National Center for Emerging and Zoonotic Infectious Diseases

### Secondary BSI Attribution: A Tale of Two Scenarios

#### LaTasha R. Powell RN, BSN, MPH, CIC Infection Prevention Consultant

March 26, 2019

"If I have a positive sitespecific culture and matching blood culture, the blood culture is automatically secondary."



"If a physician documents that the positive blood culture is secondary to an infection, the positive blood culture can be deemed secondary."



"I can deem a positive blood culture secondary to a present on admission (POA) infection even if the patient did not meet an NHSN criteria. "



"If I meet any NHSN sitespecific infection, I can deem the positive blood culture secondary to this criterion."



## **Objectives**

- Apply foundational concepts from Chapter 2 and 4 regarding primary and secondary bloodstream infections (BSI's)
- Identify the relationship between site-specific infections and secondary bloodstream infections
- Utilize Appendix B Secondary BSI Guide and reference table (Chapter 4)
- Apply the two Scenarios for secondary BSI attribution to case studies



#### Where to Locate Chapter 2 and Chapter 4?

C > NHSN > Materials for Enrolled Facilities	s > Acute Care Hospitals/Facilities	Ø O O				
NHSN	Surveillance for Bloodstream Infections					
NHSN Login	Central Line-Associated Bloodstream Infection (CLABSI) and non-ce	ntral line-associated				
About NHSN + Bloodstream Infection						
Enroll Here +	Descurses for MUCN Hears Already Envelled	New Users - Start				
Materials for Enrolled Facilities	Resources for NHSN Users Already Enrolled	Enrollment Here				
Ambulatory Surgery Centers +	Training +					
Acute Care Hospitals/Facilities	Protocols -	Step 1: Enroll into				
Surveillance for Antimicrobial Use and Antimicrobial Resistance Options	For full details on protocol definitions and the application of these definitions, please review the applicable protocol and <b>Chapter 2, Identifying Healthcare-associated</b> <b>Infection (HAI) for NHSN Surveillance</b> in the NHSN Module.					
Surveillance for BSI (CLABSI)	Bloodstream Infection (BSI) Event, January 2019.     [PDF – 2 MB]     NHSN Overview January, 2019.     [PDF – 350 KB]	NHSN				
Surveilance for UTI (CAUTI)	Identifying Healthcare-associated Infections (HAIs) in NHSN, January 2019	Step 2: Set up NHSN				
Surveillance for C. difficile, MRSA, and other Drug-resistant Infections	[PDF – 1 MB]  Patient Safety Monthly Reporting Plan, January 2019  PDF – 250 KB]	Step 3: Report				
Surveillance for CLIP		Click here to enroll				

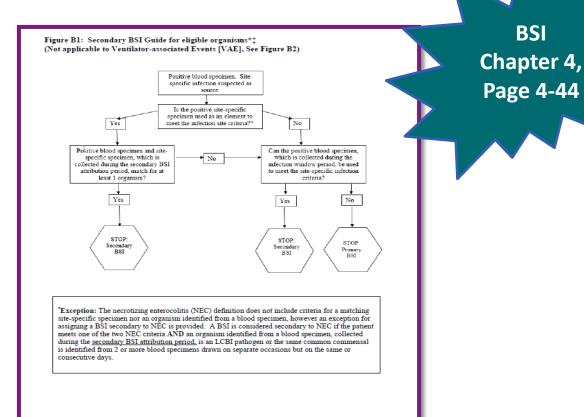
#### **Secondary BSI Guide**



Scenario 1			Scenario 2				
A positive blood specimen must contain at least one eligible matching organism to the site-specific			Positive blood specimen must be an element of the site-specific definition				
specimen							
And the blood specimen i		÷-			ollected in the site-spec	ific	
specific secondary BSI at	•	ვრი		on window perio			
And an eligible organism					identified in a blood		
specific specimen is used	as an element to mee	t the	specimen is used as an element to meet the site-				
site-specific definition			specific	definition			
Site	Criterion			Site	Criterion		
ABUTI	ABUTI			BONE	3a		
BONE	1			BURN	1		
BRST	1			DISC	3a		
CARD	1				4a, 4b, 5a or 5b		
CIRC	2 or 3			ENDO	(specific		
CONJ	1			LINDO	organisms) 6e or 7e plus other		
DECU	1				criteria as listed		
DISC	1			GIT	1b or 2c		
EAR	1, 3, 5 or 7,			IAB	2b or 3b		
EMET	1			JNT	3c		
ENDO	1			MEN	2c or 3c		
EYE	2a			OREP	3a		
GE	2a, 2b (only yeast)			PNEU	2 or 3		
IAB	1 or 3a			SA	3a		
IC	1			UMB	1b		
JNT	1			USI	3b or 4b		
LUNG	1						
MED	1						
MEN	1						
ORAL	1 or 3a						
OREP	1						
ILA	1						
PNEU	2 or 3						
SA	1						
SINU	1						
SSI	SI, DI or OS						
SKIN	2a						
ST	1						
UMB	1a						
UR	1a or 3a						
USI	1						
SUTI	1a, 1b or 2						
VASC only as SSI	1						
VCUF	3						

BSI Chapter 4, Page 4-36

#### **Secondary BSI Guide**



January 2019

4-44

#### Where to Locate Chapter 17?

I

lational Healthcare Safety	Network (NHSN)	
DC > NHSN > Materials for Enrolled Facilitie	s > Acute Care Hospitals/Facilities	G 🖸 😌 😌
NHSN	Surveillance for Bloodstream Infections	
NHSN Login	Central Line-Associated Bloodstream Infection (CLABSI) and non-cer	ntral line-associated
About NHSN +	Bloodstream Infection	
Enroll Here +	Resources for NHSN Users Already Enrolled	New Users - Start Enrollment Here
Materials for Enrolled Facilities	Training +	
Ambulatory Surgery Centers +	Protocols +	se   _ / /
Acute Care Hospitals/Facilities	Frequently Asked Questions +	
Surveillance for Antimicrobial Use and Antimicrobial Resistance Options	Data Collection Forms +	
Surveillance for BSI (CLABSI)	CMS Supporting Materials +	Step 1: Enroll into NHSN
Surveillance for UTI (CAUTI)	Supporting Material –	Step 2: Set up NHSN
Surveillance for C. difficile, MRSA, and other Drug-resistant Infections	NHSN Patient Safety Component Alerts,      [PDF – 1 MB]     Unusual Susceptibility Profiles Alert January 2015,      [8] (PDF – 362 KB]	Step 3: Report
Surveillance for CLIP	<u>CDC Location Labels and Location Descriptions, January 2019</u> [PDF – 1 MB]     NHSN Key Terms, January 2019 [B (PDF – 350 KB)]	Click here to enroll
Surveillance for SSI Events	<u>CDC/NHSN Surveillance Definitions for Specific Types of Infections, January 2019</u>	CRACI
Surveillance for VAE	[PDF – 1 MB] • NHSN Organism List (All Organisms, Common Commensals, MBI Organisms, and UTI	× NHSN
Surveillance for PedVAE	Bacteria) January 2019. 🖬 (XLSX – 296 KB)	Requirements Click here for more
Surveillance for PNEU (pedVAP)	<ul> <li>Guidance for Missing Device-associated Denominator Data. [PDF – 145 KB]</li> </ul>	information

National Healthcare Safety Network (NHSN)

#### CDC > NHSN > Materials for Enrolled Facilities

#### 🕜 🖸 🎯 🍘

NHSN	HAI Checklists	2019 NHSN Bone and Joint Infection (BJ) Checklist			
ISN Login	The NHSN Healthcare Associated Infections (HAI) checklists developed by the National Healthcare Network (NHSN) subject	Documentation Review Checklist			
out NHSN +	matter experts (SMEs) were adapted from the Tennessee Department of Health HAI checklists. While the format may differ,	BJ - Bone and Joint Infection			
	the intended use of the HAI checklists remains the same.	BONE-Osteomyelitis			
roll Here +	Our goal is to provide a tool to assist Infection Preventionists when making a determination about a healthcare associated	Element	Eler		
aterials for Enrolled Facilities –	infection. The HAI checklists should be used to guide Infection Preventionists and other users towards a final determination when evaluating NHSN HAI criteria. The checklist should not be used in isolation but in conjunction with the Patient Safety	Osteomyelitis must meet at least <b>one</b> of the following criteria:	IVIE		
Ambulatory Surgery Centers +	Manual.	1. Patient has organism(s) identified from bone by culture or non-culture based microbiologic testing			
Ambulatory Surgery Centers +	Please note all criteria for each respective module is listed in a single document. Use the scroll bar select to locate the	method, which is performed for purposes of clinical diagnosis and treatment, for example, not			
Acute Care Hospitals/Facilities +	criterion of interest. It is our hope that the checklists will help streamline your surveillance efforts.	Active Surveillance Culture/Testing (ASC/AST).			
Long-term Acute Care +	2019 2018	2. Patient has evidence of osteomyelitis on gross anatomic or histopathologic exam.			
Hospitals/Facilities		<ol> <li>Patient has at least <u>two</u> of the following localized signs or symptoms:</li> </ol>	-		
Long-term Care Facilities +	2019 NHSN HAI Site Specific Infections	• Fever (>38.0°C)			
Outpatient Dialysis Facilities +	NHSN Laboratory Confirmed Bloodstream Infection (LCBI) Checklist 📕 [PDF – 350 KB]	Swelling*			
outpatient biarysis raciities +		Pain or tenderness*			
npatient Rehabilitation Facilities +	NHSN Pneumonia (PNEU) Checklist 📓 [PDF – 400 KB]	Heat*			
Inpatient Psychiatric Facilities +	NHSN Surgical Site Infection (SSI) Checklist 🖪 (PDF – 300	Drainage*			
		AND at least one of the following: a. Organism(s) identified from blood by culture or non-culture based microbiologic testing			
MDRO & CDI LabID Event Calculator	NHSN Urinary Tract Infection (UTI) Checklist 📓 [PD 350 KB]	a. Organism(s) identified norm blood by current or non-current based microbiologic testing method, which is performed for purposes of clinical diagnosis and treatment, for example, not			
Calculator	NHSN Ventilator Associated Event (VAE) Chery Lt. M [PDF – 350 KB]	Active Surveillance Culture/Testing (ASC/AST)			
VAE Calculator		AND			
		Imaging test evidence suggestive of infection (for example, x-ray, CT scan, MRI, radiolabel scan			
PedVAE Calculator		[gallium, technetium, etc.]), which if equivocal is supported by clinical correlation, specifically, physician documentation of antimicrobial treatment for osteomyelitis.			
HAI & POA Worksheet Generator	2019 NHSN Chapter 17 Site Specific Infections	b. Imaging test evidence suggestive of infection (for example, x-ray, CT scan, MRI, radiolabel scan			
	NHSN Bone and Joint Infection (BJI) Checklist 🖪 [PDF – 250 KB]	[gallium, technetium, etc.]), which if equivocal is supported by clinical correlation, specifically,			
HAI Checklists	NHSN Cardiovascular (CVS) System Infection Checklist 🧧 [PDF – 350 KB]	physician documentation of antimicrobial treatment for osteomyelitis.			
Frequently Asked Questions + (FAQs)	NHSN Central Nervous System (CNS) Checklist. 🙍 [PDF – 300 KB]	*With no other recognized cause	1		
AU Option Case Examples +	NHSN Eye, Ear, Nose Throat, or Mouth (EENT) Infection Checklist. 📑 [PDF – 250 KB]	Reporting instructions: <ul> <li>Report mediastinitis following cardiac surgery that is accompanied by osteomyelitis as SSI-MED rathe</li> </ul>	er tha		
15 Rebaseline	NHSN Gastrointestinal System Infection (GI) Checklist. 🖪 [PDF – 350 KB]	BONE. • If a patient meets both organ space JNT and BONE report the SSI as BONE.			
oup Users +	NHSN Lower Respiratory Infection (LRI) Checklist 📕 [PDF – 200 KB]	After an HPRO or a KPRO if a patient meets both organ space PJI and BONE report the SSI as BONE.			
alysis Resources +					

https://www.cdc.gov/nhsn/hai-checklists/index.html

## Primary BSI vs. Secondary BSI

#### Primary BSI versus Secondary BSI – What's the Difference?

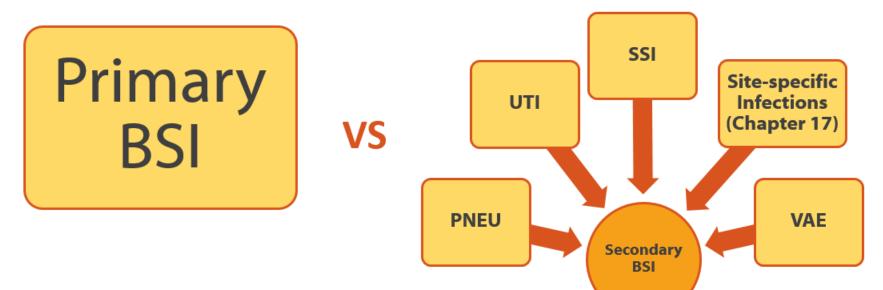
#### Primary BSI

- A Laboratory Confirmed
   Bloodstream Infection (LCBI) where
   an eligible BSI is identified and the
   BSI is not secondary to an infection
   at another body site
  - LCBI/ MBI-LCBI 1
  - LCBI/ MBI-LCBI 2
  - LCBI/ MBI-LCBI 3
- Reportable to NHSN (if an **eligible central line** in place and part of the location's monthly reporting plan)

#### <u>Secondary BSI</u>

- A bloodstream infection that is associated with a site-specific infection at another body site which may have seeded the bloodstream- Ex's:
  - IAB 1 with a secondary BSI
  - PNEU with a secondary BSI
  - GIT 2c with a secondary BSI
- <u>Not</u> reportable to NHSN as an LCBI

#### **Primary BSI vs. Secondary BSI**



### **Knowledge Check**

- Primary BSI's are reportable to NHSN if an eligible central line was in place and part of your monthly reporting plan.
  - A. True
  - B. False

#### **Knowledge Check - Rationale**

### **Correct Answer A. True**

#### Primary BSI

- A Laboratory Confirmed
   Bloodstream Infection (LCBI) where
   an eligible BSI is identified and the
   BSI is not secondary to an infection
   at another body site
  - LCBI/ MBI-LCBI 1
  - LCBI/ MBI-LCBI 2
  - LCBI/ MBI-LCBI 3
- Reportable to NHSN (if an eligible central line in place and part of the location's monthly reporting plan)

## **Important Key Terms**

#### **Important Key Terms**

- Infection Window Period (IWP)
  - 7-days during which all site-specific infection criteria must be met.
  - Collection date of the first positive diagnostic test that is used as an element to meet the site-specific infection criterion, the 3 calendar days before, and the 3 calendar days after

- Repeat Infection Timeframe (RIT)
  - 14-day timeframe during which no new infections of the same type are reported

#### Important Key Terms (cont.)

- Secondary bloodstream infection attribution period (SBAP)
  - The period in which a blood specimen must be collected for a secondary BSI to be attributed to a primary site of infection
  - Includes the Infection Window Period (IWP) combined with the Repeat Infection Timeframe (RIT)
  - 14-17 days in length depending upon the date of event



## **Endocarditis (ENDO) Criteria**

- ENDO Infection Window Period
  - 21 days during which all site-specific infection criteria must be met
    - Date the first positive diagnostic test that is used as an element of the ENDO criterion was obtained, the 10 calendars days before, and the 10 calendar days after

## **Endocarditis (ENDO) Criteria (cont.)**

#### ENDO RIT

Extended to include the remainder of the patient's current admission

#### ENDO SBAP

- Includes the 21-day infection window period and all subsequent days of the patient's current admission
- Limited to organism(s) identified in blood specimen that match the organism(s) used to meet the ENDO definition

## **Secondary BSI Concepts**



#### **Meeting the Secondary BSI Requirements**

OR

#### Scenario 1

At least one organism from the blood specimen matches an organism identified from the site-specific specimen that is used as an element to meet the NHSN site-specific infection criterion **AND** the blood specimen is **collected during the** secondary BSI attribution period (infection window period + repeat infection timeframe)

#### Scenario 2

An organism identified in the blood specimen is an element that is used to meet the NHSN site-specific infection criterion, and therefore is <u>collected</u> <u>during the site-specific infection</u> window period

# The <u>ONLY</u> Exception to the Secondary BSI Attribution Rules . . .

#### NEC-Necrotizing enterocolitis

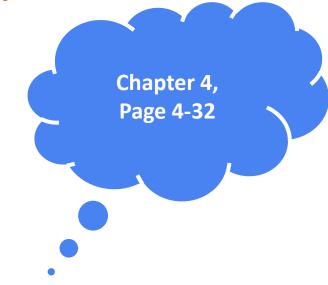
Necrotizing enterocolitis in infants (≤1 year of age) must meet one of the following criteria:

- Infant has at least <u>one</u> of the clinical and <u>one</u> of the imaging test findings from the lists below: At least <u>one</u> clinical sign:
  - a. bilious aspirate\*\* (see Note)
  - b. vomiting
  - c. abdominal distention
  - d. occult or gross blood in stools (with no rectal fissure)

And at least <u>one</u> imaging test finding which if equivocal is supported by clinical correlation (specifically, physician documentation of antimicrobial treatment for NEC):

- a. Pneumatosis intestinalis
- b. Portal venous gas (Hepatobiliary gas)
- c. Pneumoperitoneum
- \*\*Note: Bilious aspirate from a transpyloric feeding tube should be excluded
- 2. Surgical NEC: Infant has at least <u>one</u> of the following surgical findings:
  - a. surgical evidence of extensive bowel necrosis (>2 cm of bowel affected)
  - b. surgical evidence of pneumatosis intestinalis with or without intestinal perforation

#### **Exception Notes:**



- \*The necrotizing enterocolitis (NEC) definition does not include criteria for a matching site-specific specimen nor an organism identified from a blood specimen that can be used as an element to meet the NEC criteria, however an \* exception for assigning a BSI secondary to NEC is provided.
  - 2. A BSI is considered secondary to NEC if the patient meets one of the two NEC criteria AND an organism identified from a blood specimen, collected during the secondary BSI attribution period, is an LCBI pathogen, or the same common commensal identified from two or more blood specimens drawn on separate occasions that are on the same or consecutive days.

#### Important Secondary BSI Concept

- A positive blood culture on admission does NOT necessarily set a BSI RIT
  - 1/12: Patient admitted with positive blood culture *E. coli*
  - 1/21: Positive blood culture *S. aureus*
- Only primary BSIs set a 14-day BSI RIT
- Secondary BSIs do NOT- an RIT will be set for the primary type of infection
- It is necessary to determine if the *E. coli* BSI was primary or secondary to determine if the *S. aureus* BSI must be investigated as possible LCBI

#### Chapter 4, page 4-14

### **Example: POA BSI**

#### 1/12/18:

55-year-old patient admitted with fever (102.4°F) of unknown origin, work-up in progress. UA, Urine for C&S and blood cultures x 2 collected

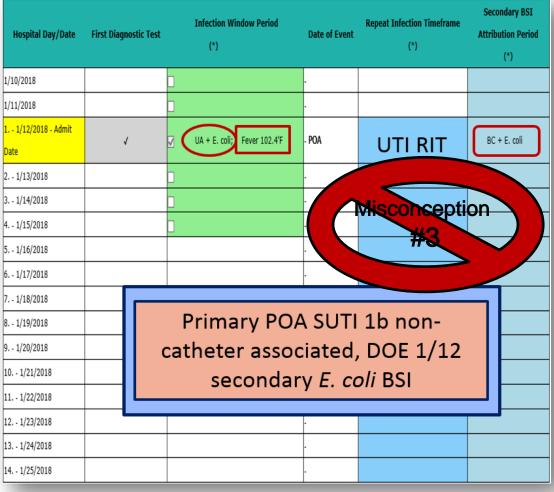
#### **Results:**

Urine positive > 10<sup>5</sup> CFU/ml *E. coli,* and 1 of 2 BCs positive for *E. coli* 

#### <u>1/21/18:</u>

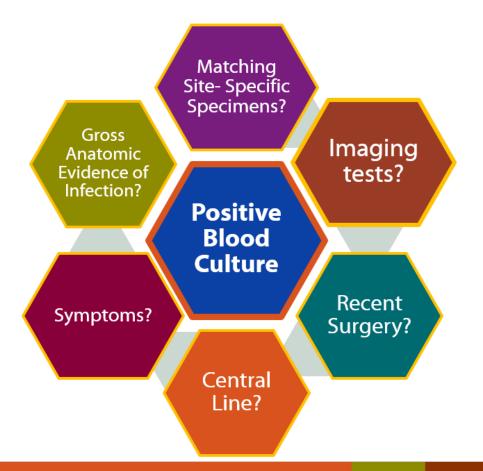
Repeat BC's collected positive for *S. aureus* 

## Refer to UTI in Resource Manual



Hospital Day/Date	First Diagnostic Test	Infection Window Period (*)	Date of Event	Repeat Infection Timeframe (*)	Secondary BSI Attribution Period (*)
1/10/2018					
1/11/2018			-		
1 1/12/2018 - Admit Date	V	UA + <i>E. coli</i> Fever 102.4'F	- POA	UTI RIT 1/12 – 1/25	BC + E. coli
2 1/13/2018 3 1/14/2018				SUTI 1b non-cathete 1/12 secondary <i>E. co</i>	
4 1/15/2018					
5 1/16/2018			-		
6 1/17/2018					
7 1/18/2018			-		
8 1/19/2018			-		
9 1/20/2018			-		
10 1/21/2018	√	✓ +BC S. aureus	- HAI	BSI RIT	BC S. aureus
11 1/22/2018				1/21 - 2/3	BC 5. aureus
12 1/23/2018			-		
13 1/24/2018					
14 1/25/2018	Prim	ary HAI LCBI 1 with <i>S. aurei</i>	15		
15 1/26/2018		DOE 1/21			
16 1/27/2018					

#### As Always, the Story Begins With...



## **Secondary Bloodstream Infections**

Scenario 1

#### **Secondary BSI Scenario 1**

At least one organism from the blood specimen matches an organism identified from the sitespecific specimen that is used as an element to meet the NHSN sitespecific infection criterion **AND** the blood specimen is collected during the secondary BSI attribution period (infection window period + repeat infection timeframe)



Site-specific specimen is used as an element to meet a primary infection criterion



#### **Questions to Ask When Applying Scenario 1**

Does at least one organism in the blood culture match the organism in the site – specific specimen? Can the site-specific specimen be used to meet a site-specific criteria?

Was the blood culture collected during the SBAP?

If the answer to all three questions is 'Yes', Scenario 1 can be applied

### **Matching Organisms Table**

Examples for Determining Matching Organisms (correct selection for NHSN reporting is bolded)

Identification # 1	Identification # 2	Matching Organisms	
		Yes or No	
Enterobacter aerogenes	Enterobacter cloacae	No	
Enterococcus faecalis	Enterococcus 📎	Yes	
Enterococcus faecium	Enterococcus faecalis	No	
Pseudomonas species	Pseudomonas aeruginosa	Yes	
Coagulase-negative Staphylococcus	Staphylococcus aureus	No	
Staphylococcus epidermidis	Coagulase-negative Staphylococcus	Yes	
Staphylococcus species	Coagulase-positive Staphylococcus	No	
Streptococcus species	Streptococcus Viridans Group	No	
Yeast	Candida species	Yes	

#### Chapter 17, page 17-3

#### An Important Note about Scenario 1...

- An organism in the positive blood culture must be eligible for use in the site-specific infection criteria
- Chapter 2, page 2-19

Pathogens excluded from specific infection definitions (for example. yeast in UTI, or *Enterococcus* spp. in PNEU) are also excluded as pathogens for BSIs secondary to that type of infection (specifically they cannot be added to one of these infections as a pathogen). The excluded organism must be accounted for as either:

1) A primary bloodstream infection (BSI/CLABSI) (see Example 3)

#### <u>OR</u>

 A secondary BSI attributed to another primary infection (for example, to an IAB or SINU), in accordance with Appendix B, Secondary BSI Guide of the <u>BSI</u> <u>Event protocol</u> (see <u>Example 4</u>)

an and a construction of the construction of t

#### "Scooping Orphans" - Blood Culture Guidance

- Pay close attention to your blood cultures!!!!
- If a single blood culture contains an organism that matches the sitespecific specimen and an organism that does not match:
  - "Scoop up" the "orphaned" organism (non-matching organism)
  - The non-matching organism is only "scooped up" when there is a matching organism in the same blood specimen
- If there are subsequent blood cultures with only the orphaned organism (non-matching), you must assess the blood cultures for LCBI criteria

## "Scooping Orphans" - Example

Hospital Day/Date	First Diagnostic Test	Infection Window Period (*)	Date of Event	Repeat Infection Timeframe (*)	Secondary BSI Attribution Period (*)
8 2/8/2019			-		
9 2/9/2019		Fever - 102	на		
10 2/10/2019		Fever - 101			
11 2/11/2019	*	Urine Culture - 100k Acinetobacter baumanii/			
12 2/12/2019					
13 2/13/2019					
14 2/14/2019		Blood cx - Acinetobacter baumanii/ E. cloacae		oth organisms are med secondary to UTI	
15 2/15/2019					
16 2/16/2019			-		
17 2/17/2019					
18 2/18/2019			-		
19 2/19/2019					
20 2/20/2019					
21 2/21/2019					
22 2/22/2019					

### Secondary BSI Scenario 1: CARD 1 Example

- 3/25 25 year-old female h/o Lupus nephritis admitted to Telemetry unit
- 3/30 Pericardial fluid collected: <u>Streptococcus</u>
   <u>pneumoniae</u>
- 3/31 Blood cultures collected: <u>Streptococcus pneumoniae</u> in both specimens

Blood and site-specific specimen has at least one matching organism

Site-specific specimen is used as an element to meet a primary infection criterion

Positive blood specimen collected during the SBAP of the site-specific infection

### **CARD 1 Rationale**

### CARD-Myocarditis or pericarditis

Myocarditis or pericarditis must meet at least one of the following criteria:

 Patient has organism(s) identified from pericardial tissue or fluid by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST)

Date		Diagnostic Test	Symptoms	IWP	DOE	RIT	SBAP
	3/25						
	3/26						
	3/27						
	3/28						
	3/29						
	3/30	Pericardial fluid culture - Streptococcus pneumoniae		IWP	DOE 3/30		SBAP
	3/31						Blood culture – Streptococcus nneumoniae
	4/1					꼭	
	4/2					-	
	4/3						
	4/4						
	4/5						
	4/6						
	4/7						
	4/8						
	4/9						
	4/10						
	4/11						
	4/12						
	4/13						
	4/14						

## Secondary BSI Scenario 1: SKIN Example

- 9/12 A forty year-old with a history of diabetes and IV heroin abuse is admitted to a medical unit. PICC placed on admission
- 9/14 Pain reported in left forearm
- 9/15 Fever: 101°F; Superficial draining wound cultured (not an IV site). Blood cultures collected
  - + MRSA skin culture
  - + MRSA blood culture x 1
- 9/18 Erythema documented

## What determination should be made in this case?

- A. 9/15 SKIN 1 with a secondary BSI
- в. 9/15 LCBI 1
- c. 9/14 SKIN 2a and CLABSI
- D. 9/14 SKIN 2a and secondary BSI

SKIN-Skin infection (skin and /or subcutaneous) excluding decubitus ulcers, burns, and infections at vascular access sites (See <u>VASC</u>).

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

- 1. Patient has at least one of the following:
  - purulent drainage
  - pustules
  - vesicles
  - boils (excluding acne)
- Patient has at least <u>two</u> of the following localized signs or symptoms: pain\* or tenderness\*, swelling\*, erythema\*, or heat\*
  - And at least <u>one</u> of the following:
  - a. organism(s) identified from aspirate or drainage from affected site by a culture or non-culture based testing method which is performed for purposes of clinical diagnosis and treatment for example, not Active Surveillance Culture/Testing (ASC/AST). Identification of 2 or more common commensal organisms without a recognized pathogen is not eligible for use. Common Commensal organisms include, but not are not limited to, diphtheroids (Corynebacterium spp. not C. diphtheria), Bacillus spp. (not B. anthracis), Propionibacterium spp., coagulase-negative staphylococci (including S. epidermidis), viridans group streptococci, Aerococcus spp., Micrococcus spp, and Rhodococcus spp. For a full list of Common Commensals see the Common Commensal tab of the NHSN organisms list.
  - b. multinucleated giant cells seen on microscopic examination of affected tissue
  - c. diagnostic single antibody titer (IgM) or 4-fold increase in paired sera (IgG) for organism

\* With no other recognized cause

## **SKIN Example Rationale**

### Correct Answer D. 9/14 SKIN 2a and secondary BSI

- SKIN 2a met on 9/14
  - 9/15 -Eligible skin specimen collected
  - SKIN IWP: 9/12 9/18
  - 9/14 Pain and 9/18 Erythema captured in IWP
  - RIT: 9/14 9/27
  - SBAP: 9/12 9/27
    - 9/15 Matching MRSA blood culture

Date	Diagnostic Test	Symptoms	IWP	DOE	RIT	SBAP
9/12						
9/13						
9/14	(	Pain		Date of event –		
9/15	Skin drainage - MRSA		₩P	SKIN 2a		Blood cx – MRSA
9/16						WIKSA
9/17 9/18	-	Erythema			꼭	
9/19		crythema				
9/20						
9/21			<u> </u>			SB
9/22			<u> </u>			SBAP
9/23			<u> </u>			
9/24						
9/25						
9/26						
9/27						
9/28						
9/29						
9/30						
10/1						
10/2						
10/3						

## Secondary BSI Scenario 1: IAB Example

- 9/14 50 year old admitted to a medical unit with a blood glucose of 900!
  - PMH: Diabetes, HTN, diverticulosis
  - PICC placed
- 9/18 CT scan: "Intra-abdominal abscess". Blood cultures negative
  - IR drainage: 200 cc purulent drainage.
    - Abscess culture: E. cloacae
- 9/28 101°F. Blood culture: Enterococcus faecalis (Vancomycin Resistant)

## What Determination Should Be Made In This Case?

- A. 9/18 HAI IAB 1w/secondary BSI (VRE)
- в. 9/28 CLABSI
- c. 9/18 HAI IAB 1 and 9/28 CLABSI
- D. 9/18 IAB 2b

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

- Patient has organism(s) identified from an abscess or from purulent material from intraabdominal space by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
- 2. Patient has at least one of the following:
  - abscess or other evidence of intraabdominal infection on gross anatomic or histopathologic exam.
  - b. abscess or other evidence of intraabdominal infection on gross anatomic or histopathologic exam

AND

organism(s) identified from blood by a culture or non-culture based microbiologic testing method, which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST). The organism(s) identified in the blood must contain at least one MBI organism. (See Appendix A of the BSI protocol)

- Patient has at least <u>two</u> of the following: fever (>38.0°C), hypotension, nausea\*, vomiting\*, abdominal pain or tenderness\*, elevated transaminase level(s)\*, or jaundice\* And at least one of the following:
  - a. organism(s) seen on Gram stain and/or identified from intraabdominal fluid or tissue obtained during invasive procedure or from an aseptically-placed drain in the intraabdominal space (for example, closed suction drainage system, open drain, T-tube drain, CT guided drainage) by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
  - b. organism(s) identified from blood by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST). The organism(s) identified in the blood must contain at least one MBI organism (See Appendix A of the BSI protocol) AND

imaging test evidence suggestive of infection ( for example, ultrasound, CT scan, MRI, ERCP, radiolabel scans [gallium, technetium, etc.] or on abdominal x-ray), which if equivocal is supported by clinical correlation, specifically, physician documentation of antimicrobial treatment for intraabdominal infection.<sup>†</sup>

\* With no other recognized cause

### IAB Example Rationale

**Correct Answer** C. 9/18 HAI IAB 1 and 9/28 CLABSI Admit

date/

- HAI IAB 1 met 9/18
  - 9/18 Abscess Culture E. cloacae
  - IAB IWP 9/15 9/21 lacksquare
  - HAI IAB RIT: 9/18 10/1
  - SBAP: 9/15 10/1
- 9/28 E. faecalis (VRE) CLABSI
  - Non-matching organism
  - No site-specific source



## **Secondary Bloodstream Infections**

Scenario 2

### **Secondary BSI Scenario 2**

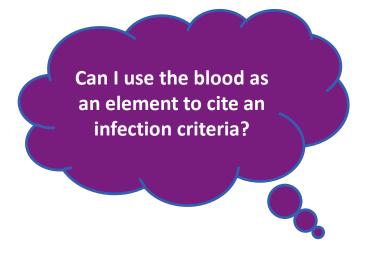
### Scenario 2

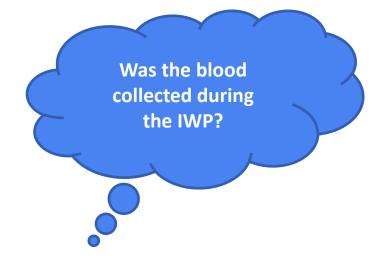
An organism identified in the blood specimen is an element that is used to meet the NHSN site-specific infection criterion, and therefore is collected during the sitespecific infection window period.

Organism in the blood is an element used to meet the primary-site infection criterion

Blood specimen is collected in the IWP (or surveillance period if a surgical site infection or SSI)

### **Questions to Ask When Applying Scenario 2**





If the answer to the two questions is 'Yes', Scenario 2 can be applied

## Secondary BSI Scenario 2: BONE 3a

- 1/22 60 year old male admitted with a right lower leg wound
- 1/24 Right lower leg pain documented
- 1/26 102°F
- 1/27 Staph aureus blood cultures x
   2; Vancomycin initiated
- 1/28 MRI: "Findings compatible with diffuse tibial osteomyelitis"

### **BJ-BONE AND JOINT INFECTION**

### **BONE-Osteomyelitis**

Osteomyelitis must meet at least <u>one</u> of the following criteria:

- Patient has organism(s) identified from bone by culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis and treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
- 2. Patient has evidence of osteomyelitis on gross anatomic or histopathologic exam.
- Patient has at least <u>two</u> of the following localized signs or symptoms: fever (>38.0°C), swelling\*, pain or tenderness\*, heat\*, or drainage\*

### And at least <u>one</u> of the following:

 organism(s) identified from blood by culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis and treatment, for example, not Active Surveillance Culture/Testing (ASC/AST)

### AND

imaging test evidence suggestive of infection (for example, x-ray, CT scan, MRI, radiolabel scan [gallium, technetium, etc.]), which if equivocal is supported by clinical correlation, specifically, physician documentation of antimicrobial treatment for osteomyelitis.

b. imaging test evidence suggestive of infection (for example, x-ray, CT scan, MRI, radiolabel scan [gallium, technetium, etc.]), which if equivocal is supported by clinical correlation, specifically, physician documentation of antimicrobial treatment for osteomyelitis.

\* With no other recognized cause

### Secondary BSI Scenario 2: BONE 3a

- 1/22 60 year old male admitted with a right lower leg wound
- 1/24 Right lower leg pain documented
- <u>1/26 102°F</u>
- 1/27 Staphylococcus aureus blood cultures x 2; Vancomycin initiated
  - 1/28 MRI: "Findings compatible with diffuse tibial osteomyelitis"

element used to meet the primary-site infection criterion 1/24 - 1/30**BONE 3a** Blood specimen is collected in the IWP (or surveillance period if a surgical site infection or SSI)

Organism in the blood is an

### Secondary BSI Scenario 2: BURN Example

- 4/1 70-year old man admitted to the BURN unit with a 2nd degree burn to the right chest
- 4/3 PICC placed
- 4/8 Only nurse's note: "New purple-colored eschar noted on right chest wound."
- 4/12 102°F; Blood cultures collected;
  - Blood culture: Staphylococcus aureus
  - Vancomycin started
- 4/20 Right chest wound healing. Discharged

### What Determination Should Be Made In This Case?

- A. No infection identified
- B. 4/8 BURN 1 with a secondary BSI
- c. 4/12 LCBI 1
- D. 4/12 CLABSI

### **BURN-Burn infection**

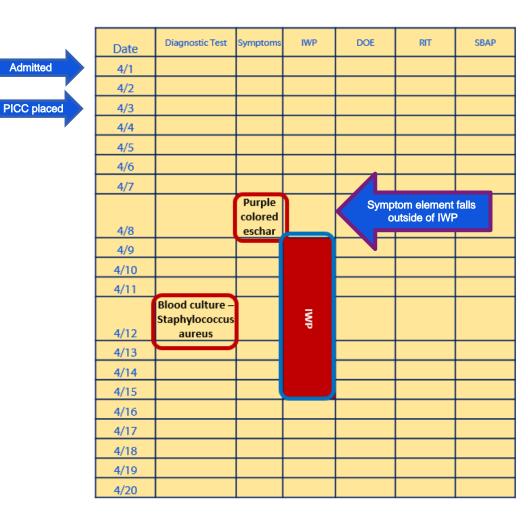
Burn infections must meet the following criteria:

 Patient has a change in burn wound appearance or character, such as rapid eschar separation, or dark brown, black, or violaceous discoloration of the eschar, *AND*

Organism(s) identified from blood by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).

## **BURN 1 Rationale**

- 4/12 CLABSI
  - Staphylococcus aureus blood culture = LCBI 1
  - Eligible central line in place on 4/12.
- BURN 1 not met
  - Blood culture and change in eschar <u>cannot</u> be captured in the same IWP.



## Secondary BSI Scenario 2: IAB Example

- 6/3 45-year old was admitted with diabetes, a gangrenous foot, and inflammatory bowel disease.
- 6/4 AMP performed
- 6/12 103°F and Blood cultures collected
  - Positive Clostridium sp. blood culture
- 6/13 CT scan: "RLQ abscess"
- 6/15 Hypotension

**Note:** No signs or symptoms of a surgical-site infection

### Is the Clostridium Blood Culture Secondary to IAB?

- A. Yes
- B. No

Intraabdominal infections must meet at least <u>one</u> of the following criteria:

- Patient has organism(s) identified from an abscess or from purulent material from intraabdominal space by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
- 2. Patient has at least one of the following:
  - abscess or other evidence of intraabdominal infection on gross anatomic or histopathologic exam.
  - b. abscess or other evidence of intraabdominal infection on gross anatomic or histopathologic exam

#### AND

organism(s) identified from blood by a culture or non-culture based microbiologic testing method, which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST). The organism(s) identified in the blood must contain at least one MBI organism. (See Appendix A of the BSI protocol)

- Patient has at least two of the following: fever (>38.0°C), hypotension, nausea\*, vomiting\*, abdominal pain or tenderness\*, elevated transaminase level(s)\*, or jaundice\* And at least one of the following:
  - a. organism(s) seen on Gram stain and/or identified from intraabdominal fluid or tissue obtained during invasive procedure or from an aseptically-placed drain in the intraabdominal space (for example, closed suction drainage system, open drain, T-tube drain, CT guided drainage) by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
  - b. organism(s) identified from blood by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST). The organism(s) identified in the blood must contain at least one MBI organism (See Appendix A of the BSI protocol) AND

imaging test evidence suggestive of infection ( for example, ultrasound, CT scan, MRI, ERCP, radiolabel scans [gallium, technetium, etc.] or on abdominal x-ray), which if equivocal is supported by clinical correlation, specifically, physician documentation of antimicrobial treatment for intraabdominal infection.<sup>†</sup>

\* With no other recognized cause

## **IAB 3b Rationale**

- Yes!
- IAB 3b met, 6/12
- 6/9 6/15 IAB IWP (created by positive blood culture)
  - 6/12 Fever
  - 6/13 Imaging suggestive of infection
  - 6/15 Hypotension
- RIT: 6/12 6/25
- SBAP: 6/9 6/25

Date	Diagnostic Test	Symptoms	IWP	DOE	RIT	SBAP
6/3						
6/4						
6/5						
6/6						
6/7						
6/8						
6/9						
6/10						
6/11						
6/12	Blood culture –	Fever		Date of		
	Clostridium		Ę	Event – IAB 3b		
6/13	CT scan – intra- abdominal abscess		÷			
6/14						
6/15		Hypotension				SBAP
6/16					즼	•
6/17						
6/18						
6/19						
6/20						
6/21						
6/22						
6/23						
6/24						
6/25						
6/26						
6/27						
6/28						

## Pathogen Assignment – Attributing a Positive Blood Culture to More Than One Infection

Example 1: Pathogen Assignment

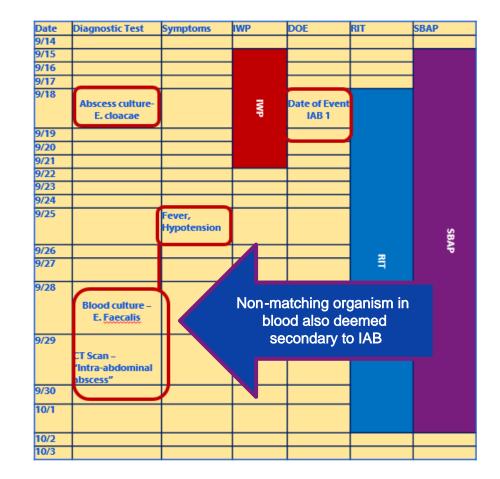
- An organism may be attributed as secondary to more than 1 type of infection
- Example
  - Chapter 4, page 4-40

Hospital Day (HD)	UTI SBAP	UTI RIT	UTI Infection Window Period	IAB Infection Window Period	IAB RIT	IAB SBAP	
1	10000000						Infection Window Period
2							(First positive diagnostic test, 3 days
3							before and 3 days after)
4		1	Urine culture: >100,000 cfu/ml K. pneumoniae				Repeat Infection Timeframe
5		2	Fever > 38.0 C				(RIT)
6		3					(DOE = day 1)
7		4					
8		5		Fever >38.0 C, Abdominal pain			Secondary BSI Attribution
9		6		CT Scan : Abdominal abscess			Period (SBAP) (Infection Window Period + RIT)
10		7	Blood culture: K. pneumoniae	Blood culture: K. pneumoniae			Date of Event (DOE)
11		8					Date the first element occurs for the fir
12		9					time within the infection window perio
13	0.000	10					
14		11					
15		12					
16		13					
17		14					
18							
19							
20							
21							
22							
23							
			SUTI &	IAB &			
			Secondary BSI DOE = HD 4	Secondary BSI DOE = HD 8			
			Pathogen: K.	Pathogen: K.			
			pneumoniae	pneumoniae			

### **Re-meeting an NHSN Site-Specific Infection to**

### **Capture Non-Matching Organisms**

- HAI IAB 1 met 9/18
  - 9/18: Abscess Culture E. cloacae
  - IAB IWP 9/15 9/21
  - HAI IAB RIT: 9/18-10/1
  - SBAP: 9/15 10/1
- HAI IAB 3b also met 9/25 within 9/18 – 10/1 IAB RIT
  - 9/25 10/1 IAB IWP (created by eligible Blood culture)
  - Fever, hypotension and eligible
     CT scan captured within IWP



## About VASC and Secondary BSI Attribution...

 A BSI can <u>only</u> be secondary to an organ space SSI-VASC

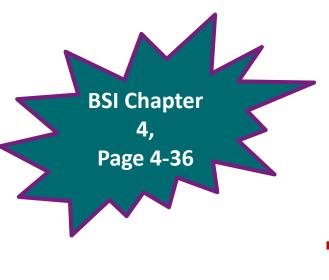


Table B1: Secondary BSI Guide: List of all NHSN primary site-specific definitions available for										
making secondary BSI determinations using Scenario 1 or Scenario 2										
	Scen	nario 1		Scenario 2						
A positive blood specimen must contain at least one				Positive	blood specimen	must be an element of the				
eligible matching organism to the site-specific					cific definition	interest of the citement of the				
specimen										
		is collected in the site		And blood specimen is collected in the site-specific						
		ttribution period			n window period					
•		identified from the s			-	identified in a blood	-			
		as an element to mee				lement to meet the site-				
	ific definition				definition					
· ·	Site	Criterion		•	Site	Criterion				
A	ABUTI	ABUTI		1	BONE	3a				
	BONE	1		1	BURN	1				
E	BRST	1		]	DISC	3a				
(	CARD	1		[		4a, 4b, 5a or 5b				
	CIRC	2 or 3			ENDO	(specific organisms)				
	CONJ	1			ENDO	6e or 7e plus other				
	DECU DISC	1				criteria as listed				
	EAR	1, 3, 5 or 7,			GIT	1b or 2c				
	EMET	1, 3, 5 01 7,		[	IAB	2b or 3b				
	ENDO	1			JNT	3c				
E	EYE	1				le or le				
0	GE	2a			SINU			1		
	GIT	2a, 2b (only yeast)			01110			-		
	IAB	1 or 3a			SSI			SI, DI or OS		
	IC JNT	1			551			51, 01 01 05		
	LUNG	1			SKIN			2a		
	MED	1			JKIN			Zd		
	MEN	1			ST			1		
	ORAL	1 or 3a			31			1		
	OREP	1			118.40			1.		
	PJI	1			UMB			1a		
	PNEU SA	2 or 3			110			1 2 -		
	SA	1			UR			1a or 3a		
	SSI	SI, DI or OS								
	SKIN	2a			USI			1		
5	ST	1								
	UMB	1a			SUTI			1a, 1b or 2		
	UR	1a or 3a								
USI 1				VASC only as SSI						
	SUTI VASC only as SSI	1a, 1b or 2 1						1		
	VCUF	3			VCUF			3		
								~		

## **Case Studies**

### **Case Study 1**

- 9/12 25-year old admitted with severe right jaw pain due to a tooth abscess. 102°F. Patient attempted to treat abscess at home with antibiotics left over from a sinus infection. Negative blood cultures on admission. Poor venous access. PICC placed.
- 9/13 "Unbearable pain!" per patient. Temp: 101°F; Purulent drainage noted in right posterior oral cavity. Culture collected.
  - Oral cavity Prevotella and Streptococcus viridans
- 9/16 Blood cultures collected MRSA x 2

# Can the 9/16 MRSA Blood Cultures Be Deemed Secondary?

A. Yes

в. **No** 

### **ORAL-Oral cavity infection (mouth, tongue, or gums)**

Oral cavity infections must meet at least one of the following criteria:

- 1. Patient has organism(s) identified from abscess or purulent material from tissues of oral cavity by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
- 2. Patient has an abscess or other evidence of oral cavity infection found on invasive procedure, gross anatomic exam, or histopathologic exam.
- 3. Patient has at least <u>one</u> of the following signs or symptoms with no other recognized cause: ulceration, raised white patches on inflamed mucosa, or plaques on oral mucosa.

### And at least one of the following:

- a. virus identified from mucosal scrapings or exudate by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST)
- b. multinucleated giant cells seen on microscopic examination of mucosal scrapings or exudate
- c. diagnostic single antibody titer (IgM) or 4-fold increase in paired sera (IgG) for organism.
- d. fungal elements seen on microscopic exam of mucosal scrapings or exudate (for example, Gram stain, KOH )
- e. physician initiates antimicrobial therapy within 2 days of onset or worsening of symptoms.

### **Reporting instruction**

• Report healthcare-associated primary herpes simplex infections of the oral cavity as ORAL; recurrent herpes infections are not healthcare associated.

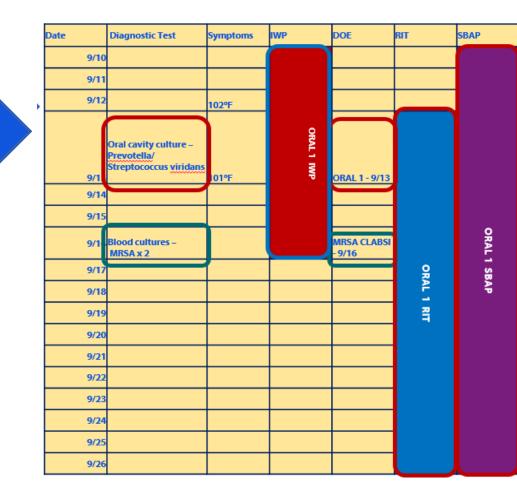
## **Case Study 1 Rationale**

- 9/13 ORAL 1 cited
  - 9/10 9/16 ORAL 1 IWP
  - 9/13 9/26 ORAL 1 RIT
  - 9/10 9/26 ORAL 1 SBAP
- 9/16 MRSA CLABSI cited
  - MRSA, non-matching organism

Admitted/

**PICC placed** 

- No other site-specific source
- Eligible central line in place on 9/16



### Case Study 2

- April 1 Patient admitted with fever and abdominal pain
- April 2 PICC placed
- April 4 US guided drainage of 4L purulent peritoneal fluid, positive for *Enterobacter cloacae and Proteus mirabilis*.
- April 10 Abdominal pain increased
- April 11 CT Scan: multiple liver abscesses. Blood cultures x 2 positive C. albicans and Morganella sp.
- April 13 Jaundice. Fever 101.2°F

### What Determination Should Be Made in this Case?

- A. CLABSI
- B. SSI-IAB 1 with secondary BSI
- c. IAB with secondary BSI

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

- Patient has organism(s) identified from an abscess or from purulent material from intraabdominal space by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
- 2. Patient has at least one of the following:
  - abscess or other evidence of intraabdominal infection on gross anatomic or histopathologic exam.
  - b. abscess or other evidence of intraabdominal infection on gross anatomic or histopathologic examples of the second second

### AND

organism(s) identified from blood by a culture or non-culture based microbiologic testing method, which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST). The organism(s) identified in the blood must contain at least one MBI organism. (See Appendix A of the BSI protocol)

- Patient has at least <u>two</u> of the following: fever (>38.0°C), hypotension, nausea\*, vomiting\*, abdominal pain or tenderness\*, elevated transaminase level(s)\*, or jaundice\* And at least one of the following:
  - a. organism(s) seen on Gram stain and/or identified from intraabdominal fluid or tissue obtained during invasive procedure or from an aseptically-placed drain in the intraabdominal space (for example, closed suction drainage system, open drain, T-tube drain, CT guided drainage) by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
  - b. organism(s) identified from blood by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST). The organism(s) identified in the blood must contain at least one MBI organism (See Appendix A of the BSI protocol) AND

imaging test evidence suggestive of infection ( for example, ultrasound, CT scan, MRI, ERCP, radiolabel scans [gallium, technetium, etc.] or on abdominal x-ray), which if equivocal is supported by clinical correlation, specifically, physician documentation of antimicrobial treatment for intraabdominal infection.<sup>†</sup>

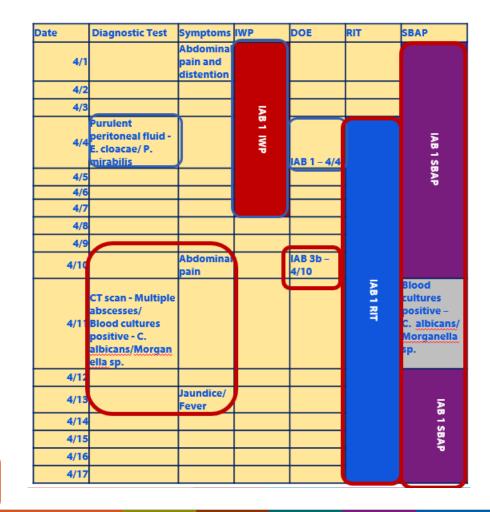
\* With no other recognized cause

## **Case Study 2 Rationale**

- 4/4 IAB 1 cited
- 4/10 IAB 3b also cited (during 4/4 IAB RIT)
  - 4/10 Abdominal pain
  - 4/11 CT scan "Multiple abscess and C. albicans and Morganella blood cultures
  - 4/13 Jaundice. 101°F

Note: Only 4/4 IAB is reported

Example of Re-meeting criteria to capture non-matching organisms.



### **Case Study 3**

- July 4 30 year old admitted with ulcerative colitis. Severe abdominal pain reported. PMH of heroin IV drug abuse.
- July 5 PICC placed after PIV dislodged.
- July 9 Nausea, vomiting and increased abdominal pain
- July 10 102°F. Continued abdominal pain. CT scan "Dilatation pronounced in the transverse colon". Blood cultures collected-Pseudomonas x 2.
- July 12 MD note: "Pseudomonas blood cultures secondary to colonic source".

## What Determination Should Be Made In This Case?

Gastrointestinal tract infections, excluding, gastroenteritis and appendicitis, must meet at least <u>one</u> of the following criteria:

- 1. Patient has one of the following:
  - a. an abscess or other evidence of gastrointestinal tract infection on gross anatomic or histopathologic exam.
  - b. abscess or other evidence of gastrointestinal tract infection on gross anatomic or histopathologic exam

#### AND

organism(s) identified from blood by a culture or non-culture based microbiologic testing method, which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST). The organism(s) identified in the blood must contain at least one MBI organism. (See Appendix A of the BSI protocol)

 Patient has at least <u>two</u> of the following signs or symptoms compatible with infection of the organ or tissue involved: fever (>38.0°C), nausea\*, vomiting\*, pain\*or tenderness\*, odynophagia\*, or dysphagia\*

#### And at least <u>one</u> of the following:

- a. organism(s) identified from drainage or tissue obtained during an invasive procedure or from drainage from an aseptically-placed drain by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
- organism(s) seen on Gram stain or fungal elements seen on KOH stain or multinucleated giant cells seen on microscopic examination of drainage or tissue obtained during an invasive procedure or from drainage from an aseptically-placed drain.
- c. organism(s) identified from blood by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST). The organism(s) identified in the blood must contain at least one MBI organism (See Appendix A of the BSI protocol) AND

imaging test evidence suggestive of gastrointestinal infection (for example, endoscopic exam, MRI, CT scan), which if equivocal is supported by clinical correlation, specifically, physician documentation of antimicrobial treatment for gastrointestinal tract infection.

d. imaging test evidence suggestive of infection (for example, endoscopic exam, MRI, CT scan), which if equivocal is supported by clinical correlation, specifically, physician documentation of antimicrobial treatment for gastrointestinal tract infection.

Intraabdominal infections must meet at least <u>one</u> of the following criteria:

- Patient has organism(s) identified from an abscess or from purulent material from intraabdominal space by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
- 2. Patient has at least one of the following:
  - abscess or other evidence of intraabdominal infection on gross anatomic or histopathologic exam.
  - b. abscess or other evidence of intraabdominal infection on gross anatomic or histopathologic exam

#### AND

organism(s) identified from blood by a culture or non-culture based microbiologic testing method, which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST). The organism(s) identified in the blood must contain at least one MBI organism. (See Appendix A of the BSI protocol)

Patient has at least <u>two</u> of the following: fever (>38.0°C), hypotension, nausea\*, vomiting\*, abdominal pain or tenderness\*, elevated transaminase level(s)\*, or jaundice\*
 And at least one of the following:

### And at least <u>one</u> of the following:

- a. organism(s) seen on Gram stain and/or identified from intraabdominal fluid or tissue obtained during invasive procedure or from an aseptically-placed drain in the intraabdominal space (for example, closed suction drainage system, open drain, T-tube drain, CT guided drainage) by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
- b. organism(s) identified from blood by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST). The organism(s) identified in the blood must contain at least one MBI organism (See Appendix A of the BSI protocol) AND

imaging test evidence suggestive of infection ( for example, ultrasound, CT scan, MRI, ERCP, radiolabel scans [gallium, technetium, etc.] or on abdominal x-ray), which if equivocal is supported by clinical correlation, specifically, physician documentation of antimicrobial treatment for intraabdominal infection.<sup>†</sup>

\* With no other recognized cause

## What Determination Should Be Made In This Case?

- A. 7/9 IAB (intra-abdominal infection) with secondary BSI
- **B.** 7/9 GIT (gastrointestinal infection) with secondary BSI
- **C.** 7/10 CLABSI
- D. 7/10 OREP (reproductive infection) with secondary BSI



### **Case Study 3 Rationale**

- July 4 30 year old admitted with ulcerative colitis. Severe abdominal pain reported. PMH of heroin IV drug abuse.
- July 5 PICC placed after PIV dislodged.
- July 9 Nausea, vomiting and increased abdominal pain
- July 10 102°F.
  - Continued abdominal pain.
  - CT scan "Dilatation pronounced in the transverse colon".
  - Blood cultures collected- Pseudomonas x 2.
- July 12 MD note: "Pseudomonas blood cultures secondary to colonic source".

MD documentation cannot be used to apply Secondary BSI attribution



Eligible symptoms 7/9 and 7/10 to meet GIT 2c (only two required)

Imaging finding not suggestive of infection or equivocal

**CLABSI, 7/10** 

## When Submitting a Secondary BSI Case to NHSN, Please Send the Following:

- Site specific infection under consideration (for example Chapter 17 infections, SSI, UTI, PNEU)
- Supporting documentation (for example any positive blood cultures, imaging results, or sign/symptoms and associated dates if applicable)
- Date(s) and results of any positive blood cultures
- All organisms identified in the blood culture(s) (include information on whether or not the organisms are in the same blood culture or two separate blood cultures)
- Any information on recent NHSN surgical procedures (including the operative report and any imaging performed)

### Summary

- There are only 2 ways to make a secondary BSI determination:
  - Scenario 1: Organism in the site-specific specimen is used to meet criteria, and the blood, collected in the secondary BSI attribution period matches at least one site-specific organism.
  - 2. Scenario 2: Organism identified in the blood specimen is used as an element to meet the site-specific infection criterion, and therefore must be collected in the IWP.
- If neither scenario is met, the BSI is a primary infection. The only exception to this rule is when NEC criteria are met.
- POA BSIs must be investigated when a subsequent positive blood specimen is identified within 14 days-otherwise an incorrect determination can be made.
  - Only a primary BSI creates a 14 day BSI RIT

### Summary continued...

- Blood specimens occurring in the SBAP must contain at least one matching organism to the site-specific specimen <u>that was used to</u> <u>meet the definition initially</u>, otherwise it must be investigated as being primary or secondary in nature.
  - Sometimes a patient will meet more than 1 criterion for a type of infection. If this occurs, consider all potential IWPs to identify possible primary sites of BSIs.
- The training videos, quick reference tools and the worksheet generator on the NHSN website are valuable resources that can improve your understanding of HAI surveillance, the application of the NHSN definitions and NHSN reporting.

### **Resources for Secondary BSI Attribution**

- Chapter 2: Identifying Healthcare-associated Infections (HAI) for NHSN Surveillance <u>https://www.cdc.gov/nhsn/pdfs/pscmanual/2psc\_identifyinghais\_nhsncurrent.pdf</u>
- Chapter 4: Bloodstream Infection Event (Central Line-Associated Bloodstream Infection and Non-central Line Associated Bloodstream Infection) <u>https://www.cdc.gov/nhsn/pdfs/pscmanual/4psc\_clabscurrent.pdf</u>
- Chapter 17: Surveillance Definitions for Specific Types of Infections <u>https://www.cdc.gov/nhsn/pdfs/pscmanual/17pscnosinfdef\_current.pdf</u>

## **Thank You** For questions email NHSN@cdc.gov

For more information, contact CDC 1-800-CDC-INFO (232-4636) TTY: 1-888-232-6348 www.cdc.gov

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.

