also present on or after day 3. All elements used to meet the infection criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between elements.
Device-associated HAI	An infection meeting the HAI definition is considered a device-associated HAI if the device was in place for >2 calendar days when all elements of a CDC/NHSN site-specific infection criterion were first present together. HAIs occurring on the day of device discontinuation or the following calendar day are considered device-associated HAIs if the device had been in place already for >2 calendar days.
Date of Event	For an HAI (excludes VAE), the date of event is the date when the last element used to meet the CDC/NHSN site-specific infection criterion occurred. Synonyms: infection date, date of infection. (See Date of Onset for VAE reporting)
Transfer Rule	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. Likewise, 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.
Date of Onset	For a VAE, the date of onset is the date of worsening oxygenation. This is further defined as the first calendar day in which the daily minimum PEEP or FiO_2 increased above the thresholds outlined in the VAE algorithm. Beginning in 2013, this term will be used for VAE reporting only and this definition will no longer be a synonym for Date of Event.

Healthcare Associated Infection (HAI)

- HAI: An infection is considered an HAI if 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). For an HAI, an element of the infection criterion may be present during the first 2 hospital days as long as it is also present on or after day 3. All elements used to meet the infection criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between elements.

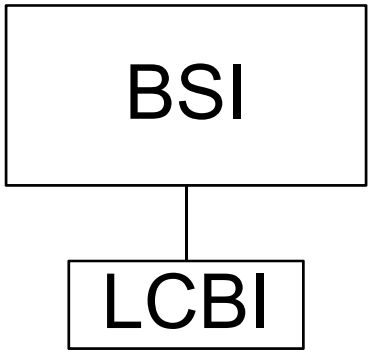
HAI

Rules	Day 1	Day 2	Day 3	Day 4	
HAI	Admit from ED to ICU	ICU All element of Infection criterion first present together	ICU		Not an HAI
HAI	Direct Admit to ICU	ICU	ICU All elements of infection criterion first present together		HAI attributable to ICU
HAI	Direct Admit to 4W	4W An element of criterion present	4W All elements of infection criterion first present together		HAI attributable to 4W

CALENDAR DAYS

Central Line-associated Bloodstream Infection (CLABSI)

- CLABSI surveillance utilizes the Major Event Type: BSI
- Specific Event Type: Laboratory Confirmed Bloodstream Infection (LCBI)



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Key Term: Date of Event

- **Date of Event: For an HAI (excludes VAE), the date of event is the date when the last element used to meet the CDC/NHSN site-specific infection criterion occurred. Synonyms: infection date, date of infection. (See Date of Onset for VAE reporting)**

Device-associated Rule

- A [illegible]on meeting the HAI definition is considered a de[illegible]associated HAI if the device has been in place for > 2 calendar days when all elements of a CDC/NHSN site-specific infection criterion were first present together. HAIs occurring on day of device discontinuation or the following day, are considered device-associated HAIs if the device had been in place already for > 2 calendar days.

Key Term: Central Line-associated Bloodstream Infection (CLABSI)

Central line-associated BSI: An LCBI where a central line (CL) or umbilical catheter (UC) was in place for >2 calendar days, with day of device placement being Day 1, when all elements of criterion were first present together. An LCBI occurring on the day of CL/UC discontinuation or the following calendar day are considered CLABSIs if the CL/UC had been in place > 2 calendar days.

NOTE: If admitted or transferred into a facility with a CL/UC in place (e.g., tunneled or implanted central line), day of first access is considered Day 1.

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Device-association

Key Terms	Day 1	Day 2	Day 3	Day 4	Infection is…
Device Associated	Device inserted	Device in place	Device in place All elements of infection criterion first present together		Device associated
Device Associated	Device inserted	Device in place All elements of infection criterion first present together			Not device associated
Device Associated	Device inserted	Device in place part of day only	All elements of infection criterion first present together		Not device associated
Device Associated	Device inserted	Device in place An element of infection criterion present	Device in place All elements of infection criterion first present together		Device associated
Device Associated	Device that has been in place for 4 days is removed	No device in place	All elements of infection criterion first present together		Not device associated
Device Associated	Device that has been in place for 4 days is removed	All elements of infection criterion first present together			Device associated

Key Term: Central Line

- **An intravascular catheter that terminates at or close to the heart or in one of the <u>great vessels</u> which is used for infusion, withdrawal of blood, or hemodynamic monitoring. The following are considered great vessels for the purpose of reporting central-line BSI:**

- Aorta
- Pulmonary arteries
- Superior vena cava
- Inferior vena cava
- Brachiocephalic veins
- Internal jugular veins
- Subclavian veins
- External iliac veins
- Common iliac veins
- Femoral veins
- Umbilical artery and vein (in neonates)

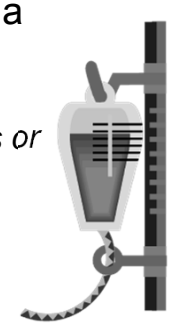
Note: Femoral ARTERIES are not great vessels

Key Term: Infusion

Infusion: 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*



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Central Line Notes

- **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 <u>not</u> considered central lines, because fluids are not infused, pushed, nor withdrawn through such devices.**
- **The following devices are <u>not</u> 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 <u>NHSN@cdc.gov</u>.***

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Key Terms: Location of Attribution and Transfer Rule

- **Location of Attribution: The inpatient location where the patient was assigned on the date of the event, which is further defined as the date when the last element used to meet the infection criterion occurred.**
- **Exceptions:**
- **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.**
- **Likewise, 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.**
- **These exceptions are called the Transfer Rule**

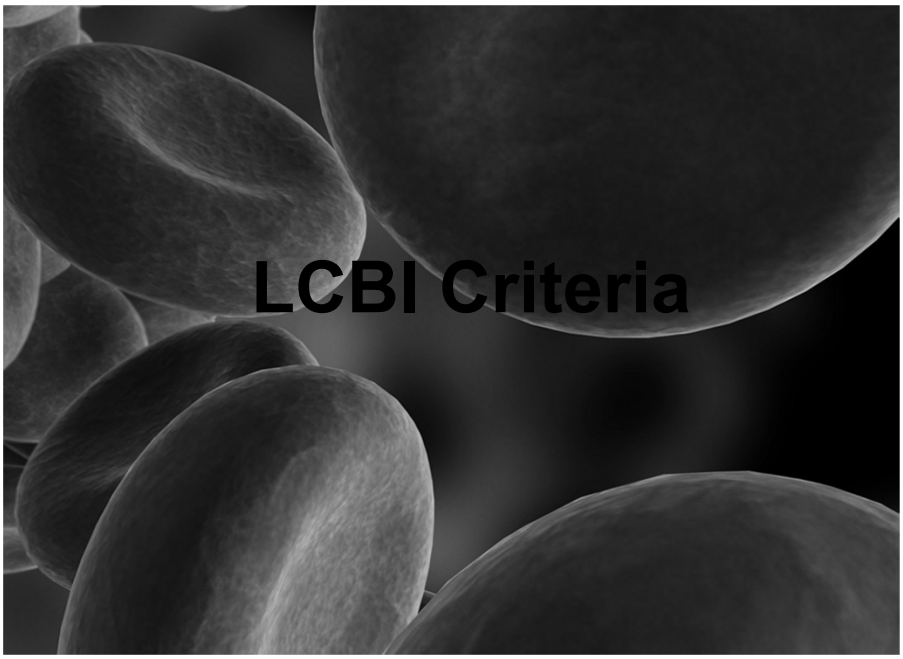
Transfer Rule

Key Terms	Day 1	Day 2	Day 3	Day 4	Infection is…
Transfer Rule	ICU ► 3W	3W All elements of Infection criterion first present together	3W		Attributable to ICU
Transfer Rule	ICU ► 3W	3W	3W All elements of infection criterion first present together		Attributable to 3W
Transfer Rule	3W ► Home	Home All elements of Infection criterion first present together	Home		Attributable to 3W

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, CLABSIs cannot be attributed to these locations. Instead, the CLABSI must be attributed to the next location in which the patient stays.**

Chapter 4 of January 2013 NHSN PSC Manual, CLABSI Event , page 4-3 and 4-4.



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Laboratory Confirmed Bloodstream Infection Criteria

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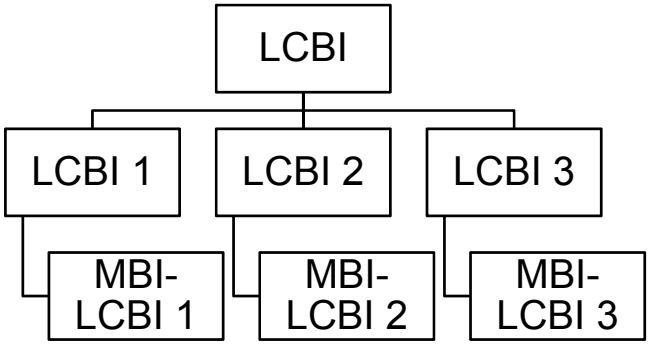

LCBI – Criterion 1

- 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: Jon 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.

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Key Term: Primary BSI (a.k.a. "not related to an infection at another site")

- A Primary BSI is identified by ruling out all non-blood sites as the source of the bloodstream infection.
- A BSI that is associated with an infection at another site is referred to as a Secondary BSI and never reported as an LCBI or CLABSI.

Secondary BSI

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

AND

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

AND

- BSI and other site must be related according to the culture guidelines provided in next few slides

*Updated Slide

Appendix 1. Secondary Bloodstream Infection (BSI) Guide*

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

- "When assessing positive blood cultures in particular, one must be sure that there is no other CDC-defined primary site of HAI that may have seeded the bloodstream secondarily; otherwise the bloodstream infection may be misclassified as a primary BSI or erroneously associated with the use of a central line, i.e., called a CLABSI."

*Chapter 4 CLABSI Event, of the NHSN Patient Safety Component Manual

*Updated Slide

Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

- **Possible Scenarios and Guidance:**
  1. **Blood and site-specific specimen cultures match for at least one organism**: In a patient suspected of having an infection, 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.

See examples next slide.

Appendix 1. Secondary Bloodstream Infection (BSI) Guide

*Updated Slide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

- **Possible Scenarios and Guidance:**
  1. **Blood and site-specific specimen cultures match for at least one organism**:
     - Example: Patient meets HAI criteria for a symptomatic urinary tract infection (suprapubic tenderness and >10^5 CFU/ml of *E. coli*) and blood culture from the same date grows *E. coli* and *P. aeruginosa*. This is an HAI SUTI with a secondary BSI and the reported organisms are *E. coli* and *P. aeruginosa*, since *P. aeruginosa* is a logical pathogen for this site of infection.
     - Example: Patient meets HAI criteria for a symptomatic urinary tract infection (suprapubic tenderness and >10^5 CFU/ml of *E. coli*) and blood culture from the same date grows *E. coli* and *S. epidermidis*. This is an HAI SUTI with a secondary BSI and the reported organism is only *E. coli*, since the single *S. epidermidis* positive blood culture by itself does not meet BSI criteria.
     - Patient meets HAI criteria for a symptomatic urinary tract infection (suprapubic tenderness and >10^5 of *E. coli)* and blood culture from the same date grows *E. coli.* This is an HAI SUTI with a secondary BSI and reported organism is *E. coli.*

Corrected example

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*Updated Slide

Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

- **Possible Scenarios and Guidance :**

2. Blood and site-specific specimen cultures do not match: There are two scenarios that can occur when a patient suspected of having an infection has blood and a site-specific specimen cultured but the organisms do not match.

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Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

Blood and Site Culture Do not Match: Scenario a: If the site-specific culture is an element used to meet the infection site criterion and the blood isolate is also an element used to meet another criterion at the same infection site, then the BSI is considered secondary to that site-specific infection.

- Example: Postoperative patient becomes febrile and complains of nausea and abdominal pain. Blood and an aseptically-obtained T-tube drainage specimen are collected for culture. A CT scan done that day shows fluid collection suggestive of infection. Culture results show *Escherichia coli* from the drainage specimen but the blood grows *Bacteroides fragilis.* Because the patient meets IAB criteria by positive site-specific culture (IAB criterion 3a) and by positive blood culture as an element of a different criterion of the same infection site (IAB 3c), the blood is considered a secondary BSI to an IAB and both organisms would be listed as the IAB infection pathogens. No primary BSI would be reported.

*Updated Slide

Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

– Blood and Site Culture Do not Match: Scenario b: 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.

- Example 1: Postoperative patient has an intraabdominal abscess (IAB) noted during reoperation and purulent material is obtained at that time which grows *Escherichia coli*. The patient spikes a fever two days later and blood culture shows *Bacteroides fragilis.* Because the organisms from the site and blood cultures do not match, and no site-specific criterion that includes positive blood culture as an element is met, both a site-specific infection (IAB criteria 1 and 2) and a primary BSI would be reported.

See example 2 next slide.

*Updated Slide

Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

– Blood and Site Culture Do not Match: Scenario b: 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.

- Example 2: Unconscious ICU patient with a Foley catheter and central line for past 4 days spikes a fever; blood, urine and sputum specimens are collected for culture. The urine culture grows >100,000 CFU/ml of *Escherichia coli*, blood culture grows *Enterococcus faecium*, and sputum shows oral flora only. Because the organisms from the urine and blood cultures do not match, and a UTI criterion that includes positive blood culture as an element is not met, both a SUTI (IAB criterion 1a) and a primary BSI would be reported. This infection does not meet the ABUTI criterion since that requires at least one matching uropathogen organism in urine and blood in an asymptomatic patient.

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Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

- **Possible Scenarios and Guidance:**

3. **No site-specific specimen culture, only a positive blood culture**: In a patient suspected of having an infection, if the only specimen cultured is blood and it grows a logical pathogen for the suspected body site of infection, and a site-specific infection criterion is met an element of which may or may not include a positive blood culture, the BSI is considered secondary to that site-specific infection.
    - Example: Postoperative patient has an abscess in the small bowel noted during reoperation. The only specimen cultured is blood which grows *B. fragilis*. Because gastrointestinal tract infection (GIT) criterion 1 is met with the surgically-identified abscess alone and because *B. fragilis* is a logical pathogen for this site of infection, the BSI is considered secondary to a GIT and *B. fragilis* is listed as the GIT infection pathogen.
    - Example: Patient has a positive blood culture with *E. coli* proximal in time with fever, abdominal pain, and CT scan evidence of intraabdominal abscess (IAB). This patient meets IAB criterion 3c, which includes a positive blood culture as one of its elements. The BSI is considered secondary to the IAB and *E. coli* is listed as the IAB infection pathogen.

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Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

Possible Scenarios and Guidance:

- **4. <u>Negative site-specific specimen culture with positive blood culture</u>**: In a patient suspected of having an infection, if a specimen from the suspected site of infection is cultured and yields no growth, but a blood specimen collected as part of the infection work-up is positive, that BSI is only considered a secondary BSI if another of the site-specific criteria that includes positive blood culture as an element is met. Otherwise, the BSI is considered a primary BSI, even if another criterion for that site is met and the blood isolate is a logical pathogen for the infection.

See examples next slide

*Updated Slide

Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

- **4. <u>Negative site-specific specimen culture with positive blood culture</u>**:
  - Example: Patient has purulent material from the IAB space cultured and it yields no growth. The patient also has fever, abdominal pain, a positive blood culture with *Pseudomonas aeruginosa*, and radiographic evidence of IAB infection. This patient does not meet IAB criterion 1 (positive culture from purulent material) but does meet IAB criterion 3c, an element of which is a positive blood culture (signs/symptoms plus positive blood culture plus radiographic evidence). This BSI is considered secondary to the IAB and *P. aeruginosa* is listed as the IAB infection pathogen.
  - Example: Postoperative knee replacement patient with a central line spikes a fever; blood and knee joint fluid are cultured. Only the blood cultures are positive (3 of 3 sets) for *S. epidermidis*. No other JNT infection criteria are met. This BSI should be reported as a CLABSI.
  - Example: Patient has a central line in place for 10 days. Patient complains of knee joint tenderness and limited range of motion. CT scan findings suggest joint (JNT) infection but culture of a needle-aspirated joint fluid is negative. However, a blood culture from the same time period grows *S. aureus*. This patient does not meet JNT criterion 1 (positive joint fluid culture) but does meet JNT criterion 3d (signs/symptoms plus imaging test evidence of infection). Even though *S. aureus* is a logical pathogen for this infection site, it is also a likely pathogen for a CLABSI. This BSI should be reported as a CLABSI, <u>not</u> a secondary BSI.

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Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

- A **matching organism** is defined as one of the following:
  - If genus and species are identified in both cultures, they must be the same.
    - Example: A blood culture reported as *Enterobacter cloacae* and an intraabdominal specimen of *Enterobacter cloacae* are matching organisms.
    - Example: A blood culture reported as *Enterobacter cloacae* and an intraabdominal specimen of *Enterobacter aerogenes* are NOT matching organisms as the species are different.
  - If the organism is less definitively identified in one culture than the other, the identifications must be complementary.
    - Example: A surgical wound growing *Pseudomonas* spp. and a blood culture growing *Pseudomonas aeruginosa* are considered a match at the genus level and therefore the BSI is reported as secondary to the SSI.
    - Example: A blood culture reported as *Candida albicans* and a urine culture reported as yeast are considered to have matching organisms

*Updated Slide

Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

Notes:

- If the blood isolate by itself does not meet BSI criteria (e.g., only one positive blood culture of a common commensal), then that isolate may not be used to indicate the presence of a secondary BSI (see example 1c).
- Antibiograms of the blood and potential primary site isolates do not have to match.
- Blood and site-specific specimens do not have to be collected on the same day but their collection dates must be such that they are considered part of the diagnostic work-up for the infection in question.

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Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

Reporting Instructions:

- **For reporting secondary BSI for possible and probable VAP, see Chapter 10.**
- Do not report secondary bloodstream infection for vascular (VASC) infections, clinically-defined pneumonia (PNU1), Ventilator-Associated Conditions (VAC), or Infection-related Ventilator-Associated Complications (IVAC).
- If a site-specific criterion requiring positive culture results is met, be sure to check the positive culture box when specifying the criteria used when adding the event, even if another criterion that does not include culture results is also met. For example, using the scenario in 2a above, the following boxes for criteria used would be checked when entering the SSI into the NHSN application: Purulent drainage or material, abscess, positive culture, and positive blood culture.

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

And

- common commensal (i.e. diptheroids [*Corynebacterium* spp.], *Bacillus* [not B. antrhacis] spp., Propionibacterium spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.) is cultured from two or more blood cultures drawn on separate occasions.

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LCBI Criterion 3

- Patient ≤ 1 yr of age has at least one of the following signs or symptoms: fever (>38^{0}C core), hypothermia (<36^{0}C core), apnea, or bradycardia

And

- positive laboratory results are not related to an infection at another site

And

- common commensal (i.e. diptheroids [*Corynebacterium* spp.], *Bacillus* [not B. antrhacis] spp., Propionibacterium spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.) is cultured from two or more blood cultures drawn on separate occasions.

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Note

A correction was made to this slide after the October training to reflect that criterion 3 applies only to children up to and including their first birthday.

- Criteria 1 & 2 may be used for patients of ANY age, including those 1 year or less.
- Criterion 3 **only applies** to patients who are **1 year or less (before or on their first birthday)**.

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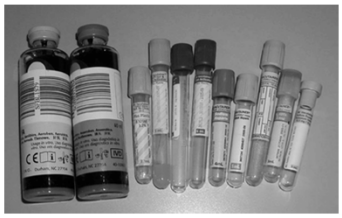
One or more blood cultures means that at least one bottle from a blood draw is reported by the laboratory as having grown at least one organism (i.e., is a positive blood culture).

More details for …Criterion 1



Recognized pathogen does not include organisms considered common commensals

A few of the recognized pathogens are Staph aureus, Enterococcus spp., E. coli, Pseudomonas spp., Klebsiella spp., Candida spp., etc.

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Criteria 2 & 3:

The phrase "common commensal... is cultured from 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)
3. That these blood cultures were collected within 2 days of each other e.g. Mon. and Tues. but NOT Mon. and Wed.

2013 change

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Meeting "Separate Occasions" Criteria

- Blood draws collected from separate sites OR
- Separate accesses of the same site, such as two draws from a single lumen catheter or draws from separate lumens of a catheter. In the latter case, the draws may be just minutes apart (i.e., just the time it takes to disinfect and draw the specimen from each lumen).

  Example: a patient with a triple lumen central line has blood drawn from each lumen within 15 minutes of each other. Each of these is considered a separate blood draw.

Criteria 2 & 3 Determining "sameness" of common commensals

- Assume that the organisms are the same if the organism from one culture is identified to both genus and species level and the companion culture identifies only the genus with or without other attributes.
- Antibiograms are no longer utilized to determine the sameness of two organisms.
- Report the more resistant organism.

Examples:

Culture Report	Companion Culture Report	Report as…
Coagulase-positive staphylococci	*S. aureus*	*S. aureus*
S. epidermidis	Coagulase-negative staphylococci	*S. epidermidis*
Enterococcus spp.	*E. faecium*	*E. faecium*
Bacillus spp. (not *anthracis*)	*B. cereus*	*B. cereus*
S. salivarius	Strep viridans	*S. salivarius*

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Mucosal Barrier Injury Laboratory-Confirmed Bloodstream Infection (MBI-LCBI)

- **Developed by Healthcare Infection Control Practices Advisory Committee (HICPAC) Surveillance Working Group**
  - Need for more specific BSI definition in oncology patients
  - Misclassification of BSI resulting from translocation of intestinal organisms inflates CLABSI rates
  - Reporting of CLABSI that are not BSI associated with the central line
  - These BSIs are not impacted by CLABSI prevention measures
  - Developed BSI definition for patients with mucosal barrier injury (e.g., GVHD, neutropenia) at high risk for translocation of intestinal organisms
  - Lead by CDC with input from external subject matter experts
    - Hospital Epidemiologist, Infection Preventionist, Infectious Disease Physicians, State HAI Programs, Oncologists
  - Considerations given to data collection burden, use of objective criteria, availability of data components, clinical credibility

Mucosal Barrier Injury Laboratory-Confirmed Bloodstream Infection (MBI-LCBI)

- **MBI-LCBI definition field-tested**
  - In 38 hospitals and 193 inpatient locations
    - ~50% Oncology or BMT locations
  - Performed over 2 months, incorporated into existing CLABSI surveillance
  - Data from all blood cultures reviewed reported to CDC
- **Findings from field testing**
  - High degree of agreement between facility and CDC application of MBI-LCBI definition
  - Identified need for adjustments to neutropenia criteria
    - Due to differences on lab reporting of WBC/ANC values
  - Demonstrated integrating MBI-LCBI definition in CLABSI surveillance was feasible
-

MBI-LCBI Criterion 1

- **Patient of any age meets criterion 1 for LCBI with at least one blood culture growing any of the following intestinal organisms with no other organisms isolated: *Bacteroides* spp., *Candida* spp., *Clostridium* spp., *Enterococcus* spp., *Fusobacterium* spp., *Peptostreptococcus* spp., *Prevotella* spp., *Veillonella* spp., or Enterobacteriaceae (see Table 3 for partial list of eligible genera)**

AND

Patient meets at least one of the following:

- **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:**
  - Grade III or IV gastrointestinal graft versus host disease (GI GVHD)
  - ≥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 positive blood culture is collected.
- **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/mm^3 on or within 3 calendar days before the date the positive blood culture was collected (Day 1).**

MBI-LCBI Criterion 2

- **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:**
- **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:**
  - Grade III or IV gastrointestinal graft versus host disease (GI GVHD)
  - ≥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.
- **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/mm^3 on or within 3 calendar days before the date the positive blood culture was collected (Day 1). (See Table 4 for example.)**

MBI-LCBI Criterion 3

- **Patient ≤1 year of age meets criterion 3 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:**
- **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:**
  - Grade III or IV gastrointestinal graft versus host disease (GI GVHD)
  - ≥ 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 is collected.
- **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/mm^3 on or within 3 calendar days before the date the positive blood culture was collected (Day 1). (See Table 4 for example.)**
-

MBI-LCBI Criteria

- **Comments:**
  - No other organisms isolated" means there is not isolation in a blood culture of another recognized pathogen (e.g., S. aureus) or common commensal (e.g., coagulase-negative staphylococci) other than listed in MBI criterion 1, 2 or 3 that would otherwise meet LCBI criteria. If this occurs, the infection should not be classified as MBI-LCBI.
-
  - Grade III/IV GI GVHD is defined as follows:
    - In adults: ≥1 L diarrhea/day or ileus with abdominal pain
    - In pediatric patients: ≥ 20cc/kg/day of diarrhea

MBI-LCBI Criteria

Table 3. Partial List of Criterion 1 MBI-LCBI Eligible Enterobacteriaceae Genera*

- **Citrobacter**
- **Enterobacter**
- **Escherichia**
- **Klebsiella**
- **Proteus**
- **Providencia**
- **Salmonella**
- **Serratia**
- **Shigella**
- **Yersina**

* Chapter 4 CLABSI Event, Page 4-10 of NHSN manual dated January 2013

Calculation of ANC

- **Remember:**
  - ANC not always reported directly in chart.
  - WBC in chart usually reported in terms of *thousand* cells/mm^3.
- **ANC calculated based on Segmented cells (Segs) and Bands**
  - ANC = Absolute Segs + Absolute Bands **or**
  - ANC = WBC × (%Segs + %Bands)/100
- **Example:**
  - WBC = 2 K/mm^3
  - Segs: 20%
  - Bands: 20%
  - ANC = 2,000 × (20 + 20)/100 = 800 cells/mm^3

MBI-LCBI Criteria

Table 4. Examples Illustrating the MBI-LCBI Criteria for Neutropenia*

		Day -7	Day -6	Day -5	Day -4	Day -3	Day -2	Day -1	Day 1*	Day 2
Pt. A	WBC	100	800	400	300	ND	ND	320	400 + BC* w/ Candida spp. x1	230

Patient A meets MBI-LCBI criterion 1. subcriterion 2: Positive blood culture with intestinal organism (Candida spp.) and neutropenia (2 separate days of WBC <500 cells/mm3 occurring on the date the positive blood culture was collected [Day 1, value = 400] or during the 3 days before that date [in this case, the day before or Day -1; value = 320]).

* Chapter 4 CLABSI Event, Page 4-11 of NHSN manual dated January 2013

MBI-LCBI Criteria

Table 4. Examples Illustrating the MBI-LCBI Criteria for Neutropenia*

		Day -7	Day -6	Day -5	Day -4	Day -3	Day -2	Day -1	Day 1*	Day 2
Pt. B	ANC	ND	410	130	ND	ND	120	110	ND +BC* w/ viridans strep x2 and fever >38.0° C	110

Patient B meets MBI-LCBI criterion 2. subcriterion 2: At least 2 positive blood cultures with viridans group streptococci (in this case, 2 positive) and neutropenia (2 separate days of ANC <500 cells/mm3 occurring on the date the positive blood culture was collected [Day 1] or during the 3 days before that date [in this case, the two days before or Days -1 and -2; values = 110 and 120]).

* Chapter 4 CLABSI Event, Page 4-11 of NHSN manual dated January 2013

Utilizing Central line-associated MBI-LCBI Data

Considerations for future use of MBI-LCBI data include removing from CLABSI data reported to CMS. At this time this is not possible. Central-line associated MBI-LCBI data will be included in the CLABSI data reported to CMS.

Your facility may choose to consider MBI-LCBI data separately from LCBI data in your internal QA work as prevention efforts for the two types of BSI may differ.

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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), <u>not through a vascular catheter.</u>

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.

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Denominator Accuracy

- **Accurate rates/standardized infection ratios (SIRS) require BOTH**
  - Accurate numerators
    - Definitions/Reporting Instructions Adherence
  - Accurate denominators
    - Mapping accuracy

      (Day 3 topic)
    - Collection accuracy
      - Specific requirements by location type
      - Counting patients with > 1 line

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Accurate Denominator Data: Requirements by Location

- **ICU (not NICU)/Non-Special Care Areas (SCA):**
  - Central line days
  - Patient days
- **SCA:**
  - Permanent central line days
  - Temporary central line days
  - Patient days
- **NICU:**
  - Central line/umbilical catheter days
  - Patient days

} By birth-weight category*

* The weight of the infant at the time of BSI is not used and should not be reported.

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Accurate Denominator Data Special Care Areas (SCAs)

- SCAs are locations where permanent (a.k.a. tunneled) central lines are likely
  - Oncology
  - Hemodialysis
  - Transplant
- Because temporary central lines carry a higher risk of CLABSI, in these locations data is collected by type: permanent vs. temporary
  - Permanent central line: A central line that is tunneled, including certain dialysis catheters and implantable catheters and ports.
  - Temporary central line: A central line that is not tunneled nor implanted.

Accurate Denominator Collection

- **In all locations: Patients with ≥ 2 CLs get counted as 1 CL day**
- **In SCAs: Patients with both permanent and temporary CLs get counted only as 1 temporary CL day**
- **NOTE: "If the patient has only a tunneled or implanted central line, begin recording days on the first day the line was accessed and continue throughout entire stay."**

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Accurate Denominator Data Neonatal ICUs (NICUs)

- **Because risk of CLABSI is associated with birthweight category, central line data (numerator and denominator) is collected based on this variable**
- **Birthweight categories**
  - ≤ 750 grams
  - 751-1000 grams
  - 1001- 1500 grams
  - 1501- 2500 grams
  - > 2501 grams

- **Neonates with both umbilical and central lines get counted only as one central line day**

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Accurate Denominator Collection

- **Examples of possible causes:**
  - Patients with 2 central lines counted as 2 CL days
  - Data import happening twice a day rather than once

orgid	location	summaryYQ	months	infcount	numExp	numcldays	SIR	SIR_pval	SIR95CI
15331	SICU	2011Q1	3	4	6.900	3000	0.58	0.1823	0.198, 1.327

CL days 3000

orgid	location	summaryYQ	months	infcount	numExp	numcldays	SIR	SIR_pval	SIR95CI
15331	SICU	2011Q1	3	4	2.420	5400	0.32	0.0057	0.110, 0.737

CL days 5400

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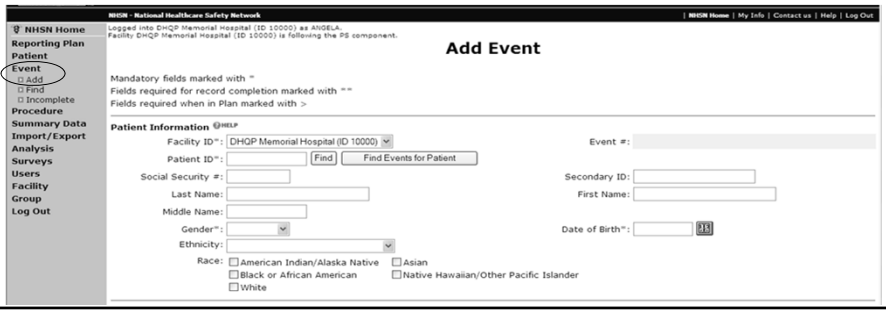
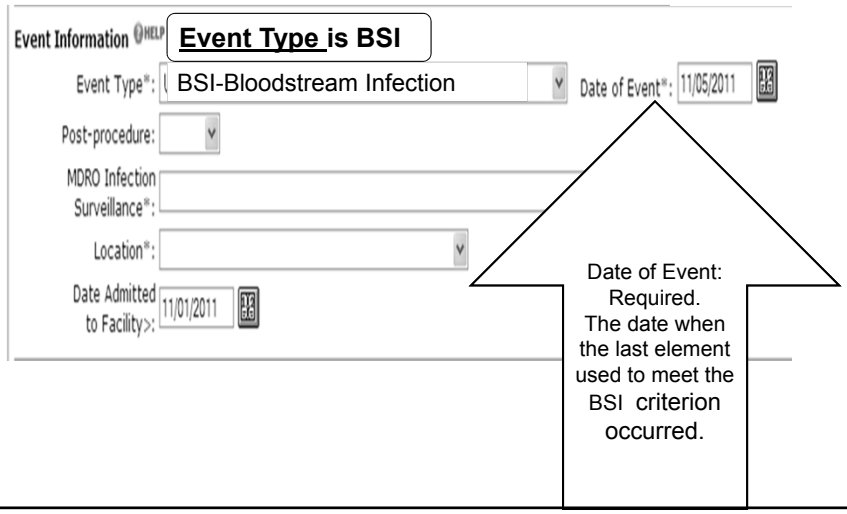
Patient Information

- The top section of BSI data collection form is used to collect patient demographics. Required fields have an asterisk (*).
- There are 4 required fields:
  - Facility ID
  - Patient ID
  - Gender
  - Date of Birth

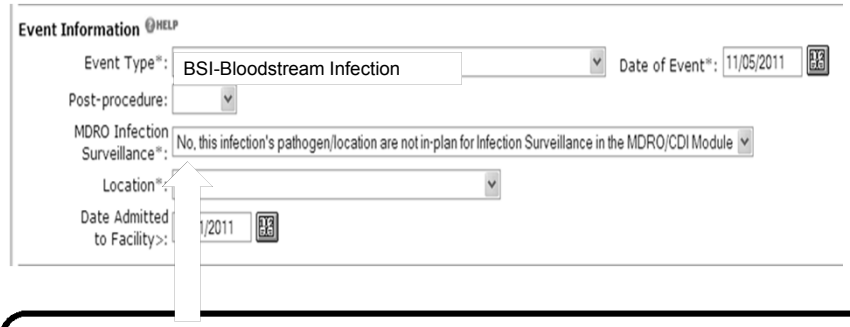


Event Information CLABSI

*Updated Slide



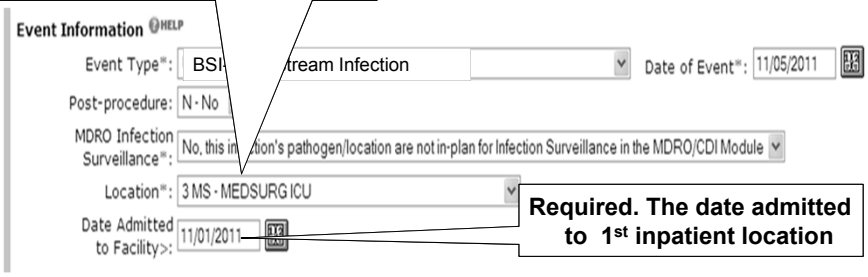
Event Information CLABSI



MDRO Infection: Enter "YES" only if the facility's monthly reporting plan includes Infection Surveillance (NOT Lab ID Event) (MDRO/CDI Module) for both the involved pathogen and the location specified.

Event Information CLABSI

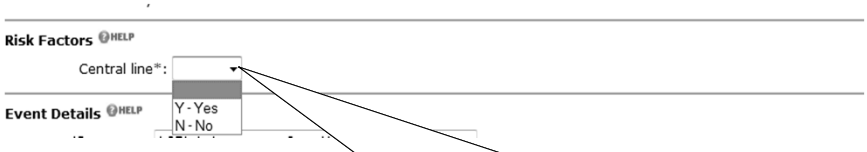
Required. Enter patient location at time when the last element used to meet the LCBI criterion occurred.



Required. The date admitted to 1st inpatient location

If the BSI develops in a patient within 2 days of transfer from a location, indicate the transferring location, not the current location of the patient.

Risk Factors CLABSI



Required: Choose Yes if a CL was in place for > 2 days and was present on the date of event or had been discontinued the day before. Otherwise choose No.

Event Details: Specific Event

Required. Event criteria must be met

Event Details

*Specific Event: Laboratory-confirmed

*Specify Criteria Used:

Signs & Symptoms (check all that apply)

Any Patient	≤ 1 year old
☐ Fever	☐ Fever
☐ Chills	☐ Hypothermia
☐ Hypotension	☐ Apnea
	☐ Bradycardia

Underlying conditions for MBI-LCBI (check all that apply):
- ☐ Allo-SCT with Grade ≥ 3 GI GVHD
- ☐ Allo-SCT with diarrhea
- ☐ Neutropenia

Laboratory (check one)
- ☐ Recognized pathogen from one or more blood cultures
- ☐ Common commensal from ≥ 2 blood cultures

This screen shot of the data collection form displays the documentation which will be required for MBI-LCBI

Event Details: BSI

Pathogens Identified: Y - Yes

Will autofill as Yes..

Pathogens HELP

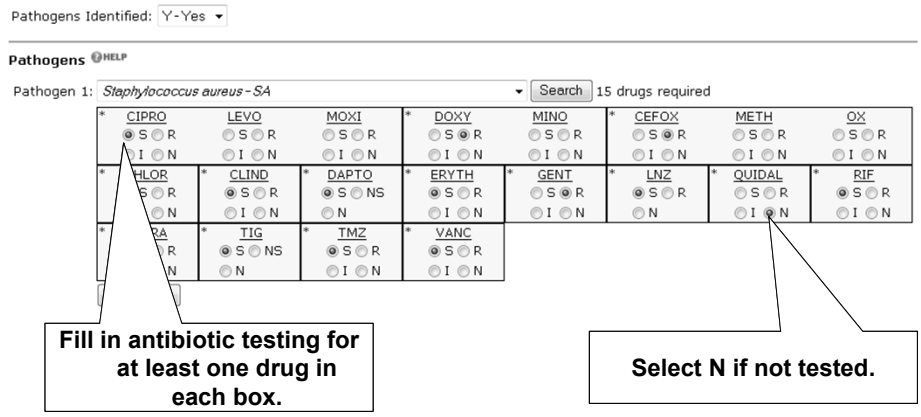
Pathogen 1: Search

Pathogen 2: Search

Pathogen 3: Search

Identify up to 3 pathogens utilizing the search menu

Event Details: BSI



THEN SAVE THE EVENT!!!

Collecting Summary Data (ICUs/Wards)

Reminder

For all locations, count **at the same time each day**
- Number of patients on the unit
- Number of patients with a central line

NHSN National Healthcare Safety Network

OMB No. 0920-0666
Exp. Date: 01-31-2015
www.cdc.gov/nhsn

Denominators for Intensive Care Unit (ICU)/Other locations (not NICU or SCA)

Page 1 of 1

*required for saving
Facility ID: *Location Code: *Month: *Year:

Date	*Number of Patients	**Number of patients with 1 or more central lines	**Number of patients with a urinary catheter	**Number of patients on a ventilator
1	32	21		
2	29	17		
3	29	15		
4				

Collecting Summary Data (NICUs)

Reminder

For NICUs, count **at the same time each day**
- Number of patients in each birthweight category on the unit
- Number of patients in each birthweight category with a central line

Safety Network www.cdc.gov/nhsn

Denominators for Neonatal Intensive Care Unit (NICU)

Page 1 of 1
*required for saving **conditionally required according to the events indicated in Plan

Facility ID: *Location Code: *Month: *Year:

Date	Birth Weight Categories																			
	A = ≤750 g				B = 751-1000 g				C =1001-1500 g				D = 1501-2500 g				E= >2500 g			
	*Pt	**CL	**VNT	UrC	*Pt	**CL	**VNT	UrC	*Pt	**CL	**VNT	UrC	*Pt	**CL	**VNT	UrC	*Pt	**CL	**VNT	UrC
1	1	1			4	3			6	2			3	1			0	0		
2	1	1			3	3			5	2			3	1			0	0		
3	2	2			3	2			5	2			3	1			1	0		
4	2	2			2	1			5	1			4	1			2	0		
5																				
6																				
7																				

Collecting Summary Data (SCAs)

Reminder

For SCAs, count **at the same time each day**
- Number of patients on the unit
- Number of patients with ONLY a permanent central line
- Number of patients with a temporary central line

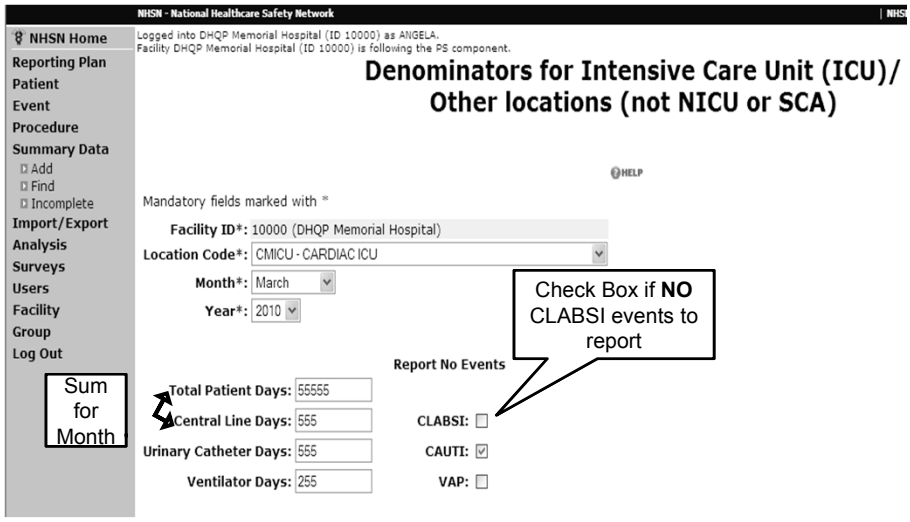
Safety Network www.cdc.gov/nhsn

Denominators for Specialty Care Area (SCA)

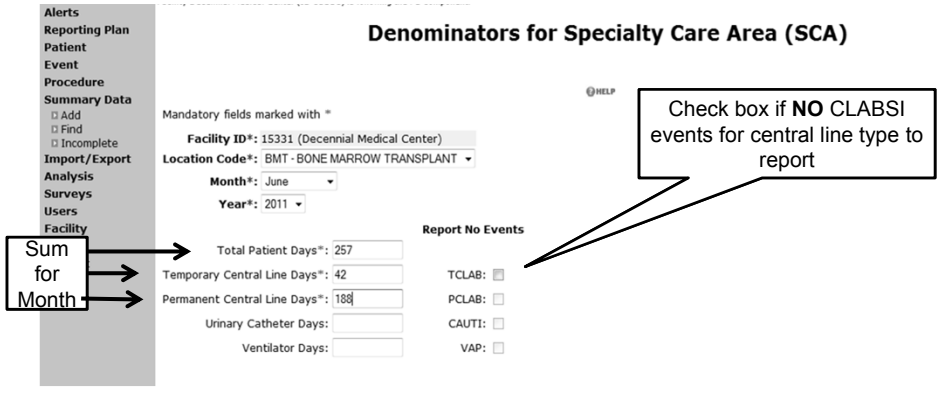
Page 1 of 1
*required for saving
Facility ID: 88888 *Location Code: Hem/Onc *Month: June *Year: 2102

Date	*Number of Patients	**Number of patients with 1 or more central lines (if patient has both, count as Temporary)		**Number of patients with a urinary catheter	**Number of patients on a ventilator
		Temporary	Permanent		
1	46	2	43		
2	49	1	45		
3	48	3	45		
4	50	8	40		
5					

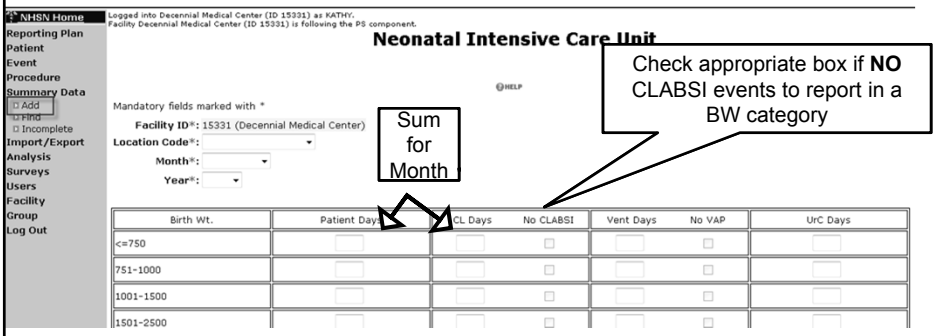
Entering Summary Data (ICU/Wards)



Entering Sumary Data (SCAs)



Entering Summary Data NICUs



Electronic Collection of Summary Data

Electronic capture of summary data is acceptable:

- Following validation of the electronic method against the manual method
  - 3 months concurrent data collection with both methods
  - Difference between methods must be within +/- 5% of each other

In Summary

- **CLABSIs result in significant morbidity and mortality in U.S. hospitals.**
- **Clinical and surveillance definitions will sometimes differ.**
  - Purposes differ
  - Surveillance definitions must be adhered to strictly and consistently
- **2013 CLABSI definitional changes include 2-day minimum facility stay for HAIs and 2-day prior minimum device dwell time for BSI to be CLABSI**
- **.**

In Summary

- **New LCBI criteria have been added for Mucosal Barrier Injury BSIs (MBI-LCBI). These will be included for CLABSI reporting to CMS at this time.**
- **Accurate data collection is necessary for successful prevention efforts and is dependent on a variety of factors:**
  - Accurate CLABSI identification and attribution
  - Accurate central line data collection
  - Accurate mapping of facility locations within NHSN

NHSN@cdc.gov

For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: www.cdc.gov