



# Using NHSN Data Validation for Improved **CLABSI** Surveillance and Prevention

100-Hospital Validation Project Summary, 2011  
*(Updated to Reflect 2013 NHSN Changes)*



HAI Liaison Program  
 Healthcare-Associated Infections Program  
 Center for Health Care Quality  
 California Department of Public Health

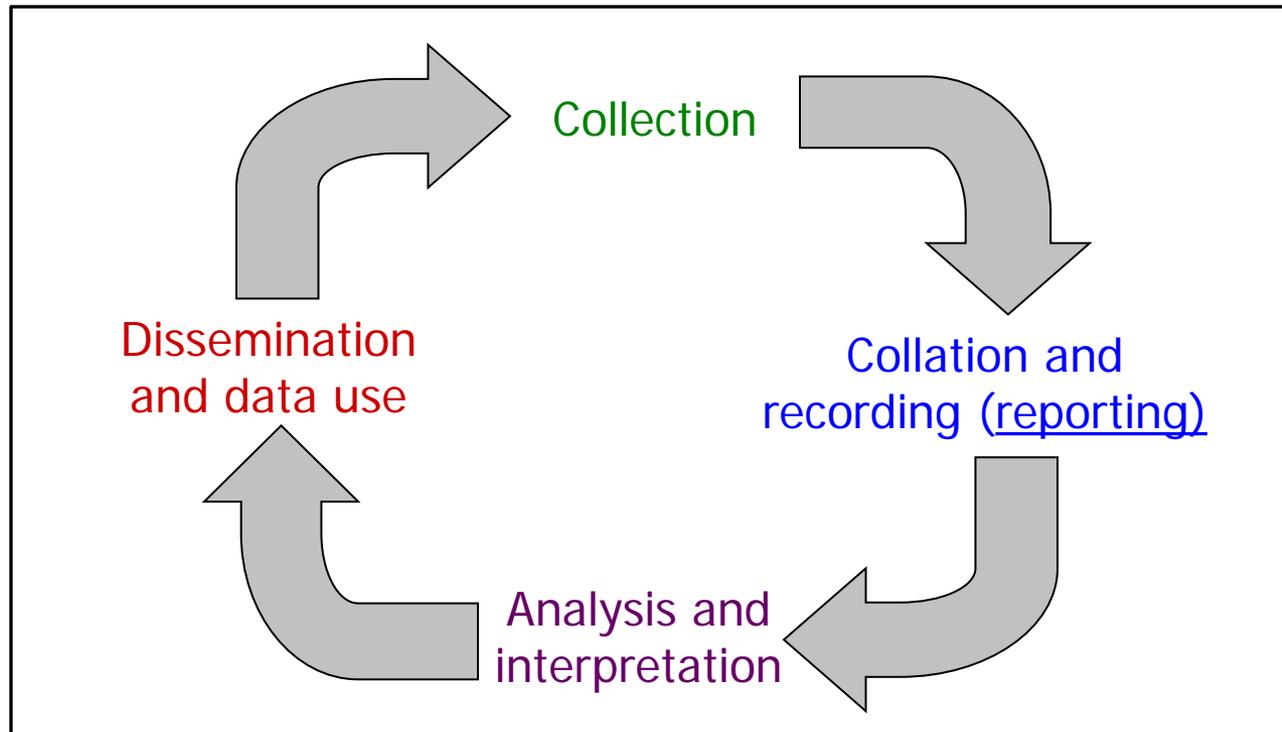
# Today's Presentation

1. Describe the attributes of quality HAI surveillance
2. Identify best practices for CLABSI case-finding
3. Review NHSN CLABSI surveillance protocols and definitions, targeting key issues identified during validations
4. Demonstrate CLABSI data validation process and forms for internal use by hospitals



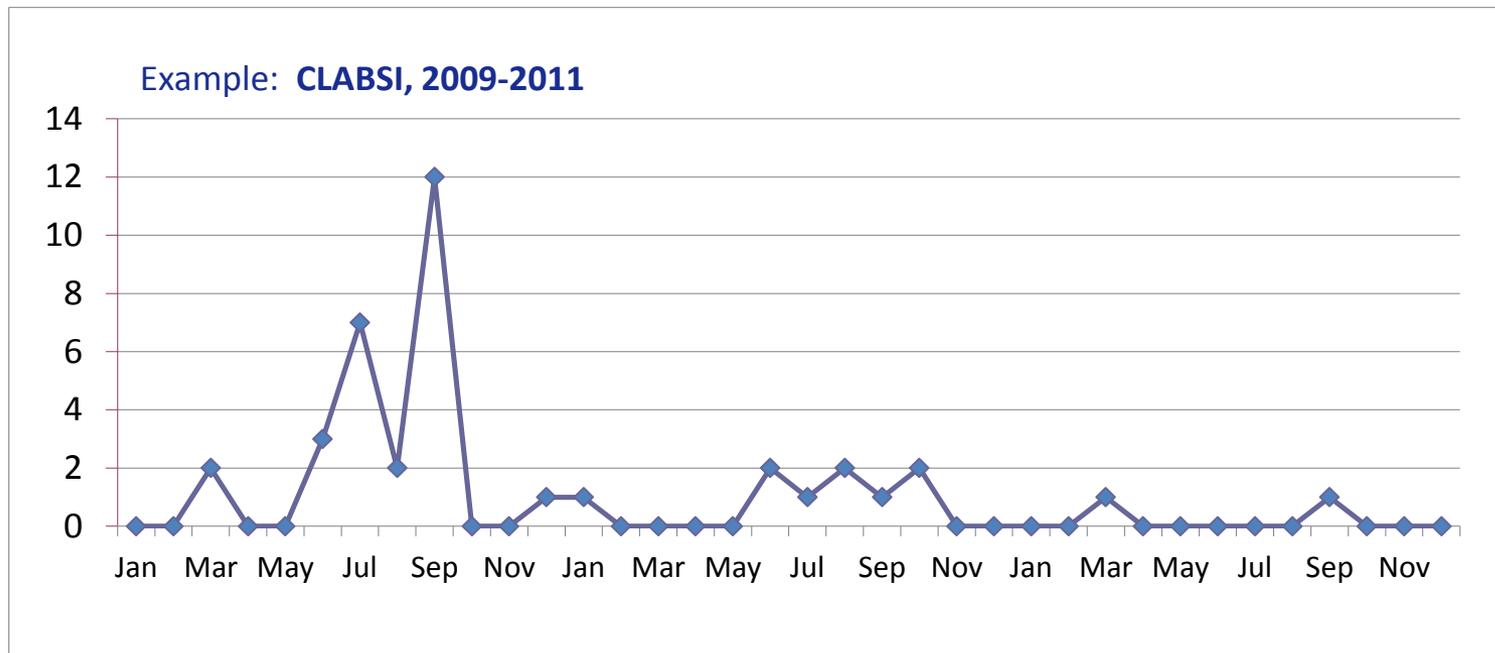
# What is Surveillance?

- **System** that starts and ends with communication and action
- **Information** loop or cycle



# Endpoint of HAI Surveillance?

- Data that demonstrate **HAI Prevention**



# Quality Surveillance for Healthcare-Acquired Infections (HAI)

*Requires*

**CONSISTENCY**

**COORDINATION**

**CONFIDENCE**

**COMPASSION**



# Consistency

Complete case-finding requires a consistent, complete evaluation of a minimum set of clinical data\*

	Always Step 1	Step 2
<b>To identify CLABSI</b>	Review every positive blood culture	Review for presence of central line



\*NHSN protocols currently silent on expectations; revisions proposed



# Coordination

- IP can't perform CLABSI surveillance alone
- CLABSI surveillance needs to be a shared responsibility across hospital units (e.g. for central line days) and services (e.g. microbiology lab data)
- The more connection of relevant clinical data points, the better the surveillance (e.g. positive blood culture, presence of central line, confirmation of symptoms)

# Confidence

- ✓ Know the CLABSI definition AND other HAI surveillance definitions
- ✓ Apply definitions with confidence the same way every time
- ✓ Seek assistance for ambiguity\*

HAI Liaison Program Data Validation, 2011

**Infection Definitions Worksheets**

*Instructions: 1) Use when reviewing positive blood cultures for determining and documenting whether the bacteremia is a primary bloodstream infection (or CLABSI), secondary to another site of infection, or contaminant. 2) Use for surgical site infection (SSI) surveillance. 3) DO NOT use for LabID C. difficile infection (CDI) or MRSA-VRE bloodstream infection surveillance. 4) Refer to often when performing surveillance. Make notes on individual infection pages as you are reviewing medical records. 5) For official (up-to-date) definitions, refer to NHSN at [www.cdc.gov/nhsn](http://www.cdc.gov/nhsn).*

Page		Page	
2	<b>Urinary tract Infections</b>	14	<b>Cardiovascular system infections</b>
	SUTI Symptomatic urinary tract infection		VASC Arterial or venous infection
	• Catheter in place at time of specimen-2		ENDO Endocarditis
	• Catheter recently removed, past 48h-3		CARD Myocarditis or pericarditis
	• NOT catheter-associated - 4		MED Mediastinitis
	• In infants and babies < 1 year old - 5		
6	ABUTI Asymptomatic UTI with Bacteremia	16	<b>Eye, ear, nose, throat, mouth, and URI infections</b>
7	<b>Surgical site infections</b>		CONJ Conjunctivitis
	SIP Superficial incisional primary SSI		EYE Eye, other than conjunctivitis
	SIS Superficial incis. secondary SSI		EAR Ear, mastoid
	DIP Deep incisional primary SSI		ORAL Oral cavity (mouth, tongue, or gums)
	DIS Deep incisional secondary SSI		SINU Sinusitis
	SSI-xxx Organ/space specific types		UR Upper respiratory tract, pharyngitis
	• BONE - 11 • JNT - 11		laryngitis, epiglottitis
	• BRST - 25 • LUNG - 21		
	• CARD - 15 • MED - 15	19	<b>Gastrointestinal system infection</b>
	• DISC - 11 • MEN - 13		GE Gastroenteritis
	• EAR - 17 • ORAL - 17		GIT Gastrointestinal (GI) Tract
			HEP Hepatitis

## AJIC major articles

### 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 nosocomial infection and criteria for specific types of nosocomial infection for surveillance purposes for use in acute care settings have been defined.<sup>1,2</sup> This document

population for which clinical descriptions of patients ≤ 1 year of age are used for surveillance. This document describes how these criteria are used for NHSN surveillance. Refer to the following operative decision following operative procedure when more than 1 incision is made. For additional information about how these criteria are used for NHSN surveillance, refer

## Difference Between Clinical and Surveillance Definitions

- Clinical criteria used by physicians for patient care and management may differ from surveillance criteria
  - Clinical
    - Patient centered
    - Used for therapeutic decisions
  - Surveillance
    - Population based
    - Applied exactly the same way each time

\*Contact [NHSN@cdc.gov](mailto:NHSN@cdc.gov) or your CDPH Liaison IP

# Compassion

- Patients want to feel safe
- Patient advocates want to be assured that providers are doing everything possible to prevent CLABSI
- Identifying every CLABSI is necessary to understand what your patients are experiencing
- No one should get a CLABSI

The screenshot displays the Consumers Union website. The top navigation bar includes links for Health Care, Food, Phones & Media, Money, and Product Safety. The main content area is titled 'rid' (Committee to Reduce Infection Deaths) and features a sidebar with links to Home, About RID, RID's 15 Steps, Infection Facts, Cost of Infection, and Model Bill. The main text reads '15 STEPS YOU CAN TAKE TO REDUCE YOUR RISK OF A HOSPITAL INFECTION'. A large banner on the right side of the page reads 'We want to hear your personal experience with health care.' and shows a woman in a wheelchair being attended to by a healthcare worker.

# Compassion

## Embrace the Cultural Change

Old: "Many infections are inevitable but *some* may be preventable"

New: "Each infection is potentially preventable unless shown otherwise"

Most HAIs are Preventable - Believe it!



Adopt facility goal of "HAI Elimination"

# Objectives of HAI Data Validation, 2011

HAI Program Liaison IPs performed onsite data validation in 100 volunteer hospitals to

- Gain a better understanding of how NHSN surveillance protocols were understood and being applied
- Provide immediate one-on-one education and coaching to volunteer hospitals
- Develop targeted education and training to all CA hospitals based on common errors, identified gaps, misinterpretations

What this validation process was NOT:

- A research study
- Formal evaluation of HAI reporting implementation

# Validation Process

- Performed onsite review at each hospital 1 to 2½ days
  - Team of 2 Liaison IPs (1 IP for smaller hospitals)
- Started with lab line lists for 3 months; required access to medical records
- Assessed completeness and accuracy of reporting for
  - CLABSI
  - CDI (LabID)
  - MRSA BSI (LabID)
  - VRE BSI (LabID)
- Interviewed 2 key hospital staff members (20-30 min each)
  - Denominator data collection processes
  - Hospital location mapping
- Used a standardized set of forms to capture data

# Presentation of CLABSI Validation Findings

- **Sensitivity**
  - Proportion of CLABSI reported by hospitals among all patients with CLABSI
  - High sensitivity indicates CLABSI were identified and reported
- **Specificity**
  - Proportion of CLABSI not reported by hospitals among patients without CLABSI
  - High specificity indicates accuracy of “ruling out” CLABSI
- **Positive Predicted Value**
  - Proportion of CLABSI reported by hospitals that actually were CLABSI
  - High PPV indicates accuracy in applying CLABSI surveillance definition

		Validation Review (Considered “Gold Standard” or truth)	
		CLABSI	Not CLABSI
Identified and Reported by Hospital	CLABSI	True positives	<b>False positives</b>
	Not CLABSI	<b>False negatives</b>	True negatives

$$\text{Positive Predictive Value (PPV)} = \frac{\text{True positives}}{\text{True positives} + \text{False positives}} \times 100$$

$$\text{Sensitivity} = \frac{\text{True positives}}{\text{True positives} + \text{False negatives}} \times 100$$

$$\text{Specificity} = \frac{\text{True negatives}}{\text{True negatives} + \text{False positives}} \times 100$$

# Quick Review of NHSN CLABSI Protocol "Rules"

For CLABSI surveillance, criteria are:

- ✓ Presence of central line currently or within previous 48 hours
- ✓ One or more positive blood cultures (depending on organism), and
- ✓ Clinical review to determine:
  - ✓ If infection present on admission (not a CLABSI)
  - ✓ If BSI secondary to infection at another site (not a CLABSI)
  - ✓ If lab findings represent contamination during blood draw (not a CLABSI)
  - ✓ If patient symptomatic when 2 positive blood cultures of common commensal bacteria (CLABSI)



# CLABSI Validation Findings

Positive blood cultures, inpatients, 3 mo:	13,259	
Positive blood culture “events” reviewed:	4,099	97 hospitals
CLABSI reported:	135	52 hospitals
Reported in error:	23	19 hospitals
CLABSI not identified, not reported:	68	42 hospitals

Sensitivity	Specificity	Positive Predictive Value (PPV)
62.0%	99.4%	82.3%

*Of note:*

*55 hospitals had identified and reported ALL CLABSI; none were missed*

*4 hospitals reported CLABSI in error and also missed CLABSI*

*16 of the hospitals that missed CLABSI had reported 0 CLABSI*

# CLABSI Reported in Error

	Reason should not have been reported
23 of 168 reported "CLABSI" did not meet NHSN criteria	<i>Secondary to another site of infection – 14</i> <i>Contaminant – 6</i> <i>CLABSI present on admission - 3</i>

# CLABSI Missed, Should Have Been Reported

	Reason Missed
<b>68 additional CLABSI identified during validation</b>	<i>Had been ruled as secondary to another infection - 12</i> <i>Had been ruled a contaminant – 6</i> <i>Had been ruled as present on admission - 4</i> <i>Disagreement with NHSN definition – 4</i> <i>Had been ruled as a continuation of previous BSI – 2</i> <i>Other (reason observed only once) – 5</i> <i>Missed* – 35</i>

\* Cases missed most often due to

1. inconsistencies between the final retrospective laboratory line lists reviewed during validation and the lists or systems that had been used for IP surveillance
2. Positive blood culture not reviewed (whatever the reason)



Agreement could not be reached for only 8 unreported CLABSI

\* Specific details not captured on validation forms



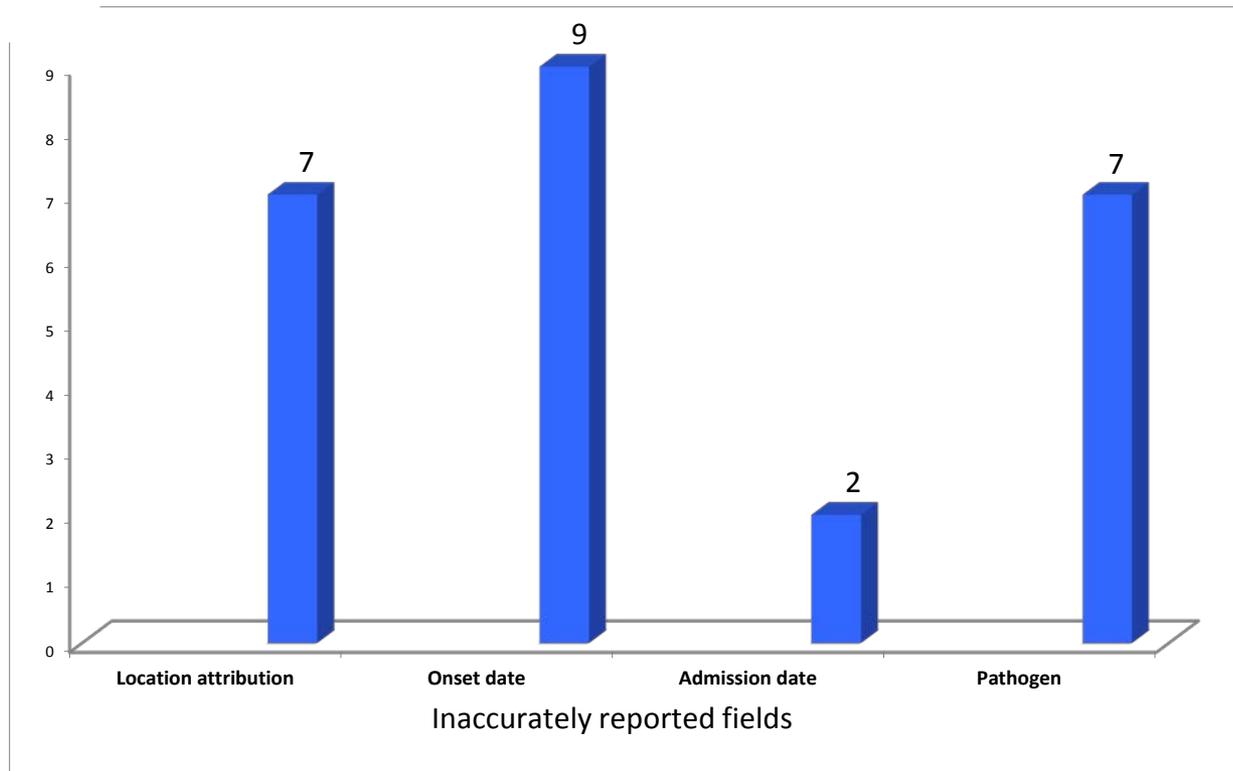
# Assessing Accuracy of Reported Data

No. reported  
CLABSI reviewed

88

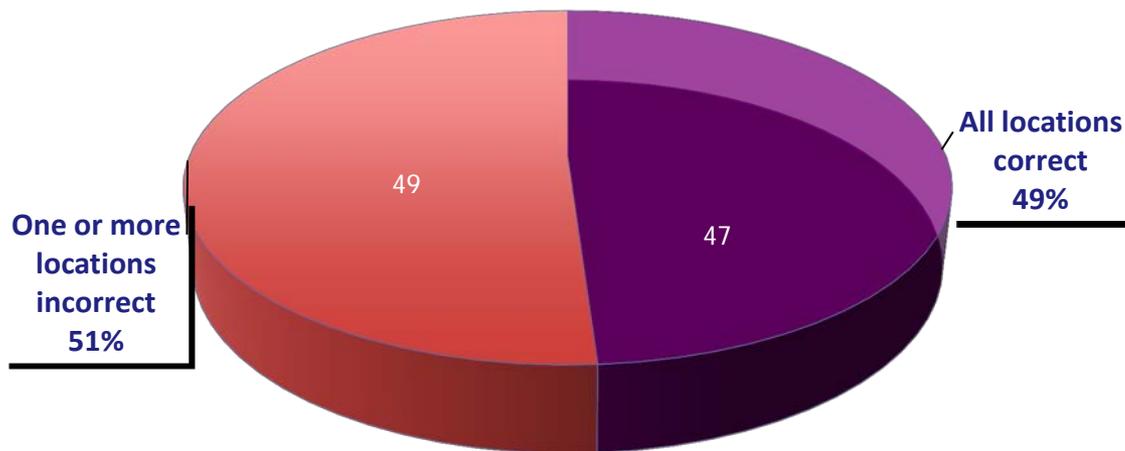
Accurate on all  
fields reviewed

81%

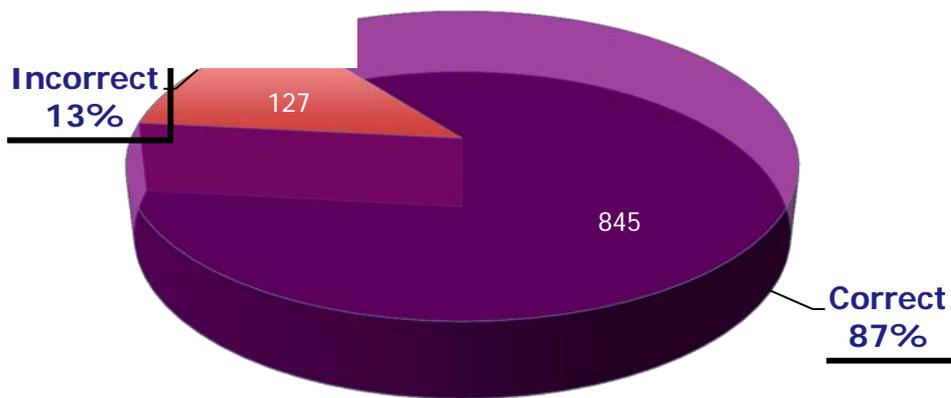


# Accuracy of Hospital Unit "Location Mapping"

By Hospital (96)



Locations (972)



# Improving CLABSI Surveillance



# Improving CLABSI Case-finding

- Review every positive blood culture from inpatients
  - Make sure you are receiving all final blood culture results
  - Many of the missed CLABSI had simply been MISSED
- First screen: Determine if patient had central line during hospitalization
  - Develop your own method based on available information systems
- Perform internal Validation (minimum once/year)
  - Ask to have retrospective line list of all positive blood culture results produced directly from your hospital's laboratory information system (LIS)
  - Compare to positive blood culture list used for routine CLABSI surveillance

# Know the CLABSI Surveillance Definition (!)

- **Criterion 1:** Single blood culture if a pathogen, which means any organism other than a common commensal
  - No other symptoms are needed to confirm CLABSI
  - Presence of central line & BSI not related to infection at another site
- **Criterion 2:** 2 positive blood cultures with same common commensal organism plus 1 of 3 symptoms --- fever, chills, or hypotension
  - Cultures can be drawn up to 2 days apart
  - Considered 2 separate blood draws if from
    - 2 peripheral sites
    - 1 peripheral and 1 central line port
    - 2 different ports from the same central line
    - 2 different central lines
  - Same even if 1 at genus level (e.g. coag negative staph) and the other at species level (e.g. Staph epi)

# Know the CLABSI Surveillance Definition

- **New in 2013**
  - All elements used to meet the infection criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between elements.
  - Date of event is the date when the last element used to meet the lab confirmed BSI (LCBI) criterion occurred.
  - Central line or Umbilical catheter in place for >2 calendar days. Day of device placement is day 1.

# NHSN List of Common Commensal Organisms

## Common Commensals

Organism and NHSN Code	SNOMED Concept Code	SNOMED Fully Specified Name
Actinomyces propionicus - PRPRO	427413007	Propionibacterium propionicum (organism)
Aerococcus christensenii - AECH	409818008	Aerococcus christensenii (organism)
Aerococcus Genus - AEGU	9008009	Genus Aerococcus (organism)
Aerococcus sanguicola - AESG	131205009	Aerococcus sanguicola (organism)
Aerococcus sanguinicola - AESGN	427222006	Aerococcus sanguinicola (organism)
Aerococcus spp. - AESP	131206005	Aerococcus species (organism)
Aerococcus urinae - AEUR	243230001	Aerococcus urinae (organism)
Aerococcus urinaeequi - AEURQ	430979003	Aerococcus urinaeequi (organism)
Aerococcus urinaehominis - AEURH	409819000	Aerococcus urinaehominis (organism)
Aerococcus viridans - AEVI	78803006	Aerococcus viridans (organism)
Arachnia propionica - PRPRO	427413007	Propionibacterium propionicum (organism)
Arthrobacter variabilis - CORVAR	11575001	Corynebacterium variabile (organism)
Bacillus aeolius - BAEOL	428272006	Bacillus aeolius (organism)
Bacillus aerius - BAERI	446486005	Bacillus aerius (organism)
Bacillus agaradhaerens - BAGAR	429112003	Bacillus agaradhaerens (organism)
Bacillus alcalophilus - BALCA	90547001	Bacillus alcalophilus (organism)
Bacillus algalicola - BALGI	428278005	Bacillus algalicola (organism)
Bacillus amyloliquefaciens - BAMYL	82289003	Bacillus amyloliquefaciens (organism)
Bacillus aquimaris (organism)	423489000	Bacillus aquimaris (organism)



From NHSN website Feb 2013

<http://www.cdc.gov/nhsn/SLX/master-organism-Com-Commensals-Lists.xls>



# Simplified View of CLABSI Definition

## LCBI 1

Patient of any age

- ❑ 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

## LCBI 2

Patient of any age

- ❑ has a common commensal cultured from 2 or more blood cultures drawn on separate occasions

And

Has at least one of the following signs or symptoms:

- ❑ Fever (>38°C), chills, or hypotension

And

Signs & symptoms and (+) lab results are not related to an infection at another site.

## LCBI 3

Patient  $\leq$  1 year of age

- ❑ has commensals cultured from 2 or more blood cultures drawn on separate occasions

And

At least one of the following signs or symptoms

- ❑ Fever (>38°C core), hypothermia (<36°C core), apnea, or bradycardia

And

- ❑ Signs and symptoms and (+) lab results are not related to an infections at another site.

All elements used to meet the infection criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between elements.

Note: Patient  $\leq$ 1 year old can meet ANY criteria

Updated to reflect 2013  
NHSN changes



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

- New in 2013 related to immunosuppressed patients
- MCBI-LCBI 1
  - Allogeneic hematopoietic stem cell transplant recipient – and specific organisms isolated
  - And Additional criterion – see protocol
- MCBI-CLBI 2
  - Viridans group streptococci – no other organisms
  - And Additional criterion – see protocol
- MCBI-LCBI 3
  - Patients <1 year of age
  - Viridans group strep with no other organisms
  - And Additional criterion – see protocol

Updated Feb 2013



See: NHSN Patient Safety Manual, Device-Associated Module, CLABSI, Chapter 4, pp6-7 for more details on this definition



# NHSN Surveillance Infection Definitions

- There are 53 NHSN-defined infections in 14 categories
- Each infection has a surveillance definition
- Many infections can result in BSI
- Access definitions via the NHSN website; most up-to-date



NHSN Patient Safety Manual, Chapter 17, pp 4-49

Updated to reflect 2013 NHSN changes



## Primary BSI (CLABSI) or Secondary BSI ?

- Rule out a CLABSI if patient has a bloodstream infection (BSI) and another site is suspected as being the primary site of infection
  - Review medical record for other primary sites of infection, especially for patients with complex co-morbidities
- **IMPORTANT:** To classify a BSI as secondary to another site, you must ensure the primary site of infection meets the NHSN surveillance definition
  - If does not meet the NHSN definition, you consider the BSI as the primary infection and report as CLABSI

## CLABSI or Secondary BSI (continued)

- Secondary BSIs are not reported as separate events in NHSN
  - When entering Events into NHSN (e.g. SSI, CAUTI, PNEU, etc), there is a data field to indicate the infection resulted in a secondary BSI
- For many surveillance definitions, a positive blood culture is included in the criteria and can help define the infection (*see next slide*)

15 HAI surveillance definitions include "Positive Blood Culture" in their criteria

ABUTI - asymptomatic bacteremic UTI

BONE - osteomyelitis

BURN - burn infection

DECU - decubitus ulcer infection

ENDO – endocarditis

GIT - other GI tract infection

IAB - intraabdominal infection

MED - mediastinitis

MEN – meningitis

OREP - other infection of genital tract

PNU 2, PNU 3 - pneumonia

SA - spinal abscess w/o meningitis

ST - soft tissue infection

UMB - omphalitis

UR - upper respiratory tract infection

# Using Lab Findings to Determine CLABSI or Secondary BSI

1. If the primary infection site **is cultured**, the secondary BSI must yield a culture of the same organism as that of the primary site

*Example A:* Patient has central line. *S. aureus* isolated from both urine and blood cultures. Clinically meets criteria for symptomatic UTI.

Report as SUTI with a secondary BSI

*Example B:* Patient has central line. *E. coli* isolated from urine. Blood culture with *S. aureus*. Clinically meets criteria for a symptomatic UTI.

Report both a SUTI and CLABSI

## Using Lab Findings to Determine CLABSI or Secondary BSI (continued)

2. If the primary infection site is **NOT cultured**, the secondary BSI must be a pathogen appropriate for the primary site

*Example C:* Patient with central line has a post-surgical abscess detected by CT scan. No culture of abscess performed. Has blood culture positive for *E. coli*.

Report as SSI-GIT with secondary BSI

*Example D:* Patient with a central line has acute onset diarrhea and fever. Stool culture not performed. 2 blood cultures positive for coagulase negative staphylococcus.

Report as CLABSI

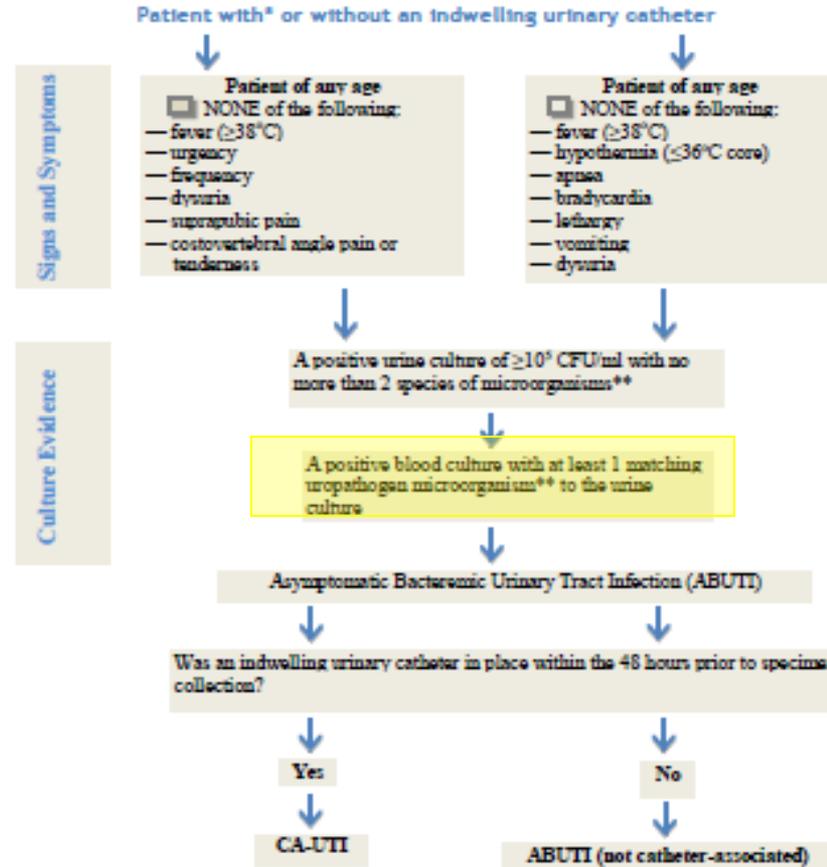
# Common Infections with Secondary BSI

- During the 2011 data validation reviews, many complex cases were reviewed to confirm or rule-out CLABSI
- Commonly observed infections with secondary BSI were
  - UTI, symptomatic (SUTI)
  - UTI, asymptomatic with bacteremia (ABUTI)
  - Pneumonia meeting criteria 2 or 3 (PNEU 2, 3)
  - GI tract infection (GIT)
  - Intra-abdominal infection (IAB)
  - Osteomyelitis (BONE)
  - Endocarditis (ENDO)
  - Deep Incisional and Organ/space SSI

# Example: ABUTI



Figure 5: Identification of Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)



Positive blood culture is in the ABUTI definition and is required to meet the definition.

NHSN has no definition for asymptomatic UTI without BSI.

NHSN Ch7 p13



\*The indwelling urinary catheter was in place within 48 hours prior to specimen collection s.

\*\*Uropathogen microorganisms are: Gram-negative bacilli, *Staphylococcus* spp., yeasts, beta-hemolytic *Streptococcus* spp., *Enterococcus* spp., *G. vaginalis*, *Aerococcus urinae*, *Corynebacterium* (urease positive)<sup>†</sup>.

<sup>†</sup>Report *Corynebacterium* (urease positive) as either *Corynebacterium species unspecified* (COS) or as *C. urealyticum* (CORURI) if so specified.



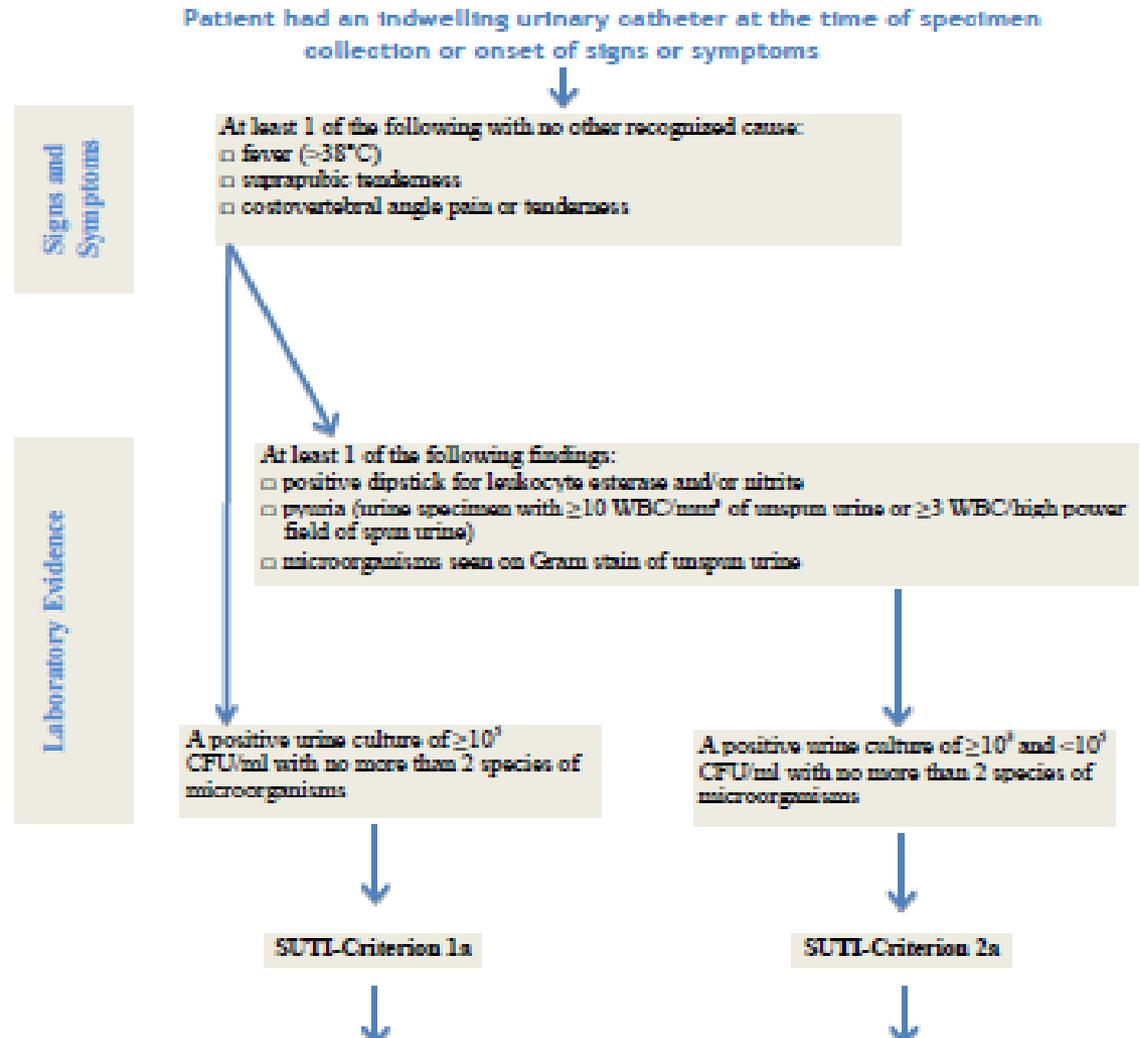


# Example: SUTI

Can have secondary BSI to SUTI, but positive blood culture not in SUTI definition.

Meaning, BSI is not needed or used to define SUTI

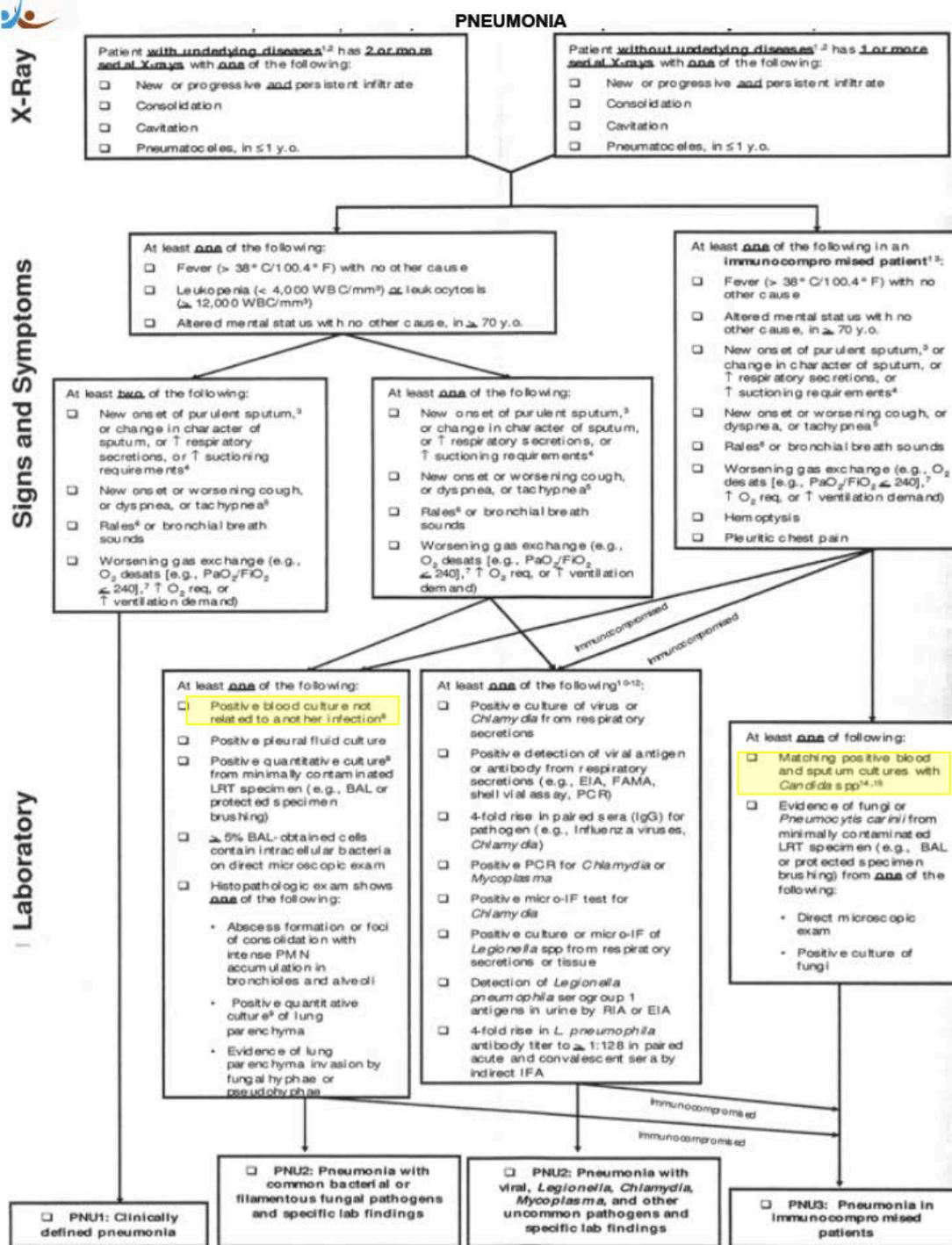
**Figure 1: Identification and Categorization of SUTI with Indwelling Catheter (see comments section page 7-8 thru 7-9 for important details)**



# Example: Pneumonia

Laboratory defined pneumonia (PNU2)

Pneumonia in immunocompromised patient (PNU3)



# Example: GIT GI Tract Infection

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

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

1. Patient has an abscess or other evidence of infection seen during a surgical operation or histopathologic examination.
2. Patient has at least 2 of the following signs or symptoms with no other recognized cause and compatible with infection of the organ or tissue involved: fever ( $>38^{\circ}\text{C}$ ), nausea, vomiting, abdominal pain, or tenderness

*and*

at least 1 of the following:

- a. organisms cultured from drainage or tissue obtained during a surgical operation or endoscopy or from a surgically placed drain
- b. organisms seen on Gram's or KOH stain or multinucleated giant cells seen on microscopic examination of drainage or tissue obtained during a surgical operation or endoscopy or from a surgically placed drain
- c. organisms cultured from blood
- d. evidence of pathologic findings on radiographic examination
- e. evidence of pathologic findings on endoscopic examination (eg, *Candida* esophagitis or proctitis).

## Example: IAB - Intraabdominal Infection

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

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

- 1. Patient has organisms cultured from purulent material from intraabdominal space obtained during a surgical operation or needle aspiration.
- 2. Patient has abscess or other evidence of intraabdominal infection seen during a surgical operation or histopathologic examination.
- 3. Patient has at least 2 of the following signs or symptoms with no other recognized cause: fever (> 38°C), nausea, vomiting, abdominal pain, or jaundice  
and  
at least 1 of the following:
  - organisms cultured from drainage from surgically placed drain (eg. closed suction drainage system. open drain. T-tube drain)
  - organisms seen on Gram's stain of drainage or tissue obtained during surgical operation or needle aspiration
  - organisms cultured from blood and radiographic evidence of infection (eg. Abnormal findings on ultrasound, CT scan. MRI, or radiolabel scans [gallium. technetium, etc] or on abdominal x-ray).

### Reporting instruction

- Do *not* report pancreatitis (an inflammatory syndrome characterized by abdominal pain, nausea, and vomiting associated with high serum levels of pancreatic enzymes) unless it is determined to be infectious in origin.

# Example: BONE Osteomyelitis

## BJ-BONE AND JOINT INFECTION

### BONE-Osteomyelitis

Osteomyelitis must meet at least 1 of the following criteria:

1. Patient has organisms cultured from bone.
2. Patient has evidence of osteomyelitis on direct examination of the bone during a surgical operation or histopathologic examination.
3. Patient has at least 2 of the following signs or symptoms with no other recognized cause: fever ( $>38^{\circ}\text{C}$ ), localized swelling, tenderness, heat, or drainage at suspected site of bone infection

and

at least 1 of the following:

- a. organisms cultured from blood
- b. positive blood antigen test (eg, *H influenzae*, *S pneumoniae*)

NHSN Ch.17 p14

# Data Correction

- Remember, if you note any errors or omissions, you can always go back and edit NHSN records to correct your data
- If you find errors that require you to make numerous changes to your data after it has been entered into NHSN, record date when changes made
- Keep records of clinical or systems issues that may change your blood culture data to help understand variation over time

## Examples include:

- Focused education for phlebotomy / blood specimen collection processes
- Reducing blood specimens drawn from central lines
- Introduction of 3<sup>rd</sup> party HAI surveillance software
- Changes in laboratory practices or lab systems



*Remember that the “power of surveillance is in sharing findings with those who need to know and who can act on the findings to improve patient safety”*

*“Recommended Practices for Surveillance”  
AJIC Am J Infect Control 2007; 35:427-40*



# Report and Use CLABSI Data

- Use NHSN analysis features to review and interpret your data
- Plan for distribution of findings, reporting to healthcare providers most able to impact patient care
- Report in a manner to demonstrate prevention progress or spark need for improvement
  - Use visual displays of data
  - charts, graphs, tables

## Using NHSN Analysis Features for Prevention: CLABSI

By using the Analysis function in NHSN, you can verify that all your monthly summary data (patient days and central line days) and events (CLABSI) have been entered. We will demonstrate various ways to look at the data, assess significance of changes (increases or decreases) over time, and identify variables to consider when reporting data to your hospital committees.

1. Always begin by generating a data set prior to using the Analysis feature to be sure all data are current.
2. In the NHSN Portal click Analysis → Output Options → Device Associated Module → Central Line-Associated BSI → CDC Defined Output → Rate Table – CLAB Data for ICU-Other → Modify.

Click in order:

- Analysis
- Output Options
- Device Associated Module
- Central Line-Associated BSI
- CDC Defined Output
- Rate Table-CLAB Data for ICU-Other
- Modify

See Analysis Guidance series at [www.cdph.ca.gov/HA](http://www.cdph.ca.gov/HA)

# Steps for Advancing CLABSI Prevention Using Your NHSN Data

- Think beyond public reporting and hospital-to-hospital comparisons
- Focus on CLABSI prevention progress within your hospital units over time (requires you to find *all* CLABSI that occur)
- Set CLABSI prevention goals and targets
- Remember the 4 C's of surveillance data quality
  - Consistency, coordination, confidence, compassion
  - Establish systems' approaches for identifying CLABSI and capturing accurate line days and patient days
  - Don't go it alone anymore!

# CLABSI Data Validation Process and Forms





## CLABSI Validation - Form A

### Summary of Positive Blood Culture Laboratory Data

**Instructions:** To begin validation of CLABSI, ask your laboratory to produce a line list directly from the laboratory information system for a 3-month time period to include  
 **Positive blood cultures** from inpatients for each of 3 months  
 Reports should include date of admission to the hospital if possible.  
 Ask to have printed twice: sorted by date and then sorted by patient name or medical record number.

**Months selected for validation:**

Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

**Laboratory information system (LIS):** \_\_\_\_\_ e.g. Meditech, Sunquest, Cerner  
**IMPORTANT:** For validation, do not produce this positive blood culture line list from a surveillance software system (e.g. Medmined, TheraDoc, AICE, etc) or infection control integration software programs. Get directly from LIS.

**STEP 1:** From positive blood cultures from **Inpatients only**, indicate total each MONTH:

Month \_\_\_\_\_ # \_\_\_\_\_  Month \_\_\_\_\_ # \_\_\_\_\_  Month \_\_\_\_\_ # \_\_\_\_\_

**STEP 2:** Determine number of months to include in CLABSI validation.

<i><b>If total inpatient positive blood cultures in 3 mo. is</b></i>	<i><b>Perform review for</b></i>	
$\leq 60$	<i>all 3 months</i>	
$>60$ and $<120$	<i>2 months</i>	<i>Select the month with the <b>greatest #</b>, then a 2<sup>nd</sup> month that makes a 2-month total closest to 60</i>
$\geq 120$	<i>1 month</i>	<i>Select the month with the <b>greatest #</b></i>

*In general, starting with 60 positive blood cultures results in approximately 40-55 infectious event "clusters" and will result in in-depth chart review of 10-15 records. The remaining generally require only cursory review to identify or rule out CLABSI (often accomplished using data available through EMR systems). The likelihood of identifying CLABSI is based on your underlying rate and the number of positive blood cultures you include in your validation.*

**STEP 3:** Check the boxes next to months (above) you are including in the CLABSI validation review.

# Positive blood cultures from **Inpatients** during months ✓'d to include in review \_\_\_\_\_

# Separate BSI Events\* \_\_\_\_\_ **[INCLUDE IN CLABSI REVIEW]**

*\*Event = "Cluster" of positive blood cultures near same date for same patient counts as 1 event; single positive blood cultures also count as 1 event*

**STEP 4:** On your lab line list, number each BSI event.

**STEP 5:** For each numbered BSI event, enter the corresponding culture date (1st positive) and admission date in table on **Form 4**. Follow instructions on **Form 4** to complete review.

OPTIONAL STEP: For most comprehensive review, review positive blood cultures from ED patients for recent hospital discharge (and presence of central line in previous 48 hours)

# \_\_\_\_\_ **[INCLUDE IN CLABSI REVIEW AS POSSIBLE]** Add recent discharges to table on Form



### CLABSI Validation – Form B BSI Events Table

**Instructions:**

1. Fill in first specimen date for each BSI event in table below. Numbers should correspond to laboratory line list (see Form A).
2. Use Analysis to produce CLABSI line list for the 1,2, or 3-month review period. Also print NHSN Event record for each reported CLABSI..
3. For each numbered BSI event, answer Q1 by referring to your NHSN line list. For cases reported to NHSN, record NHSN Event #. If CLABSI on your NHSN list but were not on lab line list, add to the bottom of the table.
4. For each BSI event, review patient's medical record to verify your decision to report or not report to NHSN. Carefully follow NHSN protocols and surveillance definitions; refer to them often.
  - o For each CLABSI **Reported** to NHSN, complete a Form C, CLABSI Validation Review. Record info on table in 1 of 2 columns as shown.
  - o For each BSI event **NOT** reported to NHSN, indicate reason why in the appropriate column. Use Form D as worksheet if needed. If BSI event should have been reported as a CLABSI but was not, record as missed. Indicate a reason the case may have been missed.
5. Complete Form E, CLABSI Validation Findings.

**When review complete, make all needed corrections to your data in NHSN!**

**BSI Events Table.**

Lab list #	First positive blood culture of each BSI Event  Specimen date	Admission date	Q1. Was Event reported to NHSN as a CLABSI?		If YES to Q1 Perform medical record review, complete <b>Form 5</b> , then fill in 1 of columns below		If NO to Q1 Perform medical review. Use BSI review work sheet if helpful. Stop as soon as you can complete one of the columns below.							
			YES √ NHSN Event#	NO √	Not a CLABSI <b>Reported in error</b> Why?	*Data fields correctly reported to NHSN? √ If NO, List	NO central line or no line in previous 48 hours	Present on admission and not discharged in previous 48 hours	Contaminant i.e. Common skin commensals Single +bld cx    ≥2 +bld cx but no S/S		Secondary BSI Primary site of infection	<b>MISSED</b> CLABSI Should have been reported		
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1	___/___/11	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	___/___/11	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	___/___/11	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	___/___/11	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	___/___/11	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	___/___/11	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	___/___/11	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	___/___/11	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	___/___/11	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	___/___/11	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Column totals: \_\_\_\_\_

**CLABSI Validation – Form C**

Confirm Accuracy of Reported CLABSI -OR-  Record CLABSI that was Missed  
*✓ one*

**Instructions:** Complete for each reported CLABSI from Form B. Check box (☑) if data field correct as reported to NHSN or fill-in correct information. -OR- use form to collect data for Missed CLABSI by filling-in all fields.

Lab Line List# \_\_\_\_\_ 1<sup>st</sup> positive blood culture \_\_\_/\_\_\_/11 NHSN Event #: \_\_\_\_\_

Patient ID: \_\_\_\_\_

Gender: F M Other \_\_\_\_\_ Date of Birth: \_\_\_/\_\_\_/\_\_\_

Event Type: BSI **Date of Event (onset):**  \_\_\_/\_\_\_/11

MDRO Infection Surveillance:  "Yes, this infection's pathogen & location are not in-plan for Infection Surveillance in the MDRO/CDI Module"  
 "No, this infection's pathogen & location are **not** in-plan for Infection Surveillance in the MDRO/CDI Module"

**Date Admitted to Facility:**  \_\_\_/\_\_\_/11 **Location Attribution:**  \_\_\_\_\_

**Risk Factors**

Mark Relevant Location  If Reported Correctly  
 \_\_\_ If ICU/Other locations  
     Central line: Yes No   
 \_\_\_ If Specialty Care Area,  
     Permanent central line: Yes No   
     Temporary central line: Yes No   
 \_\_\_ If NICU,  
     Non-umbilical central line: Yes No   
     Umbilical catheter:: Yes No   
     Birth weight (grams): \_\_\_\_\_

Location of Device Insertion: \_\_\_\_\_  
*optional*  
 Date of Device Insertion: \_\_\_/\_\_\_/11  
*optional*

Medical record review revealed **NOT** a CLABSI  
 Reason reported in error: \_\_\_\_\_

**Event Details**

Specific Event: Laboratory-confirmed BSI

Criteria:  
Signs & Symptoms NOTE: S/S needed only if common skin commensal  
 Any patient  
 Fever  ≤1 year old  
 Chills  Fever  
 Hypotension  Hypothermia  
 Apnea  
 Bradycardia

**Laboratory**  
 Recognized pathogen from one or more blood cultures  
 Common skin commensal from ≥2 blood cultures

Died: Yes No \_\_\_\_\_ If Died, BSI Contributed to Death: Yes No \_\_\_\_\_

**Pathogen/s:**  Reported Correctly \_\_\_\_\_ If VRE or MRSA, reported also as LabID?  Yes  No



**CLABSI Validation – Form D  
Chart Review Work Sheet**

**Instructions:** Use for notes when reviewing BSI Events (from Form B) to either rule out or confirm CLABSI. Record final determination by checking appropriate boxes. Transfer findings to BSI Events table, Form B.

- 1. BSI event from patient with no central line present or during previous 48 hours.
- 2. BSI associated with Infection that was **PRESENT ON ADMISSION** from patient not recently discharged from hospital in the previous 48 hours.
- 3. Positive blood culture was determined to be a **CONTAMINANT**, i.e. common commensal organism(s) from
  - only one positive culture within a 2 day period
  - 2 cultures on separate occasions, but patient with no signs/symptoms of infection
- 4. Infection was a **BSI SECONDARY TO ANOTHER SITE OF INFECTION**.
 

<input type="checkbox"/> UTI	<input type="checkbox"/> SSI
<input type="checkbox"/> PNEU	<input type="checkbox"/> Bone/Joint
<input type="checkbox"/> Central nervous system	<input type="checkbox"/> Cardiovascular
<input type="checkbox"/> EENT or URI	<input type="checkbox"/> LRI
<input type="checkbox"/> GI	<input type="checkbox"/> Reproductive tract
<input type="checkbox"/> Skin/ Soft tissue	<input type="checkbox"/> Systemic

**Refer to NHSN Infection definitions to be sure criteria for primary infection site have been met!**
- 5. Infection met NHSN surveillance criteria for **CLABSI**, and should have been reported to NHSN. Complete **Form 5**, CLABSI Review Form.

**MEDICAL RECORD REVIEW:** Lab Line List# \_\_\_ 1<sup>st</sup> positive blood culture of Event \_\_\_/\_\_\_/11

**HOSPITALIZATION**  
 Hospital Admission Date \_\_\_/\_\_\_/\_\_\_ Reason for Admission \_\_\_\_\_  
 Discharge Date \_\_\_/\_\_\_/\_\_\_ Admitted from Home SNF Dialysis \_\_\_\_\_  
 Date of 1<sup>st</sup> +blood Culture \_\_\_/\_\_\_/\_\_\_ Discharge disposition \_\_\_\_\_  
 Date admitted to location: \_\_\_/\_\_\_/\_\_\_ Hospital location at time of 1<sup>st</sup> positive culture: \_\_\_\_\_  
 If on unit < 48 hrs, previous location \_\_\_\_\_

**CENTRAL LINE HISTORY**

Date of initial central line insertion ___/___/___	Location of Line Insertion _____
Line type: _____	Insertion site _____ Removal _____
Date of 2 <sup>nd</sup> central line insertion ___/___/___	Location of Line Insertion _____
Line type: _____	Insertion site _____ Removal _____
Date of 3 <sup>rd</sup> central line insertion ___/___/___	Location of Line Insertion _____
Line type: _____	Insertion site _____ Removal _____

**CLINICAL NOTES**

---

---

---

---

---



### CLABSI Validation – Form E CLABSI Validation Findings

Validation results can be displayed using 2x2 tables and the accuracy and completeness of HAI surveillance and reporting can be calculated. Quantitative findings of data validation include sensitivity, specificity, and positive predictive value (defined below).

		Validation Review (Considered “Gold Standard” or truth)	
		CLABSI	Not CLABSI
Identified and Reported by Hospital	CLABSI	True positives	<b>False positives</b>
	Not CLABSI	<b>False negatives</b>	True negatives

$$\text{Positive Predictive Value (PPV)} = \frac{\text{True positives}}{\text{True positives} + \text{False positives}} \times 100$$

$$\text{Sensitivity} = \frac{\text{True positives}}{\text{True positives} + \text{False negatives}} \times 100$$

$$\text{Specificity} = \frac{\text{True negatives}}{\text{True negatives} + \text{False positives}} \times 100$$

#### Sensitivity

- Answers question “How likely are all true infections found?”
- For CLABSI surveillance, sensitivity is defined as the proportion of CLABSI identified and reported from the total of all patients who had a CLABSI.
- If sensitivity is high, it means CLABSI are being identified during surveillance. If sensitivity is low, it means CLABSI are being missed and the hospital’s CLABSI rate could be higher than what is being reported.
- Measures **completeness** and implies effective surveillance methods for case-finding.

#### Specificity

- Answers question “How likely are patients without an infection accurately identified as not having an infection?”
- For CLABSI surveillance, specificity is defined as the proportion of CLABSI not reported from the total of all patients who did not have a CLABSI.
- If specificity is high, it means CLABSI are being ruled out appropriately among patients with positive blood cultures. If specificity is low it means that CLABSI are being reported that are not really CLABSI. The hospital’s CLABSI rate may actually be lower than what is being reported.

#### Positive Predictive Value (PPV)

- Also called the precision rate.
- For CLABSI surveillance, PPV is the proportion of CLABSI reported that met the case definition.
- If PPV is high, it means the identified and reported CLABSI really *are* CLABSI. If PPV is low, it means CLABSI being reported do not meet the case definition.
- Measures **accuracy** in applying surveillance definitions and following protocols.

### Example

Positive blood cultures events reviewed for validation = **100**

		Validation Review ("Gold Standard" or truth)	
		CLABSI	Not CLABSI
Identified and Reported by Hospital	CLABSI <b>5</b>	4	<b>1</b> <i>Reported in error</i>
	Not CLABSI <b>95</b>	<b>2</b> <i>Missed</i>	93

**Positive Predictive Value (PPV) =**  
 $\frac{4 \text{ True positives}}{4 \text{ True pos.} + 1 \text{ False pos.}} \times 100$

**80%**

**Sensitivity =**  
 $\frac{4 \text{ True positives}}{4 \text{ True pos.} + 2 \text{ False neg.}} \times 100$

**67%**

**Specificity =**  
 $\frac{93 \text{ True negatives}}{93 \text{ True neg.} + 1 \text{ False pos.}} \times 100$

**99%**

### Interpretation:

For the 100 blood culture events reviewed for CLABSI, the validation reviewers found **5** disparities compared to the hospital surveillance report.

The hospital had identified and reported 5 CLABSI. The validation reviewers determined only 4 should have been reported; **1** did not meet the surveillance criteria.

The calculated **positive predictive value (PPV)** reveals that what routine hospital surveillance identifies as CLABSI meets the CLABSI surveillance criteria only 80% of the time.

For the other 95 positive blood culture events reviewed in which routine hospital surveillance identified no CLABSI, the validation reviewers identified **2** additional CLABSI.

The calculated **sensitivity** reveals routine hospital surveillance is identifying only 67% of the CLABSI occurring (1/3 are being missed).

The calculated **specificity** reveals hospital routine surveillance accurately "rules out" CLABSI 99% of the time.

**Data Validation for CLABSI**

Hospital: \_\_\_\_\_

Surveillance time period: \_\_\_\_\_

From BSI Events Table, Form 4

		Validation Review	
		CLABSI	Not CLABSI
# positive blood culture events reviewed = _____		A	B <i>Reported in Error</i>
<b>Identified and Reported by Hospital</b>	<b>CLABSI _____</b> <i>Form B, total Q1 = Yes</i>	A	B <i>Reported in Error</i>
	<b>Not CLABSI _____</b> <i>Form B total Q1 = No</i>	C <i>Missed</i>	D

**Sensitivity** =  $\frac{A}{A + C} \times 100 =$  \_\_\_\_\_

**Specificity** =  $\frac{D}{D + B} \times 100 =$  \_\_\_\_\_

**Positive Predictive Value** =  $\frac{A}{A + B} \times 100 =$  \_\_\_\_\_

## Infection Definitions Worksheets

### Instructions:

- 1) Use when reviewing positive blood cultures for determining and documenting whether a positive blood culture is a primary BSI (CLABSI), secondary BSI to another site of infection, or a contaminant.
- 2) Use for surgical site infection (SSI) surveillance.
- 3) DO NOT use for **LabID** CDI or MRSA-VRE BSI surveillance. Use LabID methods in the MDRO/CDI Module protocol.
- 4) Refer to often when performing surveillance. Make notes on individual infection pages as you are reviewing medical records.

<i>Page</i>		<i>Page</i>	
<b>2</b>	<b>Urinary tract Infections</b>	<b>14</b>	<b>Cardiovascular system infections</b>
	SUTI Symptomatic urinary tract infection		VASC Arterial or venous infection
	• Catheter in place at time of specimen-2		ENDO Endocarditis
	• Catheter recently removed, past 48h-3		CARD Myocarditis or pericarditis
	• NOT catheter-associated - 4		MED Mediastinitis
	• In infants and babies $\leq 1$ year old - 5		
<b>6</b>	ABUTI Asymptomatic UTI with Bacteremia	<b>16</b>	<b>Eye, ear, nose, throat, mouth, and URI infections</b>
<b>7</b>	<b>Surgical site infections</b>		CONJ Conjunctivitis
	SIP Superficial incisional primary SSI		EYE Eye, other than conjunctivitis
	SIS Superficial incis. secondary SSI		EAR Ear, mastoid
	DIP Deep incisional primary SSI		ORAL Oral cavity (mouth, tongue, or gums)
	DIS Deep incisional secondary SSI		SINU Sinusitis
	SSI-xxx Organ/space specific types		UR Upper respiratory tract, pharyngitis
	• BONE - 11 • JNT - 11		laryngitis, epiglottitis
	• BRST - 25 • LUNG - 21	<b>19</b>	<b>Gastrointestinal system infection</b>
	• CARD - 15 • MED - 15		GE Gastroenteritis
	• DISC - 11 • MEN - 13		GIT Gastrointestinal (GI) Tract
	• EAR - 17 • ORAL - 17		HEP Hepatitis
	• EMET - 22 • OREP - 22		IAB Intrabdominal not specified elsewhere
	• ENDO - 14 • SA - 13		NEC Necrotizing enterocolitis
	• EYE - 16 • SINU - 18	<b>21</b>	<b>Lower respiratory tract infection, other than Pneu</b>
	• GIT - 19 • UR - 18		BRON Bronchitis, tracheobronchitis,
	• IAB - 20 • VASC - 14		tracheitis, without evidence of pneu
	• IC - 12 • VCUF - 22		LUNG Other infections of lower resp tract
<b>8</b>	<b>Bloodstream infection</b>	<b>22</b>	<b>Reproductive tract infections</b>
	LCBI Lab-confirmed BSI		EMET Endometritis
<b>9</b>	<b>Pneumonia</b>		EPIS Episiotomy
	PNU1 Clinically defined pneumonia		VCUF Vaginal cuff
	PNU2 Pneu with specific lab findings		OREP Other infections of male or female
	PNU3 Pneu in immunocompromised		reproductive tract
<b>10</b>	PNU1 Alternate clinical definition, $\leq 1$ yo	<b>23</b>	<b>Skin and soft tissue infection</b>
<b>11</b>	<b>Bone and joint infections</b>		SKIN Skin
	BONE Osteomyelitis		ST Soft tissue
	JNT Joint or bursa		DECU Decubitus ulcer
	DISC Disc space		BURN Burn
<b>12</b>	<b>Central nervous system infections</b>		BRST Breast abscess or mastitis
	IC Intracranial infection		UMB Omphalitis
	MEN Meningitis or ventriculitis		PUST Pustulosis
	SA Spinal abscess without meningitis		CIRC Newborn circumcision
		<b>26</b>	<b>Systemic Infection</b>
			DI Disseminated infection



## GASTROINTESTINAL SYSTEM INFECTIONS

### GE - Gastroenteritis

Gastroenteritis must meet at least 1 of the following criteria:

- 1. Patient has an acute onset of diarrhea (liquid stools for more than 12 hours) with or without vomiting or fever (> 38°C) and no likely noninfectious cause (eg. diagnostic tests therapeutic regimen other than antimicrobial agents. Acute exacerbation of a chronic condition. or psychologic stress).
- 2. Patient has at least 2 of the following signs or symptoms with no other recognized cause: nausea, vomiting, abdominal pain, fever (>38°C), or headache  
and  
at least 1 of the following:
  - a. an enteric pathogen is cultured from stool or rectal swab
  - b. an enteric pathogen is detected by routine or electron microscopy
  - c. an enteric pathogen is detected by antigen or antibody assay on blood or feces
  - d. evidence of an enteric pathogen is detected by cytopathic changes in tissue culture (toxin assay)
  - e. diagnostic single antibody titer (IgM) or 4-fold increase in paired sera (IgG) for pathogen.

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

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

- 1. Patient has an abscess or other evidence of infection seen during a surgical operation or histopathologic examination.
- 2. Patient has at least 2 of the following signs or symptoms with no other recognized cause and compatible with infection of the organ or tissue involved: fever (>38°C), nausea, vomiting, abdominal pain, or tenderness  
and  
at least 1 of the following:
  - organisms cultured from drainage or tissue obtained during a surgical operation or endoscopy or from a surgically placed drain
  - organisms seen on Gram's or KOH stain or multinucleated giant cells seen on microscopic examination of drainage or tissue obtained during a surgical operation or endoscopy or from a surgically placed drain
  - organisms cultured from blood
  - evidence of pathologic findings on radiographic examination
  - evidence of pathologic findings on endoscopic examination (eg. *Candida* esophagitis or procti)

### HEP - Hepatitis

Hepatitis must meet the following criterion:

- Patient has at least 2 of the following signs or symptoms with no other recognized cause: fever (>38°C), anorexia, nausea, vomiting, abdominal pain, jaundice, or history of transfusion within the previous 3 months  
and  
at least 1 of the following:
  - a. positive antigen or antibody test for hepatitis A, hepatitis B, hepatitis C. or delta hepatitis
  - b. abnormal liver function tests (eg. elevated ALT/AST. bilirubin)
  - c. cytomegalovirus (CMV) detected in urine or oropharyngeal secretions.

#### Reporting instructions

- Do *not* report hepatitis or jaundice of noninfectious origin (alpha-1 antitrypsin deficiency. etc).
- Do *not* report hepatitis or jaundice that results from exposure to hepatotoxins (alcoholic or acetaminophen-induced hepatitis. etc).
- Do *not* report hepatitis or jaundice that results from biliary obstruction (cholecystitis).

**Español**

→ Su salud en su idioma

**Most Popular Links**

→ Birth, Death, & Marriage Certificates

→ Licensing and Certification

→ WIC

**Quick Links**

→ About Us

→ Decisions Pending & Opportunities for Public Participation

→ Diseases & Conditions

→ Job Opportunities

→ Local Health Services

→ Newsroom

→ Public Availability of Documents

**Related Links**

→ California Health and Human Services Agency

→ Department of Health Care Services (includes Medi-Cal)

→ State Agencies Directory

[Home](#) > [Programs](#) > [Healthcare Associated Infections Program](#)

## Healthcare Associated Infections (HAI) Program

The Healthcare Associated Infections (HAI) Program is one of three programs in the [Center for Health Care Quality](#) of the [California Department of Public Health](#). The Program is responsible for the surveillance, reporting, and prevention of infections in California's general acute care hospitals as mandated by Senate Bills 739, 1058, and 158. The Program was authorized in December 2009.

HAIs are the most common complication of hospital care and are listed among the top ten leading causes of death in the United States. It is estimated that each year there are more than 1.7 million infections, 99,000 deaths, and \$3.1 billion dollars in excess healthcare costs in acute care hospitals alone. Based on this data it is estimated that approximately 200,000 infections occur in California each year with an annual cost of about \$600 million - \$1.6 billion. The vision of the HAI Program is to eliminate HAIs for California patients.

### Healthcare Associated Infections

↓ New [HAI Information and Reports](#)  
Links to All Pages on HAIs and Mandatory Public Reporting

### Healthcare Associated Infections - Advisory Committee

↓ New [HAI-AC Recruitment Page](#)  
→ [HAI Advisory Committee](#)

### Information for Infection Prevention Programs

- [AFLs, Legislation, and Regulations](#)
- ↓ New [Using NHSN Data Validation for Improved HAI Surveillance and Prevention \(New Page\)](#)
- ↓ New [Using NHSN Analysis for Prevention Guidance Series](#)
- [Basics of Infection Prevention 2 Day Mini Course](#)
- [NHSN Guidance Specific to California Hospitals](#)
- [California Infection Control and Prevention Guidelines](#)
- [HAI Liaison Program - IP Assignments by County \(PDF, New Window\)](#)

### Influenza Information

- [Healthcare Personnel Influenza Vaccination](#)
- [Influenza Vaccination Information for Consumers](#)

### Resources

- [Selected links to the Association of Professionals in Infection Control and Hospital Epidemiology \(APIC\)](#)
- [Selected links to the Centers for Disease Control and Prevention \(CDC\)](#)
- [Selected links to the Society for Healthcare Epidemiology of America \(SHEA\)](#)

### Public Reporting - Healthcare Associated Infections

- ↓ New [My Hospital - Healthcare Associated Infections Interactive Map](#)
- ↓ New [Central Line associated Bloodstream Infection \(CLABSI\) 2011](#)
- ↓ New [Methicillin-resistant Staphylococcus aureus \(MRSA\) and Vancomycin-resistant Enterococcus \(VRE\) 2011](#)
- ↓ New [Surgical Site Infections 2011](#)
- [Clostridium difficile Infection \(CDI\) 2011 data will be published soon](#)

### Public Reporting - Prevention Measures

- ↓ New [Central Line Insertion Practices \(CLIP\)](#)
- [Surgical Site Infection Prevention Measures Mandatory Reporting](#)

### Antimicrobial Resistance

- ↓ New [California Antibiogram Project](#)
- [The California Antimicrobial Stewardship Program Initiative](#)

### Contact

- [HAI Program](#)

# Questions?

Email

[InfectionControl@cdph.ca.gov](mailto:InfectionControl@cdph.ca.gov)

or

Your designated HAI Liaison IP  
[FirstName.LastName@cdph.ca.gov](mailto:FirstName.LastName@cdph.ca.gov)

[Lynn.Janssen@cdph.ca.gov](mailto:Lynn.Janssen@cdph.ca.gov)

