



The Devil is in the Details: Applying CAUTI and CLABSI Criteria Accurately

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Mercer Conference Center

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Objectives

1. State the Centers for Disease Control and Prevention's definitions and criteria of Catheter-associated Urinary Tract Infection (CAUTI) and Central Line-associated Bloodstream Infection (CLABSI)
2. Correctly identify CAUTI and CLABSI as applied to case studies
3. State the correct method to identify denominators for CAUTI and CLABSI rate calculations.



NHSN Website

A Valuable Resource

- NHSN Manual
 - Criteria
 - Key Definitions
 - Tables of Instructions
- Data and Statistics
 - NHSN published reports
- Trainings
- NHSN forms
- Lots more!!!

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

DIVISION of Healthcare Quality Promotion (DHQP) at CDC. NHSN also includes a new component for hospitals to monitor adverse reactions and incidents associated with receipt of blood and blood products. Enrollment is open to all types of healthcare facilities in the United States, including acute care hospitals, long term acute care hospitals, psychiatric hospitals, rehabilitation hospitals, outpatient dialysis centers, ambulatory surgery centers, and long term care facilities. For more information, click on the topics below.

Biovigilance Component

NHSN Biovigilance Component

GO »

Biovigilance

»

KNOW

**What to Do
About the Flu**

www.flu.gov

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Topics

About NHSN

Overview, External Peer Review, Confidentiality, How data are used...

Patient Safety Component

Procedure, Device (Dialysis Event), Medication-associated, MDRO, & HRIIV Modules...

Enrollment Requirements

Eligibility, Required Training, Reporting & System Requirements, Security, Begin Enrollment...

Healthcare Personnel Safety Component

Benefits of Participation, Facility-Level Options, BBF Exposure Module...

Resource Library

Guides, Manuals, NHSN Codes & Variables, FAQs, HIPAA...

Biovigilance Component

Hemovigilance Module Overview, Protocol and Tables of Instructions...

Data Collection Forms

Forms for routine data collection including customizable forms to meet specific needs...

NHSN Training

Pre-recorded webcasts: Enrollment, Data Entry, Surveillance, Analysis, PS & HPS Components...

Communication Updates

E-mail updates

NewsLetters

Data & Statistics

States with Facilities Using NHSN (total=2186)



CDC currently supports more than 2000 hospitals that are using NHSN and 19 states require hospitals to report HAI's using NHSN.

[More Data & Statistics »](#)




NHSN Report 2008 NHSN Report, data summary for 2006 through 2007

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Contact NHSN:




 Centers for Disease Control and Prevention
National Healthcare Safety Network
MS-A24
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Atlanta, GA 30333

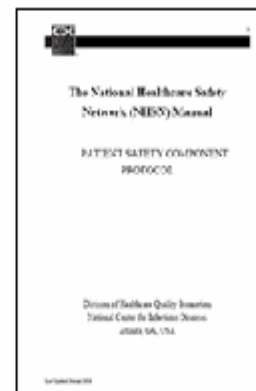
nhsn@cdc.gov

[More contact info »](#)

Patient Safety Component

Download the NHSN Manual: Patient Safety Protocol by section:

-  [Table of Contents](#) PDF (38 KB / 2 pages)
-  [NHSN Overview](#) PDF (51 KB / 5 pages)
-  [Identifying Healthcare-associated Infections \(HAIs\) in NHSN](#) PDF (84 KB / 2 pages)
-  [Patient Safety Monthly Reporting Plan](#) PDF (26 KB / 1 pages)
-  [Central Line-Associated Bloodstream Infection \(CLABSI\) Event](#) PDF (66 KB / 7 pages)
-  [Central Line Insertion Practices \(CLIP\) Adherence](#) PDF (82 KB / 3 pages)
-  <http://www.cdc.gov/nhsn/PDFs/ICD-9-cmCODEScurrent.pdf> (pages)
-  [Catheter-Associated Urinary Tract Infection \(CAUTI\) Event](#) PDF (236 KB / 11 pages)
-  [Dialysis Event](#) PDF (53 KB / 3 pages)
-  [Surgical Site Infection \(SSI\) Event](#) PDF (180 KB / 13 pages)
-  [Post-Procedure Pneumonia \(PPP\) Event](#) PDF (36 KB / 2 pages)
-  [Antimicrobial Use and Resistance \(AUR\) Option](#) PDF (54 KB / 4 pages)
-  [Multidrug-resistant Organism \(MDRO\) and *Clostridium difficile*-Associated Disease \(CDAD\) Module Protocol](#) PDF (413 KB/ 25 pages)
-  [High Risk Inpatient Influenza \(HRIIV\) Protocol](#) PDF (438KB / 20 pages)
-  [Tables of Instructions Updated June 2009](#), PDF (422 KB / 49 pages)
-  [CDC Location Labels and Location Descriptions](#) PDF (268 KB / 15 pages)



CDC/NHSN surveillance definition of health care–associated infection and criteria for specific types of infections in the acute care setting

Teresa C. Horan, MPH, Mary Andrus, RN, BA, CIC, and Margaret A. Dudeck, MPH
Atlanta, Georgia

BACKGROUND

Since 1988, the Centers for Disease Control and Prevention (CDC) has published 2 articles in which nos-

population for which clinical sepsis is used has been restricted to patients ≤ 1 year old. Another example is that incisional SSI descriptions have been expanded to specify whether an SSI affects the primary or a secondary in-

Horan TC, Andrus ML, Dudeck MA. CDC/NHSN surveillance definition of healthcare-associated infection and criteria for specific types of infections in the acute care setting. *Am J Infect Control* 2008;36:309-32.

<http://www.cdc.gov/ncidod/dhqp/pdf/NNIS/NosInfDefinitions.pdf>



Consistency is a Must!

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



What If My Physician's Balk?

- Remind of surveillance vs. clinical definitions
 - Diff purposes
 - May not be the same
 - Comments section useful to note important factors
- Can submit questions to NHSN mailbox



Healthcare-associated Infection (HAI)

- A localized or systemic condition resulting from an adverse reaction to the presence of an infectious agent(s) or its toxin(s) that
 - Occurs in a patient in a healthcare setting and
 - Was not present or incubating at the time of admission, unless the infection was related to a previous admission
- When the setting is a hospital, meets the criteria for a specific infection (body) site as defined by CDC
- When the setting is a hospital, may also be called a nosocomial infection

Table 1. CDC/NHSN major and specific types of health care-associated infections

BSI	Bloodstream infection	
	LCBI	Laboratory-confirmed bloodstream infection
	CSEP	Clinical sepsis
PNEU	Pneumonia	
	PNU1	Clinically defined pneumonia
	PNU2	Pneumonia with specific laboratory findings
	PNU3	Pneumonia in immunocompromised patient
Bj	Bone and joint infection	
	BONE	Osteomyelitis
	JNT	Joint or bursa
	DISC	Disc space
CNS	Central nervous system	
	IC	Intracranial infection
	MEN	Meningitis or ventriculitis
	SA	Spinal abscess without meningitis
CVS	Cardiovascular system infection	
	VASC	Arterial or venous infection
	ENDO	Endocarditis
	CARD	Myocarditis or pericarditis
	MED	Mediastinitis

Major & Specific Infection Types

BSI-BLOODSTREAM INFECTION

LCBI-Laboratory-confirmed bloodstream infection

LCBI criteria 1 and 2 may be used for patients of any age, including patients ≤ 1 year of age.

LCBI must meet at least 1 of the following criteria:

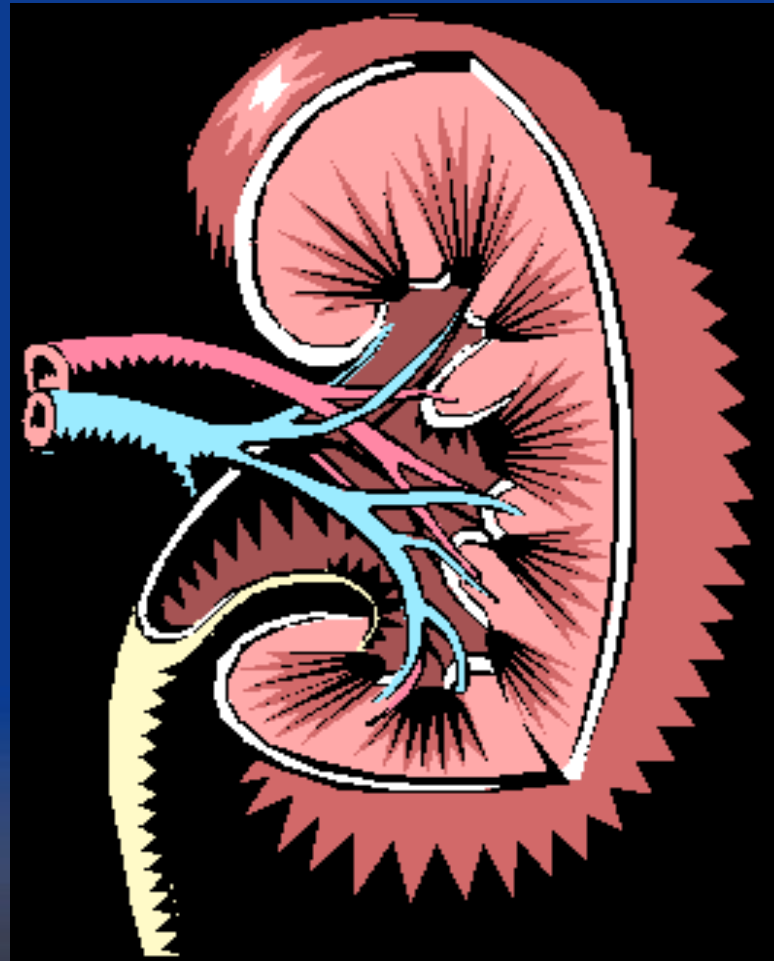
1. Patient has a recognized pathogen cultured from 1 or more blood cultures
and
organism cultured from blood is *not* related to an infection at another site. (See Notes 1 and 2.)
2. Patient has at least 1 of the following signs or symptoms: fever ($>38^{\circ}\text{C}$), chills, or hypotension
and
signs and symptoms and positive laboratory results are *not* related to an infection at another site
and
common skin contaminant (ie, 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 2 or more blood cultures drawn on separate occasions. (See Notes 3 and 4.)



CAUTI and CLABSI Criteria and Application



Catheter-associated Urinary Tract Infection (CAUTI)





Catheter-associated Urinary Tract Infection (CAUTI) Surveillance

- Most common HAI
- Rates range between
 - 16.8% in Rehab
 - 3.1% in Med Surg ICU non-major teaching facility
- Renewed interest:
 - Mandatory reporting
 - Denial of CMS reimbursement dollars





Major & Specific Infection Types- UTI

- Major: Urinary Tract Infection (UTI)
- Specific:
 - Symptomatic UTI (SUTI)
 - Asymptomatic Bacteremic UTI (ABUTI)
 - Other UTI (OUTI)

CAUTI= UTI where an indwelling urinary catheter was in place in the 48 hours prior to infection onset



CAUTI

A UTI when an indwelling urinary catheter was in place in the 48 hours prior to infection onset

**Note: There is no minimum period of time that the catheter must be in place in order for the UTI to be considered catheter-associated.*

**Note: SUTI 1b and 2b and Other UTI cannot be catheter-associated.*



Indwelling Catheter

- A drainage tube that is inserted into the urinary bladder through the urethra, is left in place, and is connected to a closed collection system; also called a Foley catheter; does not include:
 - straight in and out catheters
 - Suprapubic catheters
 - Nephrostomy tubes



CAUTI Denominator Data

- CAUTIs are attributed to patient location
- # indwelling urinary catheter days/unit
- For urinary catheter device utilization: # patient days/unit



48 Hour Rule

- If a CAUTI develops within 48 hours of transfer from one inpatient location to another in the same facility, the infection is attributed to the transferring location.

This rule applies to CLABSI surveillance also.

Example of Completed Denominators for ICU/Other Locations Form



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

OMB No. 0920-0666
Exp. Date: 02-29-2008

* required for saving

*Facility ID# **10000** *Month: **Nov** *Year: **2008** *Location Code: **MSICU**

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	6	6		
2	8	6		
3	6	4		
4	7	7		
5	6	6		
6	8	6		
7				
8				
9				
10				
11				
31	//	//		
*Totals	151	138		

Patient-days Central-line days Urinary catheter-days Ventilator-days

2 Key Questions



- Was an indwelling catheter in place at the time of or within 48 hours prior to the urine specimen collection?
- Is the patient 65 years or older?

Symptomatic UTI – 1a & 1b



Criterion	Symptomatic Urinary Tract Infection (SUTI)
1a	<p>Must meet at least 1 of the following criteria:</p> <p>Patient had an indwelling urinary catheter in place at the time of specimen collection <i>and</i> at least 1 of the following signs or symptoms with no other recognized cause: fever ($>38^{\circ}\text{C}$), suprapubic tenderness, or costovertebral angle pain or tenderness <i>and</i> a positive urine culture of $\geq 10^5$ colony-forming units (CFU)/ml with no more than 2 species of microorganisms.</p> <p>-----OR-----</p> <p>Patient had indwelling urinary catheter <u>removed within the 48 hours prior to specimen collection</u> <i>and</i> at least 1 of the following signs or symptoms with no other recognized cause: fever ($>38^{\circ}\text{C}$), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness <i>and</i> a positive urine culture of $\geq 10^5$ colony-forming units (CFU)/ml with no more than 2 species of microorganisms.</p>
1b	<p>Patient did <u>not</u> have an indwelling urinary catheter in place at the time of specimen collection nor within 48 hours prior to specimen collection <i>and</i> has at least 1 of the following signs or symptoms with no other recognized cause: fever ($>38^{\circ}\text{C}$) in a patient that is ≤ 65 years of age, urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness <i>and</i> a positive urine culture of $\geq 10^5$ CFU/ml with no more than 2 species of microorganisms.</p>

1 a and 1 b

Symptomatic UTI – 2a



Patient had an indwelling urinary catheter in place at the time of specimen collection

and

at least 1 of the following signs or symptoms with no other recognized cause:

fever ($>38^{\circ}\text{C}$), suprapubic tenderness, or costovertebral angle pain or tenderness

and

a positive urinalysis demonstrated by at least 1 of the following findings:

- a. positive dipstick for leukocyte esterase and/or nitrite
- b. pyuria (urine specimen with ≥ 10 white blood cells [WBC]/ mm^3 or ≥ 3 WBC/high power field of unspun urine)
- c. microorganisms seen on Gram stain of unspun urine

and

a positive urine culture of $\geq 10^3$ and $< 10^5$ CFU/ml with no more than 2 species of microorganisms.

-----OR-----

Patient had indwelling urinary catheter removed within the 48 hours prior to specimen collection

and

at least 1 of the following signs or symptoms with no other recognized cause:

fever ($>38^{\circ}\text{C}$), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness

and

a positive urinalysis demonstrated by at least 1 of the following findings:

- a. positive dipstick for leukocyte esterase and/or nitrite
- b. pyuria (urine specimen with ≥ 10 white blood cells [WBC]/ mm^3 or ≥ 3 WBC/high power field of unspun urine)
- c. microorganisms seen on Gram stain of unspun urine

and



Symptomatic UTI – 2b

Patient did not have an indwelling urinary catheter in place at the time of specimen collection nor within 48 hours prior to specimen collection

and

has at least 1 of the following signs or symptoms with no other recognized cause: fever ($>38^{\circ}\text{C}$) in a patient that is ≤ 65 years of age, urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness

and

a positive urinalysis demonstrated by at least 1 of the following findings:

- a. positive dipstick for leukocyte esterase and/or nitrite
- b. pyuria (urine specimen with ≥ 10 WBC/ mm^3 or ≥ 3 WBC/high power field of unspun urine)
- c. microorganisms seen on Gram stain of unspun urine

and

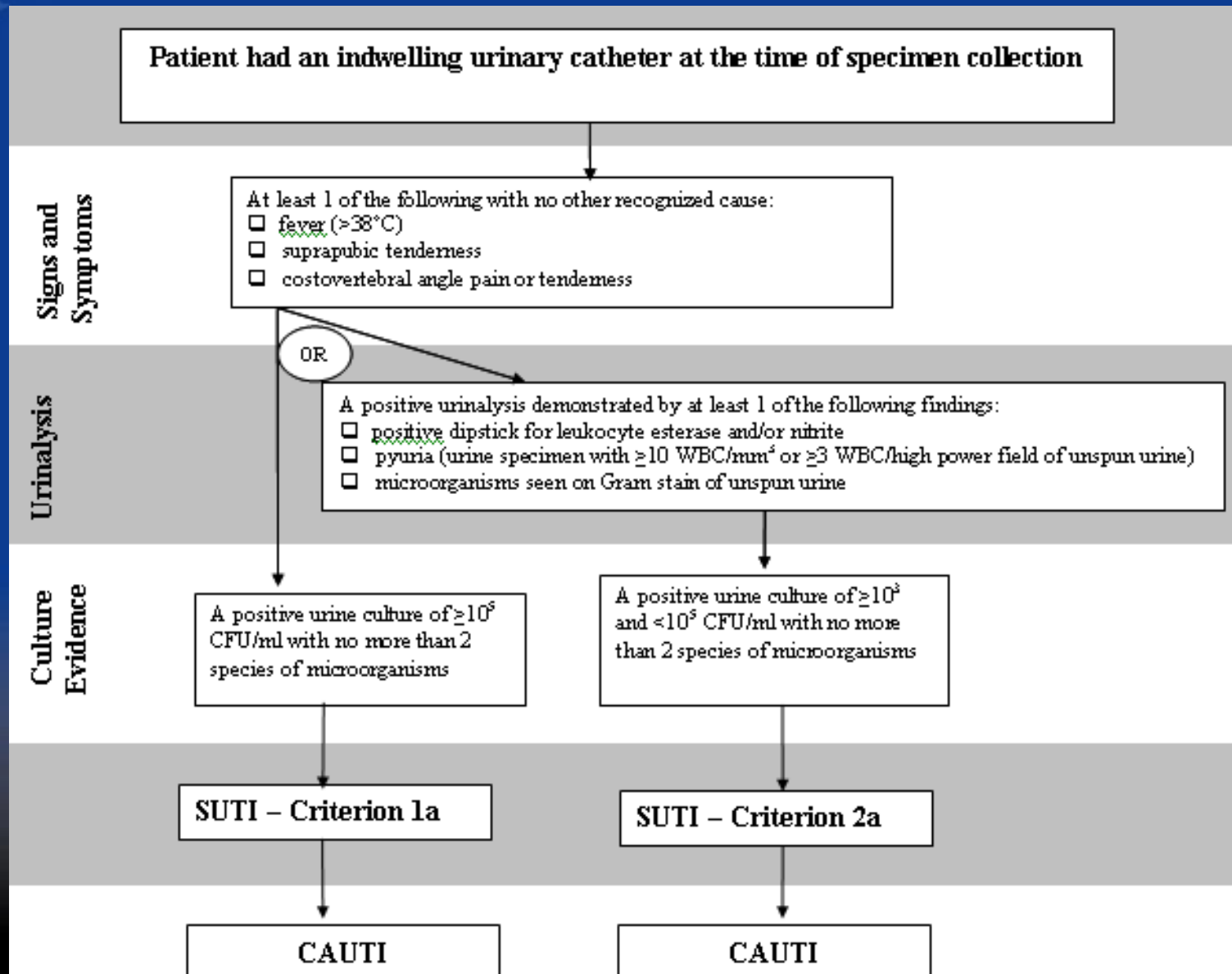
a positive urine culture of $\geq 10^3$ and $< 10^5$ CFU/ml with no more than 2 species of microorganisms.

SUTI for ≤ 1 year olds – Criteria 3 & 4



3	<p>Patient ≤ 1 year of age with or without an indwelling urinary catheter has at least 1 of the following signs or symptoms with no other recognized cause: fever ($>38^{\circ}\text{C}$ core), hypothermia ($<36^{\circ}\text{C}$ core), apnea, bradycardia, dysuria, lethargy, or vomiting</p> <p><i>and</i></p> <p>a positive urine culture of $\geq 10^5$ CFU/ml with no more than 2 species of microorganisms.</p>
4	<p>Patient ≤ 1 year of age with or without an indwelling urinary catheter has at least 1 of the following signs or symptoms with no other recognized cause: fever ($>38^{\circ}\text{C}$ core), hypothermia ($<36^{\circ}\text{C}$ core), apnea, bradycardia, dysuria, lethargy, or vomiting</p> <p><i>and</i></p> <p>a positive urinalysis demonstrated by at least one of the following findings:</p> <ol style="list-style-type: none">positive dipstick for leukocyte esterase and/or nitritepyuria (urine specimen with ≥ 10 WBC/mm^3 or ≥ 3 WBC/high power field of unspun urine)microorganisms seen on Gram's stain of unspun urine <p><i>and</i></p> <p>a positive urine culture of between $\geq 10^3$ and $<10^5$ CFU/ml with no more than two species of microorganisms.</p>

SUTI 1a & 2a Catheter in Place Flow Diagram



Asymptomatic Bacteremic UTI (ABUTI)



Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)

Patient with or without an indwelling urinary catheter has no signs or symptoms (i.e., no fever ($>38^{\circ}\text{C}$) for patients ≤ 65 years of age*; and for any age patient no urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness, OR for a patient ≤ 1 year of age, no fever ($>38^{\circ}\text{C}$ core), hypothermia ($<36^{\circ}\text{C}$ core), apnea, bradycardia, dysuria, lethargy, or vomiting)

and

a positive urine culture of $\geq 10^5$ CFU/ml with no more than 2 species of uropathogen microorganisms**

and

a positive blood culture with at least 1 matching uropathogen microorganism to the urine culture.

*Fever is not diagnostic for UTI in the elderly (>65 years of age) and therefore fever in this age group does not disqualify from meeting the criteria of an ABUTI.

**Uropathogen microorganisms are: Gram-negative bacilli, *Staphylococcus* spp., yeasts, beta-hemolytic *Streptococcus* spp., *Enterococcus* spp., *G. vaginalis*, *Aerococcus urinae*, and *Corynebacterium* (urease positive).

- ▢ Add
- ▢ Find
- ▢ Incomplete

Add Event

Mandatory fields marked with *

[Print PDF Form](#)

Fields required for record completion marked with **

Fields required when in Plan marked with >

Patient Information [HELP](#)

Facility ID*:

Event #: 19363

Patient ID*:

Social Security #:

Secondary ID:

Last Name:

First Name:

Middle Name:

Gender*:

Date of Birth*:

Ethnicity:

- Race: American Indian/Alaska Native Asian
 Black or African American Native Hawaiian/Other Pacific Islander
 White

Event Information [HELP](#)

Event Type*:

Date of Event*:

Post-procedure:

MDRO Infection Surveillance*:

Event Information [?HELP](#)

Event Type*: UTI - Urinary Tract Infection Date of Event*: 04/03/2009

Post-procedure:

MDRO Infection Surveillance*: No, this event pathogen/location is not in-plan for MDRO/CDAD Module

Location*: 71ICU - 71 ICU CARDIAC

Date Admitted to Facility>: 03/28/2009

Risk Factors [?HELP](#)

Urinary Catheter*:

Location of Device Insertion:

Date of Device Insertion: REMOVE - Removed within 48 hours prior
NEITHER - Not in place nor within 48 hours prior

Determines if age is a factor

Event Details [?HELP](#)

Specific Event>:

Secondary Bloodstream Infection>:

Died**>:

Discharge Date:

Pathogens Identified>: If Yes, specify below ->

Pathogens [?HELP](#)

Risk Factors [?HELP](#)

Urinary Catheter*: REMOVE - Removed within 48 hours prior

Location of Device Insertion:

Date of Device Insertion:

Event Details [?HELP](#)

Specific Event>: SUTI - Symptomatic UTI

Specify Criteria Used* (check all that apply):

Signs & Symptoms

Any patient

- Fever
- Urgency
- Frequency
- Dysuria
- Suprapubic tenderness
- Costovertebral angle pain or tenderness
- Abscess
- Pain or tenderness
- Purulent drainage or material
- Other evidence of infection found on direct exam, during surgery, or by diagnostic tests

<=1 year old

- Fever
- Hypothermia
- Apnea
- Bradycardia
- Dysuria
- Lethargy
- Vomiting

Laboratory & Diagnostic Testing

- 1 positive urine culture with $\geq 10^5$ CFU/ml with no more than 2 species of microorganisms
- Positive dipstick for leukocyte esterase or nitrite
- Pyuria
- Microorganisms seen on Gram stain of unspun urine
- 1 positive culture between $\geq 10^3$ and $< 10^5$ CFU/ml with no more than 2 species of microorganisms
- Positive culture
- Positive blood culture
- Radiographic evidence of infection

Secondary

Available selections based on Specific Event Type



Case 1

- 50 year old patient with end stage pancreatic cancer with liver & bone mets admitted to hospital with advance directive for comfort care and antibiotics only; peripheral IV and nasal cannula inserted
- Day 4: patient is febrile and has suprapubic tenderness; IV ampicillin started after urine obtained for culture
- Day 5: difficulty breathing; CXR=infiltrate L lung base
- Day 6: urine culture results = 10^5 CFU/ml *E coli*
- Day 7: WBC/mm³ = 3400; patchy infiltrates in both lung bases; continued episodes of dyspnea; rales noted in LLL
- Day 11: Patient expired



Case 1



- Does this patient have an HAI?
 - Yes
- What type(s)?
- SUTI Criteria 1b
 - No catheter last 48 hours
 - Fever in patient ≤ 65 years
 - Urine culture $\geq 10^5 \leq 2$ species
 - (suprapubic tenderness)
- Device associated?
- No
 - Would you report this HAI?
 - It depends

Case 2



- POD 3: 66 y.o. patient in the ICU with a Foley catheter s/p exploratory lap; patient noted to be febrile (38.9°) and complained of diffuse abdominal pain
- WBC increased to 19,000. He had cloudy, foul-smelling urine and urinalysis showed 2+ protein, + nitrite, 2+ leukocyte esterase, wbc – TNTC, and 3+ bacteria. Culture was 10,000 CFU/ml *E. coli*. The abdominal pain seemed localized to surgical area

Is this a UTI?

If so, what type?

Criteria?



Case 2



- SUTI
- 2a
 - Positive urine culture $\geq 10^3$ and $< 10^5$ with no more than 2 species
 - Pyuria (≥ 10 WBC)
 - Fever ($>38^\circ\text{C}$)
 - (+ leukocyte esterase, nitrite)

What if the patient had been 65 years of age? Is it still a SUTI 2a?

Yes. Age not factor when catheter in place at specimen collection.



Case 3

- 84 year old patient is hospitalized with GI bleed
- Day 3: Patient has catheter in place and no signs or symptoms of infection
- Day 9: Patient becomes unresponsive, is intubated and CBC shows WBC of 15,000. Temp 38.5°C. Patient is pan-cultured. Blood culture and urine both grow *Streptococcus pyogenes* – urine $>10^5$ CFU/ml.

Is this a UTI?

Yes

If so, what type?



Case 3



- ABUTI:
 - No signs or symptoms
 - Positive blood culture with at least 1 matching uropathogen to the urine culture
 - (Fever is not diagnostic for UTI in the elderly, therefore fever in this age group does not disqualify from ABUTI)

What if the organism in both cultures had been Micrococcus? Is it still an ABUTI?

*No.
Micrococcus
not on
uropathogen
list*



Case 4

- 3 week old infant born at 27 weeks gestation. Umbilical catheter in place. HR 100, RR 32, and core temperature ranges between 37.8°C and 36.2°C. Straight cath urine culture yields $>10^5$ CFU/ml *Staphylococcus epidermidis*.
- 1 blood culture sent same day, also positive for *S. epi*. No susceptibilities provided.

Is this a UTI?

Yes

If so, what type?

ABUTI



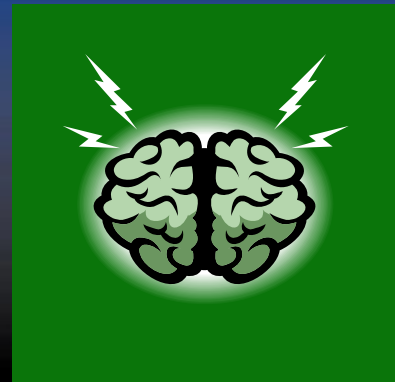
Case 4

- What if the one blood and urine culture had been positive for a *Micrococcus* not speciated?

Is this now a UTI?

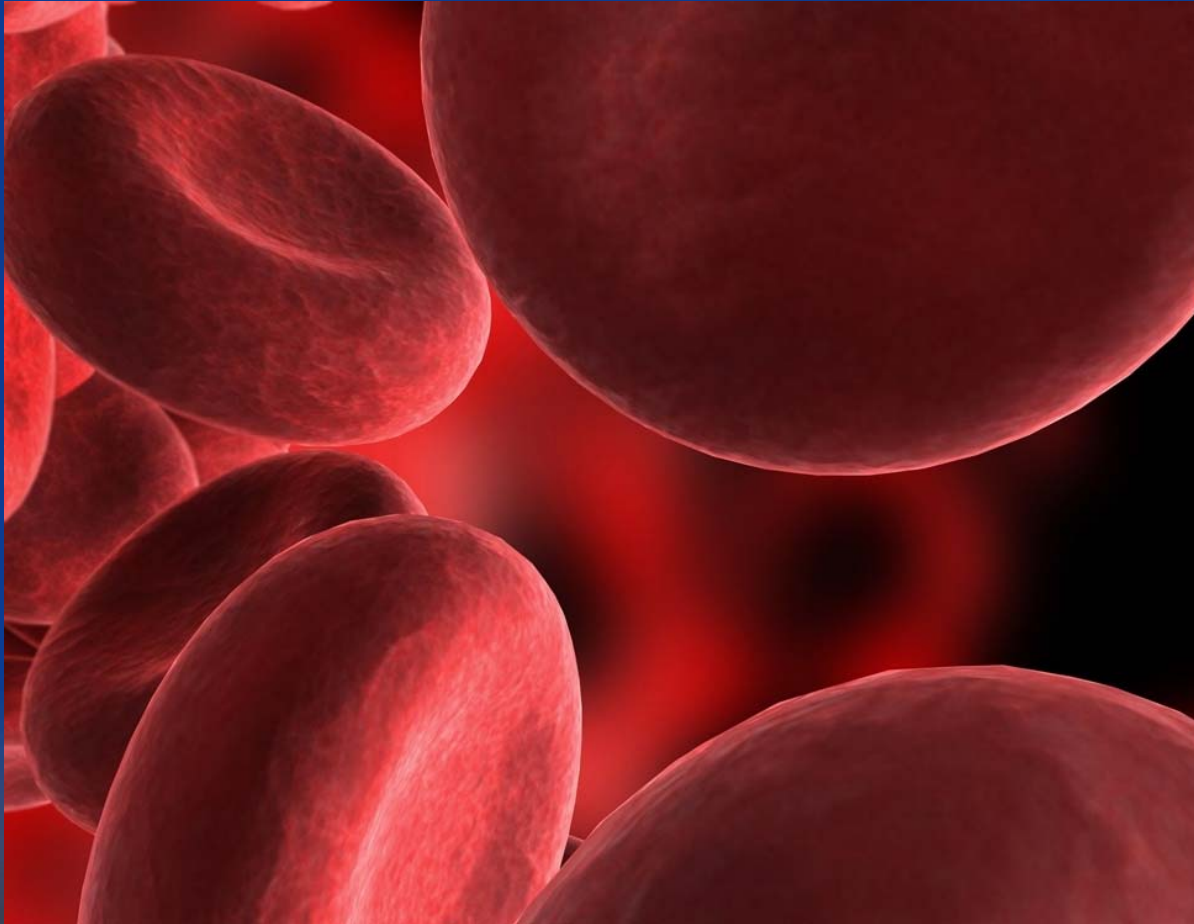
If so, what type?

For you NHSN brainiacs..is it a BSI?





Laboratory Confirmed Bloodstream Infections



Central Line-associate Bloodstream Infections (CLABSI) Module

- 250,000 CLABSIs occur in the United States each year¹
- Most bloodstream infections are associated with the presence of a central line or umbilical catheter (in neonates) at the time of or before the onset of the infection
- Estimated mortality is 12-25% for each CLABSI¹



Cost to the healthcare system est. \$34,000-\$56,000/CLABSI
\$296 mil- \$2.3 bil. → in US/year^{2,3,4}



Central Line-associated Bloodstream Infection (CLABSI)

- CLABSI surveillance utilizes the Major Event Type: BSI
- CLABSI= Primary BSI that develops in a patient that had a central line within the 48 hours prior to the infection onset.

NOTE: There is no minimum time period that the central line must be in place in order for the BSI to be considered central line-associated.



48 Hour Rule

- CLABSIs are attributed to the patient location at the onset of the BSI
- If the BSI develops in a patient within 48 hours of discharge from a location, indicate the discharging location on the infection report



Definition: Central Line

A vascular infusion device that terminates at or close to the heart or in one of the great vessels and is used for infusion, withdrawal of blood, or hemodynamic monitoring.



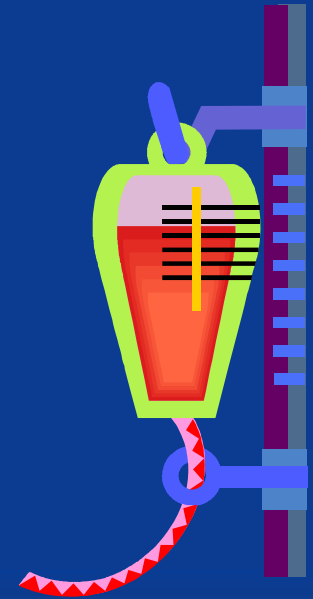
Definition: Central Line

The following are considered great vessels for the purpose of reporting central line infections and counting central line days

- Aorta
- Pulmonary artery
- Superior vena cava
- Inferior vena cava
- Brachiocephalic veins
- Internal jugular veins
- Subclavian veins
- External iliac veins
- Common femoral veins

Infusion

- Introduction of a solution through a blood vessel via a catheter lumen
- Includes:
 - Continuous infusions such as nutritious fluids or medications, or
 - Intermittent infusions such as flushes or IV antimicrobial administration
 - Administration of blood or blood products in the case of transfusion or hemodialysis





Note



- Neither the location of the insertion site nor the type of device may be used to determine if a line qualifies as 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.



Bloodstream Infection Definitions : Event Type LCBI: Criterion 1



Laboratory-confirmed bloodstream infection (LCBI): Must meet one of the following criteria:

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. (See Notes 1 and 2 below.)



LCBI – Criterion 1

**Patient has a recognized pathogen cultured from one or more blood cultures
and
organism cultured from blood is not related to an infection at another site.**



Example: Jon Smith had a PICC line inserted on admission (June 1). On hospital day 4, he became confused and experienced chills. Blood cultures were drawn which grew *E. faecalis*.

Mr. Smith meets the criteria for LCBI Criterion 1.



LCBI Criterion 2



Criterion 2: Patient has at least one of the following signs or symptoms: fever (>38°C), chills, or hypotension

and

signs and symptoms and positive laboratory results are not related to an infection at another site

and

common skin contaminant (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.



LCBI Criterion 3



Criterion 3: Patient ≤ 1 year of age has at least one of the following signs or symptoms: fever ($>38^{\circ}\text{C}$ core) hypothermia ($<36^{\circ}\text{C}$ core), apnea, or bradycardia }
and

signs and symptoms and positive laboratory results are not related to an infection at another site

and

common skin contaminant (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. (See Notes 3, 4 and 5 below.)



Bloodstream Infection: Event Type: Clinical Sepsis



Clinical sepsis (CSEP): Must meet the following criterion:

Patient \leq 1 year of age has at least one of the following clinical signs or symptoms with no other recognized cause: fever ($>38^{\circ}\text{C}$ core), hypothermia ($<36^{\circ}\text{C}$, core), apnea, or bradycardia

and

blood culture not done or no organisms detected in blood

and

no apparent infection at another site

and

physician institutes treatment for sepsis.

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

Recognized pathogen does not include organisms considered common skin contaminants. A few of the recognized pathogens are *Staph aureus*, *Enterococcus* spp., *E. coli*, *Pseudomonas* spp., *Klebsiella* spp., *Candida* spp., etc.





The phrase "*two or more blood cultures (BC) drawn on separate occasions*" means:

1. That blood from at least two blood draws were collected within two days of each other, and
2. That at least one bottle from each blood draw is reported by the laboratory as having grown the same common skin contaminant organism (i.e., is a positive BC)



Determining “sameness” of two organisms



If the common skin contaminant from one culture is identified to both genus and species level (e.g., *S. epidermidis*) and the companion culture identifies only the genus with or without other attributes (in this example, coagulase-negative staphylococci), then it is assumed that the organisms are the same.

Report the genus/species to NHSN, i.e., in this example, report *S. epidermidis*. See other examples below:

Culture	Companion Culture	Report as...
<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>



Determining “sameness” of two organisms

If common skin contaminant organisms are speciated (e.g., both are *B. cereus*), but no antibiograms are done, or they are done for only one of the isolates, it is assumed that the organisms are the same.





Determining “sameness” of two organisms (cont.)

If the common skin contaminants from the cultures have antibiograms that are different for two or more antimicrobial agents, it is assumed that the organisms are not the same.

Examples:

Organism Name	Isolate A	Isolate B	Interpret as...
<i>S. epidermidis</i>	All drugs S	All drugs S	Same
<i>S. epidermidis</i>	OX R GENT R	OX S GENT S	Different
<i>Corynebacterium</i> spp.	PENG R CIPRO S	PENG S CIPRO R	Different
<i>Strep viridans</i>	All drugs S	All drugs S except ERYTH (R)	Same

Collecting Blood Culture Specimens



Ideally, blood specimens for culture should be obtained from two to four blood draws from separate venipuncture sites (e.g., right and left antecubital veins), not through a vascular catheter.



These blood draws should be performed simultaneously or over a short period of time (i.e., within a few hours).

If your facility does not currently obtain specimens using this technique, you may still report BSIs using the NHSN criteria, but you should work with appropriate personnel to facilitate better specimen collection practices for blood cultures.

Case 1



- James is a 28 year old patient with a central line who is 3 days post colon surgery on April 1. He spikes a fever and has blood cultures x2 drawn; on April 2, 1 set is negative, 1 bottle from the second set is positive for *Bacillus cereus*. His doctor orders antibiotics and notes “postop sepsis” in the chart.

How should this be reported?

- Not reported. Does not meet any criteria for BSI- common skin contaminant recovered from one bottle only

Case 1



- On April 2nd, another set of blood cultures are collected and 1/2 bottles grow *B. cereus*. Susceptibilities of the 2 organisms are shown:

Organism	Azithromycin	Cetrixone	Gentamycin	Piperacillin	Vancomycin
#1	S	R	S	R	S
#2	S	S	S	R	S

Case 1



- Is this a BSI?
- If yes, what criteria?
- If yes, what date of onset?

Organism	Azithromycin	Cetrixone	Gentamycin	Piperacillin	Vancomycin
#1	S	R	S	R	S
#2	S	S	S	R	S

Case 1



- Is this a BSI? *Yes*
- If yes, what criteria?
- If yes, what date of onset? *April, 1- first date of onset*

LCBI Criterion 2- fever >38°C, not related to another site, same CSC cultured from ≥ 2 blood cultures drawn on separate occasions.

Antibiograms do not differ for 2 or more antibiotics.



Case 1



- What if the patient was 3 weeks old?



Still a LCBI. – Criteria 1 and 2 can be used for patients of any age.

Is this a CLABSI?

Yes, central line in place or removed within 48 hours prior to event onset.



Case 2

- A patient with a PICC placed in another facility has been in our hospital for the past week and now has a blood culture growing *Acinetobacter baumannii*.

Is this a BSI? If so, what criteria? *Yes, Criteria 1*

Is this a CLABSI?

Yes, central line in place at time of culture

Should it be attributed to our hospital or to the facility that placed the PICC?

Attributed to our hospital- not present or incubating at the time of admission- apply the 48 hour rule for transfer





Case 2

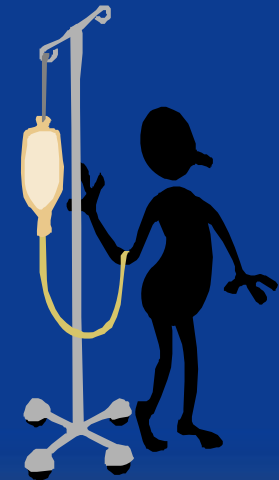
- What if the patient also has an increase in his sputum, and developed rales, a fever of 38°C and has two chest xrays with increased consolidation in his right lower lobe, in the two days before his blood culture?

Is this a BSI?

Why or why not?

No. Patient now meets criteria of a PNU2:

- *Definitive chest xray*
- *Fever; New rales*
- *Positive blood culture not related to another source of infection (blood culture attributed to PNU2)*





Case 3

An 81 year old patient was in MICU for a week with a central line in place the entire time. Just prior to discharge from the MICU to a medical ward, the line was pulled. Within 36 hours, she became disoriented and hypotensive. Blood cultures x 2 were drawn and 3 of 4 bottles grew Micrococci and coagulase-negative staphylococci.

Is this a BSI? *Yes- LCBI*

Is this a CLABSI? *Yes- Central line in place in 48 hours prior to event onset*

Criteria? *Criterion 2- hypotension and CSC from ≥ 2 blood cultures*



Case 3

Location of attribution?

MICU

Organism(s)?

*Micrococcus sp and
Coagulase Negative
Staphylococcus*



Case 4

- Patient admitted to MICU on 1/21 due to GI bleed
- L subclavian line placed on 1/22
- 1/28 patient spikes fever (102.1°F); blood specimen for culture drawn through the line x 1; line removed and tip sent for culture
- 1/3 blood and tip culture positive for coagulase-negative staphylococci

Is this a CLABSI?

No. Catheter tips are not used in NHSN criteria. Therefore only 1 blood culture is positive with CSC. No criteria met.



Case 5

- 85-year old female admitted from an extended care facility. Recent onset confusion and urinary incontinence. Started on antibiotics.

PMH: Hypertension, recent CVA, Insulin-dependant diabetic

- Day 1: Temp 37.5° C, pan cultured (blood, urine, sputum). Foley catheter inserted. Blood sugar 198. PICC line inserted. Admitted to ICU.



Case 5



- Day 3: All cultures negative, antibiotics D/Cd. Blood sugar remains unstable.
- Day 6: Temp 39.5°. Noted to have suprapubic tenderness and shaking chills. Pan cultures repeated, antibiotics restarted, CXR clear. PICC d/c and tip cultured.
- Day 8: Urine culture $\geq 10^5$ MRSA. Blood culture 2 of 3 and PICC tip positive for MRSA. Antibigrams match.



Case 5



- Day 10: Improving urine clear transferred back to long-term care on antibiotics.
- Did this patient have a HAI UTI attributable to your facility? If so, what type?
 - Yes, SUTI 1a
 - Fever, (suprapubic tenderness) urine culture $\geq 10^5$ with no more than 2 species; catheter in place
- Did the patient have a BSI? If so, is it a CLABSI?
 - BSI: Yes. Positive blood culture.
 - CLABSI :No- Positive blood culture due to other recognized cause- urosepsis.



Case 6

- 8/14- A 41 year old female presents to the Emergency Room in diabetic coma and with anemia. She has a subclavian catheter inserted in the Emergency Room. The next day, in the ICU, she has a midline central catheter inserted for blood transfusions. 8/21- she develops fever to 39°C, and shaking chills. 2 sets of blood cultures sent.
- 8/15- blood cultures positive for *Pseudomonas aeruginosa*. Neither insertion site shows inflammation and there is no other documented infection



- Is there a BSI? If so, what type?
 - Yes. LCBI
- Criterion?
 - Criterion 1
 - Pathogen cultured from 1 or more blood cultures
- If so, which line should the BSI be attributed to?
 - If the tip of the midline catheter does not end in one of the great vessels or at or in the heart, then it is not considered a central line. Therefore the CLABSI would be attributed to the subclavian line. If two central lines are in place, and If unable to identify one line as source, attribute to the oldest line. If both central lines were inserted at the same time, attribute to the one with the highest risk i.e. temporary vs. tunneled, femoral vs subclavian, etc.

Case 6



Case 6

- What unit should be indicated for the Location of Device Insertion field?
 - The Emergency Department. However, this field is optional. CLABSI will be attributed to the ICU since ED is not an inpatient location and no denominator data are collected there.



Case 7



- Day 1: One-day-old twin male infant admitted and emergently transferred to Neonatal Intensive Care Unit. Vented in isolette during transport. Peripheral IV in scalp, IV fluid at 1cc/hr with Prostin (0.05mcg/kg/min) started prior to transport, and umbilical catheter inserted upon admission to NICU.
- Neonatal History: Gestational age-term infant, birth wt. 1810 grams, Apgars 8 & 9. A cardiac echocardiogram showed transposition of the great vessels of the heart.



Case 7

- Day 3: Repair of Patent Ductus Arteriosus and Atrial Septal Defect performed; later that day the umbilical catheter site was noted to be slightly red.
- Day 4: umbilical catheter site remained slightly red and a low grade temperature developed.
- Day 5: the umbilical line was pulled, 1 blood culture was drawn and the umbilical catheter tip was sent for culture.
- Day 6: continued elevated temp of 38.1° and antibiotics were started.
- Day 7: the culture and umbilical catheter tip were both positive for *Aerococcus sp.* Antibiotics adjusted as needed for coverage. Patient clinically improving.



Case 7



- Does this patient have an HAI?
- If so, what type? Criteria?
 - No. Because the catheter tip is not used for meeting NHSN criteria, there is only one positive blood culture for *Aerococcus*, a CSC. Therefore patient does not meet criteria.
- *Does the baby meet criteria for CSEP?*
 - *No. A positive blood culture is not included in the CSEP criteria (blood culture not done, or no growth).*



Case 7



- What if both cultures were positive for *Staphylococcus aureus*?
 - *LCBI-Criteria 1- 1 blood culture positive for pathogen (catheter tip still not used)*



Case 8

- Baby girl Jones is born at 35 weeks and weighs 1200_grams at birth. An infusion line is placed into her umbilical vein after admission to the NICU. 2 days after birth, her core temperature drops to 35° C, she is diagnosed with sepsis and started on antibiotics. A single blood culture is drawn and returns positive for *Candida albicans* 2 days later.



Case 8

- Is the criteria for a lab confirmed bloodstream infection met?
 - Yes. LCBI Criterion 1- Pathogen recovered from blood.
- If her blood culture had been negative, would the criteria for clinical sepsis be met?
 - Yes
- What would be assigned as a pathogen?
 - CSEP has no identified pathogen



Case 8

- What criteria would be met if blood cultures had been drawn on Day 2 and Day 3 and both were positive for *S. epidermidis* with the same antibiogram?
 - LCBI Criterion 3:
 - Patient 1 year or younger,
 - Hypothermia
 - CSC from 2 or more matching blood cultures on separate occasions

Case 9



- 6/4-49 year old diabetic patient admitted in diabetic coma. Patient with left foot with painful swollen, red and warm to touch, but without drainage. Subclavian line inserted in E.R. Patient admitted to MICU. Temp 37.8°C. Antibiotics begun for “cellulitis”
- 6/6 Temp 38.2°C. Hypotension. Blood cultures x 2 sets collected.
- 6/7 *Staph aureus* cultured from blood x2.



Case 9



Does this patient have an BSI?

Yes- pathogen recovered from blood culture.

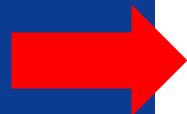
Primary or secondary?

Secondary

**What is the
primary infection?**

SKIN- Criteria 2

Case 9



SST-SKIN AND SOFT TISSUE INFECTION

SKIN-Skin

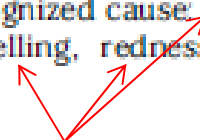
Skin infections must meet at least 1 of the following criteria:

1. Patient has purulent drainage, pustules, vesicles, or boils.
2. Patient has at least 2 of the following signs or symptoms with no other recognized cause: pain or tenderness, localized swelling, redness, or heat

and

at least 1 of the following:

- a. organisms cultured from aspirate or drainage from affected site; if organisms are normal skin flora (ie, diphtheroids [*Corynebacterium* spp], *Bacillus* [not *B anthracis*] spp, *Propionibacterium* spp, coagulase-negative staphylococci [including *S epidermidis*], viridans group streptococci, *Aerococcus* spp, *Micrococcus* spp), they must be a pure culture
- b. organisms cultured from blood
- c. positive antigen test performed on infected tissue or blood (eg, herpes simplex, varicella zoster, *H influenzae*, *N meningitidis*)
- d. multinucleated giant cells seen on microscopic examination of affected tissue
- e. diagnostic single antibody titer (IgM) or 4-fold increase in paired sera (IgG) for pathogen.





Collecting Summary Data

- NHSN Protocol for the collection of device-associated infection denominators:
 - Patient Days: at the same time every day count the number of patients on the unit
 - Device Days: at the same time every day, count the number of patients with one or more devices (pt with ≥ 2 gets counted as 1)



Collecting Summary Data

- Data collected differs according to location
- CLABSI:
 - SCAs:
 - # pts.with permanent central lines
 - # pts with temp central lines
 - Pts with both count only temp line
 - NICUs: stratified by birthweight
 - # pts with central line
 - # pts with umbilical line
 - Pts with both count only umbilical line

Collecting ICU/Other Summary Data



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Facility

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Logged into DHQP MEMORIAL HOSPITAL (ID 10018) as FSA6.
Facility DHQP MEMORIAL HOSPITAL (ID 10018) is following the PS component.

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

[?HELP](#)

Mandatory fields marked with *

[Print PDF Form](#)

Facility ID*: 10018 (DHQP MEMORIAL HOSPITAL)

Location Code*:

Month*:

Year*:

Total Patient Days:

Central Line Days:

Urinary Catheter Days:

Ventilator Days:

Save

Back

Collecting SCA Summary Data



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Users

Facility

Group

Log Out

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Facility DHQP MEMORIAL HOSPITAL (ID 10018) is following the PS component.

Denominators for Specialty Care Area (SCA)

[HELP](#)

Mandatory fields marked with *

[Print PDF Form](#)

Facility ID*: 10018 (DHQP MEMORIAL HOSPITAL)

Location Code*: LTAC - LONG TERM ACUTE CARE UNIT

Month*: BMT - BONE MARROW TRANSPLANT
FOX SA1 - FOX SUBACUTE 1

Year*: LTAC - LONG TERM ACUTE CARE UNIT

Total Patient Days:

Temporary Central Line Days:

Permanent Central Line Days:

Urinary Catheter Days:

Ventilator Days:

Save

Back

Collecting NICU Summary Data



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Facility DHQP MEMORIAL HOSPITAL (ID 10018) is following the PS component.

Neonatal Intensive Care Unit

[HELP](#)

Mandatory fields marked with *

[Print PDF Form](#)

Facility ID*: 10018 (DHQP MEMORIAL HOSPITAL)

Location Code*: NICU - LEVEL 3 NICU

Month*:

Year*:

Birth Wt.	Patient Days	U/C Days	CL Days	Vent Days
<=750	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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>2500	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>



Collecting Summary Data

- MICU – collecting patient days and device days on June 8 at noon

Patient	ADT	Vascular	Urinary	Respiratory
101 Smith	Home @ 9 am	PICC home w/ pt	Indwelling foley to DD	O2 @2L/min cont
102 Washington	Day 3	Peripheral IV	Bedpan – cath spec to lab	IPPB q 6 hours
103 Doe	Adm 10 am	IJ CL inserted at 2 pm	Voiding	O2 @ 2L/min prn
104 -----				
105 Chen	Day 2	Swan Ganz and PICC	Suprapubic to direct drainage	Intubated/vent
106 Jones	Day 8	Subclavian CL cont	Indwelling foley to DD	Trach / vent
107 Gonzales	D/C to nursing home @ 4 pm	Peripheral line d/c at 1 pm	Incontinent	Suctioned prn



Collecting Summary Data

How many patient days are counted for this MICU on June 8?

- A. 7
- B. 6
- C. 5
- D. 4
- E. 3

Patient	ADT
101 Smith	Home @ 9 am
102 Washington	Day 3
103 Doe	Adm 10 am
104 -----	
105 Chen	Day 2
106 Jones	Day 8
107 Gonzales	D/C to nursing home @ 4 pm



Collecting Summary Data

How many central line days?

- A. 6
- B. 5
- C. 3
- D. 2
- E. 0

Patient	ADT	Vascular
101 Smith	Home @ 9 am	PICC home w/ pt
102 Washington	Day 3	Peripheral IV
103 Doe	Adm 10 am	IJ CL inserted at 2 pm
104 -----		
105 Chen	Day 2	Swan Ganz and PICC
106 Jones	Day 8	Subclavian CL cont
107 Gonzales	D/C to nursing home @ 4 pm	Peripheral line d/c at 1 pm



Collecting Summary Data

How many indwelling catheter days?

- A. 6
- B. 5
- C. 4
- D. 3
- E. 2
- F. 1

Patient	ADT	Urinary
101 Smith	Home @ 9 am	Indwelling foley to DD
102 Washington	Day 3	Bedpan – cath spec to lab
103 Doe	Adm 10 am	Voiding
104 -----		
105 Chen	Day 2	Suprapubic to direct drainage
106 Jones	Day 8	Indwelling foley to DD
107 Gonzales	D/C to nursing home @ 4 pm	Incontinent



WELL DONE!!!





References

- AJIC: American Journal of Infection Control, Volume 36, Issue 5, Pages 309-332, June 2008, Authors: Teresa C. Horan; Mary Andrus; Margaret A. Dudeck.
[www.ajicjournal.org/article/S0196-6553\(08\)00167.../abstract](http://www.ajicjournal.org/article/S0196-6553(08)00167.../abstract)

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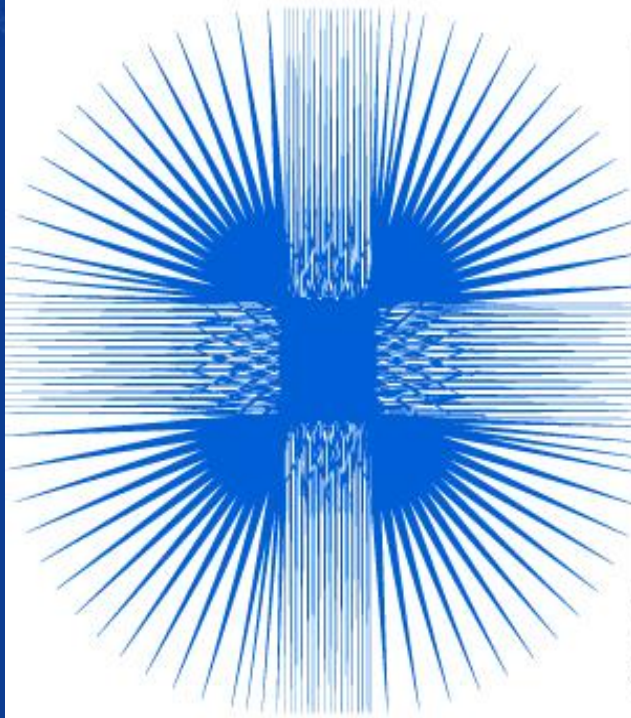
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