

# **NHSN Central Line-associated Bloodstream Infection Surveillance in 2014**

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# Objectives

1. **Define key terms for device-associated infections and CLABSI**
2. **Identify device-associated infections surveillance changes**
3. **Describe how to collect central line and patient day data**
4. **Identify data collection forms**

# Since CLABSI Reporting is Not New to Most

## □ We Will Not be Covering in Depth:

- Center's for Medicare and Medicaid Services (CMS) Inpatient Quality Reporting Program (IQRP) reporting requirements, timelines, etc. See CMS Supporting materials at:  
<http://www.cdc.gov/nhsn/acute-care-hospital/clabsi/index.html>
- Contact list for QIOs:  
<http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier2&cid=1144767874793>
- Step by step CLABSI event data entry
- CLABSI data analysis



# CLABSI Epidemiology

- **In recent prevalence study<sup>1</sup>:**
  - 28% of acute care patients had a central line
  - 14% of HAIs were BSI
  - All BSIs identified were CLABSI
  
- **Estimated 41,000 CLABSI annually hospital-wide<sup>2</sup>**
  - 18,000 CLABSI annually in ICUs
  
- **Cost varies (2007 dollars)<sup>3</sup>: \$7,000 to \$29,000 per episode**

<sup>1</sup> Magill ss, Hellinger w, et. al. Prevalence of Healthcare-Associated Infections in Acute Care Hospitals in Jacksonville, Florida. Infection Control and Hospital Epidemiology, Vol. 33, No. 3 (March 2012), pp. 283-91

<sup>2</sup> Vital Signs: Central line-associated bloodstream infections -- United States, 2001, 2008, and 2009. MMWR March 4, 2011; 60(08);243-248.

<sup>3</sup> 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](http://www.cdc.gov/hai/pdfs/hai/scott_costpaper.pdf)

# **CLABSI Prevention and Control Efforts are Only as Good as the Data - - Make it Golden!**



# NHSN CLABSI Surveillance

## □ **Active**

- Includes rounding on patient care units
- Identifies a variety of infection prevention and control issues
- Encourages teamwork

## □ **Prospective**

- During facility stay
- Provides opportunities to clarify documentation/criteria issues with staff
- Can assist with discrimination between primary and secondary BSI
- May identify outbreaks earlier

## The “Musts” of Infection Surveillance

- ❑ **Know protocol/criteria**-carry it with you
- ❑ **Consistently apply the criteria**
- ❑ **Report events meeting criteria; exclude those that don't**
- ❑ **Failure to do so:**
  - Breach of NHSN Rules of Behavior
  - Decreased usefulness of national comparative data
  - Unfair comparisons between facilities
  - Possible validation discrepancies
  - Potential impact of CMS Inpatient Quality Reporting score & facility reimbursement
- ❑ **Concerns about the criteria should be sent to NHSN-NOT addressed by non-reporting of events or facility adjudication**

# Clinical Disagreement?

	<b>Surveillance Definitions</b>	<b>Clinical Diagnoses</b>
<b>Purpose</b>	Identify trends <u>within a population</u> for prevention and research	Identify disease in, and treatment needs for, <u>individual patients</u>
<b>Components</b>	Limited predetermined data elements	All diagnostic information available
<b>Clinical judgment</b>	Excluded if possible	Valued

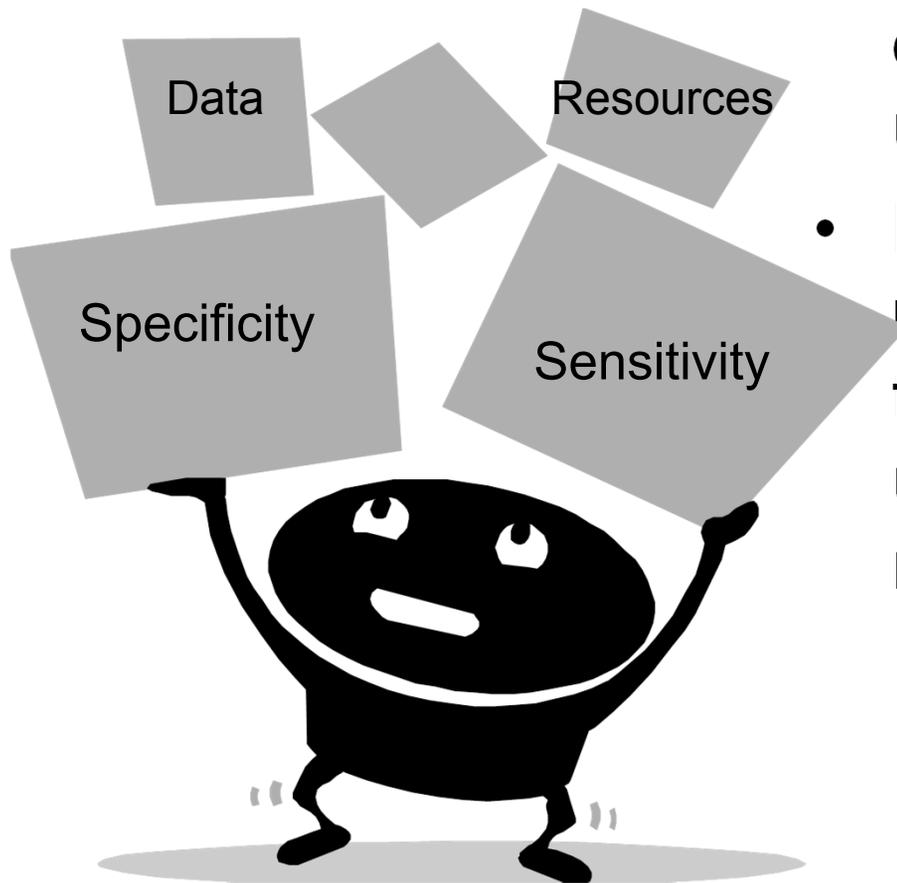


Bottom Line: At times clinical judgment and surveillance determinations will not match. Surveillance determinations always “trump” in epidemiologic surveillance.

(Use of the comments section in event form can be useful for internal quality improvement discussions)

# Surveillance Definitions

- Perfect Goal: Identify all true cases, exclude all false cases using few resources
- Real Life Goal: Identify the majority of true cases, exclude the majority of false cases, using a reasonable amount of resources



# Changes for 2014

- MBI-LCBI reporting is a required part of CLABSI reporting
- Expanded time window for neutropenia in MBI-LCBI criteria to include 3 days AFTER positive blood culture collection;
- Exclusion of HeRO (Hemodialysis Reliable Outflow catheters) as central lines
- Additional field for hemodialysis catheter present

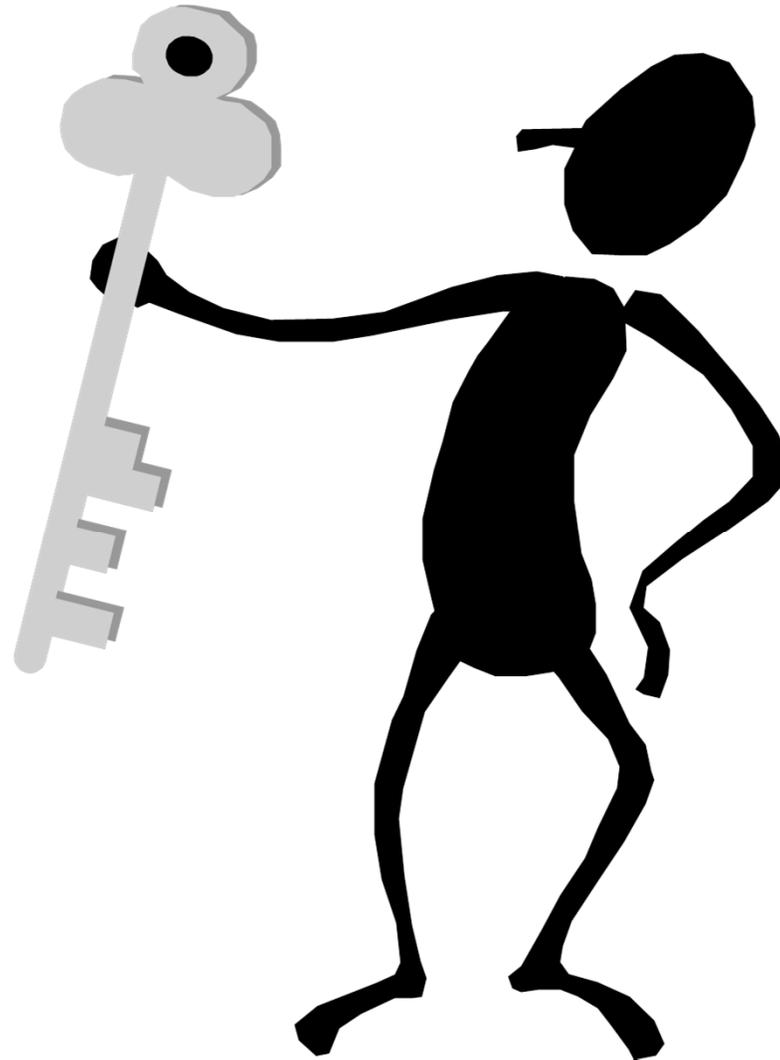
# 2014 BSI Form

<input type="checkbox"/> Yes, this infection's pathogen & location are in-plan for infection surveillance in the MDRO/CDI Module <input type="checkbox"/> No, this infection's pathogen & location are <b>not</b> in-plan for Infection Surveillance in the MDRO/CDI Module	
*Date Admitted to Facility:	*Location:
<b>Risk Factors</b>	
*If ICU/Other locations, Central line: Yes No *If Specialty Care Area, Permanent central line: Yes No Temporary central line: Yes No *If NICU, Central line, including umbilical catheter: Yes No Birth weight (grams):	Any Hemodialysis Catheter Present: Yes No Location of Device Insertion: _____ Date of Device Insertion: ___ / ___ / _____
<b>Event Details</b>	
*Specific Event: Laboratory-confirmed	

**Field is optional**



# Device-associated Infections' Key Terms



# Key Terms

## Present On Admission:

Present on Admission (POA): (NOTE: This should not be applied to SSI, VAE, or LabID Events.)

If all of the elements used to meet a CDC/NHSN site-specific infection criterion are present during the two calendar days before the day of admission, the first day of admission (day 1) and/or the day after admission (day 2) and are documented in the medical record, the infection is considered POA. Infections that are POA should not be reported as HAIs. Acceptable documentation does not include patient-reported signs and/or symptoms (e.g., patient reporting having a fever prior to arrival to the hospital). Instead, symptoms must be documented in the chart by a healthcare professional during the POA time frame (e.g., nursing home documents fever prior to arrival to the hospital). Physician diagnosis can be accepted as evidence of an infection that is POA only when physician diagnosis is an element of the specific infection definition.

Illustration of present on admission (POA) time frame			
2 calendar days before admission	1 calendar day before admission	Day 1 (Day of facility admission)	Day 2 (Day after facility admission)
October 27	October 28	October 29	October 30

Note: For POA, the temperature value does not need to be known to establish the presence of a fever.

# Key Terms

Healthcare-associated infection (HAI) (Not to be used in the SSI, VAE, or LabID Event protocols)

A localized or systemic condition resulting from an adverse reaction to the presence of an infectious agent(s) or its toxin(s) that was not present on admission to the acute care facility. **An infection is considered an HAI if all elements of a CDC/NHSN site-specific infection criterion were not present during the POA time period but were all present on or after the 3rd calendar day of admission to the facility (the day of hospital admission is calendar day 1). All elements used to meet the CDC/NHSN site-specific infection criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between any two adjacent elements.** The definition of a gap day is a calendar day during which no infection criterion elements are present.

If all elements of a CDC/NHSN site-specific infection criterion are present on the day of transfer or the next day from one inpatient location to another in the same facility or a new facility, the infection is attributed to the transferring location or facility. Likewise, if all elements of a CDC/NHSN site-specific infection criterion are present on the day of discharge or the next day, the infection is attributed to the discharging location.

# Investigating an Infection

**Ask yourself questions in this order\*:**

1. Is it POA? If POA, (and no discharge in last 2 days) stop.

2. Is it an HAI?\* If not HAI, stop.

3. If this is an HAI, which site-specific criterion is met?

4. If HAI, is it a device-associated event?

6. Attributable to what location/facility/procedure?

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

\*Some infections will fit neither the POA nor the HAI definitions. Such infections should not be reported to NHSN. These infections may later meet the definition of HAI at which time they must be reported.



**Meet:  
The Unlucky Family**

About to become healthcare consumers on a grand scale



## **Grandma Unlucky Goes to the Hospital**

Grandma Flo is admitted to the hospital with respiratory insufficiency following a failed cinnamon teaspoon challenge.



## **Does Grandma Have a POA Infection or HAI?**

**May 3<sup>rd</sup>: Grandma Flo is admitted with new cough productive of yellow sputum flecked with red, fever 38.2 ° C, and rales. She reports failing the cinnamon teaspoon challenge on April 28<sup>th</sup> and having increased respiratory problems since. CXR shows consolidation in bilateral lung lobes.**

**☺ POA.**

**2. HAI.**

All elements of PNU 1 present before Day 3 (fever, new cough and rales and consolidation on CXR. In this case, all elements were documented in hospital.

# POA or HAI !CALENDAR DAYS!

Key Terms	Day 1 Day of admit	Day2	Day 3	Day 4	Day 5	Day 6	Day 7	
POA	ED to ICU	ICU Fever >38 (+) UC >100K CFU						POA, UTI
POA	LTC to ICU Documented fever in LTC day prior to admission	(+) UC >100K CFU						POA, UTI
HAI	ED to ICU Asymptomatic (Asx)	ICU Asx	ICU (+) <i>S. aureus</i> in blood culture					HAI, LCBI attributable to ICU
HAI	ICU	ICU Fever >38	ICU Fever >38	(+) UC >100K				HAI, UTI

# Note about HAI vs. POA

- Sometimes NEITHER POA nor HAI
- Do not attempt to “borrow” an element from Day 1 or 2 to meet criteria for HAI.
- Do NOT report HAI.

Key Terms	Day 1 Day of admit	Day2	Day 3	Day 4	Day 5	Day 6	Day 7	
HAI	ED to ICU	ICU Fever >38	(+) UC >100K <i>E. coli</i> Afebrile	Asx	Asx	Asx		Neither an HAI nor POA

# Key Terms

<b>Device-associated HAI</b>	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.
<b>Date of Event</b>	For an HAI (excludes VAE), the date of event is the date when the <u>last</u> 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)
<b>Transfer Rule</b>	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. (See NHSN manual for guidance for >1 transfer in 1 day ).
<b>Date of Onset</b>	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 <sub>2</sub> 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.

# Device-associated Event

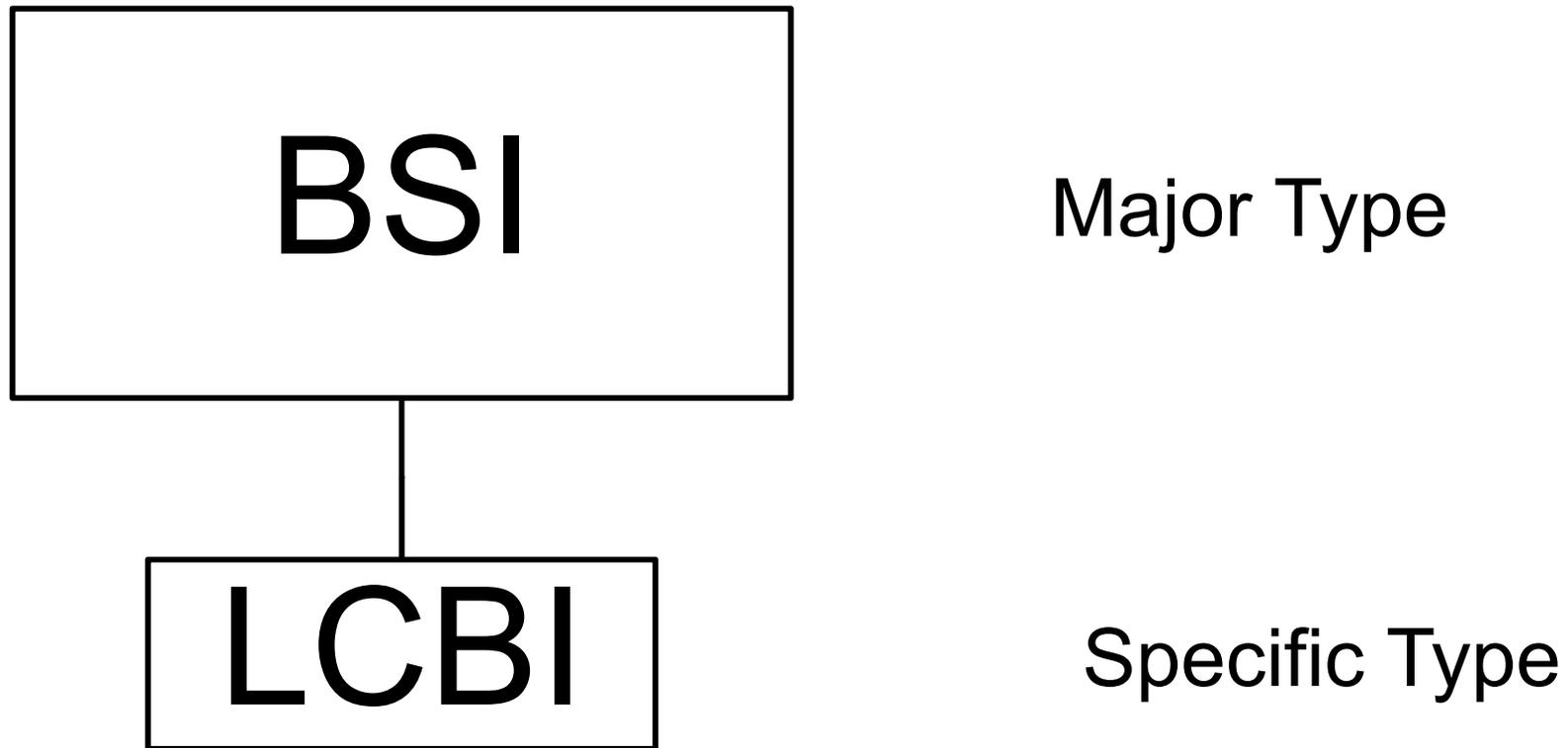
- ❑ An infection meeting the HAI definition is considered a device-associated HAI if the device has been in place for  $> 2$  calendar days on the day of event.
- ❑ For recently removed devices, HAIs occurring on day of device discontinuation or the following day are considered device-associated if the device had already been in place for  $> 2$  calendar days.
- ❑ IF a device is removed and then reinserted on same day or the next day, this is considered continuous device days for the purpose of surveillance. Only if a complete calendar day passes without the device does should the device day count begin anew. (Example to follow, and in CAUTI presentation, in handout, and March 2014 NHSN Newsletter)



## **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)**

# Central Line-associated Bloodstream Infection (CLABSI) Events



# Key Term:

## Central Line-associated Bloodstream Infection (CLABSI)

Central line-associated BSI: 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 LCBI criteria must be fully met on the day of 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.\*

\*A device is considered accessed once it is inserted or used for withdrawal or insertion of any fluids during that inpatient stay.



## Grandpa's Turn

Grandpa Monte is admitted to hospital following bungee jumping accident



## Grandpa Monte

- ❑ **7/1: Grandpa is admitted with myocardial infarction and multiple fractures following bungy jump from local bridge (luckily he was over water). Central line inserted in ED. Admitted to Med-Surg ICU.**
- ❑ **7/4: Status improved, transfer to 4E. Central line continued.**
- ❑ **7/9: Central line discontinued.**
- ❑ **7/10: WBCs 15,000. Blood cultures and urine cultures collected.**
- ❑ **7/11: Blood cultures positive *S. aureus*. Urine culture negative.**

# True or False: Grandpa's BSI is Central Line Associated

1. True
2. False

Central line in place > 2 calendar days.

Date of event (7/10 date blood collected) is the day after the day the central line was removed.

# Device-association

Key Terms	Day 1 Day of admit	Day2	Day 3	Day 4	Day 5	Day 6	Day 7	
Device Associated	Device inserted	Device (central line) in place	Device in place <b>Date of event</b> for a BSI					Device associated BSI (CLABSI)
Device Associated	5W	5W	Device (central line) inserted	Device removed	<b>Date of event</b> for a BSI			Non-central line associated BSI (CL not in place > 2 days)
Device Associated	Device (central line) inserted	Device in place Fever >38.0° C	Device in place Fever >38.0° C, (+) BC x 2 <i>S. hominis</i> ; <b>Date of event</b>					Device associated BSI (CLABSI)
Device Associated	ICU	ICU	Device (central line) inserted Fever >38.0° C	Device in place GAP DAY	Device in place (+) BC x 2 <i>S. hominis</i> ; <b>Date of event</b>	Device in place Asx	Device in place Asx	Device associated BSI (CLABSI)
Device Associated	Device (central line) inserted	Device in place	Device in place	Device removed	BC (+) <i>S. aureus</i> <b>Date of event</b>			Device associated BSI (CLABSI)
Device Associated	Device (central line) inserted	Device in place	Device in place	Device removed	Device reinserted	<b>Date of event</b> for a BSI		Device associated BSI (CLABSI)
Device Associated	Device (central line) inserted	Device in place	Device in place	Device removed	No device in place	<b>Date of event</b> for a BSI		Non-catheter associated BSI

# Key Term: 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:**

- 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)

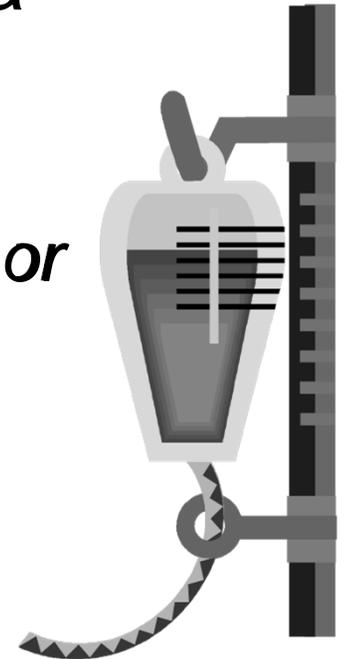
Note: Femoral ARTERIES are not great vessels

# 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*



# 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 not considered central lines, because fluids are not infused, pushed, nor withdrawn through such devices.**
- ❑ **The following devices are not considered central lines: extracorporeal membrane oxygenation (ECMO), femoral arterial catheters, intraaortic balloon pump (IABP) devices, and Hemodialysis Reliable Outflow (HeRO) catheters.**
- ❑ ***If you have a question about whether a device qualifies as a central line, please email us at [NHSN@cdc.gov](mailto:NHSN@cdc.gov).***

# **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.

## **Exception (a.k.a The Transfer Rule)**

- **If all elements of an HAI are present on the day of transfer or the next day, the HAI is attributed to the transferring location or facility. Receiving facilities should share information about such HAIs with the transferring facility to enable reporting.**

# Transfer Rule

Key Terms	Day 1 Day of admit	Day2	Day 3	Day 4	Day 5	Day 6	Day 7	
Transfer Rule	ICU	ICU	ICU →5W	5W Date of event for an HAI	5W			HAI is attributable to the ICU
Transfer Rule	ICU	ICU	ICU →5W	5W	5W Date of event for an HAI			HAI is attributable to the 5W
Transfer Rule	5W	5W	5W	5W →Discharged Home	Admit to ED with <i>S. aureus</i> in blood (LCBI 1 criteria met)			Attributable to 5W
Multi-transfer Rule	ICU	ICU	ICU →5W→ CCU	CCU Date of event for an HAI	CCU			HAI is attributable to the ICU



Peter is hospitalized for pelvic fracture after slip and fall while doing the Harlem Shake at the office.





## Peter

- ❑ **8/12: Peter admitted to ED. Intra-vascular catheter inserted in common iliac vein. IV fluids begun. Foley catheter inserted. To OR for closed reduction and traction placement. Sent to Step Down unit postoperatively.**
- ❑ **8/13: Step Down unit. Afebrile. Asymptomatic**
- ❑ **8/14: Transfer from Step Down to Trauma Unit. Temp 38.1° C. 1 set blood culture collected.**
- ❑ **8/15: Trauma unit. Temp 37.9° C. 1 set of blood cultures collected. Blood cultures from 8/14 positive for *S. epidermidis*.**
- ❑ **8/17: Trauma unit. Temp 37.9° C. Blood cultures from 8/15 positive for *S. epidermidis*.**



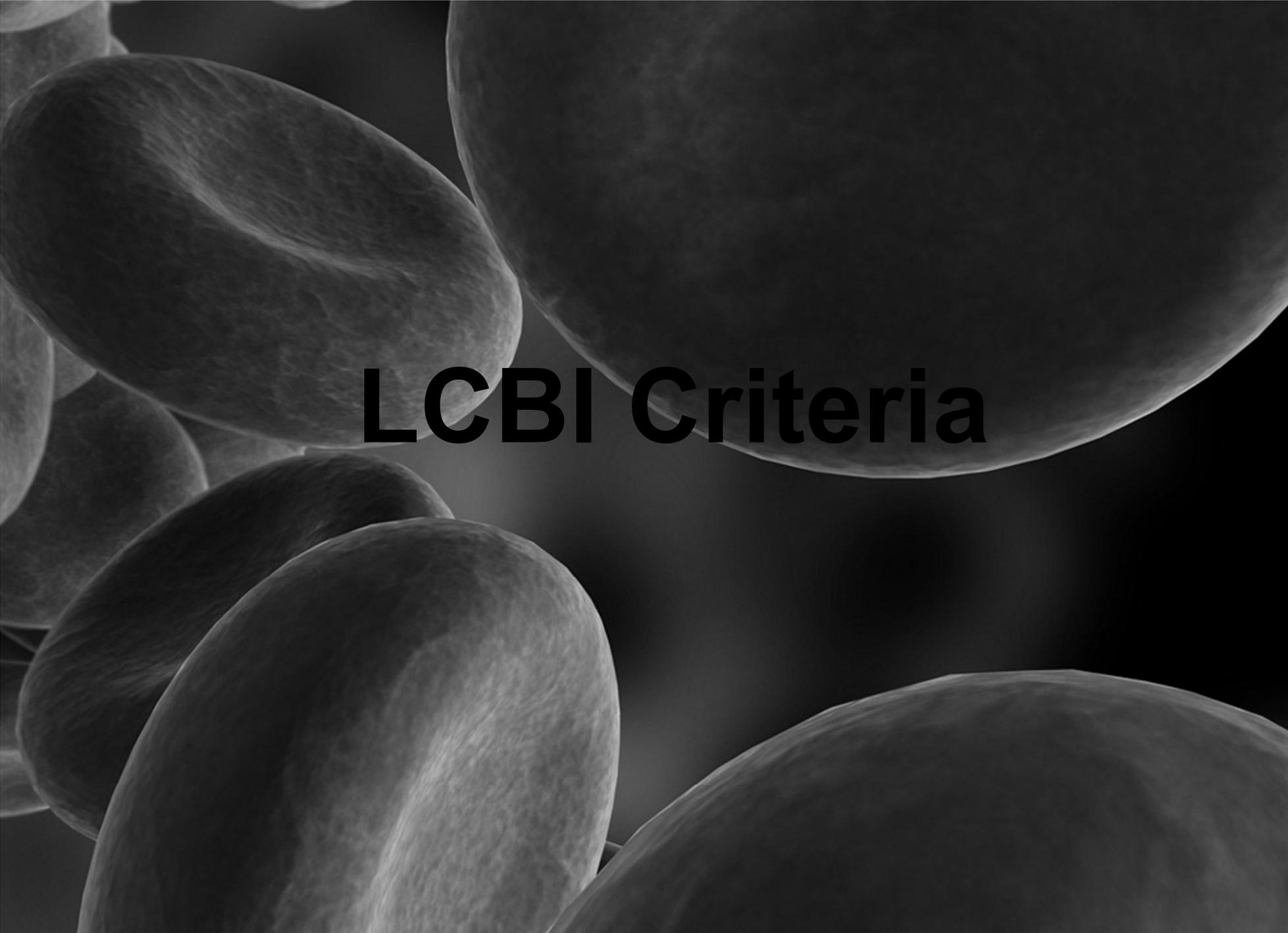
# Which of the Following is True?

1. Peter's IV is not a central line. The date of his LCBI is 8/14 and is attributed to the ED.
2. Peter's IV is a central line. The date of his CLABSI is 8/14 and it is attributed to Step Down.



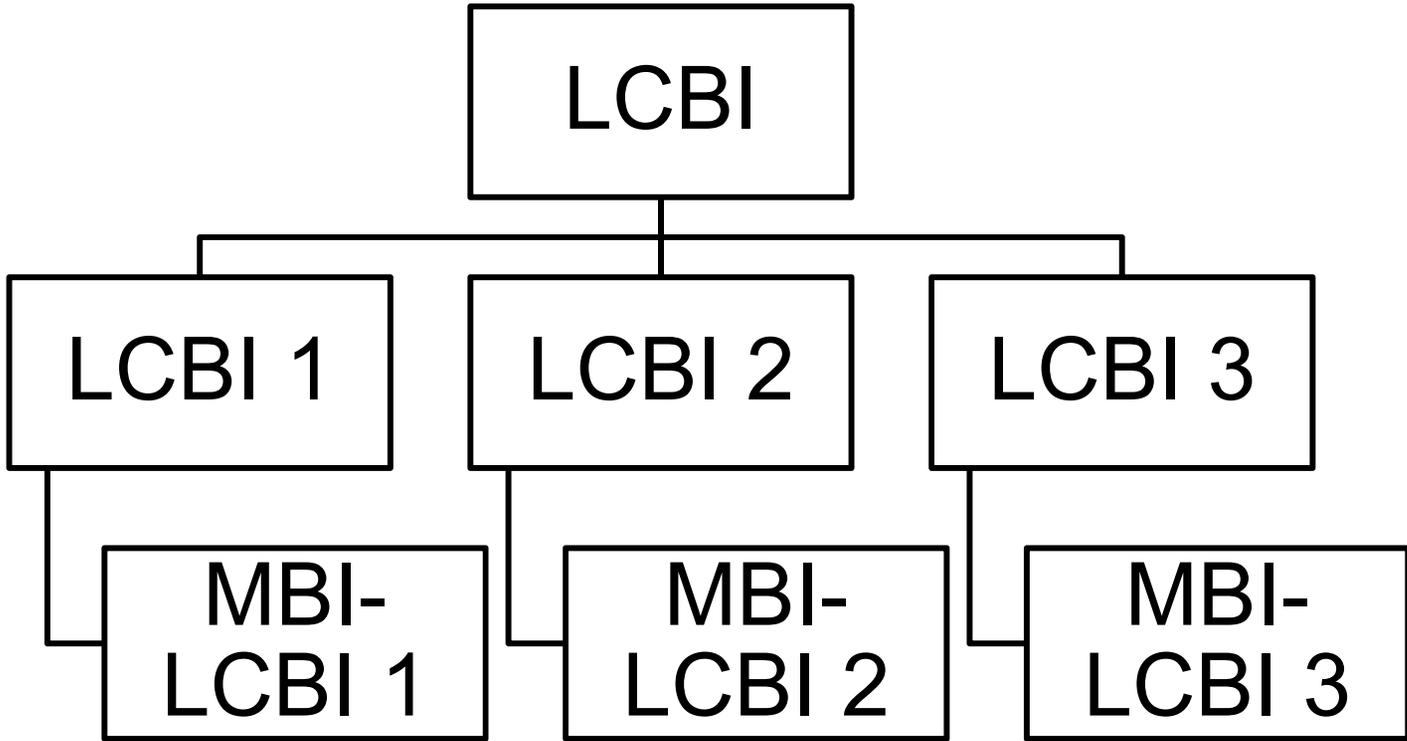
## Peter

- ❑ **Peter's line is a central line: Common iliac vein is one of the great vessels. The line is used for infusion.**
- ❑ **The date of event is the date of the last element used to meet criteria. In this scenario, the last element, positive blood culture, was collected on 8/14. NOTE: If matching common commensals are recovered on separate days, the date of collection of the first common commensal = element date.**
- ❑ **The date of event is the day of transfer from Step Down unit. Therefore, CLABSI attributed to Step Down unit.**



# LCBI Criteria

# Laboratory Confirmed Bloodstream Infection Criteria



# 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 3<sup>rd</sup>. On September 7<sup>th</sup> because of elevated WBC, 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- Criterion 2

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

### And

- positive laboratory results 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. (These separate occasions must be on same day or consecutive days).

## LCBI Criterion 3

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

### And

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

### And

- the same common commensal (i.e. diphtheroids [*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. (These separate occasions must be  
43 on same day or consecutive days).

# Note

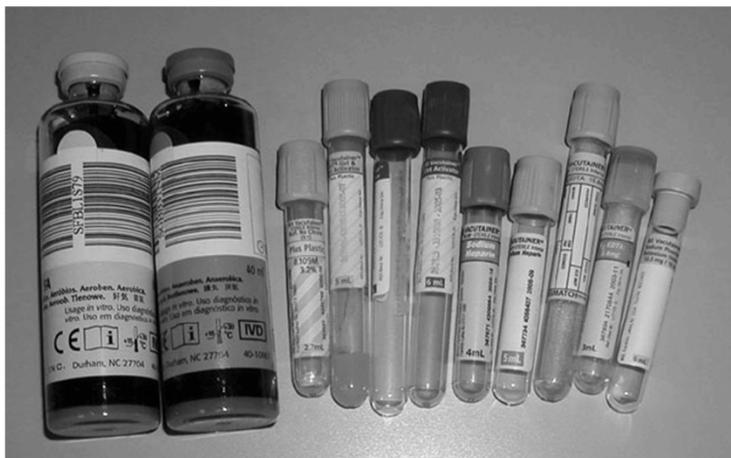
- Criteria 1 & 2 may be used for patients of ANY age, including those 1 year or less.
- Criterion 3 **only applies** to patients who are **1 year or less (before or on their first birthday)**.

**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.**



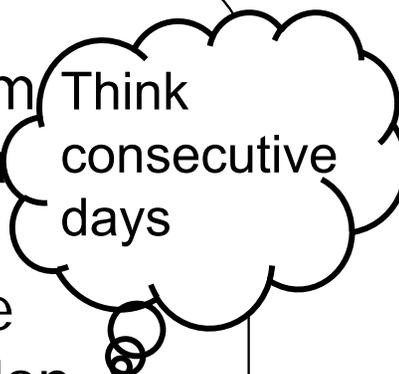
## Criteria 2 & 3:

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, e.g. Mon. and Tues. but NOT Mon. and Wed.

### **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)



Think consecutive days

# Meeting “Separate Occasions” Criteria

- Collected in a manner which suggests that 2 separate blood draw site preparations were performed.
- Reduces the misidentification of contaminated BCs as BSI.
- It includes:
  - 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).

# 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.
- Antibigrams are NOT utilized to determine the sameness of two organisms.
- Report the more resistant organism.

Examples:

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

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

## **□ Developed by CDC with 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 by reporting CLABSI 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 Preventionists, Infectious Disease Physicians, State HAI Programs, Oncologists
- Considerations given to data collection burden, use of objective criteria, availability of data components, clinical credibility
- **REQUIRED FOR CLABSI REPORTING AS OF 1/1/14**

# 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 in 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\*

## 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)
  - $\geq 1$  liter diarrhea in a 24 hour period (or  $\geq 20$  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<sup>3</sup> on or within 3 calendar days before or 3 calendar days after the date the positive blood culture was collected (Day 1).

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

## 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)
  - $\geq 1$  liter diarrhea in a 24 hour period (or  $\geq 20$  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<sup>3</sup> on or within 3 calendar days before or 3 calendar days after the date the positive blood culture was collected (Day 1).

## MBI-LCBI Criterion 3

- Patient  $\leq 1$  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)
  - $\geq 20$  mL/kg diarrhea 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<sup>3</sup> on or within 3 calendar days before or 3 calendar days after the date the positive blood culture was collected (Day 1).

# 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



# 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. subcriterion 2: Positive blood culture with intestinal organism (*Candida* spp.) and neutropenia (2 separate days of WBC <500 cells/mm<sup>3</sup> 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 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> <i>group</i> <i>strep</i> X2 and <i>fever</i> 38.1° C	110	300	320

Patient meets MBI-LCBI criterion 2. subcriterion 2: At least 2 positive blood cultures with viridans group streptococci (in this case, 2 positive) and fever >38.0°C and neutropenia (2 separate days of ANC <500 cells/mm<sup>3</sup> 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.

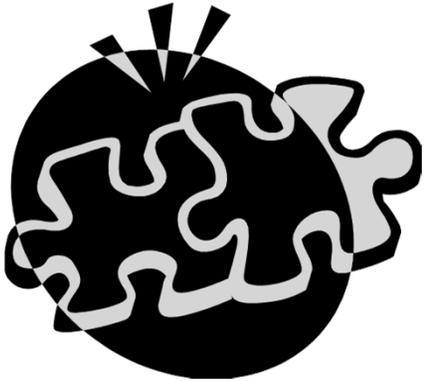
# MBI-LCBI Criteria- Examples

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</i> <i>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/mm<sup>3</sup> 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.

# 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 because of Federal Register Rule, this 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.*

# Blood Culture Specimen Note

- **All blood cultures (regardless of collection method) must be included in surveillance if participating in NHSN CLABSI surveillance**
  - Bloods collected via venipuncture
  - Bloods collected through vascular catheters
  - Cannot be considered a contaminant unless single unmatched common commensal (surveillance vs. clinical determination)



Serial BSIs?  
Superman,  
please explain





## Distinguishing Serial BSIs

- (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 either POA or an HAI, clinical information must be utilized to determine that the original infection had resolved before reporting a second infection at the same site. If the original infection had not resolved before subsequent positive cultures are collected from the same site, add the pathogens recovered from the subsequent cultures to those reported for the first infection, if it was an HAI. Depending on the infection type, information which may be useful to consider in determining if the infection has resolved includes signs and symptoms, results from diagnostic testing, as well as completion of antimicrobial therapy. For example, a change in blood culture in a patient with extended treatment for endocarditis may represent a new LCBI.



## Primary Bloodstream Infection (BSI)

Page 1 of 4

\*required for saving \*\*required for completion

Facility ID:	Event #:	
*Patient ID:	Social Security #:	
Secondary ID:	Medicare #:	
Patient Name, Last:	First:	Middle:
*Gender: F M Other	*Date of Birth:	
Ethnicity (Specify):	Race (Specify):	
*Event Type: BSI	*Date of Event:	
Post-procedure BSI: Yes No	Date of Procedure:	
NHSN Procedure Code:	ICD-9-CM Procedure Code:	
*MDRO Infection Surveillance:		
<input type="checkbox"/> Yes, this infection's pathogen & location are in-plan for Infection Surveillance in the MDRO/CDI Module <input type="checkbox"/> No, this infection's pathogen & location are not in-plan for Infection Surveillance in the MDRO/CDI Module		
*Date Admitted to Facility:	*Location:	
<b>Risk Factors</b>		
*If ICU/Other locations, Central line: Yes No	Any hemodialysis catheter present: Yes No	
*If Specialty Care Area/Oncology, Permanent central line: Yes No	Location of Device Insertion: _____	
Temporary central line: Yes No	Date of Device Insertion: __/__/____	
*If NICU, Central line, including umbilical catheter: Yes No		
Birth weight (grams):		
<b>Event Details</b>		
*Specific Event: Laboratory-confirmed		
*Specify Criteria Used:		
<u>Signs &amp; Symptoms (check all that apply)</u>		<u>Underlying conditions for MBI-LCBI (check all that apply):</u>
<u>Any Patient</u> <input type="checkbox"/> Fever <input type="checkbox"/> Chills <input type="checkbox"/> Hypotension	<u>≤ 1 year old</u> <input type="checkbox"/> Fever <input type="checkbox"/> Hypothermia <input type="checkbox"/> Apnea <input type="checkbox"/> Bradycardia	<input type="checkbox"/> Allo-SCT with Grade ≥ 3 GI GVHD <input type="checkbox"/> Allo-SCT with diarrhea <input type="checkbox"/> Neutropenia
		<u>Laboratory (check one)</u> <input type="checkbox"/> Recognized pathogen from one or more blood cultures <input type="checkbox"/> Common commensal from ≥ 2 blood cultures
**Died: Yes No	BSI Contributed to Death: Yes No	
Discharge Date:	*Pathogens Identified: Yes No **If Yes, specify on pages 2-3.	
<small>Assurance of Confidentiality: The voluntarily provided information obtained in this surveillance system that would permit identification of any individual or institution is collected with a guarantee that it will be held in strict confidence, will be used only for the purposes stated, and will not otherwise be disclosed or released without the consent of the individual, or the institution in accordance with Sections 304, 306 and 306(d) of the Public Health Service Act (42 USC 242b, 242c, and 242m(d)).</small>		
<small>Public reporting burden of this collection of information is estimated to average 33 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC, Reports Clearance Officer, 1600 Clifton Rd., MS D-74, Atlanta, GA 30333, ATTN: PRA (0920-0666). CDC 57.108 (Front) Rev. 8 v8.1</small>		

# BSI Data Collection Form

[http://www.cdc.gov/nhsn/forms/57.108\\_PrimaryBSI\\_BLANK.pdf](http://www.cdc.gov/nhsn/forms/57.108_PrimaryBSI_BLANK.pdf)

**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
    - Specific requirements by location type
    - Counting patients with > 1 line
    - Electronic collection validation



# Accurate Denominator Data: Requirements by Location

## ❑ ICU (not NICU) / Non-Special Care Areas (SCA):

- Central line days
- Patient days

## ❑ SCA / ONC Locations:

- 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.

# Accurate Denominator Data

## Special Care Areas (SCAs)/Oncology

### Locations (ONC)

- Permanent central line: A central line that is tunneled, or implanted including certain dialysis catheters and ports.
- Temporary central line: A central line that is not tunneled nor implanted.
- Locations where permanent (a.k.a. tunneled) central lines are likely
  - Oncology
  - Hemodialysis
  - Transplant
- In these locations central lines days are counted by type: permanent vs. temporary

# Accurate Denominator Collection

- ❑ **In all locations: Patients with  $\geq 2$  CLs get counted as 1 CL day**
- ❑ **In SCA/ONC: Because temporary central lines carry a higher risk of CLABSI, 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 placed or accessed and continue until line removed or patient discharged. (No “de-accessing”)**



# 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**
  - $\leq 750$  grams
  - 751-1000 grams
  - 1001- 1500 grams
  - 1501- 2500 grams
  - $> 2501$  grams
- ❑ **Neonates with either umbilical or central line, or both, get counted only as one central line day**



# 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

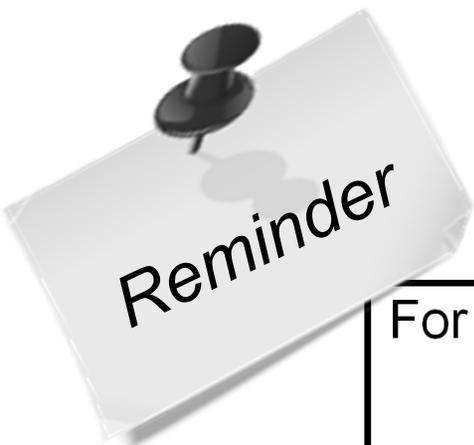
orgid	location	summaryYQ	months	infcount	numExp	numcldays	SIR	SIR_pval	SIR95CI
15331	SICU	2011Q1	3	4	6.900	3000	0.58	0.1823	0.198, 1.327

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

# Collecting Summary Data (ICUs/Wards)



For all locations, count **at the same time each day**

- Number of patients on the unit
- Number of patients with a central line



OMB No. 0920-0666  
Exp. Date: 01-31-2015  
[www.cdc.gov/nhsn](http://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 (SCAs/ONC)



For SCAs/ONC, 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 (with or without a permanent central line also)



OMB No. 0920-0666  
Exp. Date: 12-31-2015  
[www.cdc.gov/nhsn](http://www.cdc.gov/nhsn)

## Denominators for Specialty Care Area (SCA)/Oncology (ONC)

Page 1 of 1

*required for saving Facility ID: 88888						
*Location Code: ONC Surg CC						
*Month: June						
*Year: 2012						
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		Total Patients	Number on APRV
1	48	2	43			
2	49	1	45			
3	48	3	45			
4	50	8	40			
5						
6						

# Entering Summary Data (ICU/Wards)

 NHSN Home

Logged into Decennial Medical Center (ID 15331) as KATHY.  
Facility Decennial Medical Center (ID 15331) is following the PS component.

- Alerts
- Reporting Plan
- Patient
- Event
- Procedure
- Summary Data
  - Add
  - Find
  - Incomplete
  - Delete AUR Data
- Import/Export
- Analysis
- Surveys
- Users
- Facility
- Group
- Log Out

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

 HELP

Mandatory fields marked with \*

Facility ID\*: 15331 (Decennial Medical Center)

Location Code\*:

Month\*:

Year\*:

Check Box if **NO**  
CLABSI events to  
report

Sum  
for  
Month

Total Patient Days:

Central Line Days:

Urinary Catheter Days:

Ventilator Days:

APRV Days:

Report No Events

CLABSI:

CAUTI:

VAE:

PedVAP:

# Entering Summary Data (SCAs)

NHSN - National Healthcare Safety Network NHSN Home

Logged into Decennial Medical Center (ID 15331) as KATHY.  
Facility Decennial Medical Center (ID 15331) is following the PS component.

## Denominators for Specialty Care Area/Oncology

HELP

Mandatory fields marked with \*

Facility ID\*: 15331 (Decennial Medical Center)

Location Code\*:

Month\*:

Year\*:

**Report No Events**

TCLAB:

PCLAB:

CAUTI:

VAE:

PedVAP:

Total Patient Days:

Temporary Central Line Days:

Permanent Central Line Days:

Urinary Catheter Days:

Ventilator Days:

APRV Days:

Sum for Month

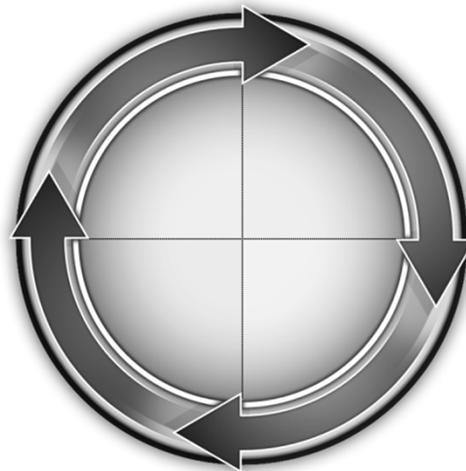
Check box if **NO** CLABSI events for central line type to report



# 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  $\leq 5\%$



## 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
- ❑ **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

## In Summary Continued

- **2014 CLABSI definitional/protocol changes include:**
  - Requirement for Mucosal Barrier Injury BSIs (MBI-LCBI) to be identified and included in CLABSI reporting
  - Optional field to identify that a hemodialysis catheter was present at the time of the CLABSI
  - Exclusion of HeRO catheters from central lines
  - Extension of the neutropenia time period to also include the 3 days after the positive blood cultures

# Resources for CLABSI Reporting

All necessary protocols, forms, etc:

- <http://www.cdc.gov/nhsn/acute-care-hospital/clabsi/index.html>
- <http://www.cdc.gov/nhsn/LTACH/clabsi/index.html>
- <http://www.cdc.gov/nhsn/inpatient-rehab/clabsi/index.html>

Operational guidance for CMS reporting:

- <http://www.cdc.gov/nhsn/cms/index.html>

NHSN training:

- <http://www.cdc.gov/nhsn/training/>

# **Objectives: Part 2**

- 1. Identify the relationship of site-specific infections to secondary bloodstream infections.**
- 2. Review Secondary BSI Guide and apply to educational case studies.**

# Primary Bloodstream Infection

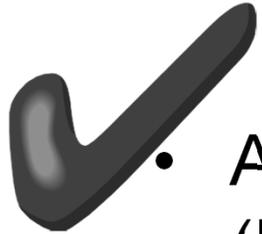


(Very Important Point)

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

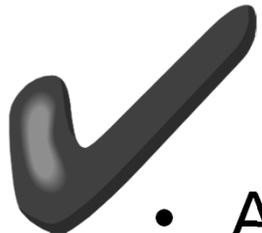
- A BSI that is associated with an **infection** at another site is referred to as a Secondary BSI and never reported as an LCBI or CLABSI.
- A CLABSI may not be secondary to an **infection** at another site, i.e., it must be a primary BSI.
- A Primary BSI is identified by ruling out all non-blood sites as the source of the bloodstream infection.

## A Secondary BSI is:



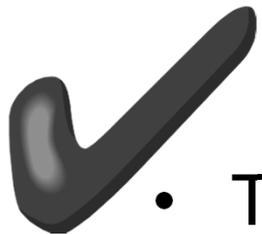
- A laboratory confirmed bloodstream infection (LCBI) associated with a documented HAI at another site

**AND**



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

**AND**



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

# 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**



# Secondary BSI Scenarios

- 1. Blood and site-specific specimen cultures match for at least one organism**
- 2. Blood and site-specific specimen cultures do not match**
- 3. No site-specific specimen culture, only a positive blood culture**
- 4. Negative site-specific specimen culture with positive blood culture**

**Scenario 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.**

**Scenario 1:  
Blood and Site Specific Specimen  
with Matching Organism  
Example #1:**

Miss Jones meets HAI criteria for a symptomatic urinary tract infection (suprapubic tenderness and urine culture  $>10^5$  CFU/ml of *E. coli*) on Day 7 of admission. The next day, a blood culture is collected and is positive for *E. coli*.

This is an HAI SUTI with a secondary BSI and the reported organism is *E. coli*. (The urine culture is utilized to meet the SUTI criterion.)

**Scenario 1:  
Blood and Site Specific Specimen with Matching  
Organism  
Example #2:**

Mr. Stone meets HAI criteria for a symptomatic urinary tract infection (suprapubic tenderness and urine culture  $>10^5$  CFU/ml of *E. coli*) and a single blood culture from the same date grows *E. coli* and *S. epidermidis*.

# Does Mr. Stone have a primary or secondary BSI?

0%

1. Mr. Stone has a SUTI and also a separate primary BSI.

0%



2. Mr. Stone has a SUTI with secondary BSI.

The urine culture is utilized to meet the SUTI criterion. There is a matching organism in both cultures. The only organism reported for the SUTI is *E. coli*, since the single blood culture with *S. epidermidis* does not meet the LCBI criteria. If the second organism in the blood had been a pathogen, it too would have been reported as a pathogen for the SUTI.

## **Scenario 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.
- b) If the site-specific culture is an element used to meet the infection site criterion but the blood isolate is not, then the BSI is considered a primary infection.

**Scenario 2:  
Blood and Site Specific Specimen  
Cultures Do Not Match  
Example #1:**

Mr. Smith has a Whipple procedure on May 1<sup>st</sup>. On May 4<sup>th</sup> he spikes a temp and complains of nausea and abdominal pain. Blood and an aseptically-obtained T-tube drainage specimen which is purulent, are collected for culture. On May 5<sup>th</sup>, a CT scan shows loculated fluid collection. Culture results from 5/4 collection show *Escherichia coli* from the purulent drainage specimen but the blood grows *Bacteroides fragilis*.

Given the info we have, is Mr. Smith's BSI primary or secondary?

1. Primary

✓ 2. Secondary



# Mr. Smith Continued

**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 1 of the following criteria:

1. Patient has organisms cultured from purulent material from intraabdominal space obtained during an invasive procedure.
2. Patient has abscess or other evidence of intraabdominal infection seen during an invasive procedure or histopathologic examination.
3. Patient has at least 2 of the following signs or symptoms: fever ( $>38^{\circ}\text{C}$ ), nausea\*, vomiting\*, abdominal pain\*, or jaundice\*  
and  
at least 1 of the following:
  - a. organisms cultured from drainage from an aseptically-placed drain (e.g., closed suction drainage system, open drain, T-tube drain)
  - b. organisms seen on Gram's stain of drainage or tissue obtained during invasive procedure or from an aseptically-placed drain
  - c. organisms cultured from blood and imaging test evidence of infection (e.g., abnormal findings on ultrasound, CT scan, MRI, or radiolabel scans [gallium, technetium, etc.] or on abdominal x-ray).

\* With no other recognized cause

# Mr. Smith-Continued

Because Mr. Smith 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.

**Scenario 2:  
Blood and Site Specific Specimen Cultures Do Not  
Match  
Example #2**

Mr. Sykes, has been hospitalized for 30 days in the ICU following an MVA with multiple fractures and closed head injury. He is status post subdural hematoma evacuation and has had a central line since admission. He is receiving TPN and is heavily sedated and ventilated. He spikes a fever to 38.9°C. Pleural fluid is collected via thoracentesis and is cultured and is positive for *S. aureus*. That same day blood cultures are collected and are positive for *Candida parapsilosis*.

# Does Mr. Sykes have a primary BSI?

0% 1. Yes

0% 2. No.

Although Mr. Sykes meets criterion 1 for LUNG, because no organisms from the pleural fluid and blood cultures match, and no LUNG criterion using a positive blood culture as an element is met, patient meets criteria for both a LUNG with *S. aureus* and a primary BSI with *C. parapsilosis*.

# Mr. Sykes-Continued

## **LUNG-Other infection of the lower respiratory tract**

Other infections of the lower respiratory tract must meet at least *1* of the following criteria:

- ① Patient has organisms seen on smear or cultured from lung tissue or fluid, including pleural fluid.
2. Patient has a lung abscess or empyema seen during an invasive procedure or histopathologic examination.
3. Patient has an abscess cavity seen on radiographic examination of lung.

**But no criterion utilizing positive blood cultures is met.**

### **Reporting instructions**

- Report concurrent lower respiratory tract infection and pneumonia with the same organism(s) as PNEU.
  - Report lung abscess or empyema without pneumonia as LUNG.
-

**Scenario 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.**

# Scenario 3: No Site Specific Specimen Culture, Only Positive Blood Culture Example #1

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.

Note: Sometimes it is difficult to determine if an organism is a logical organism for a site of infection. Clinical judgment will have to be used to make a determination. If questions arise, you may email NHSN for assistance.

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

**“...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.**

**Scenario 4:**  
**Negative site-specific specimen  
culture with positive blood culture**  
**Example #1:**

Mr. Anderson is hospitalized following a fall with left femur fracture. He has an ORIF and is in traction. He has a tunneled central line in place for dialysis which he received on day 2 and 5 of admission. On hospital day 5 he spikes a fever of 38.1°C; His right knee, which is a native joint, is swollen and warm to the touch. Two blood culture sets and one knee joint fluid culture are collected. Joint fluid culture shows no growth. The blood cultures from two separate blood draws are positive for *Group B Streptococcus*. Is Mr. Anderson's LCBI primary or secondary?

# Mr. Anderson-Continued

## **JNT-Joint or bursa infection**

Joint or bursa infections must meet at least 1 of the following criteria:

1. Patient has organisms cultured from joint fluid or synovial biopsy.
2. Patient has evidence of joint or bursa infection seen during an invasive procedure or histopathologic examination.
3. Patient has at least 2 of the following signs or symptoms with no other recognized cause: joint pain, swelling, tenderness, heat, evidence of effusion or limitation of motion  
*and*  
at least 1 of the following:
  - a. organisms and white blood cells seen on Gram's stain of joint fluid
  - b. positive laboratory test on blood culture or appropriate antigen test on blood, urine, or joint fluid.
  - c. cellular profile and chemistries of joint fluid compatible with infection and not explained by an underlying rheumatologic disorder
  - d. imaging test evidence of infection (e.g., abnormal findings on x-ray, CT scan, MRI, radiolabel scan [gallium, technetium, etc.]).

# Is Mr. Anderson's LCBI primary or secondary in nature?

0%

1. Primary

0%

✓ 2. Secondary to JNT

Even though the joint fluid culture is negative, because a JNT criterion with positive blood culture as an element, is met, this LCBI is considered secondary to a JNT.

Example of meets site criterion but site culture negative, and positive blood culture with non-logical pathogen (= primary LCBI)



- (I can't come up with an example...maybe it doesn't happen)

## **Additional 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.**
- ❑ Antibigrams 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 there must be evidence of ongoing infection at the specific site at the time of blood culture collection.**



# What is a matching organism?

- 1. If genus and species are identified in both cultures, they must be the same.**
  - a) Example: A blood culture reported as *Enterobacter cloacae* and an intraabdominal specimen of *Enterobacter cloacae* are matching organisms.
  - b) Example: A blood culture reported as *Enterobacter cloacae* and an intraabdominal specimen of *Enterobacter aerogenes* are NOT matching organisms as the species are different.

# What is a matching organism? (cont.)

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

- a) 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.
- b) Example: A blood culture reported as *Candida albicans* and a urine culture reported as yeast are considered to have matching organisms.

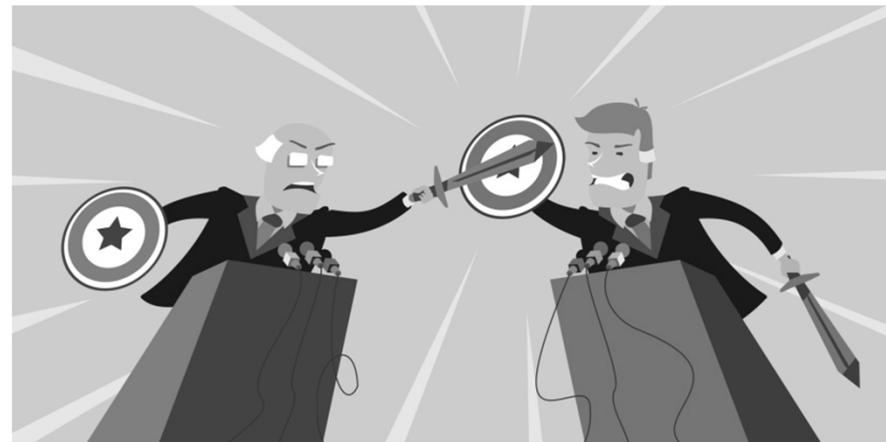
# Reporting Instructions

- 1. For reporting secondary BSI for possible and probable VAP, see the VAE Chapter in the NHSN Patient Safety 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.**

# Ground Rules for Case Studies

- Purposes:
  - Training on use of definitions AS THEY EXIST
  - Optimize inter-rater reliability and data quality
- Surveillance  $\neq$  clinical
- Examples highlight new criteria, common errors and difficult issues

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



# Investigating a Positive Blood Culture as Possible CLABSI

**Ask yourself questions in this order\*:**

1. Is it POA? If POA, (and no discharge in last 2 days) stop .

2. Is it an HAI? If not HAI, stop.

3. If this is an HAI, which site-specific criterion is met?

4. Is this an LCBI?

4a. If this is an LCBI, is it primary or secondary?

5. Is this a CLABSI?

5. Attributable to what location/facility?

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

## Ms. A.

- April 1: Ms. A is transferred to your facility with pancreatic cancer and a PICC, which is first accessed on Day 1.
- April 7: Blood culture collected on April 5<sup>th</sup> is growing *Providencia stuartii*. No other organisms isolated. Patient started on antibiotics.
- Additional laboratory values as follows:

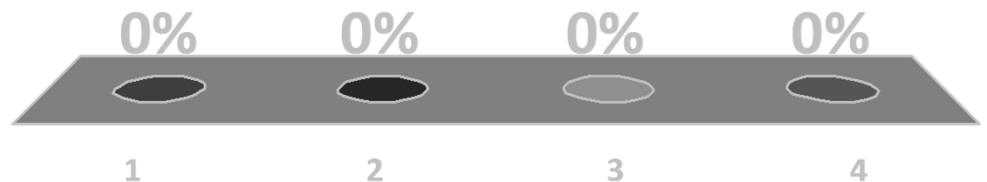
	Admission Date			Blood culture collected		Result reported	
	Apr 1	Apr 2	Apr 3	Apr 4	Apr 5	Apr 6	Apr 7
WBC	900	800	600	600	500	400	500
ANC	---	---	---	---	400	---	600

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

Yes. LCBI criteria were not met in the POA time period but were later met during the admission. Therefore it's an HAI. Also attributable to your hospital for same reason.

What is the most specific type of HAI that Ms. A has?

1. LCBI 1
2. LCBI 2
3. MBI-LCBI 1
4. MBI-LCBI 2



# Ms. A. : Laboratory Values

Admission Date



Apr 1

Apr 2

Apr 3

Apr 4

Blood culture collected



Apr 5

Apr 6

Pathogen in BC reported



Apr 7

WBC	900	800	600	600	500	400	500
ANC	---	---	---	---	400	---	600

	Day -5	Day -4	Day -3	Day -2	Day -1	Day 1	Day 2	Day 3
ANC or WBC < 500?						X	X	

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

**Eligible Pathogen (Enterobacteriaceae)**

**+**

**No other pathogen isolated**

**Meets MBI-LCBI Criteria 1.2**

If this patient has an MBI-LCBI,  
how should the data field  
“central line” be completed?

1. Enter “No” to the central line data field.
2. Enter “Yes” to the central line data field.

MBI-LCBIs are LCBIs and if a central line is present and has been accessed during the device-associated time period, it is currently a CLABSI.

## **Mr. B.**

- 6/10: 75 year old female admitted to the ER on 6/10 from nursing home with fever of 38.2°C in nursing home day before admission, and altered level of consciousness today. Condom catheter, sacral decubitus, with yellow exudate and reddened edges. Patient moans when edges are palpated. Urine, and blood cultures collected.**
- Admitted to the 5E Medical Ward.**
- Diagnosis: Infected decubitus rule out osteomyelitis/sepsis.**

# Mr. B. Continued

Date	Temp	Diagnostic Findings
6/10	38.2°C	Urinalysis performed. Leukocyte positive; 5 WBC/mm <sup>3</sup> of unspun urine. No organisms seen on gram stain of urine. PICC line placed.
6/12	38.4°C	Urine cultures negative. Blood cultures collected 6/10, positive for <i>Pseudomonas aeruginosa</i> . CT scan of sacrum suggestive of osteomyelitis.

What site-specific criteria would you consider?  
DECU; BONE; LCBI

## **BONE-Osteomyelitis**

Osteomyelitis must meet at least 1 of the following criteria:

1. Patient has organisms cultured from bone.
2. Patient has evidence of osteomyelitis on direct examination of the bone during an invasive procedure or histopathologic examination.
3. Patient has at least 2 of the following signs or symptoms: fever ( $>38^{\circ}\text{C}$ ), localized swelling\*, tenderness\*, heat\*, or drainage at suspected site of bone infection\*

*and*

at least 1 of the following:

- a. organisms cultured from blood
- b. positive laboratory test on blood (e.g., antigen tests for *H influenzae* or *S pneumoniae*)
- c. imaging test evidence of infection (e.g., abnormal findings on x-ray, CT scan, MRI, radiolabel scan [gallium, technetium, etc.]).

\* With no other recognized cause

### **Reporting instruction**

- Report mediastinitis following cardiac surgery that is accompanied by osteomyelitis as SSI-MED rather than SSI-BONE.

## **DECU-Decubitus ulcer infection, including both superficial and deep infections**

Decubitus ulcer infections must meet the following criterion:

Patient has at least 2 of the following signs or symptoms with no other recognized cause: redness, tenderness, or swelling of decubitus wound edges

*and*

at least 1 of the following:

- a. organisms cultured from properly collected fluid or tissue (see Comments)
- b. organisms cultured from blood.

### **Comments**

- Purulent drainage alone is not sufficient evidence of an infection.
- Organisms cultured from the surface of a decubitus ulcer are not sufficient evidence that the ulcer is infected. A properly collected specimen from a decubitus ulcer involves needle aspiration of fluid or biopsy of tissue from the ulcer margin.

## Mr. B.

If there is an infection is it POA or HAI and what type?

- POA; all elements of infection present in time period of 2 days before admission until day after admission
- DECU Cr b- redness, and tenderness of decubitus edges and positive blood culture

Is the BSI primary or secondary in nature?

- Secondary. The blood culture is utilized to meet the DECU criterion

# Mr. B.

## **DECU-Decubitus ulcer infection, including both superficial and deep infections**

Decubitus ulcer infections must meet the following criterion:

Patient has at least 2 of the following signs or symptoms with no other recognized cause: **redness,**  
**tenderness,** or swelling of decubitus wound edges

*and*

at least 1 of the following:

- a. organisms cultured from properly collected fluid or tissue (see Comments)
- b. organisms cultured from blood.

### **Comments**

- Purulent drainage alone is not sufficient evidence of an infection.
- Organisms cultured from the surface of a decubitus ulcer are not sufficient evidence that the ulcer is infected. A properly collected specimen from a decubitus ulcer involves needle aspiration of fluid or biopsy of tissue from the ulcer margin.

## **Ms. F.**

- ❑ **Ms. F., who is 10 years old, has been in PICU for a week with a central line in place the entire time. 4 months ago she received an allo-SCT for AML. Currently weighs 25kg.**
- ❑ **April 6: The line is pulled**
- ❑ **April 7: She becomes disoriented and hypotensive. Blood cultures x 2 and urine cultures are collected.**
- ❑ **1 blood culture is positive for *Streptococcus mutans* and the other is reported as Viridans Group Strep.**
- ❑ **Is this a BSI?**
- ❑ **If so, which criterion?**  
Yes, LCBI Criterion 2: hypotension AND 2 or more blood cultures with CC considered to be the same organism not related to infection at another site with a gap of no more than 1 day between any 2 elements.

# Is it central line associated?

1. No
2.  Yes

The date of the LCBI (Cr2) is April 7 which is after the POA time period. The central line had been in place for  $> 2$  days on the date of event. Therefore this LCBI is CLABSI.



# Ms. F.

- What organism should be reported?

Report *S. mutans*

□

<b>Culture Report</b>	<b>Companion Culture Report</b>	<b>Report as...</b>
<i>S. epidermidis</i>	<i>Coagulase-negative staphylococci</i>	<i>S. epidermidis</i>
<i>Bacillus</i> spp. (not <i>anthracis</i> )	<i>B. cereus</i>	<i>B. cereus</i>
<i>S. salivarius</i>	<i>Strep viridans</i>	<i>S. salivarius</i>

□

# Ms. F. Variation

- **What if “GI GVHD” was documented?**
  - Still LCBI criterion 2. Not eligible to be MBI-LCBI because description of GI GVHD not specific enough. Only if it is documented that it is grade III or IV GVHD would it meet criteria for MBI-LCBI (criterion 2.1.a).
  
- **What if on April 4 she had 625 mL of diarrhea?**

# Ms. F.

Blood culture collected;  
2/2 viridans group strep

	Apr 3 Day -5	Apr 4 Day -4	Apr 5 Day -3	Apr 6 Day -2	Apr 7 Day -1	Apr 6 Day 1	Apr 7 Day 2	Apr 8 Day 3
Fever, chills or hypotension						X		
Diarrhea total $\geq$ 20 mL/kg in 24 hours		X (625)						

**Patient meets allogeneic hematopoietic stem cell transplant definition**

+

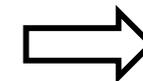
**$\geq$  20 mL/kg diarrhea in 24 hours within 7 days  
before blood culture**

+

**Blood culture only growing viridans group  
streptococci**

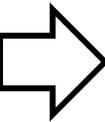
+

**No other organism  
Meets MBI-LCBI Criteria 2.1.b.**



20mL X 25 Kg  
=500 mL minimum  
diarrhea

## **Ms. F.**

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

**AND**

**patient meets at least one of the following:**

-  **□ 1. Is an allogeneic hematopoietic stem cell transplant recipient within the past year with one of the following documented during same hospitalization as positive blood culture:**
  -  **▪ a. Grade III or IV gastrointestinal graft versus host disease (GI GVHD)**
  - b. ≥1 liter diarrhea in a 24 hour period (or ≥20 mL/kg in a 24 hour period for patients <18 years of age) with onset on or within 7 calendar days before the date the first positive blood culture was collected.**
- 2. Is neutropenic, defined as at least 2 separate days with values of absolute neutrophil count (ANC) or total white blood cell count (WBC) <500 cells/mm<sup>3</sup> on or within 3 calendar days before the date the positive blood culture was collected (Day 1). (See Table 4 for example.)**

## Ms. F: Variations continued

### What if the second blood culture also grew

#### □ **Micrococcus?**

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

#### □ **S. aureus?**

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

# Mr. P.

- ❑ **March 1: 12 y.o. patient admitted following MVA with multiple fractures. Central line placed at admission.**
- ❑ **March 4: Diarrhea.**
- ❑ **March 6: Diarrhea.**
- ❑ **March 8: Fever 38.2° C. Nausea and vomiting. Diarrhea continues.**
- ❑ **March 9: Diarrhea. Blood cultures drawn. Positive for viridans group streptococci 2/2 sets.**

What types of infections would you be considering?

GE, GIT, LCBI

## **GIT-Gastrointestinal tract infection (esophagus, stomach, small and large bowel, and rectum) excluding gastroenteritis and appendicitis**

Gastrointestinal tract infections, excluding gastroenteritis and appendicitis, must meet at least *1* of the following criteria:

1. Patient has an abscess or other evidence of infection seen during an invasive procedure or histopathologic examination.
2. Patient has at least 2 of the following signs or symptoms compatible with infection of the organ or tissue involved: fever (>38°C), nausea\*, vomiting\*, abdominal pain\*, or tenderness\*

*and*

at least *1* of the following:

- a. organisms cultured from drainage or tissue obtained during an invasive procedure or endoscopy or from an aseptically-placed drain
- b. organisms seen on Gram's or KOH stain or multinucleated giant cells seen on microscopic examination of drainage or tissue obtained during an invasive procedure or endoscopy or from an aseptically-placed drain
- c. organisms cultured from blood
- d. evidence of pathologic findings on imaging test
- e. evidence of pathologic findings on endoscopic examination (e.g., *Candida esophagitis* or *proctitis*).

\* With no other recognized cause

## **GE-Gastroenteritis**

Gastroenteritis must meet at least 1 of the following criteria:

1. Patient has an acute onset of diarrhea (liquid stools for more than 12 hours) with or without vomiting or fever ( $>38^{\circ}\text{C}$ ) and no likely noninfectious cause (e.g., diagnostic tests, therapeutic regimen other than antimicrobial agents, acute exacerbation of a chronic condition, or psychological stress).
2. Patient has at least 2 of the following signs or symptoms: nausea\*, vomiting\*, abdominal pain\*, fever ( $>38^{\circ}\text{C}$ ), or headache\*

*and*

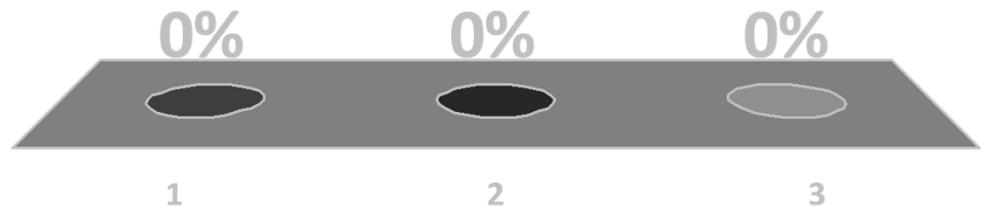
at least 1 of the following:

- a. an enteric pathogen is cultured from stool or rectal swab
- b. an enteric pathogen is detected by routine or electron microscopy
- c. an enteric pathogen is detected by antigen or antibody assay on blood or feces
- d. evidence of an enteric pathogen is detected by cytopathic changes in tissue culture (toxin assay)
- e. diagnostic single antibody titer (IgM) or 4-fold increase in paired sera (IgG) for pathogen.

\* With no other recognized cause

# Does this patient have an LCBI and/or some other HAI?

1. This patient has a GIT infection. BSI is secondary.
2. This patient has both a GIT and a BSI.
3. This patient has only an MBI-LCBI



**GIT-Gastrointestinal tract infection (esophagus, stomach, small and large bowel, and rectum) excluding gastroenteritis and appendicitis**

Gastrointestinal tract infections, excluding gastroenteritis and appendicitis, must meet at least 1 of the following criteria:

1. Patient has an abscess or other evidence of infection seen during an invasive procedure or histopathologic examination.
2. Patient has at least 2 of the following signs or symptoms compatible with infection of the organ or tissue involved: fever ( $>38^{\circ}\text{C}$ ), nausea\*, vomiting\*, abdominal pain\*, or tenderness\*

*and*

at least 1 of the following:

- a. organisms cultured from drainage or tissue obtained during an invasive procedure or endoscopy or from an aseptically-placed drain
- b. organisms seen on Gram's or KOH stain or multinucleated giant cells seen on microscopic examination of drainage or tissue obtained during an invasive procedure or endoscopy or from an aseptically-placed drain
- c. organisms cultured from blood
- d. evidence of pathologic findings on imaging test
- e. evidence of pathologic findings on endoscopic examination (e.g., *Candida esophagitis* or *proctitis*).

\* With no other recognized cause

## **Mr. W. (as compared to Mr. P.)**

- March 1: 12 y.o. patient undergoes stem cell transplant. Central line in place since admission one week prior.**
- March 4: Diarrhea. ANC 450.**
- March 5: ANC 430**
- March 6: Diarrhea. ANC 400**
- March 7: No diarrhea. No ANC test.**
- March 8: Fever 38.2° C. Nausea and vomiting. Diarrhea continues. > 1 liter in 24 hours. ANC 325.**
- March 9: Diarrhea. Blood cultures drawn. Positive for viridans group streptococci 2/2 sets.**

GE, GIT, LCBI (MBI)

What types of infections would you be considering?

**GIT-Gastrointestinal tract infection (esophagus, stomach, small and large bowel, and rectum) excluding gastroenteritis and appendicitis**

Gastrointestinal tract infections, excluding gastroenteritis and appendicitis, must meet at least 1 of the following criteria:

1. Patient has an abscess or other evidence of infection seen during an invasive procedure or histopathologic examination.
2. Patient has at least 2 of the following signs or symptoms compatible with infection of the organ or tissue involved: fever ( $>38^{\circ}\text{C}$ ), nausea\*, vomiting\*, abdominal pain\*, or tenderness\*

*and*

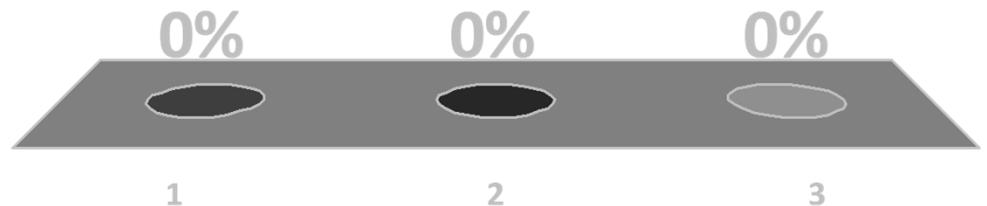
at least 1 of the following:

- a. organisms cultured from drainage or tissue obtained during an invasive procedure or endoscopy or from an aseptically-placed drain
- b. organisms seen on Gram's or KOH stain or multinucleated giant cells seen on microscopic examination of drainage or tissue obtained during an invasive procedure or endoscopy or from an aseptically-placed drain
- c. organisms cultured from blood
- d. evidence of pathologic findings on imaging test
- e. evidence of pathologic findings on endoscopic examination (e.g., *Candida esophagitis* or *proctitis*).

\* With no other recognized cause

# Does this patient have an LCBI and/or some other HAI?

1. This patient has a GIT infection. BSI is secondary.
2. This patient has both a GIT and a BSI.
3. This patient has only an MBI-LCBI 2.



# Purpose of MBI LCBI (a.k.a MBI vs Secondary to GIT)

MBI-LCBIs are:

- BSIs that occur in the absence of other infections (i.e., primary BSI) but in the context of non-infectious disturbances (such as neutropenia or GVHD) as MBI-LCBI
- In this case the nausea, vomiting, and diarrhea are most likely due to the stem-cell transplant and medications NOT due to a GIT infection

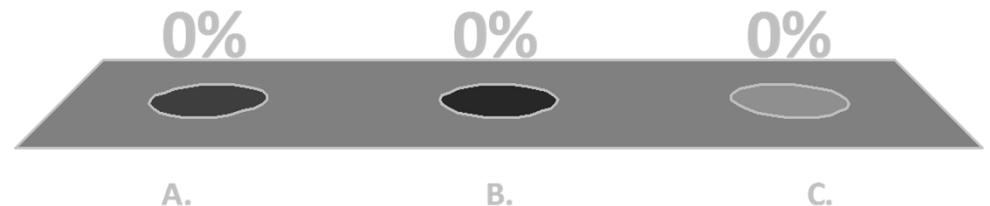
The rules for attributing secondary BSI apply to MBI-LCBI also. If the site-specific infection are not met (because the symptoms are due to a non-infectious cause) then the site specific criteria cannot be met and BSI cannot be identified as secondary to that site.

## Mr. H.

- 3/1 -Mr. H, a 66-year-old male is admitted to SICU following robotic assisted LIMA harvest and CBGB. Central line placed in right subclavian vein.
- 3/3- Patient progressed well, and was transferred to Intermediate Care Unit with central line.
- 3/5- Temp. 100.8 ° F. Central line site without signs of infection. Lungs clear bilaterally.
- 3/6- Temp. 101.7 ° F . 2 blood cultures sets collected one from each of 2 ports.
- 3/7- 1 blood culture set positive for *S. epidermidis* and other positive for coagulase-negative staphylococcus.

# Which of the following is true?

- A. The patient has a CLABSI that should be reported to NHSN with coagulase-negative staphylococcus listed as pathogen.
- ✓ B. The patient has a CLABSI with *S. epidermidis*.
- C. This patient does not have a CLABSI because the blood cultures were both collected through the central line.



## Mr. H. Rationale

- ❑ Patient did not meet POA definition.
- ❑ LCBI criterion 2 met on hospital day 6 therefore HAI.
- ❑ *S. epidermidis* is a coagulase-negative staphylococcus and therefore the organisms are considered a match.
- ❑ Collection of the blood cultures from separate ports are considered “separate occasions” in NHSN.
- ❑ No other source of infection to exclude BSI as 2°
- ❑ Central line in place > 2 days on date of LCBI therefore device-associated

## Mr. H. Continued

- **3/12/13: Mr. H. has been on antibiotics for BSI since late on 3/7. WBCs have remained elevated and he has had periods of altered levels of consciousness. Blood and urine cultures are collected.**
- **3/13/13: 1 set of blood cultures positive *Candida albicans*. Urine culture no growth.**

# Does Mr. H have a BSI related to the 3/12/13 cultures?

- 0% 1. Yes, he has a new BSI with C. albicans.
- 0% 2. No, he does not have a new BSI because only a single blood culture as positive .
- 0% 3. No, he does not have a new BSI because this is an extension of the original BSI.

# New Infection or Extension?

- “Following an infection, which is either POA or an HAI, ...If the original infection had not resolved before subsequent positive cultures are collected from the same site, add the pathogens recovered from the subsequent cultures to those reported for the first infection, if it was an HAI. Depending on the infection type, information which may be useful to consider in determining if the infection has resolved includes signs and symptoms, results from diagnostic testing, as well as completion of antimicrobial therapy. For example, a change in blood culture in a patient with extended treatment for endocarditis may represent a new laboratory confirmed bloodstream infection (LCBI).”\*

In this case, Mr. H. is still being treated for his first BSI and his symptoms have not fully resolved nor new ones identified which clearly establish a new infection.

\*January 2014 NHSN manual CLABSI chapter page 2-2



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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.