TENNESSEE DEPARTMENT OF HEALTH
HEALTHCARE-ASSOCIATED INFECTIONS AND ANTIMICROBIAL RESISTANCE PROGRAM
HAI Surveillance Definitions

BLOOD STREAM INFECTION (BSI)

(Last updated January 1, 2014)

Healthcare-associated infections (HAI): All NHSN site specific infections must first meet the HAI definition as defined in the "Additional Information" checklist before a site specific infection (e.g., CLABSI) can be reported to NHSN.

NOTE: Gap day:

Does "...criterion were first present together on or after the 3rd hospital day..." mean that all elements of an HAI criterion have to be present the same day to meet the criteria?

No. There can be a gap of up to one day between elements. However, to determine if a patient meets the HAI criterion, do not utilize elements that were present on day 1 or 2 but not present on day or after day 3.

Present on Admission (POA): Infections that are POA, as defined in the "Additional Information" checklist, are not considered HAIs and therefore are never reported to NHSN.

Primary bloodstream infections (BSI): Laboratory-confirmed bloodstream infections (LCBI) that are **not** secondary to an infection at another body site (see "Secondary Bloodstream Infection [BSI] Guide" at the end of this checklist as well as the checklist corresponding to the other body site).

Date of event: For a BSI the date of event is the date when the last element used to meet the laboratory-confirmed bloodstream infection (LCBI) criterion occurred. Synonym: infection date.

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 BSI and counting central-line days in the NHSN system:

Aorta	Brachiocephalic veins	Common iliac veins
Pulmonary artery	Internal jugular veins	Femoral veins
Superior vena cava	Subclavian veins	In neonates – the umbilical artery/vein
Inferior vena cava	External iliac veins	

NOTES:

1. Neither the insertion site nor the type of device may be used to determine if a line qualifies as a central line. The device must terminate in one of the great vessels or in or near the heart and be used for one of the purposes outlined above, to qualify as a central line.
2. An introducer is considered an intravascular catheter, and depending on the location of its tip and use, may be a central line.
3. 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.

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NOTES *(cont.)*:

4. The following devices are not considered central lines:
   - Extracorporeal membrane oxygenation (ECMO)
   - Femoral arterial catheters
   - Intraaortic balloon pump (IABP) devices
   - Hemodialysis reliable outflow (HeRO) dialysis catheters

Infusion: The introduction of a solution through a blood vessel via a catheter lumen. This may include continuous infusions such as nutritional fluids or medications, or it may include intermittent infusions such as flushes, IV antimicrobial administration, or blood transfusion or hemodialysis.

Umbilical catheter: A central vascular device inserted through the umbilical artery or vein in a neonate.

Temporary central line: A non-tunneled, non-implanted catheter.

Permanent central line: Includes

- Tunneled catheters, including certain dialysis catheters
- Implanted catheters (including ports)

Central line-associated BSI (CLABSI): A laboratory-confirmed bloodstream infection (LCBI) where

- Patient had **ALL** Δ of the following:
  - Δ central line (CL) or umbilical catheter (UC) was in place for >2 calendar days on the day of event (with day of device placement being Day 1)
  - Δ a CL or UC was in place on the date of event or the day before

NOTE:

- If a CL or UC was in place for >2 calendar days and then removed, the LCBI criteria must be fully met on the day of device discontinuation or the next day.
- If the patient is admitted or transferred into a facility with a central line in place (e.g., tunneled or implanted central line), day of first access is considered Day 1.
- "Access" is defined as line placement, infusion or withdrawal through the line.
- To distinguish subsequent LCBIs from a previous unresolved LCBI, see **Note** following HAI definitions in the Additional Information Checklist.
- Patients suspected or known to have accessed their own IV lines are not excluded from CLABSI surveillance. A facility must protect the line as best they can. Prevention efforts may include providing a patient sitter and/or removal of the catheter as soon as is clinically possible.

EXAMPLES:

- Patient in MICU has central line inserted/accessed on June 1. On June 3, the central line is still in place and the patient has positive blood culture with *S. aureus*. This is a CLABSI because the central line was in place for >2 calendar days on the date of event.

- Patient has a central line inserted on June 1. On June 3, the central line is removed and on June 4 the patient has a positive blood culture with *S. aureus*. This is a CLABSI because the central line was in place for >2 calendar days (June 1, 2, and 3) and was in place the day before the date of event.
- A central line is placed in the facility on May 30th. On June 3, the central line is removed and on June 4 patient spikes a fever of 38.3°C. Two blood culture sets collected on June 5 are positive for *S. epidermidis*. This may be a healthcare-associated bloodstream infection but it is not a CLABSI because the central line was not place the day of or the day before LCBI Criterion 2 was met (June 5).

NOTE:

- Permanent central lines should be included in the central line-day count beginning on the first day that they are accessed and continuing until the patient is discharged or the line is discontinued, whichever comes first. Therefore, if a patient is admitted with a permanent central line which is not accessed until hospital day 4, the line should not be included in the central line-days until day 4 and then included every day until the patient is discharged or the line is discontinued. If the line is never accessed, it is never counted in the central line-day count.
- Insertion of the line is considered an accession.
- If a central line is removed and then reinserted on the same calendar day or the following day, this represents continuous central line presence because a central line was in place for some period of time each calendar day.
- If a central line is removed and the patent has an **entire** calendar day without a central line in place, and a central line is subsequently re-inserted, the day of re-insertion represents day 1 of that central line.

Location of attribution: The inpatient location where the patient was assigned on the date of the LCBI event, which is further defined as the date when the last element used to meet the LCBI criterion occurred (see exception below).

INPATIENT DIALYSIS:

Inpatients receiving dialysis are included in any CLABSI surveillance in the location in which they are housed, regardless of whether or not the central line is the only central line and only accessed for dialysis. This also applies to patients in the Long-Term Acute Care (LTAC) facilities within Acute Care Facilities when dialysis is received from the Acute Care Facility staff.

EXAMPLES: *CLABSIs in the following examples will be attributed to unit A*

- Patient on Unit A receives onsite dialysis by contracted dialysis staff
- Dialysis staff travels to Unit A to provide dialysis to Unit A patient
- Patient resides on Unit A for inpatient care, but is transported to dialysis unit within the facility for dialysis. Since CLABSIs cannot be attributed to non-bedded locations, such an event must be attributed to the inpatient location housing the patient.
- Facilities may choose to capture information about the presence of a dialysis catheter in patients with LCBIs. The BSI collection form includes a data field “Any hemodialysis catheter present” which may be marked yes or no, and utilized internally by facility to identify association of dialysis to LCBI.

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NOTE:

- When hemodialysis through a central line is provided by contracted staff members who are not employees of the facility, CLABSIs that are identified in these patients are attributed to the inpatient location where the patient was assigned. Facilities are responsible for the care provided within their confines and infection prevention issues related to contracted staff or their agencies should be addressed by the facility.

EXCEPTION TO LOCATION OF ATTRIBUTION:

Transfer Rule: If all elements of a CLABSI are present on the day of transfer or the next day, in the same facility or a new facility the infection is attributed to the transferring location or facility. Receiving facilities should share information about such HAIs with the transferring facility to enable reporting. This is called the Transfer Rule and examples are shown below:

- Patient with a central line in place in the SICU is transferred to the surgical ward. On the next day, the patient meets criterion for an LCBI. This is reported to NHSN as a CLABSI for the SICU.
- Patient without a central line is transferred from the medical ward on hospital day 3 to MICU. Later that day a central line is inserted. The next day, LCBI criteria are met. This would be considered a BSI and attributed to the medical ward; however, it is not a CLABSI because the central line was not in place >2 days on the date of event.
- Patient with a central line in place is transferred from the medical ward to the coronary care ICU (CCU). After 4 days in the CCU and with the central line still in place, all elements of LCBI are met. This is reported to NHSN as a CLABSI for the CCU.
- After a two week hospital stay, a patient on the urology ward of Hospital A has his only central line removed and is discharged home a few hours later. The IP from Hospital B calls the next day to report that this patient has been admitted to Hospital B and met the LCBI criteria. This CLABSI should be reported to NHSN for, and by, Hospital A and attributed to the urology ward.

3/22	3/23	3/24
Patient on Unit A	Patient transferred from Unit A to Unit B. Later that day, patient transferred to Unit C. (day of transfer)	Patent transferred from Unit C to Unit D. Last element for CLABSI Criterion met. CLABSI attributed to Unit A since Unit A was the original unit initiating the transfer in the 2 day time-frame. (day of transfer)

NOTE:

- Surveillance for CLABSIs after the patient is discharged from the facility is not required. However, if discovered, any CLABSIs with event date on the day of discharge or the next day should be reported to NHSN (see Transfer Rule). No additional central line days are reported.

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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 inpatient location in which the patient stays.

EXAMPLE:

- Patient, who had no clinical signs or symptoms of sepsis upon arrival to the Emergency Department, has a central line inserted there and then is admitted to the MICU on the same day. All elements of LCBI are first present together on MICU Day 3. This is reported as a CLABSI for the MICU because all elements of LCBI are first present together >2 calendar days after hospital admission and the central line was in place for >2 calendar days.

LCBI – Laboratory-Confirmed Blood Stream Infection

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

☐ **Criterion 1:** ***(Last updated January 1, 2014)***

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

  AND

- ○ Patient has organism cultured from blood is not related to an infection at another site ***(See Secondary Bloodstream Infection (BSI) Guide toward end of this checklist.)***

☐ **Criterion 2:** ***(Last updated January 1, 2014)***

- ○ Patient of any age has at least **ONE** Δ of the following signs or symptoms:
  - Δ fever (>38°C)
  - Δ chills
  - Δ hypotension

  AND

- ○ Patient has positive laboratory results that are not related to an infection at another site ***(See Secondary Bloodstream Infection (BSI) Guide toward end of this checklist.)***

  AND

- ○ Patient has the same common commensal cultured from two or more blood cultures drawn on separate occasions (See comment 3a below). (***Criterion elements must occur within a timeframe that does not exceed a gap of 1 calendar day between two adjacent elements.)***

EXAMPLES OF COMMON COMMENSALS*:

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

** See complete list of common commensals at http://www.cdc.gov/nhsn/XLS/master-organism-Com-Commensals-Lists.xlsx)*

NOTE:

The matching common commensals represent a single element; therefore the collection date of the **first** common commensal is the Date of the Event.

6/1/2013	6/2/2013	6/3/2013	6/4/2013	Date of LCBI Event = 6/3/2013
Fever >38°C	No LCBI elements	S. epidermidis (1 of 2)	S. epidermidis (1of 2)	

☐ **Criterion 3:** ***(Last updated January 1, 2014)***

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

  AND

- Patient has positive laboratory results that are not related to an infection at another site ***(See Secondary Bloodstream Infection (BSI) Guide toward end of this checklist.)***

  AND

- Patient has the same common commensal cultured from two or more blood cultures drawn on separate occasions (See comment 3a below). (***Criterion elements must occur within a timeframe that does not exceed a gap of 1 calendar day between two adjacent elements.)***

EXAMPLES OF COMMON COMMENSAL*:

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

** See complete list of common commensals at http://www.cdc.gov/nhsn/XLS/master-organism-Com-Commensals-Lists.xlsx)*

NOTE:
The matching common commensals represent a single element; therefore the collection date of the **first** common commensal is the date of the element.

6/1/2013	6/2/2013	6/3/2013	6/4/2013	Date of LCBI Event = 6/3/2013
Fever >38°C	No LCBI elements	S. epidermidis (1 of 2)	S. epidermidis (1of 2)	

MBI-LCBI – Mucosal Barrier Injury Laboratory-Confirmed Blood Stream Infection
(Last updated January 1, 2014)

NOTE: In 2014, when reporting an LCBI, it is required to indicate which of the underlying conditions of the MBI-LCBI criterion was met, if any. All CLABSI, whether LCBI or MBI-LCBI, must be reported if CLABSI is part of your Monthly Reporting Plan.

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

☐ **Criterion 1:** ***(Last updated January 1, 2014)***

- Patient of any age has **BOTH** Δ of the following:
  - Δ meets criterion 1 for LCBI
  - Δ has at least one blood culture growing any of the following intestinal organisms with no other organisms isolated ***(See Comment #5 below)***:

Bacteroides spp.	*Enterococcus* spp.	*Prevotella* spp.
Candida spp.	*Fusobacterium* spp.	*Veillonella* spp.
Clostridium spp.	*Peptostreptococcus* spp.	Enterobacteriaceae*

*See table toward the end of this checklist for partial list of eligible Enterobacteriaceae genera.

AND

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- Patient meets at least **ONE** Δ of the following:
  - Δ 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) ***(See Comment #6 below)***
    - ☐ ≥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 was collected
  - Δ is neutropenic, defined as at least 2 separate days with **ONE** ☐ of the following:
    - ☐ values of absolute neutrophil count (ANC) within a seven-day time period which includes the date the positive culture was collected (Day 1), the 3 calendar days before ***AND*** the 3 calendar days after ***(See table titled Examples Illustrating the MBI-LCBI Criterion for Neutropenia)***
    - ☐ total white blood cell count (WBC) <500 cells/mm^3 within a seven-day time period which includes the date the positive culture was collected (Day 1), the 3 calendar days before ***AND*** the 3 calendar days after ***(See table titled Examples Illustrating the MBI-LCBI Criterion for Neutropenia)***

☐ **Criterion 2**: ***(Last updated January 1, 2014)***

- Patient of any age has **BOTH** Δ of the following:
  - Δ meets criterion 2 for LCBI
  - Δ has blood cultures that are growing only viridans group streptococci with no other organisms isolated

AND

- Patient meets at least **ONE** Δ of the following:
  - Δ 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) ***(See Comment #6 below)***
    - ☐ ≥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
  - Δ is neutropenic, defined as at least 2 separate days with **ONE** ☐ of the following:
    - ☐ values of absolute neutrophil count (ANC) within a seven-day time period which includes the date the positive culture was collected (Day 1), the 3 calendar days before ***AND*** the 3 calendar days after ***(See table titled Examples Illustrating the MBI-LCBI Criterion for Neutropenia)***
    - ☐ total white blood cell count (WBC) <500 cells/mm^3 within a seven-day time period which includes the date the positive culture was collected (Day 1), the

3 calendar days before ***AND*** the 3 calendar days after ***(See table titled Examples Illustrating the MBI-LCBI Criterion for Neutropenia)***

☐ **Criterion 3**: ***(Last updated January 1, 2014)***

- Patient ≤1 year of age has **BOTH** Δ of the following:
  - Δ meets criterion 3 for LCBI
  - Δ has blood cultures are growing only viridans group streptococci with no other organisms isolated

    AND
- Patient meets at least **ONE** Δ of the following:
  - Δ 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) ***(See Comment #6 below)***
    - ☐ ≥20 mL/kg diarrhea in a 24-hour period with onset on or within 7 calendar days before the date the first positive blood culture was collected.
  - Δ is neutropenic, defined as at least 2 separate days with **ONE** ☐ of the following:
    - ☐ values of absolute neutrophil count (ANC) within a seven-day time period which includes the date the positive culture was collected (Day 1), the 3 calendar days before ***AND*** the 3 calendar days after ***(See table titled Examples Illustrating the MBI-LCBI Criterion for Neutropenia)***
    - ☐ total white blood cell count (WBC) <500 cells/mm^3 within a seven-day time period which includes the date the positive culture was collected (Day 1), the 3 calendar days before ***AND*** the 3 calendar days after ***(See table titled Examples Illustrating the MBI-LCBI Criterion for Neutropenia)***

Comments: ***(Last updated January 1, 2014)***

1. In LCBI criterion 1, the term "recognized pathogen" includes any organism not included on the common commensal list ***(See criteria 2 and 3 or Supporting Material section at www.cdc.gov/nhsn/acute-care-hospital/clabsi/index.html for the list of common commensals.).***
2. LCBI criteria 1 and 2 and MCI-LCBI criteria 1 and 2 may be used for patients of any age, including those patients ≤1 year of age.
3. In LCBI criteria 2 and 3, the if the pathogen or common commensal is identified to the species level from one blood culture, and a companion blood culture is identified with only a descriptive name, which is complementary to the companion culture (e.g., to the genus level), then it is assumed that the organisms are the same. The organism identified to the species level should be reported as the infecting organism along with its antibiogram if available (See table below titled "Examples of How to Report Speciated and Unspeciated Organisms Isolated from Blood Cultures"). Only genus and species identification should be utilized to determine the sameness of organisms (i.e., matching organisms). No additional comparative methods should be used (e.g., morphology or antibiograms) because laboratory testing capabilities and protocols may vary between facilities. This will reduce reporting variability, solely due to laboratory practice,

between facilities reporting LCBIs meeting criteria 2. Report the organism to the genus/species level only once, and if antibiogram data are available, report the results from the most resistant panel.

a. In LCBI criteria 2 and 3, the phrase "two or more blood culture drawn on separate occasions" means 1) that blood from at least two blood draws were collected on the same or consecutive calendar days and 2) were collected in a manner which suggests 2 separate blood draw site preparations were performed. This will reduce misidentification of contaminated blood cultures as LCBI. For example, blood cultures drawn from different sites (e.g., different venipunctures, a combination of venipuncture and lumen withdrawal, or different lumens of the same central line) should undergo separate decontaminations and are therefore considered drawn on "separate occasions".

b. A blood culture may consist of a single bottle for a pediatric blood draw due to volume constraints. Therefore, to meet this part of the criterion, each bottle from two or single bottle blood draws would have to be culture-positive for the same commensal.

4. Specimen Collection Considerations: Although blood cultures drawn through central lines can have a higher rate of contamination than blood cultures collected through peripheral venipuncture all positive blood cultures, regardless of the sites from which they were collected, must be included when considering in-plan CLABSI surveillance.
5. In MBI-LCBI 1, 2, and 3, "No other organisms isolated" means that there is not isolation in a blood culture of another recognized pathogen (e.g., *S. aureus*) or common commensal (e.g., coagulase-negative staphyloccci) other than listed in MBI-LCBI criterion 1, 2, or 3 that would otherwise meat LCBI criteria. If this occurs, the infection should not be classified as MBI-LCBI.
6. Grade III/IV GVHD is defined as follows:
    - In adults: ≥1 L diarrhea/day or ileus with abdominal pain.
    - In pediatric patients: ≥20 cc/kg/day of diarrhea

REPORTING INSTRUCTIONS: ***(Last updated January 1, 2014)***

1. Report organisms cultured from blood as BSI–LCBI when no other site of infection is evident ***(see "Secondary Bloodstream Infection (BSI) Guide" found after the tables below.)***
2. Catheter tip cultures are not used to determine whether a patient has a primary BSI.
3. When there is a positive blood culture and clinical signs or symptoms of localized infection at a vascular access site, but no other infection can be found, the infection is considered a primary BSI.
4. Purulent phlebitis confirmed with a positive semiquantitative culture of a catheter tip, but with either negative or no blood culture is considered a CVS-VASC, not a BSI, SST-SKIN, or a ST infection.
5. Occasionally a patient with both peripheral and central IV lines develops a primary bloodstream infection (LCBI) that can clearly be attributed to the peripheral line (e.g., pus at the insertion site and matching pathogen from pus and blood). In this situation, enter "Central Line = No" in the NHSN application. You should, however, include the patient's central line days in the summary denominator count.
6. If your state or facility requires that you report healthcare-associated BSIs that are not central line-associated, enter "Central Line = No" in the NHSN application when reporting these BSIs.

You should, however, include all of the patient's central line days in the summary denominator count.

Examples of How to Report Speciated and Unspeciated Organisms Isolated from Blood Cultures		
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*

Partial List of Criterion 1 MBI-LCBI Eligible Enterobacteriaceae Genera*			
Citrobacter	Enterobacter	Escherichia	Klebsiella
Proteus	Providencia	Salmonella	Serratia
Shigella	Yersina		

** See complete list of common commensals at http://www.cdc.gov/nhsn/XLS/master-organism-Com-Commensals-Lists.xlsx*

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	Day 3	Day 4
Pt. A	WBC	100	800	400	300	ND	ND	320	400 + BC* w/ *Candida* spp. x1	ND	550	600
Pt. B	ANC	ND	410	130	ND	ND	120	110	ND +BC* w/ viridans strep x2 and fever >38°C	110	300	320
Pt. C	WBC	100	800	400	300	ND	ND	ND	600 + BC* w/ *Candida* spp. x1	230	ND	400

ND = not done
* Day the blood specimen that was positive was collected

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

Patient B meets MBI-LCBI criterion 2, sub-criterion 2: At least 2 positive blood cultures with viridans group streptococci (in this case, 2 positive), and fever >38°C and neutropenia (2 separate days of ANC <500 cells/mm^3 occurring on the date the positive blood culture was collected [Day 1] or during the 3 days before or the 3 days after that date). In this case, Day -1 value=110 and Day -2 value=120.

> **NOTE:** Any two of Days -2, -1, 1, 2, 3, and 4 could be used to meet this requirement since WBC or ANC under 500 were present on those days.

Patient C meets MBI-LCBI criterion 1, sub-criterion 2: Positive blood culture with intestinal organism (*Candida* spp.) and neutropenia (2 separate days of WBC<500 cells/mm^3 occurring on the date the positive blood culture was collected [Day 1] or during the 3 days before or the 3 days after that date. In this case, Day 2 value=230 and Day 4 value=400]).

Secondary Bloodstream Infection (BSI) Guide (not applicable to Ventilator-associated Events [VAE]) *(Last updated January 1, 2014)*

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

The purpose of using the CDC/NHSN infection criteria is to identify and consistently categorize infections that are healthcare-associated into major and specific infection sites or types. LCBI criteria include the caveat that organism(s) cultured from the blood cannot be related to infection at another site (i.e., must be a primary BSI). One must be sure that there is no other CDC-defined primary site of infection 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. For locations participating in in-plan VAE surveillance, refer to the VAE chapter for specific guidance on assigning a secondary BSI to a VAE.

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Below are listed several scenarios that may occur with guidance on how to distinguish between the primary or secondary nature of a BSI, along with the definition of "matching organisms", and important notes and reporting instructions.

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.

   Examples:

   a. 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*. This is an HAI SUTI with a secondary BSI and the reported organism is *E. coli*.
   b. 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.
   c. 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 common commensal *S. epidermidis* positive blood culture by itself does not meet BSI criteria.

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.
   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.

      Examples:

      i. 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 purulent 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.
   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.

Examples:

i. 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.

ii. Unconscious ICU patient with a Foley catheter and a 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 (SUTI 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.

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.

Examples:

a. 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.

b. 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.

4. **Negative site-specific specimen culture with positive blood culture**: 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.

Examples:

a. 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.

b. Postoperative knee replacement patient with a central line spikes a fever; blood and knee joint fluid are cultured. Only the blood cultures from at least two separate blood draws are positive for *S. epidermidis*. No other JNT infection criteria are met. This BSI should be reported as a CLABSI.

c. 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*. While this patient does not meet JNT criterion 1 (positive joint fluid culture) he does meet JNT criterion 3b (signs/symptoms plus positive laboratory test on blood [blood culture]). Since a positive blood culture is part of the criterion met for JNT infection, this BSI is considered secondary to the JNT infection and not reported as a CLABSI. *S. aureus* is reported as the pathogen for the JNT infection.

A **matching organism** is defined as one of the following:

1. If genus and species are identified in both cultures, they must be the same.

   Examples:

   a. A blood culture reported as *Enterobacter cloacae* and an intraabdominal specimen of *Enterobacter cloacae* are matching organisms.
   b. A blood culture reported as *Enterobacter cloacae* and an intraabdominal specimen of *Enterobacter aerogenes* are NOT matching organisms as the species are different.

2. If the organism is less definitively identified in one culture than the other, the identifications must be complementary.

   Examples:

   a. 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.
   b. A blood culture reported as *Candida albicans* and a urine culture reported as yeast are considered to have matching organisms because the organisms are considered complementary, i.e. *Candida* is a type of yeast.

NOTES*: *(Last updated January 1, 2014)

1. 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).
2. Antibiograms of the blood and potential primary site isolates do not have to match.

3. Blood and site-specific specimens do not have to be collected on the same day but there must be evidence of infection at the specific site at the time of blood culture collection.

REPORTING INSTRUCTIONS*: *(Last updated January 1, 2014)

1. For reporting secondary BSI for possible and probable VAP, see Chapter 10 of the 2014 NHSN Patent Safety Component Manual).
2. 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).
3. 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 2.a.i above, the following boxes for criteria used would be checked when entering the SSI into the NHSN application: fever, nausea, pain or tenderness, positive culture, positive blood culture, imaging test evidence of infection.

Patient Safety Component Protocol FAQs*: *(Last updated March, 2013)

- **Secondary BSI:**
  What is the meaning of the statement "not related to infection at another site" included in the Laboratory Confirmed Bloodstream Infection criteria?
  Please see the section above called "Secondary Bloodstream Infection (BSI) Guide" for guidance in determining the primary source of an infection for NHSN CLABSI surveillance purposes.

- **Contract Staff:**
  How should CLABSIs be reported when they develop in patients whose only central line is accessed solely by contracted dialysis staff?
  Facilities are responsible for all of the care which is provided in their facilities. This includes care provided by employed staff and contracted staff alike. Therefore such a CLABSI would be reported for the facility in which the patient is housed.

- **Dialysis Patients:**
  What if patients are provided dialysis by dialysis staff members, either this staff coming to the patient or the patient going to the dialysis unit. Our unit nursing staff does not access the dialysis catheter. If these patients develop CLABSI are they attributable to our location/facility?
  If the dialysis unit is one to which patients are transported for dialysis and then escorted back to their inpatient unit for the rest of their care, the CLABSI must be attributed to the inpatient location where the patient is housed overnight. Because in this scenario the dialysis unit does not have overnight patients, there can be no patient day counts nor central line counts and there is no way within NHSN to perform CLABSI surveillance in this location. This is an issue that we are discussing and plan to add a hemodialysis variable to the BSI form in 2014. In the

meantime, a facility may create a custom field on the LCBI form and label it something like "Dialysis line care only". Data can be analyzed based on this field and the results utilized for the facility's internal quality work. For more information on how to do this, enter the NHSN application, choose the help icon from the upper right hand corner and type "Custom Fields" in the search box. Remember, the CLABSI will still need to be reported to NHSN for the unit in which the patient is housed.

- **Blood Culture Collection Methods:**
  If two blood cultures are drawn, one through a central line, and one from a venipuncture and the venipuncture culture is negative for growth but the line culture grows an NHSN pathogen, does this meet the CLABSI criteria?
  Yes. Blood cultures collected by any means, either through venipuncture or collected through existing vascular catheters must be considered in your surveillance of BSI. Therefore, a blood culture which is collected through a vascular catheter and that is positive for an organism, is considered a positive blood culture for CLABSI surveillance

- **Patient Manipulation of Central Line:**
  If an inpatient is suspected of accessing their own vascular catheter ,e.g., injecting illicit drugs, and a BSI develops, is this BSI attributed to the facility?
  Yes, if the patient meets the definition of a BSI this is attributable to your facility. A facility must protect the line as best they can. Prevention efforts may include providing a patient sitter and/or removal of the catheter as soon as clinically possible.

- **Midline Catheter:**
  Does a midline catheter qualify as a central line?

  Midline catheters by description are not intended to end in one of the great vessels. However, the location of the tip of the catheter is the determining factor and a recent chest x-ray report may indicate the true location. Also, consider what the line is being used for. To qualify as a central line, is must be used for infusion, withdrawal of blood, or hemodynamic monitoring.

- **Catheter Tips:**
  Are central line catheter tips used to meet the NHSN LCBI criteria? Why?
  No. Catheter tip cultures are not utilized for NHSN CLABSI surveillance for several reasons. Catheter tip cultures have been shown to have higher rates of contamination than blood cultures. Furthermore, not all laboratories are able to perform quantified catheter tip cultures. Catheter tips are a part of some other types of non-NHSN surveillance such as catheter-related BSI (CRBSI) which is generally thought of as a clinical definition, used when diagnosing and treating patients. The Guidelines for the Prevention of Intravascular Catheter-Related Infections, 2011 address CRBSI and may be helpful when addressing a physician: http://www.cdc.gov/hicpac/pdf/guidelines/bsi-guidelines-2011.pdf

- **Multiple Central Lines:**
  If a patient has two central lines in at the same time, how do I determine to which line to attribute the positive blood culture?
  You will not be required to attribute a CLABSI to a specific central line. Instead you will simply be required to answer whether or not a central line was in place greater than 2 calendar days on the date of the BSI event and also in place on the day of the event or the day before the event?

- **Purulent Drainage from IV Site:**
  If a patient has purulent drainage from an old IV site, but a negative blood culture how do I report this to NHSN?
  Consult the criteria for VASC-Arterial or Venous Infection available at http://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf. Such a patient would meet criterion 4. If your facility is monitoring for these types of infection, enter this into NHSN as a VASC event.

- **Intraaortic Balloon Pump (IABP):**
  Are intraaortic balloon pumps (IABP) considered central lines?
  No. Because IABPs are not generally used for infusion, blood withdrawal or for hemodynamic monitoring, they are not considered central lines.

- **Femoral Arterial Lines:**
  Are femoral arterial lines considered central lines in NHSN?
  No. Because the femoral artery is not among the list of great vessels defined for CLABSI surveillance in NHSN, a catheter in this vessel is not considered a central line. Do not include femoral artery catheter days in your count of central line days.

- **Pre-Existing Central Lines:**
  When patients are admitted to an inpatient unit with a permanent (tunneled) pre-existing central line in place, which is not accessed during the hospitalization, are those days included in the central line-day count?
  No. Permanent central lines should be included in the central line-day count beginning on the first day that they are accessed (insertion of the line is considered an accession) and continuing until the patient is discharged or the line is discontinued, whichever comes first. Therefore, if a patient is admitted with a permanent central line which is not accessed until hospital day 4, the line should not be included in the central line-days count until day 4 and then included every day until the patient is discharged or the line is discontinued. If the line is never accessed, it is never counted in the central line day counts.

- **Chronic Dialysis Patients:**
  When performing central line-associated bloodstream infection (CLABSI) surveillance in an inpatient dialysis location, should chronic dialysis inpatients be included?
  Yes. If CLABSI surveillance in an inpatient dialysis location is part of your monthly reporting plan, all patients in that location must be included in CLABSI surveillance. (Note: inpatient dialysis locations that are not bedded locations, i.e., patients do not spend the night in these locations, but instead are transported there for dialysis and return to another bedded location for the remainder of their care, cannot participate in the NHSN CLABSI protocol at this time.)

- **MBI-LCBI-Organisms List:**
  How was the list of organisms included in the Mucosal Barrier Injury-Laboratory Confirmed Bloodstream Infection (MBI-LCBI) criteria, developed?
  The list of organisms included in the MBI-LCBI was developed by consensus of the HICPAC surveillance working group, made up of infectious disease professionals, healthcare epidemiologist, infection preventionists, and state public health representatives. The list of organisms included in the definition is intended to represent those that are most likely to be attributed to mucosal barrier injury. We recognize that not all mucosal barrier injury related

bloodstream infections will be categorized as MBI-LCBI. CDC staff will be evaluating the list of MBI-LCBI organisms on an ongoing basis to determine if changes are needed.

- **Patient Reported Fever:**
  Can I use patient reported fever to meet CDC/NHSN LCBI criterion 2 for present upon admission?
  Patient reported signs and symptoms (e.g., fever) cannot be used as an element to meet CDC/NHSN site-specific criteria unless also observed and documented by a healthcare provider. For example, a patient is transferred from a nursing home and is afebrile upon admission to the hospital. The nursing home documentation indicates that the patient had a fever the morning of admission. If the nursing home documented or reported fever is included as part of the patient's admission/facility record, then it can be used as one of the elements to meet CDC/NHSN LCBI criterion 2.

- **Hypotension:**
  What is the definition of hypotension when evaluating common commensal for CLABSI?
  NHSN does not provide specific value for this vital sign. Instead, each facility should use the vital sign parameters as states in its policies and procedures for clinical documentation.

- **Distinguishing Serial Reportable Infections From Single, Unresolved Infection:**
  Is there a time period following the identification of an infection during which another of the same type of infection cannot be reported?
  No. At present time NHSN does not have a set time period during which only 1 infection of the same event type may be reported for the same patient (with the exception of VAE and LabID Event reporting for which there is a 14-day window [see individual protocols for VAE and LabID Events]) following an infection which is present on admission (POA) or a healthcare-associated infection (HAI). Discussions are underway regarding creating such a rule, however no final decisions have been made and no changes would be made before 2014. In the meantime, use the clinical information you have available to determine if the original infection has resolved before reporting a second.

- **Removal and Reinsertion of a Central Line:**
  How do I count calendar days when a central line is removed and later reinserted?
  If a central line is removed and then reinserted on the same calendar day or the following day, this represents continuous central line presence because a central line was in place for some period of time each calendar day. If a central line is removed and the patient has an entire calendar day without a central line in place and a central line is subsequently re-inserted, the day of re-insertion represents Day 1 of that central line.

- **Secondary BSI and Time-Frame:**
  How do I count calendar days when a central line is removed and later reinserted?
  How closely do the criteria for the BSI and the site specific infection have to fall together in order for the BSI to be considered secondary?
  Currently, we do not have a set-time period for which a BSI may or may not be considered secondary to another infection. Instead, our guidance is for users to use the clinical information available to determine if the time-period is reasonable.

  For example, although the patient does not necessarily have to meet all elements of the NHSN criteria for the primary infection on the exact day of the positive blood culture, the patient must have ongoing signs/symptoms related to the primary infection at the time of the positive blood culture. If the documentation support that the primary infection has resolved (e.g., symptoms

resolved), then a positive blood culture must not be reported as secondary to a resolved infection. Same guidance applies to blood cultures that are collected prior to the onset of the signs/symptoms of the primary infection. If the patient has a positive blood culture and no other signs of infection on the date the specimen is collected, then it is unlikely that the BSI is attributable to another infection.

NOTE:
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.