



LTCH QRP Provider Training



NHSN Bloodstream Infection Surveillance in 2015

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Objectives

- ❑ **Identify 2015 BSI infections surveillance changes.**
- ❑ **Identify the relationship of site-specific infections to secondary bloodstream infections.**
- ❑ **Describe Secondary BSI Guide and apply to educational case studies.**

Limitations for Today's Presentation

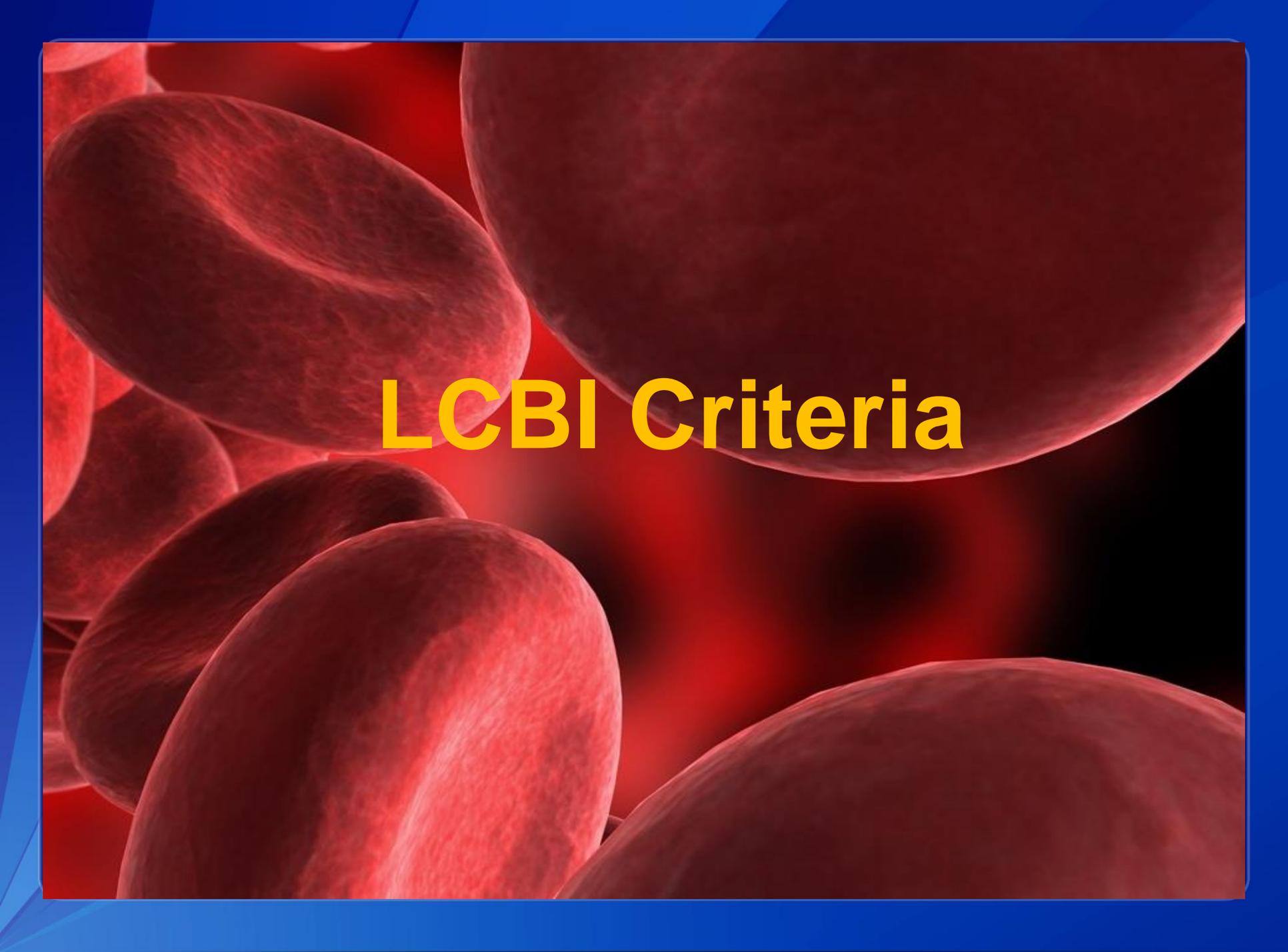
- Time limitations
- Some basic terms/concepts will not be defined/reviewed, e.g. central line, central line day count, etc.
- All available in NHSN BSI protocol
http://www.cdc.gov/nhsn/pdfs/pscmanual/4psc_clabscurrent.pdf
- Further trainings available on line
<http://www.cdc.gov/nhsn/training/patient-safety-component/index.html>

Central Line-associated Bloodstream Infection (CLABSI)

Central line-associated BSI (CLABSI): A laboratory-confirmed bloodstream infection (LCBI) where central line (CL) or umbilical catheter (UC) was in place for >2 calendar days on the date of event, with day of device placement being Day 1,

AND

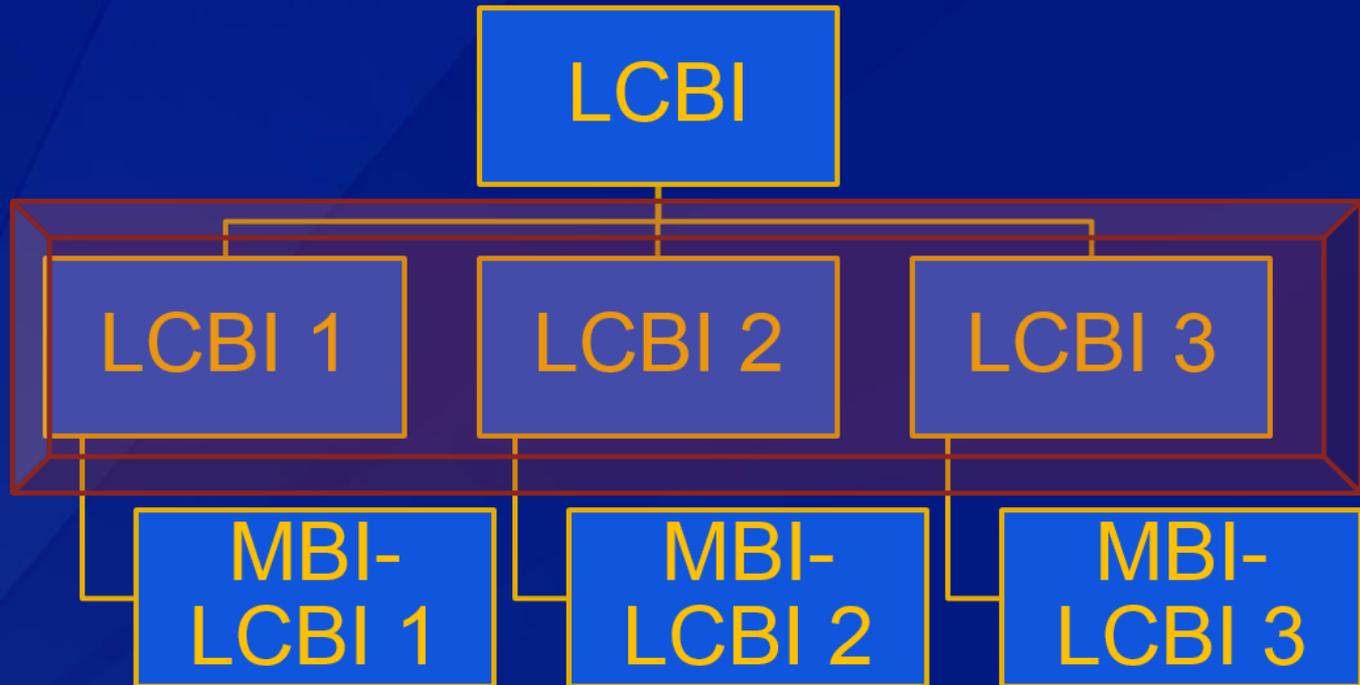
a CL or UC was in place on the date of event or the day before. If a CL or UC was in place for >2 calendar days and then removed, the date of event of the LCBI must be the day of discontinuation or the next day. If the patient is admitted or transferred into a facility with an implanted central line (port) in place, and that is the patient's only central line, day of first access in an inpatient location is considered Day 1. "Access" is defined as line placement, infusion or withdrawal through the line. Such lines continue to be eligible for CLABSI once they are accessed until they are either discontinued or the day after patient discharged (as per the Transfer Rule). **Note that the "de-access" of a port does not result in the patient's removal from CLABSI surveillance.**

A microscopic view of several red blood cells, showing their characteristic biconcave disc shape. The cells are illuminated from the side, creating a strong red glow and highlighting their textured surface. The background is dark, making the red cells stand out prominently.

LCBI Criteria

Laboratory Confirmed Bloodstream Infection Criteria

Determines
date of
event →



LCBI – Criterion 1

- Patient has a **recognized pathogen** cultured from one or more blood cultures

And

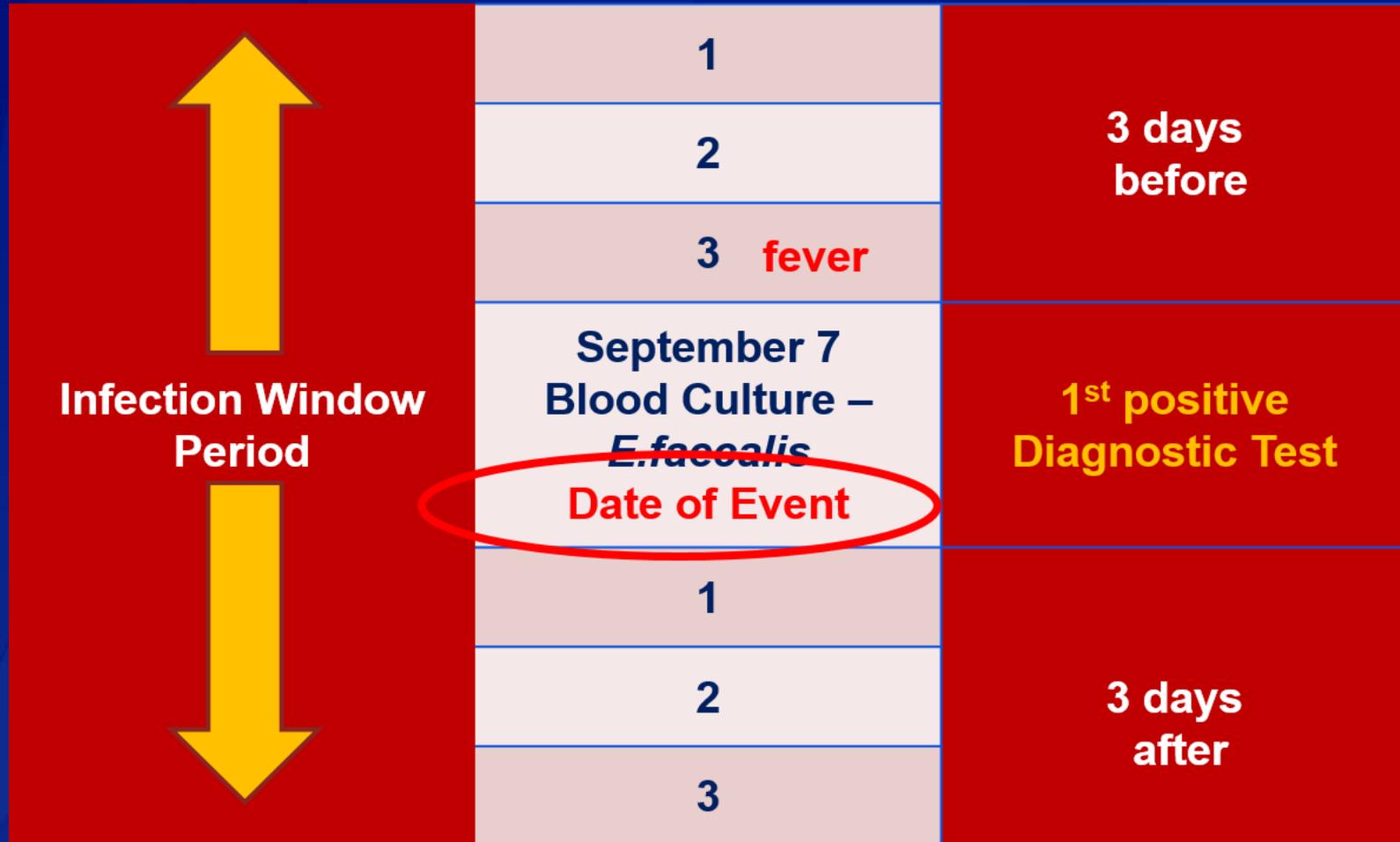
- Organism cultured from blood is not related to an infection at another site.



Example: Mary Jones had a central line inserted on admission September 3rd. On September 6th and 7th she was hypotensive and had an elevated WBC. On September 7th blood cultures are drawn which grew *E. faecalis*. No other source of *E. faecalis* infection is present.

Mary meets the criteria for LCBI Criterion 1 (recognized pathogen).

LCBI 1 Infection Window Period



LCBI- Criterion 2

- Patient has at least one of the following signs or symptoms: fever ($>38.0^{\circ}\text{C}$), chills, or hypotension

And

- Organisms cultured from blood **are not related** to an infection at another site

And

- the same common commensal (i.e. diptheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] 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 (same or consecutive days) within the 7 day Infection Window Period.**

LCBI – Criterion 2 Common Commensal

Example: Edith Smith had a central line inserted on admission September 3rd. On September 6th and 7th she was hypotensive and had an elevated WBC. On September 7th two blood cultures are drawn one grew coagulase negative *Staphylococcus* and the other *Staphylococcus epidermidis*. No other source of infection is present. Mary meets the criteria for LCBI Criterion 2 (common commensal).



LCBI Criterion 3

- Patient \leq 1 yr of age has at least one of the following signs or symptoms: fever ($>38.0^{\circ}\text{C}$), hypothermia ($<36^{\circ}\text{C}$), apnea, or bradycardia

And

- Organisms cultured from blood **are not related** to an infection at another site

And

- the same common commensal (i.e. diptheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] 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 (same or consecutive days) within the 7 day Infection Window Period**

LCBI 2 & 3 Date of Event

DOE= date of blood culture or first s/s during IWP whichever comes first

Infection Window Period

Date of 1st blood culture

1st positive Diagnostic Test

1

2

3

apnea

apnea

1

Matching blood culture

2

3

3 days before

3 days after

LCBI 2 & 3 Date of Event

DOE= date of blood culture or first s/s during IWP whichever comes first

Infection Window Period

Date of 1st blood culture

1

2

3

1

2

3

Matching blood culture

hypotension

3 days before

1st positive Diagnostic Test

3 days after

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

- ❑ **Subset of LCBI criteria**
- ❑ **Must meet LCBI 1, 2 or 3 prior to applying MBI criteria- date of LCBI is date of event**
- ❑ **NOTE: If an MBI-LCBI is identified, and a subsequent blood culture during the RIT of the MBI-LCBI is found to have an organism that is excluded from MBI criteria, the primary MBI-LCBI event is edited to become an LCBI and the organism is added to the event.**

MBI-LCBI Organisms

- Complete listing of MBI-LCBI organisms available at <http://www.cdc.gov/nhsn/acute-care-hospital/clabsi/index.html>

| | | | |
|--------------------|-------|----------|---------------------------------|
| Bacillus pestis | YERPE | 54365000 | Yersinia pestis (organism) |
| Bacterium rettgeri | PR | 14196002 | Providencia rettgeri (organism) |

▶ All Organisms / Top Organisms / Common Commensals / **MBI Organisms** / MFI Bacteria

- Partial List of Eligible Enterobacteriaceae

| | |
|---------------------|--------------------|
| <i>Citrobacter</i> | <i>Providencia</i> |
| <i>Enterobacter</i> | <i>Salmonella</i> |
| <i>Escherichia</i> | <i>Serratia</i> |
| <i>Klebsiella</i> | <i>Shigella</i> |
| <i>Proteus</i> | <i>Yersina</i> |

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*

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/mm³ within a 7 day period which includes the date the positive blood culture was collected (Day 1), the 3 calendar days before and the 3 calendar days after.

MBI-LCBI Criteria- Examples

| Day # | -7 | -6 | -5 | -4 | -3 | -2 | -1 | 1 | 2 | 3 | 4 |
|-------|-----|-----|-----|-----|------------|------------|-----|-------------------------------------|------------|-----|-----|
| WBC | 100 | 800 | 400 | 300 | Not tested | Not tested | 320 | 400 + BC* w/ <i>Candida</i> spp. X1 | Not tested | 550 | 600 |

Patient 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/mm³ occurring on the date the positive blood culture was collected [Day 1, value = 400] or during the 3 days before or after that date [in this case, the day before or Day -1; value = 320]).

*Day the blood specimen that was positive was collected.

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/mm³ **within a 7 day period which includes the date the positive blood culture was collected (Day 1), the 3 calendar days before and the 3 calendar days after.**

MBI-LCBI Criteria- Examples

| Day # | -7 | -6 | -5 | -4 | -3 | -2 | -1 | 1 | 2 | 3 | 4 |
|-------|------------|-----|-----|------------|------------|-----|-----|---|-----|-----|-----|
| ANC | Not tested | 410 | 130 | Not tested | Not tested | 120 | 110 | Not tested; + BC* w/ <i>viridans</i> group strep X2 and fever 38.1° C | 110 | 300 | 320 |

Patient 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 $>38.0^{\circ}\text{C}$ 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 or after that date). In this case, the Day -1 value=110 and Day -2 value = 120. Note: any two days of Day -2, -1, 2, 3 and 4 could be used since ANC under 500 on those days.

*Day the blood specimen that was positive was collected.

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 diarrhea in a 24 hour period 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/mm³ **within a 7 day period which includes the date the positive blood culture was collected (Day 1), the 3 calendar days before and the 3 calendar days after.**

MBI-LCBI Criteria- Examples

| Day # | -7 | -6 | -5 | -4 | -3 | -2 | -1 | 1 | 2 | 3 | 4 |
|-------|-----|-----|-----|-----|------------|------------|------------|-------------------------------------|-----|------------|-----|
| WBC | 100 | 800 | 400 | 300 | Not tested | Not tested | Not tested | 600 + BC* w/ <i>Candida spp.</i> X1 | 230 | Not tested | 400 |

Patient 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] or during the 3 days before or after that date). In this case, the Day 2 value=230 and Day 4 value = 400.

- *Day the blood specimen that was positive was collected.

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.

i.e. a single common commensal does NOT exclude from meeting MBI-LCBI criteria

Utilizing MBI-LCBI Data

Reporting required in 2015, as it will be a baseline year for future SIR data. Will be removed from 2016 CLABSI metrics shared with 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.

Mr. Smith

- On February 5th, Mr. Smith is discharged from an acute care hospital with central line and antibiotics for an infected wound. and admitted to your facility. On February 6th, he develops fever, generalized pain, and hypotension. Blood cultures are drawn, which are negative. On facility day 4, February 9th, repeat blood cultures are collected, and positive for *E.coli*.

Determining BSI

| Date | Device | LOC | | RIT |
|-----------------|--------|-----|--|----------------------------|
| Feb 5 Admission | CLine | | | |
| 6 | CLine | 5E | Blood Cultures no growth, fever, pain, hypotension | Infection Window? 2/6-2/11 |
| 7 | CLine | 5E | | |
| 8 | CLine | 5E | | |
| 9 | CLine | 5E | Blood Culture + <i>E.coli</i> | |
| 10 | CLine | 5E | | |
| 11 | CLine | 5E | | |
| 12 | CLine | 5E | | |
| 13 | CLine | 5E | | |
| 14 | CLine | 5E | | |
| 15 | CLine | 5E | | |
| 16 | CLine | 5E | | |
| 17 | CLine | 5E | | |
| 18 | CLine | 5E | | |
| 19 | CLine | 5E | | |
| 20 | CLine | 5E | | |
| 21 | CLine | 5E | | |

Infection Window? 2/6-2/11

Date of Event? 2/9

Event type? HAI CLABSI

RIT? 2/6-2/19

REMEMBER!!

There is NO
Secondary BSI
Attribution Period for
LCBI !

Repeat Blood Culture

On February 17th, a repeat blood culture is collected and is subsequently reported as growing *S. aureus*. No other source of infection is identified.



| Date | Device | LOC | | RIT |
|--------------------|--------|-----|--|----------------------------|
| Feb 5 Admission | CLine | | | |
| 6 | CLine | | Blood Cultures no growth, fever, pain, hypotension | Infection Window? 2/6-2/11 |
| 7 | CLine | | | |
| 8 | CLine | | | |
| 9 | CLine | | Blood Culture + <i>E.coli</i> | |
| 10 | CLine | | | |
| 11 | CLine | 5E | | RIT? 2/9-2/22 |
| 12 | | | | |
| 13 | | | | |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | | | BC: <i>S. aureus</i> | |
| 18 | | | | |
| 19 | | | | |
| 20 | | | | |
| 21 | | | | |

The repeat blood culture falls within the RIT of the primary BSI. Therefore, unless another primary source with a matching organism is identified, the pathogen is added to the primary BSI with date of event Feb 9. No new event should be identified or reported.

Determining BSI

Infection Window? 2/6-2/11

Date of Event? 2/9

Event type? HAI CLABSI

RIT? 2/9-2/22

How should this blood culture on 2/17 be recorded in NHSN?

S. aureus will be added to the LCBI reported for 2/9

Do not confuse
Primary BSI RIT with a Site-Specific
event's Secondary BSI Attribution Period

Important!

True or False?

IF an LCBI is determined to be secondary to a primary site-specific infection, all subsequent positive blood cultures with a collection date that falls within the primary site-specific events secondary BSI attribution period can automatically be attributed to that event.

FALSE!!!!

If an LCBI is secondary to another source of infection, any of the following subsequent blood cultures must also satisfy the requirements necessary to be assigned as a secondary BSI to that event:

Blood and site-specific specimen cultures match for at least one organism

OR

Blood isolate is an element used to meet the site-specific criterion

If not the BSI must be evaluated as a new event:

Possible primary BSI

OR

Possible secondary BSI to different primary site-specific infection

Example 1

Primary BSI RIT

- ❑ 4/1: 59-year-old cancer patient with PICC line admitted. PICC line is accessed on day of admission.
- ❑ 4/4: Two separate blood culture sets are collected and are positive for *S. epidermidis*. Fever 100.9 ° F. No other source of infection is identified.
- ❑ Patient meets HAI-LCBI 2 criteria
- ❑ **BSI 14 day RIT is set.**
- ❑ 4/8: Blood collected for culture and positive for *S. aureus*.

The *S. aureus* is added as a pathogen to the BSI since the blood culture has a collection date that occurs within the **Primary BSI RIT.**

Example 2

Secondary BSI Attribution Period

- ❑ 5/1/15: 55-year-old female is admitted with fever 101.3° F. A urine culture collected on admission is positive for *E.coli* 10⁵ CFU/ml.
- ❑ 5/2: Blood cultures collected on 5/2 also positive for *E.coli*.
- ❑ Patient meets criteria for POA-SUTI with secondary BSI with pathogen *E.coli*.
- ❑ UTI 14-day RIT and a Secondary BSI Attribution Period is set (No BSI RIT set).
- ❑ 5/8 repeat blood cultures are positive for *S. aureus*.

The blood culture with *S. aureus* must be investigated and determined to be either: A primary BSI **OR** a secondary BSI to a site-specific infection. The 5/8 blood culture pathogen *S. aureus* is not a matching pathogen to the site-specific culture pathogen used to meet the SUTI criteria nor can it be used as an element to meet the SUTI criterion .

Example 3

Secondary BSI Attribution Period

- ❑ 4/1/15: Otherwise healthy 5-year-old admitted with opacities in lungs bilaterally. PICC line placed.
- ❑ 4/2: Fever 102.7° F; rales; tachypnea; blood collected for culture is positive for *H. influenzae*.
- ❑ Patient meets criteria for POA-PNU2 with secondary BSI with *H. influenzae*.
- ❑ PNEU 14 day RIT and a Secondary BSI attribution period is set _____ (No BSI RIT set).
- ❑ 4/8 blood culture positive for *A. baumannii*.

The blood culture *A. baumannii* must be investigated and determined to be either: A primary BSI **OR** a secondary BSI to a site-specific infection

Note: Only if the blood culture can be used as an element to again meet PNU2 within the PNEU 14 day RIT can the BSI be attributed to the PNEU event.

Consider this:

- ❑ Ida IP notes a patient is admitted from home on 5/1 with Foley catheter and fever and positive blood cultures for *E. coli on admission*. The patient hasn't recently been discharged, so IDA chalks this BSI up as Present on Admission (POA). A central line is placed.
- ❑ On 5/10, blood collected for culture from patient is positive for *S. aureus*. Ida decides that she does not need to investigate this as a potential CLABSI since it is still within the POA BSI RIT.
- ❑ Is this correct?

Answer

NO. Without knowing if the 5/1 BSI is primary in nature, one cannot determine that a BSI RIT has been set. If the 5/1 BSI was secondary to another site, e.g., UTI, then the *S. aureus* cannot be considered secondary because:

1. There are no matching cultures between blood and urine and,
2. SUTI criteria cannot be met with a positive blood culture.

Therefore the blood culture with *S. aureus* must be investigated and determined to be either: A primary BSI **OR** a secondary BSI to a site-specific infection.

NHSN Secondary Bloodstream Infection Determination



(Very Important Point)

Chapter 4 Appendix 1: Secondary Bloodstream Infection Guide

(not applicable to Ventilator-associated Events)

- Guidance is central to making surveillance determination of primary vs secondary BSI**

“...and organism cultured from blood is not related to an infection at another site...”

- 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.
- A CLABSI may not be secondary to an infection at another site, i.e., it must be a primary BSI.
- A Primary BSI is identified by ruling out all non-blood sites as the source of the bloodstream infection.

A Secondary BSI is:



A laboratory confirmed bloodstream infection (LCBI) associated with an NHSN defined primary site infection

AND



A primary infection meeting one of the NHSN infection definitions in Chapter 17 is identified

AND



The BSI and primary infection site are related according to the guidelines provided in NHSN's Appendix 1: Secondary BSI Guide in Chapter 4

Secondary Bloodstream Infection (BSI)

- ❑ **Secondary bloodstream infections may be attributed to a primary site infection as per the Secondary BSI Guide (Appendix 1) of the BSI event protocol**
 - Blood culture pathogen matches at least one organism found in a site-specific infection culture used to meet the primary site infection criterion
- OR**
- The positive blood culture is an element used to meet the primary site infection criterion

Secondary BSI Attribution

Secondary BSI Attribution Period

(Infection Window Period
+
Repeat Infection Timeframe)

15 days

| Hospital Day | SUTI Criterion |
|--------------|--|
| 9 | |
| 10 | |
| 11 | Temp = 101.5° F |
| 12 | Temp = 102.1° F |
| 13 | Urine culture: >100,000 cfu/ml, <i>E. coli</i> |
| 14 | |
| 15 | |
| 16 | |
| 17 | |
| 18 | |
| 19 | |
| 20 | |
| 21 | |
| 22 | |
| 23 | |
| 24 | |

Secondary BSI Scenario 1 – Example 1

1. Blood & site-specific cultures match.

- At least one organism must match
- That organism cannot be an excluded organism for that site-specific infection
- Site-specific criteria must be met using the site-specific culture
- Blood with matching organism must be collected during the secondary BSI attribution period
- Example: Patient meets criterion 1 for a symptomatic urinary tract infection (suprapubic tenderness and $>10^5$ CFU/ml of *E. coli*) and blood culture collected 5 days later grows *E. coli*. This is a SUTI with a secondary BSI and the reported organism is *E. coli*.

Secondary BSI Attribution

Secondary BSI Attribution Period

(Infection Window Period

+

Repeat Infection Timeframe)

17 days

| Day | Criterion |
|-------|---|
| 9 | |
| 10 | |
| 11 | |
| 12 | |
| 13 | Suprapubic tenderness; Urine culture: >100,000 cfu/ml, <i>E. coli</i> |
| 14 | |
| 15 | |
| 16 | |
| 17 | |
| 18 | Blood culture: <i>E.coli</i> |
| 19 | |
| 20 | SUTI with secondary BSI* |
| 21 | Pathogen: <i>E.coli</i> |
| 22 | Date of Event: Day 13 |
| 23 | |
| 24-26 | |

* Per the Secondary Bloodstream Infection Guide (Appendix 1) of the Bloodstream Infection Protocol

Secondary BSI Scenario 1- Example 2

- ❑ Patient meets criterion 1 for a symptomatic urinary tract infection (suprapubic tenderness and $>10^5$ CFU/ml of *E. coli* and $>10^5$ CFU/ml of *Candida glabrata*) and blood culture collected 5 days later within the secondary BSI attribution period grows *Candida glabrata* and *S. aureus*.
- ❑ This is a SUTI with *E. coli* and a primary BSI with *Candida glabrata* and *S. aureus* if no other primary infection site can be identified.
 - ❑ *Candida* is an excluded UTI organism
 - ❑ *S. aureus* does not match at least one organism found in the site-specific culture (urine)

Secondary BSI Attribution

| DAY | SUTI Criterion 1 | LCBI Criterion 1 | DAY |
|------------|---|--|------------|
| 9 | | | 9 |
| 10 | | | 10 |
| 11 | | | 11 |
| 12 | | | 12 |
| 13 | Suprapubic tenderness; Urine culture: >100,000 cfu/ml, <i>E. coli</i> , >100,000 <i>C. glabrata</i> | | 13 |
| 14 | | | 14 |
| 15 | | | 15 |
| 16 | | | 16 |
| 17 | | | 17 |
| 18 | Blood culture: <i>C. glabrata</i> and <i>S. aureus</i> | Blood culture: <i>C. glabrata</i> and <i>S. aureus</i> | 18 |
| 19 | | | 19 |
| 20 | 1) SUTI - Pathogen: <i>E.coli</i> Date of Event: Day 13 2) LCBI- Pathogens: <i>C. glabrata</i> and <i>S. aureus</i> Date of Event: Day 18* | | 20 |
| 21 | | | 21 |
| 22 thru 26 | | | 22 thru 31 |

17 days

Secondary BSI Attribution Period
 (Infection Window Period + Repeat Infection Timeframe)

* Per the Secondary Bloodstream Infection Guide (Appendix 12) of the Bloodstream Infection Protocol

Secondary BSI Scenario 2

2. Blood and site-specific cultures do not match.

- If the blood isolate is an element used to meet the site-specific criterion, then the BSI is considered secondary to that site-specific infection.
 - **EXAMPLE** - Patient is febrile, has a new onset of cough and has positive chest radiographs indicating the presence of an infiltrate. *Pseudomonas aeruginosa* is isolated from the blood. Because the patient can meet PNU2 definition where positive blood culture is an element of the criteria, the BSI is considered secondary to the PNEU. No primary BSI would be reported.

Secondary BSI Attribution

Secondary BSI Attribution Period

(Infection Window Period
+
Repeat Infection Timeframe)

15 days

| Day | PNU2 Criterion |
|-----|---|
| 9 | |
| 10 | |
| 11 | New cough |
| 12 | Temp = 102.1° F |
| 13 | Chest Radiograph: Infiltrate |
| 14 | Chest Radiograph: Infiltrate |
| 15 | Blood culture: <i>Pseudomonas aeruginosa</i> |
| 16 | |
| 17 | |
| 18 | |
| 19 | |
| 20 | |
| 21 | PNU 2 with secondary BSI* Pathogen: <i>P. aeruginosa</i> Date of Event: Day 11 |
| 22 | |
| 23 | |
| 24 | |

* Per the Secondary Bloodstream Infection Guide (Appendix 1) of the Bloodstream Infection Protocol

Secondary BSI Scenario 2 (continued)

2. Blood and site-specific cultures do not match.

- ❑ If the site-specific culture is an element used to meet the infection site criterion and the blood isolate is not, then the BSI is considered a primary infection.
- **EXAMPLE** : Postoperative patient has an intraabdominal abscess (IAB) noted during reoperation and purulent material is obtained at that time which grows *Escherichia coli*.
- Five days later, the patient spikes a fever and blood culture shows *Bacteroides fragilis*. Because there is not at least one organism that matches in both the site culture and blood culture and no site-specific criterion that includes positive blood culture as an element is met, both a site-specific infection (GI-IAB criteria 1 and 2) and a primary BSI would be reported.

IAB 2015

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

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

1. Patient has organisms cultured from abscess and/or purulent material from intraabdominal space.
2. Patient has abscess or other evidence of intraabdominal infection on gross anatomic or histopathologic exam.
3. Patient has at least two of the following signs or symptoms: fever ($>38.0^{\circ}\text{C}^{\pm}$), nausea*, vomiting*, abdominal pain*, or jaundice*

And at least one of the following:

- a. organisms seen on culture or Gram stain of drainage or tissue obtained during invasive procedure or from an aseptically-placed drain (e.g., closed suction drainage system, open drain, T-tube drain, CT guided drainage)



Not met

- b. organisms cultured from blood and imaging test evidence of infection (e.g., ultrasound, CT scan, MRI, radiolabel scans [gallium, technetium, etc.] or on abdominal x-ray)

* *With no other recognized cause*

\pm *As documented in the medical record*

Secondary BSI Attribution

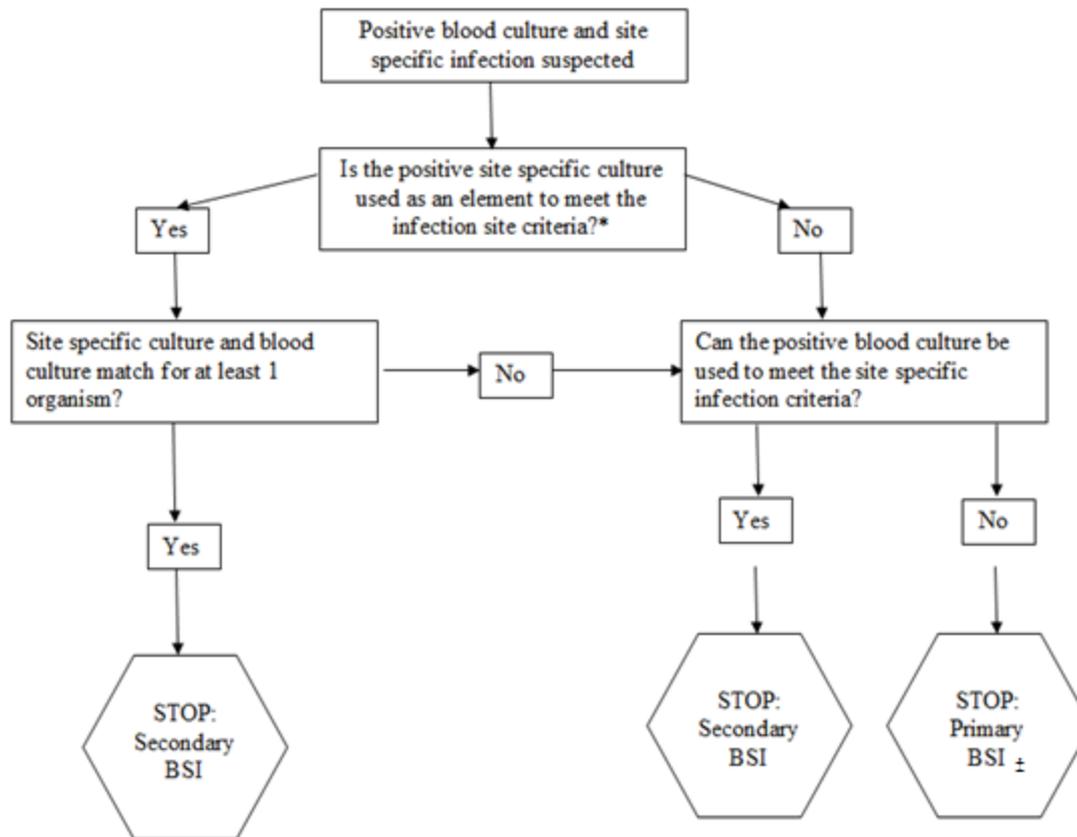
| DAY | GI-IAB | LCBI Criterion 1 | DAY |
|------------|-------------------------|-----------------------------------|------------|
| 9 | | | 9 |
| 10 | | | 10 |
| 11 | | | 11 |
| 12 | | | 12 |
| 13 | Abscess/Culture: E.coli | | 13 |
| 14 | | | 14 |
| 15 | | | 15 |
| 16 | | | 16 |
| 17 | | | 17 |
| 18 | 102.2° F | Blood culture: <i>B. fragilis</i> | 18 |
| 19 | 101.2° F | | 19 |
| 20 | | | 20 |
| 21 | | | 21 |
| 22 thru 26 | | | 22 thru 31 |

Secondary BSI Attribution Period
 (Infection Window Period + Repeat Infection Timeframe)

1) IAB: *E. Coli*
 Date of Event: Day 13
 2) Primary BSI: *B. fragilis*
 Date of Event: Day 18

* Per the Secondary Bloodstream Infection Guide (Appendix 1) of the Bloodstream Infection Protocol

Secondary BSI Guide



*If an organism is excluded as a causative agent for a site specific infection (i.e. yeast in UTI), the blood cannot be considered secondary to that site.

CLABSI Denominator Data

Data Accuracy

- ❑ **Accurate rates/standardized infection ratios (SIR) require BOTH**
 - **Accurate numerators**
 - Definitions/Reporting Instructions Adherence
 - **Accurate denominators**
 - Mapping accuracy (see NHSN online training)
 - Collection accuracy
 - Electronic collection validation

Accurate Denominator Collection

- ❑ **In all locations:** Patients with ≥ 2 CLs get counted as 1 CL day
- ❑ **NOTE:** If the patient has only a tunneled or implanted central line, begin recording days on the first day the line was placed or accessed and continue until line removed or patient discharged. (No “de-accessing”)

Check Your Denominator Data

- Ensure your denominator data is correct.

Examples of potential problems:

- Counting a patient with 2 CLs as 2 rather than 1 CL day
- Electronic 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 | 12.420 | 5400 | 0.32 | 0.0057 | 0.110, 0.737 |

CL days 5400

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
 - If difference > 5 % address issues, and revalidate for 3 months; repeat cycle until difference $\leq 5\%$



**NEW
2015**

Once Weekly Denominator Collection

- Reducing NHSN Data Collection Burden
- Eligible ICU and ward location types may use
 - Must have 75 or more CL days per month
- Patient days
 - Collected daily
- Central line days collected on a single day, once a week
 - e.g. Every Tuesday

Summary

- ❑ NHSN LCBIs must be primary in nature
- ❑ Hard and fast surveillance rules for determining distinguishing primary and secondary BSIs.
- ❑ BSIs that are present on admission do not necessarily set a BSI RIT- some investigation may be necessary.
- ❑ Collecting accurate central line days is as important as correctly identifying LCBIs.

Resources

- Protocols, trainings, Frequently Asked Questions, etc:
- <http://www.cdc.gov/nhsn/acute-care-hospital/clabsi/index.html>
- [**NHSN@cdc.gov**](mailto:NHSN@cdc.gov)

Questions?