



# Using NHSN Data Validation for Improved HAI Surveillance and Prevention

Educational Road Shows  
17 Cities  
May – July 2012



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

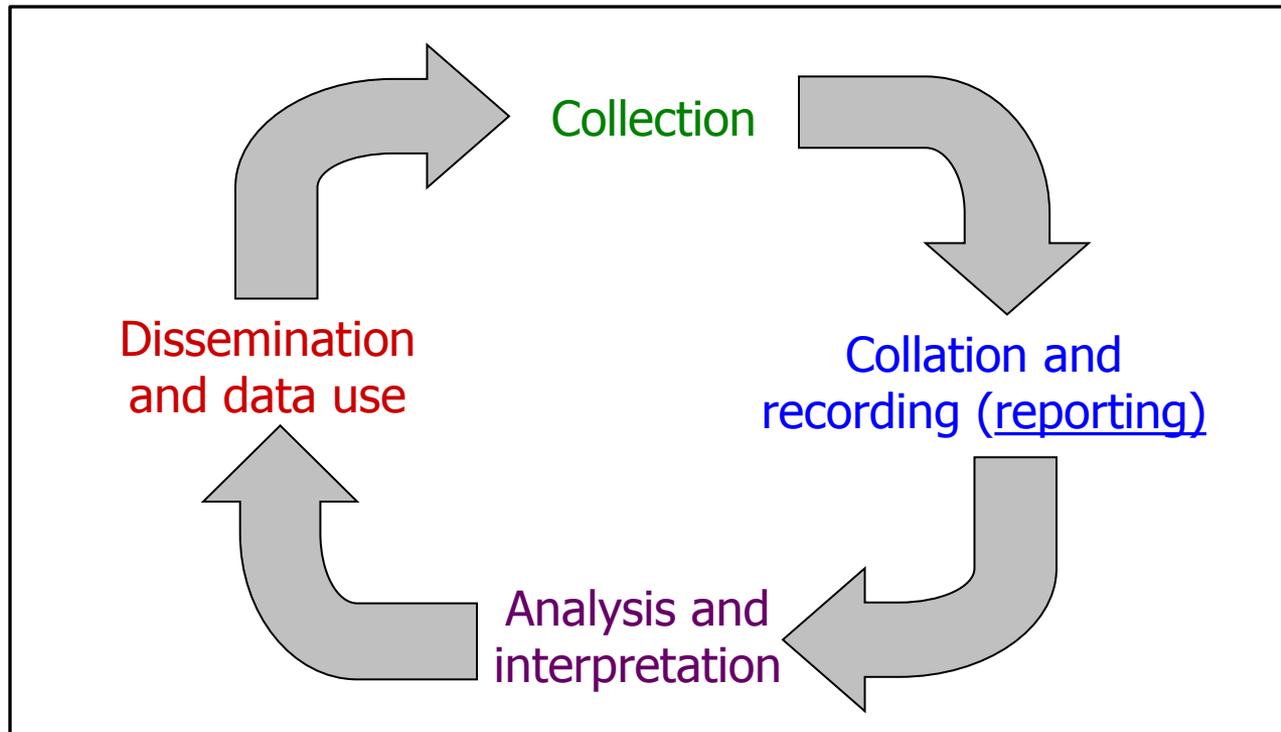
# Today's Presentation

1. Describe the attributes of quality HAI surveillance
2. Review 2011 NHSN data validation findings from 100 California hospitals
3. Identify best practices for case-finding
4. Review NHSN protocols, targeting highlighted issues
5. Demonstrate data validation process and forms for internal use by hospitals
6. Apply NHSN skills using case scenarios



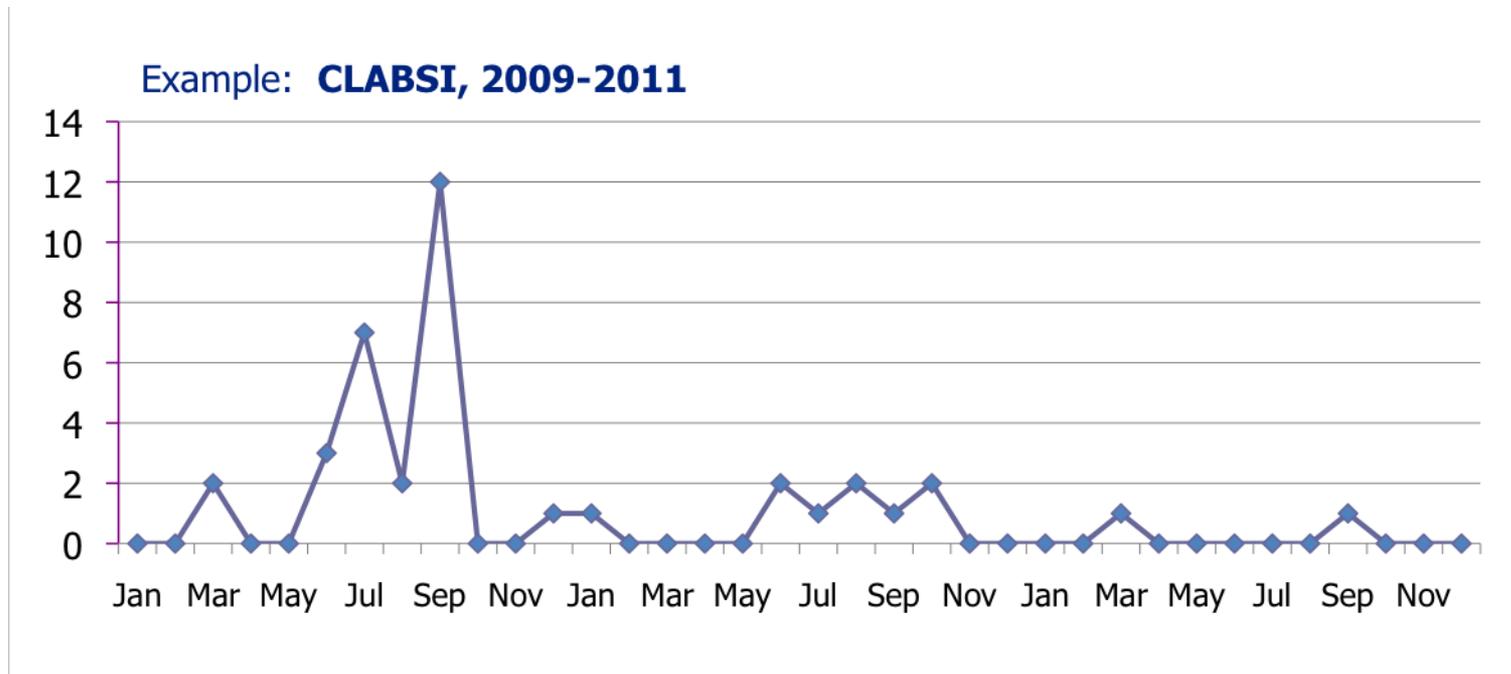
# What is Surveillance?

- **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 comprehensive evaluation of a minimum clinical data set\*

	Always Step 1	Step 2
<b>CLABSI</b>	Review every positive blood culture	Review for presence of central line
<b>SSI</b>	Identify and review all post-op hospital re-admissions (30d or 1y) Review all returns-to-OR	Review wound cultures but realize that culture-based surveillance alone <u>misses</u> 50-60% of SSI
<b>MRSA/VRE BSI</b>	Review all final <i>S.aureus</i> & Enterococcal bacteremia	Assess if ER-positives were admitted
<b>CDI</b>	Review all <i>C.difficile</i> toxin positives tests (PCR, assay, culture)	Assess if ER-positives were admitted

\*NHSN protocols currently silent on expectations; revisions proposed

# Coordination

- IP and Quality can't do it alone
- HAI surveillance needs to be a shared responsibility across hospital units, services, and disciplines
- The more connection of relevant clinical data points, the better the surveillance (e.g. new antimicrobial starts)
- Ongoing collection of patient risk factors (i.e. denominator data) requires data system solutions

# Confidence

- ✓ Know the 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 CLABSII), 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 incision, 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	19	<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

## AJIC major articles

### CDC/NHSN surveillance definitions of health care-associated infections 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 definitions are restricted to patients  $\leq 1$  year following operative procedures in which 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 your CDPH Liaison IP or [NHSN@cdc.gov](mailto:NHSN@cdc.gov)

# Compassion

- Patients want to feel safe
- Patient advocates want to be assured that providers are doing everything possible to prevent infections
- Identifying every HAI is necessary to understand what your patients are experiencing

The collage consists of three overlapping images. The top-left image is a screenshot of the RID (Risk Reduction Initiative) website, featuring a navigation menu with links like 'Home', 'About RID', 'RID's 15 Steps', 'Infection Facts', 'Cost of Infection', and '2015 Model Bill'. A banner below the menu reads '15 STEPS YOU CAN TAKE TO REDUCE YOUR RISK OF A HOSPITAL INFECTION'. The top-right image shows the Consumers Union.org logo, described as a 'Nonprofit Publisher of Consumer Reports', with a navigation bar for 'Health Care', 'Food', 'Phones & Media', 'Money', and 'Product Safety'. Below this is a banner that says 'We want to hear your personal experience with health care.' The bottom-right image shows a woman in a wheelchair being attended to by a healthcare worker, with a banner that says 'We want to hear your personal experience with health care.'

# 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"

# HAI Liaison Program and Quality Surveillance

Conditions of CDC grant funding, 2010-2011

- Enhance participation in the **National Healthcare Safety Network** (NHSN) for HAI surveillance and reporting
- Support the **use of NHSN data** for local HAI prevention efforts
- Develop and implement protocols for **NHSN data validation**



# Common Steps for HAI Data Validation

- 1) Select hospitals
- 2) Develop sampling framework
- 3) Select patient population for review
- 4) Abstract data from medical records
- 5) Use findings to improve surveillance

CDC, 2009

# Objectives of HAI Data Validation, 2011

HAI Program Liaison IPs performed onsite data validation 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

Important to remember that findings may not be generalizable

# CDPH HAI Data Validation Tenets

- External *Performed by CDPH HAI Program staff*
- Independent *Reviews done by CDPH reviewers working alone*
- Voluntary *HAI Program non-regulatory*
- “Real practice” model *“Census” sample (records not targeted for review); comprehensive review of positive labs for 3 month time period*
- Reproducible *Process can be duplicated by hospital*

# 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

*For LabID, we did not distinguish between (nor collect information on) community-onset vs. hospital-onset cases*

# Presentation of Findings

- **Sensitivity**
  - Proportion of HAI reported by hospital among all patients with an HAI
  - High sensitivity indicates HAI are being identified and reported
- **Specificity**
  - Proportion of HAI not reported by hospital among patients without an HAI
  - High specificity indicates accuracy in “ruling out” HAI
- **Positive Predicted Value**
  - Proportion of HAI detected by hospital that actually are HAI
  - High PPV indicates accuracy in applying surveillance definitions

		HAI Liaison Program IP Review		
		HAI	Not an HAI	
Hospital Surveillance Report	HAI	True positives	False positives	<b>Positive Predictive Value</b> $\frac{\text{True positives}}{\text{True positives} + \text{False positives}} \times 100$
	Not an HAI	False negatives	True negatives	

<b>Sensitivity</b> $\frac{\text{True positives}}{\text{True positives} + \text{False negatives}} \times 100$	<b>Specificity</b> $\frac{\text{True negatives}}{\text{True negatives} + \text{False positives}} \times 100$
---	---

# Completing Validation Process

- Results of validation findings reviewed and left with the hospital prior to exit
  - Provided immediate onsite education to improve HAI surveillance and reporting
  - Hospitals expected to correct data in NHSN based on validation findings
- No hospital identifiers recorded on any validation forms or materials
  - Date and reviewer's initials removed from all forms immediately following data entry
  - Identifiable hospital results not maintained by CDPH
- Hospitals that participated will be offered opportunity to be acknowledged by CDPH
  - The precise manner of acknowledgement has not yet been determined



# Summary to Date

- All CA hospitals invited to participate, June 2011
- 100 hospitals volunteered within 9 days (30 put on waiting list)
- Onsite validation performed, July–Oct 2011
- Data entry and preliminary analysis, Dec 2011–Feb 2012
- Outreach and education plan developed for using validation findings to improve surveillance, March-April 2012
- Aggregate results approved for presentation, May 2012
- 17-city educational road show, May-July 2012
- Additional data analysis, ongoing



# Preliminary Validation Findings

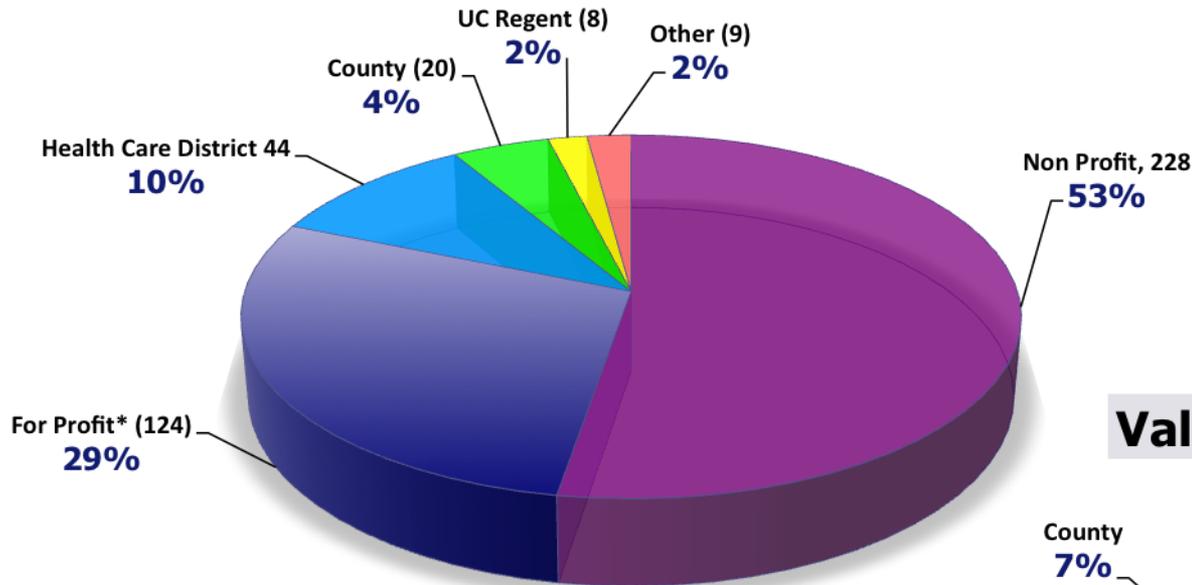


# Comparison of Hospital Characteristics

	California	Validation Sample
<b>Acute care hospitals</b>	<b>433</b>	<b>100</b>
Counties with hospitals	57	33
Northern hospitals	197 (45%)	47 (47%)
Southern hospitals	236 (55%)	53 (53%)
LA County hospitals	101 (23%)	25 (25%)
Rural hospitals	63 (15%)	15 (15%)
Critical Access hospitals	28 (6%)	6 (6%)
Pediatric hospitals	12 (3%)	1 (1%)
Teaching hospitals	83 (19%)	28 (28%)
Bed size, mean	210	255

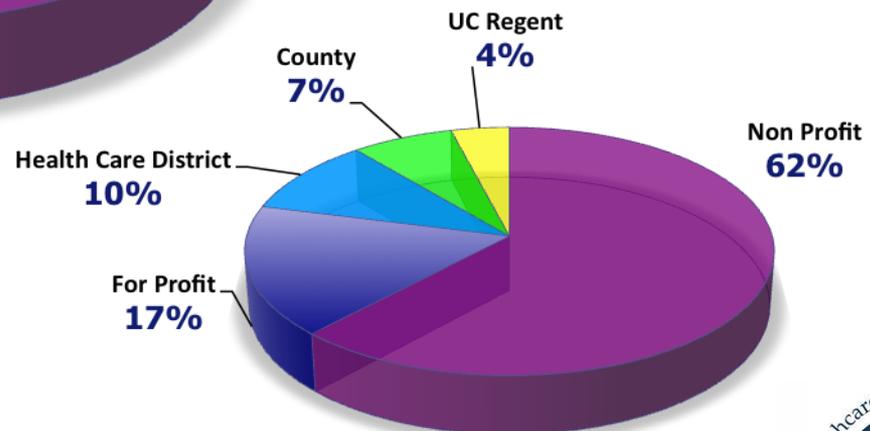
# Hospital License Type

**All CA Hospitals, N=433**



\*Includes for-profit, limited

**Validation Hospitals, N=100**



# Quick Review of NHSN Reporting Rules

## For LabID inpatient facility-wide surveillance:

- ✓ Report every positive lab test from inpatients and from ED patients if admitted same calendar day
- ✓ Do not report another positive from same patient still in the hospital (or readmitted to the hospital) until >14 days after previous
- ✓ Ignore positive lab tests done in outpatient settings

## For CLABSI surveillance, criteria are:

- ✓ Presence of central line within previous 48 hours, and
- ✓ One or more positive blood cultures (depending on organism), and
- ✓ Clinical review to determine patient symptoms, if infection present on admission, if BSI secondary to infection at another site, or if lab findings represent a contaminant

# Validation Findings by Infection Type

	CDI	MRSA BSI	VRE BSI	CLABSI
<b>Description of labs reviewed</b>	ED & inpatient <i>C difficile</i> toxin-positive tests, 3 mo.	ED & inpatient MRSA positive blood cultures, 3 mo.	ED & inpatient VRE positive blood cultures, 3 mo.	Inpatient "BSI events" of $\geq 1$ positive blood cultures, 1-3 mo*
<b>Labs reviewed by validators</b>	3000	1300	239	4099
<b>Reported by hospitals</b>	2172	442	112	135
<b>Reported in error</b> (should <i>not</i> have been reported)	55	15	4	23
<b>Not identified by hospital</b> (should have been reported)	221	150	41	68
<b>Sensitivity</b>	90%	74%	73%	62%
<b>Specificity</b>	92%	98%	96%	99%
<b>PPV</b>	97%	97%	96%	82%

\*dependent on volume

# Cases Reported in Error

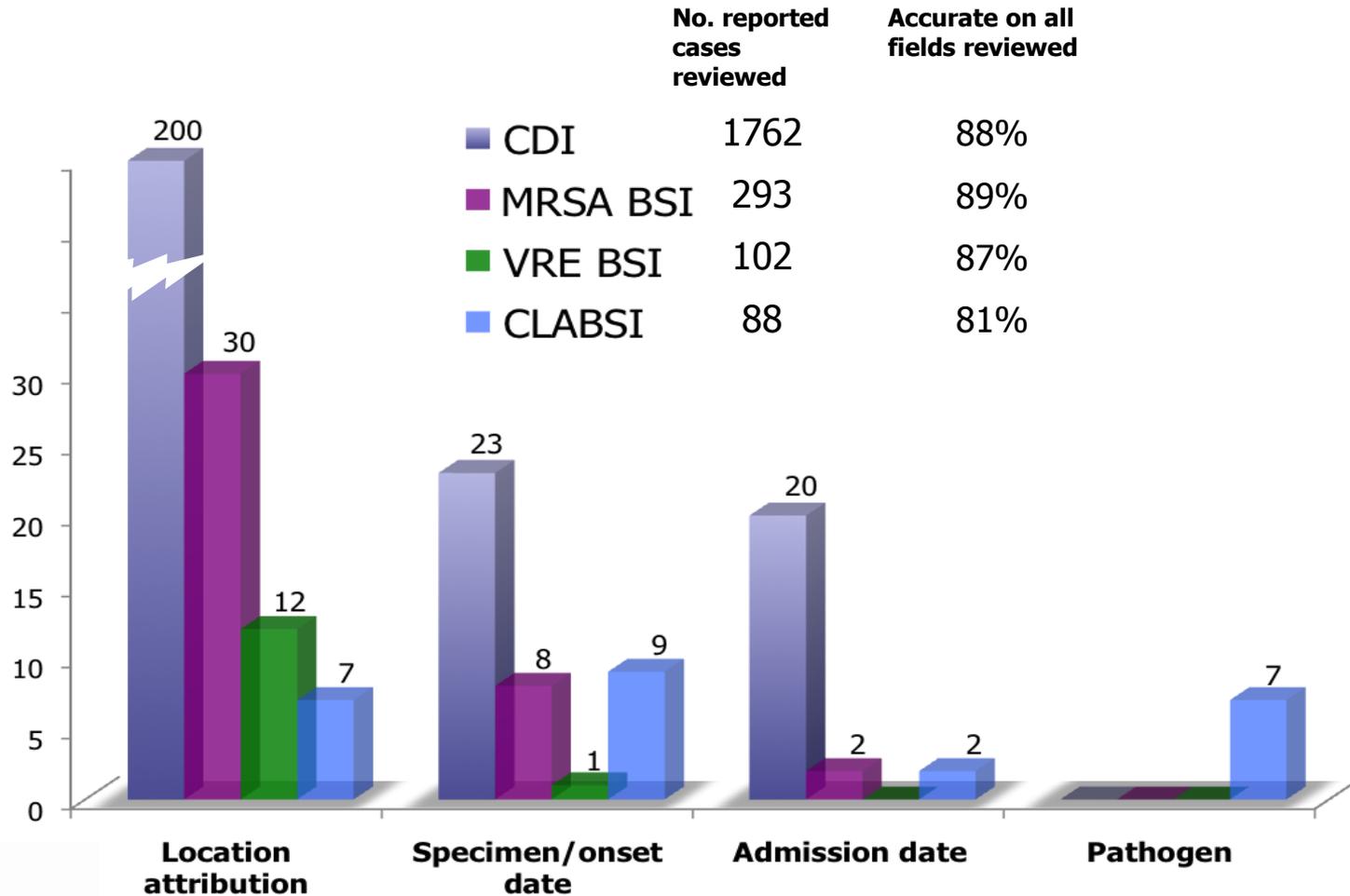
	No.	Reason should not have been reported
<b>CDI</b>	55	<p>Specific info not captured on validation forms - 22            For remaining 33, reasons were:</p> <p><i>Test prior to patient admission date - 19</i>  <i>ER specimen, patient not admitted - 6</i>  <i>Not CDI toxin+ per final lab result - 5</i>  <i>&lt;14 days since prior - 2</i>  <i>Patient &lt;1 year old - 1</i></p>
<b>VRE</b>	4	<p><i>Not VRE per final lab result - 2</i>  <i>ER specimen, patient not admitted - 1</i>  <i>&lt;14 days since prior - 1</i></p>
<b>MRSA</b>	15	<p><i>ER specimen, patient not admitted - 6</i>  <i>Test prior to patient admission date - 5</i>  <i>Not MRSA per final lab result - 2</i>  <i>Specific info not captured - 2</i></p>
<b>CLABSI</b>	23	<p><i>2 to another site of infection - 14</i>  <i>Contaminant - 6</i>  <i>Present on admission - 3</i></p>

# Cases Missed, Should Have Been Reported

HAI	No.	Reason Missed
<b>CDI</b>	221	<i>Ruled duplicate but &gt;14 days since last CDI – 17 ER specimen, thought patient not admitted – 11 Missed* - 193</i>
<b>VRE</b>	41	<i>Not in IP surveillance lab report - 4 ER specimen, thought patient not admitted - 2 Reported only as CLABSI - 2 Delayed MICs – 2 Missed* - 31</i>
<b>MRSA</b>	42	<i>ER specimen, thought patient not admitted – 2 Missed* - 40</i>
<b>CLABSI</b>	68	<i>Ruled as 2 to another infection - 12 Ruled a contaminant - 6 Ruled present on admission - 4 Disagreement with NHSN definition – 4 Ruled continuation of previous BSI – 2 Other reasons observed only once – 5 Missed* – 35</i>

Agreement could not be reached for only 8 unreported CLABSI

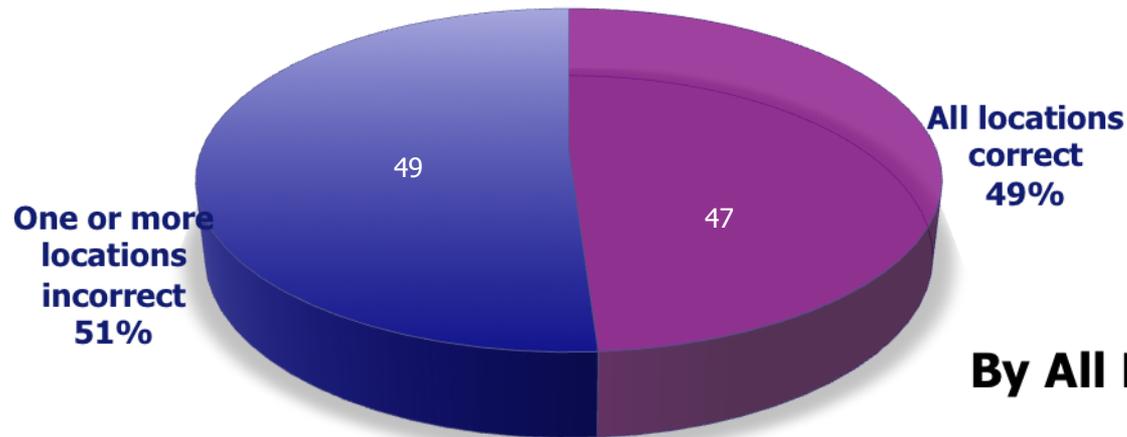
# Assessing Accuracy of Reported Data



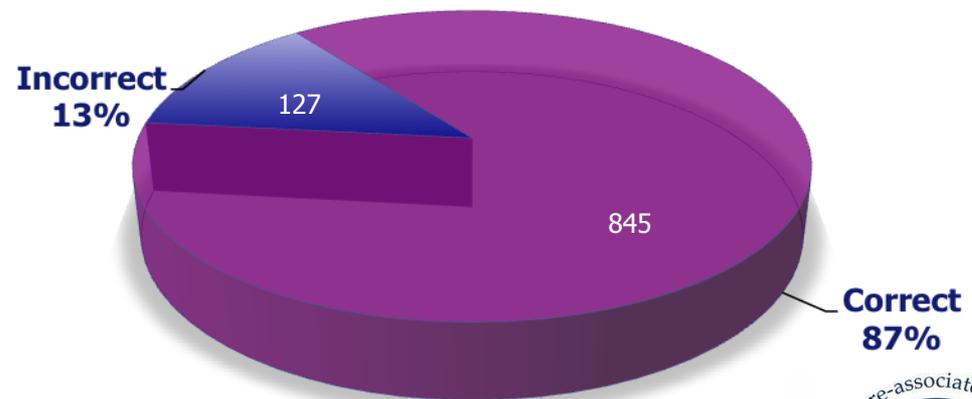
Inaccurately reported fields

# Accuracy of Location Mapping

## By Hospital (96)

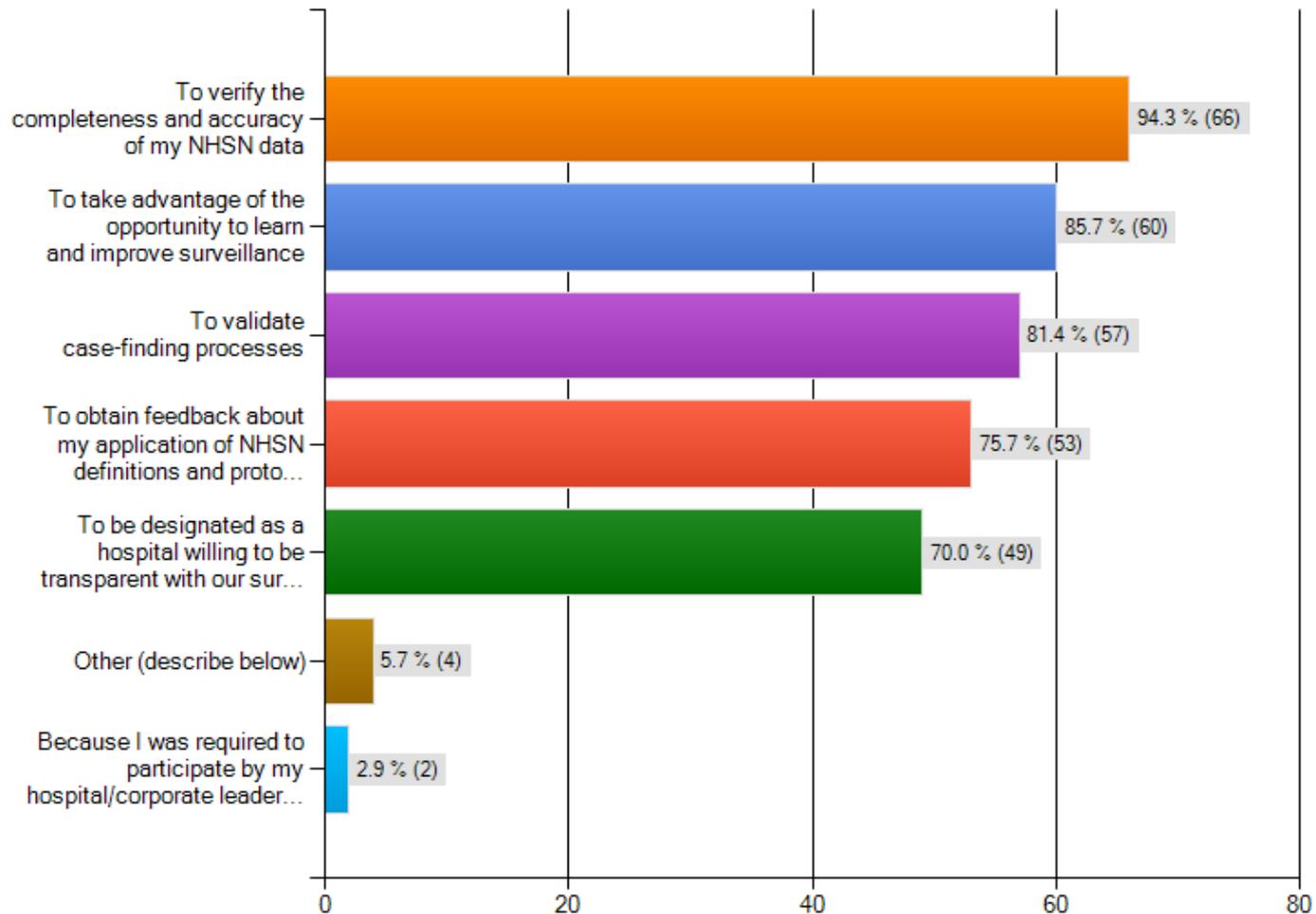


## By All Locations (972)



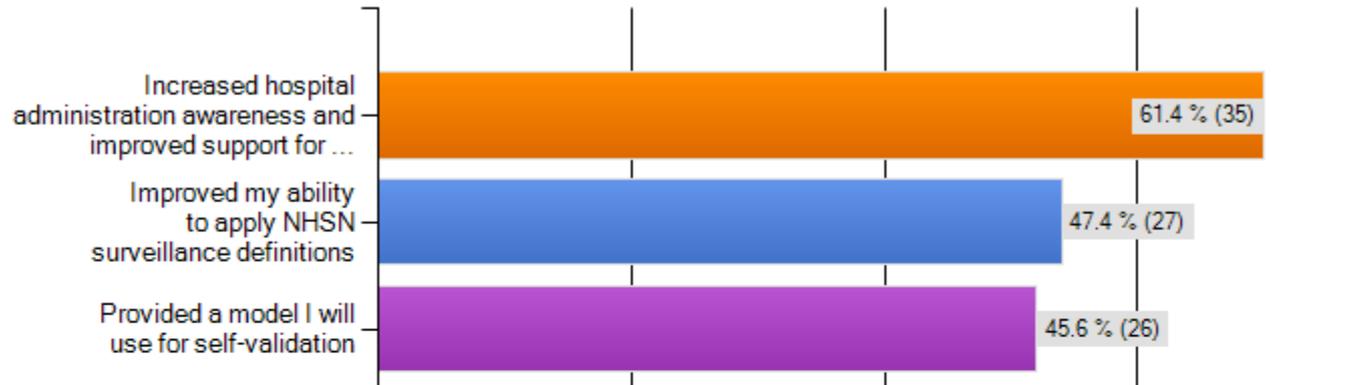
# Post-Validation Survey - 70% Response Rate

## 1. Why did you volunteer to participate in onsite data validation? (Select all that apply)

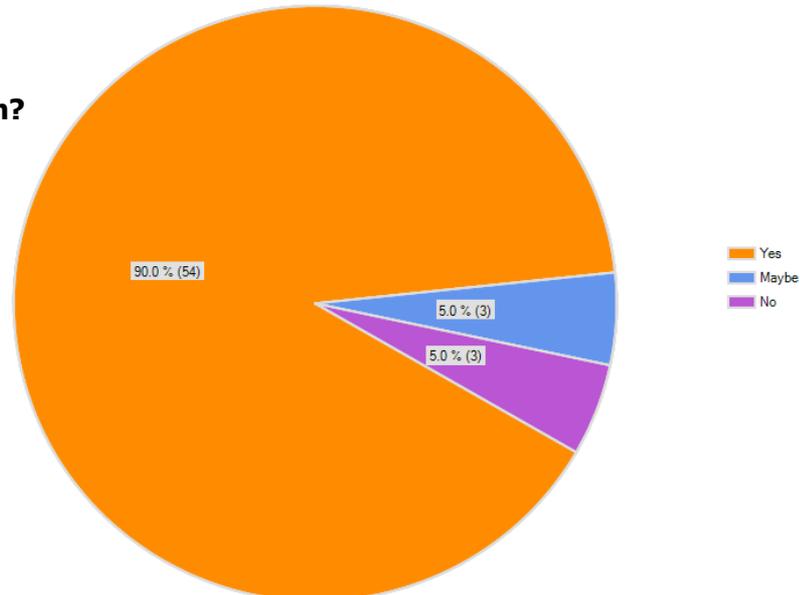


# Post-Validation Survey

## 4. How did/will this validation experience affect your practice? (Select all that apply)



## 8. Would you volunteer again?



# Improving CDI Surveillance

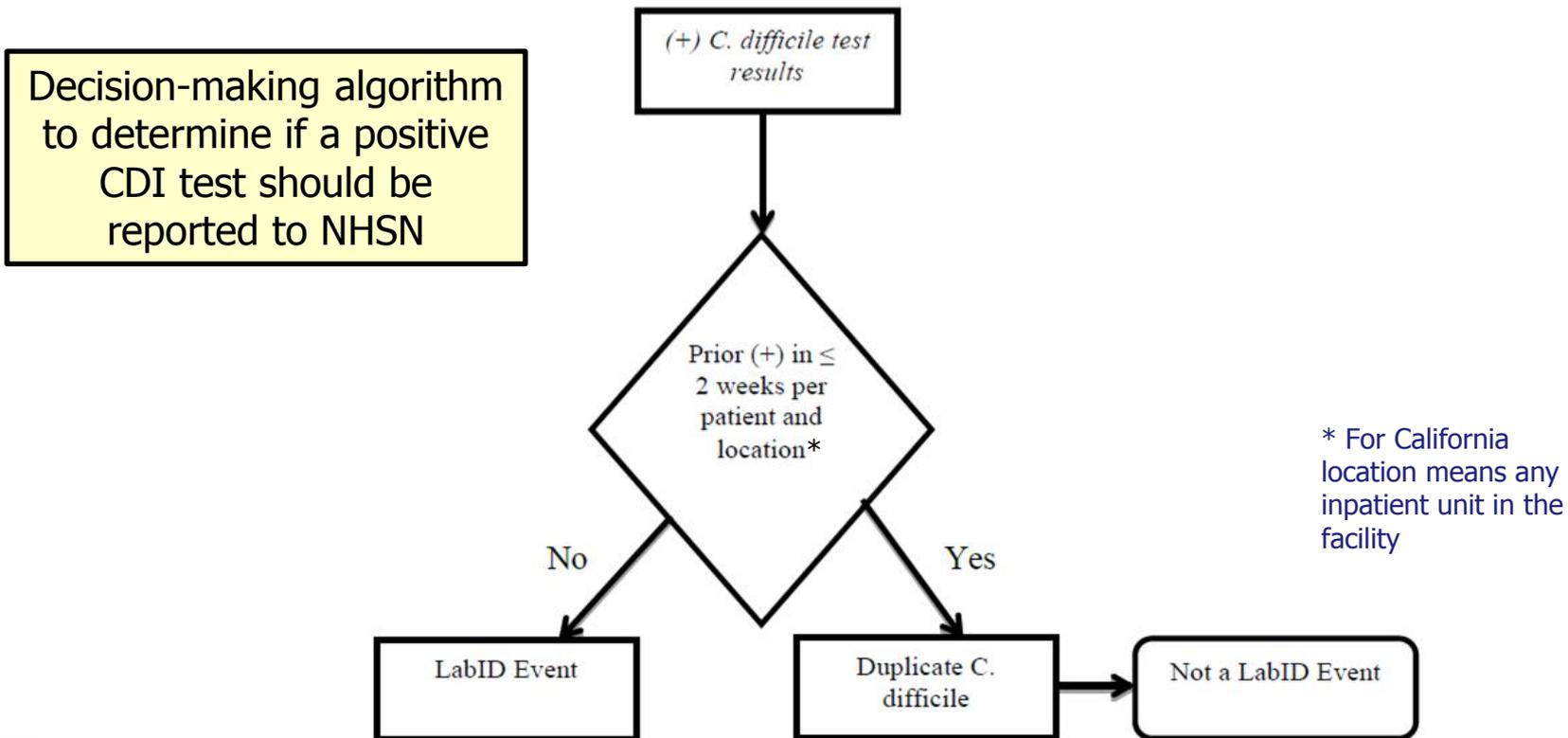


# CDI Surveillance

- LabID method is a nationally-recognized quality measure for the surveillance of CDI (NQF endorsed)
- Requires no clinical review or further evaluation of positive lab finding
- Facility-wide Inpatient LabID surveillance must be in your monthly reporting plan per CA reporting requirements
  - Report ALL *C. difficile* toxin-positive tests from inpatients, and ED patients if admitted to your hospital the same calendar day



Figure 2. *C. difficile* test Results Algorithm for Laboratory-Identified (LabID) Events



# CDI LabID Surveillance

- NHSN algorithm categorizes CDI cases according to the admission and testing dates you enter

Community-Onset ( <b>CO</b> )	For Inpatient surveillance, a LabID event collected $\leq 3$ days after admission to the facility (i.e., days 1, 2, 3 or admission)
Healthcare Facility-Onset ( <b>HO</b> )	LabID event collected $> 3$ days after admission to the facility (on or after day 4)

Community-Onset Healthcare Facility - Associated ( <b>CO-HCFA</b> )	LabID event collected from a patient who was discharged from the facility $\leq 4$ weeks prior to current date of stool specimen collection
---	---

## CDI LabID Surveillance (continued)

- NHSN also tracks if cases are new or recurrent
  - CDI is considered recurrent if  $>2$  weeks and  $\leq 8$  weeks after last CDI event reported for that patient
- There is no advantage to not entering cases, regardless of what you know of patient's history with CDI



# To report or not report?

- Was the specimen collected in the ED on a different day than admission?
  - Don't report. Only exception is if you are also doing outpatient surveillance (would be reported for outpatient location, ED). Remember, because you are required to do inpatient surveillance, you must *ALSO* report the 1<sup>st</sup> inpatient positive.
- We found a positive test that should be reported, but then realized we failed to report the 1<sup>st</sup> positive specimen. What should we do?
  - Report. But go back and report the 1<sup>st</sup> test date. Do not record a 2<sup>nd</sup> positive until  $\geq 14$  days from previous.
- What about a patient known to have a recent history of CDI (or other reportable MDRO)?
  - Report. *ALL* non-duplicate specimens should be reported, regardless of history

# CDI Reporting Tips

- Check for prior positives before entering a CDI Event into NHSN
  - Prevents you from inadvertently reporting “the 2<sup>nd</sup> event” when in fact the first positive CDI was missed
- Until you are sure of completeness, do not rely on only one source (e.g. daily reports) for your CDI data
  - Ask lab to run a monthly retrospective report of final results
- Enter all toxin-positives, including those from patients with a history of *C difficile*
  - Not JUST because of mandates; rather you need to know for your prevention efforts

# Improving Completeness of CDI Reporting

Ensure you have identified and reported all CDI

- Ask your lab to run a retrospective line list of toxin-positive *C. difficile* for a given time period
  - i.e. the previous month or quarter
  - Sort by patient name or ID
- Using NHSN Analysis, run a line list of all CDI LabID events you reported in the same time period
- Compare the lists

# Improving Accuracy of CDI Reporting

Verify that CDI are being attributed to the correct inpatient location

- Enter location where patient was when CDI specimen was collected
- If the CDI specimen was collected in the ED and the patient is admitted to the facility on the SAME date, report location as the admitting inpatient location
- NHSN 48-hour “transfer rule” does **not** apply for LabID events



# Improving MDRO BSI Surveillance



# Difference Between CLABSI and MDRO BSI Surveillance and Reporting

## **CLABSI** surveillance follows the protocol in the NHSN **Device-Associated Module**

- Requires positive blood culture plus review of clinical symptoms to ensure case definition is met
- CLABSI by definition are primary bloodstream infections

## **MRSA/VRE-BSI** surveillance follows LabID method in NHSN **MDRO/CDI Module**

- Requires only the positive blood culture to meet the case definition for a LabID event
- Both primary and secondary bloodstream infections are included

# MDRO BSI and CLABSI Reporting (continued)

When MRSA or VRE is the pathogen causing CLABSI, you must report the event twice to capture in both the **Device-Associated** and **MDRO/CDI** Modules

# Improving Completeness of MRSA/VRE Reporting

- Follow same reporting rules as for LabID CDI surveillance
- Check communications with your lab
- Verify data you are receiving from your lab are complete and final culture results
- Compare your daily lab reports to an end of month lab summary on all ED and inpatient MRSA/VRE BSI BSI

# Improving Completeness of MRSA/VRE Reporting (continued)

- Cases may be missed if unclear description of MDRO status on lab reports
  - MDROs should be reported as “MRSA” or “VRE” rather than relying on review of the susceptibility profile
  - Work with lab so positive specimen results are straightforward
  - An unclear MDRO status can affect not only surveillance and reporting but also treatment, isolation, and cleaning practices

# Improving Completeness of MRSA/VRE Reporting (continued)

- Know how data are exchanged between laboratory system and third party surveillance software system (e.g. Medmined, Safety Surveillor)
  - Be aware of settings and filters used by third party software; may filter out data that should be reported to NHSN/CDPH
    - Duplicates (Must report cases if  $\geq 2$  wks from previous)
    - CO cases (Some systems filter out positive blood cultures in first 48 hours after admission)
  - Filters can vary for the same software (even within a hospital system!)
  - Check data from third party software sources against reports printed directly from your laboratory

# Improving CLABSI Surveillance



# Improving CLABSI Case-finding

- Review every positive blood culture from inpatients
  - Many of the missed CLABSI had simply been MISSED
- First screen: Presence of central line during hospitalization
  - Develop your own method based on available information systems
- Know the surveillance definition!
  - Criterion 1: Single blood culture if a pathogen, which means any organism other than a common commensal; No other symptoms needed to confirm CLABSI
  - Criterion 2: 2 common commensal positive bloods plus 1 of 3 symptoms --- fever, chills, or hypotension
    - Cultures can be drawn up to 2 days apart
    - Same even if 1 at genus level (e.g. coag negative staph) and the other at species level (e.g. Staph epi)



# Simplified View of CLABSI Definition

Patient with a central line must meet one of the following criterion

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

2

- Patient of any age
- has common skin commensals 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 and symptoms and (+) lab results are not related to an infection at another site

3

- Patient  $\leq$  1 year of age
- has common skin commensals 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 core), hypothermia (<36°C core), apnea, or bradycardia
    - and*
    - Signs and symptoms and (+) lab results are not related to an infection at another

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

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

<b>UTI</b>	<b>Urinary tract infection</b>	
	SUTI	Symptomatic urinary tract infection
	<del>ASB</del>	<del>Asymptomatic bacteriuria</del>
	OUTI	Other infections of the urinary tract
<b>SSI</b>	<b>Surgical site infection</b>	
	SIP	Superficial incisional primary SSI
	SIS	Superficial incisional secondary SSI
	DIP	Deep incisional primary SSI
	DIS	Deep incisional secondary SSI
	Organ/space	Organ/space SSI. Indicate specific type:
		<ul style="list-style-type: none"> <li>• BONE</li> <li>• BRST</li> <li>• CARD</li> <li>• DISC</li> <li>• EAR</li> <li>• BMET</li> <li>• ENDO</li> <li>• EYE</li> <li>• GIT</li> <li>• IAB</li> <li>• IC</li> <li>• JNT</li> <li>• LUNG</li> <li>• MED</li> <li>• MEN</li> <li>• ORAL</li> <li>• OREP</li> <li>• OUTI</li> <li>• SA</li> <li>• SINU</li> <li>• UR</li> <li>• VASC</li> <li>• VCUF</li> </ul>
<b>BSI</b>	<b>Bloodstream infection</b>	
	LCBI	Laboratory-confirmed bloodstream infection
	<del>CSEP</del>	<del>Clinical sepsis</del>
<b>PNEU</b>	<b>Pneumonia</b>	
	PNU1	Clinically defined pneumonia
	PNU2	Pneumonia with specific laboratory findings
	PNU3	Pneumonia in immunocompromised patient
<b>Bj</b>	<b>Bone and joint infection</b>	
	BONE	Osteomyelitis
	JNT	Joint or bursa
	DISC	Disc space
<b>CNS</b>	<b>Central nervous system</b>	
	IC	Intracranial infection
	MEN	Meningitis or ventriculitis
	SA	Spinal abscess without meningitis
<b>CVS</b>	<b>Cardiovascular system infection</b>	
	VASC	Arterial or venous infection
	ENDO	Endocarditis
	CARD	Myocarditis or pericarditis
	MED	Mediastinitis

**Table 1. Continued**

<b>EENT</b>	<b>Eye, ear, nose, throat, or mouth infection</b>	
	CONJ	Conjunctivitis
	EYE	Eye, other than conjunctivitis
	EAR	Ear, mastoid
	ORAL	Oral cavity (mouth, tongue, or gums)
	SINU	Sinusitis
	UR	Upper respiratory tract, pharyngitis, laryngitis, epiglottitis
<b>GI</b>	<b>Gastrointestinal system infection</b>	
	GE	Gastroenteritis
	GIT	Gastrointestinal (GI) tract
	HEP	Hepatitis
	IAB	Intraabdominal, not specified elsewhere
	NEC	Necrotizing enterocolitis
<b>LRI</b>	<b>Lower respiratory tract infection, other than pneumonia</b>	
	BRON	Bronchitis, tracheobronchitis, tracheitis, without evidence of pneumonia
	LUNG	Other infections of the lower respiratory tract
<b>REPR</b>	<b>Reproductive tract infection</b>	
	BMET	Endometritis
	EPIS	Episiotomy
	VCUF	Vaginal cuff
	OREP	Other infections of the male or female reproductive tract
<b>SST</b>	<b>Skin and soft tissue infection</b>	
	SKIN	Skin
	ST	Soft tissue
	DECU	Decubitus ulcer
	BURN	Burn
	BRST	Breast abscess or mastitis
	UMB	Omphalitis
	PUST	Pustulosis
	CIRC	Newborn circumcision
<b>SYS</b>	<b>Systemic Infection</b>	
	DI	Disseminated infection

There 13 NHSN infection categories with 46 infections  
 Each has a surveillance definition  
 Many infections can result in BSI  
 Access definitions via the NHSN website; most up-to-date

(<37°C rectal), apnea, bradycardia, dysuria, lethargy, or vomiting  
 and  
 patient has a positive urine culture, that is,  $\geq 10^5$  microorganisms per cc of urine with no more than two species of microorganisms.  
 4. Patient  $\leq 1$  year of age has at least 1 of the following signs or symptoms with no other recognized cause: fever ( $>38^\circ\text{C}$ ), hypothermia ( $<37^\circ\text{C}$ ), apnea, bradycardia, dysuria, lethargy, or vomiting

Continued



## Primary BSI (CLABSI) or Secondary BSI ?

- Rule out a CLABSI if patient has a BSI but another site is suspected as being the primary site of infection
- Especially for patients with complex co-morbidities, review medical record for other primary sites of infection
- To classify a BSI as secondary to another site, the primary site of infection must meet the NHSN surveillance criteria

## 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 secondary BSI
- For many surveillance definitions, a positive blood culture is included in the criteria and can help define the infection (*see next slide*)

HAI Infection Definitions  
with "Positive Blood  
Culture" Included in  
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

# Laboratory Findings of Secondary BSI

- 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:* Patient with E-coli isolated from urine and blood cultures meets the criteria for a symptomatic UTI

Report as SUTI with a secondary BSI

See NHSN Forms, Section 57-114, UTI



# Laboratory Findings of Secondary BSI

- If the primary HAI site is **NOT cultured**, the secondary BSI must be a pathogen appropriate for the primary site

*Example:* Patient with central line has a post-op abscess detected by CT scan; meets criteria for GI tract infection. Also has a positive blood culture for *Bacteroides fragilis*.

Report as SSI-GIT with secondary BSI

# Common Infections with Secondary BSI

- During the 2011 data validation reviews, many complex HAI 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)
  - Intrabdominal infection (IAB)
  - Osteomyelitis (BONE)
  - Endocarditis (ENDO)

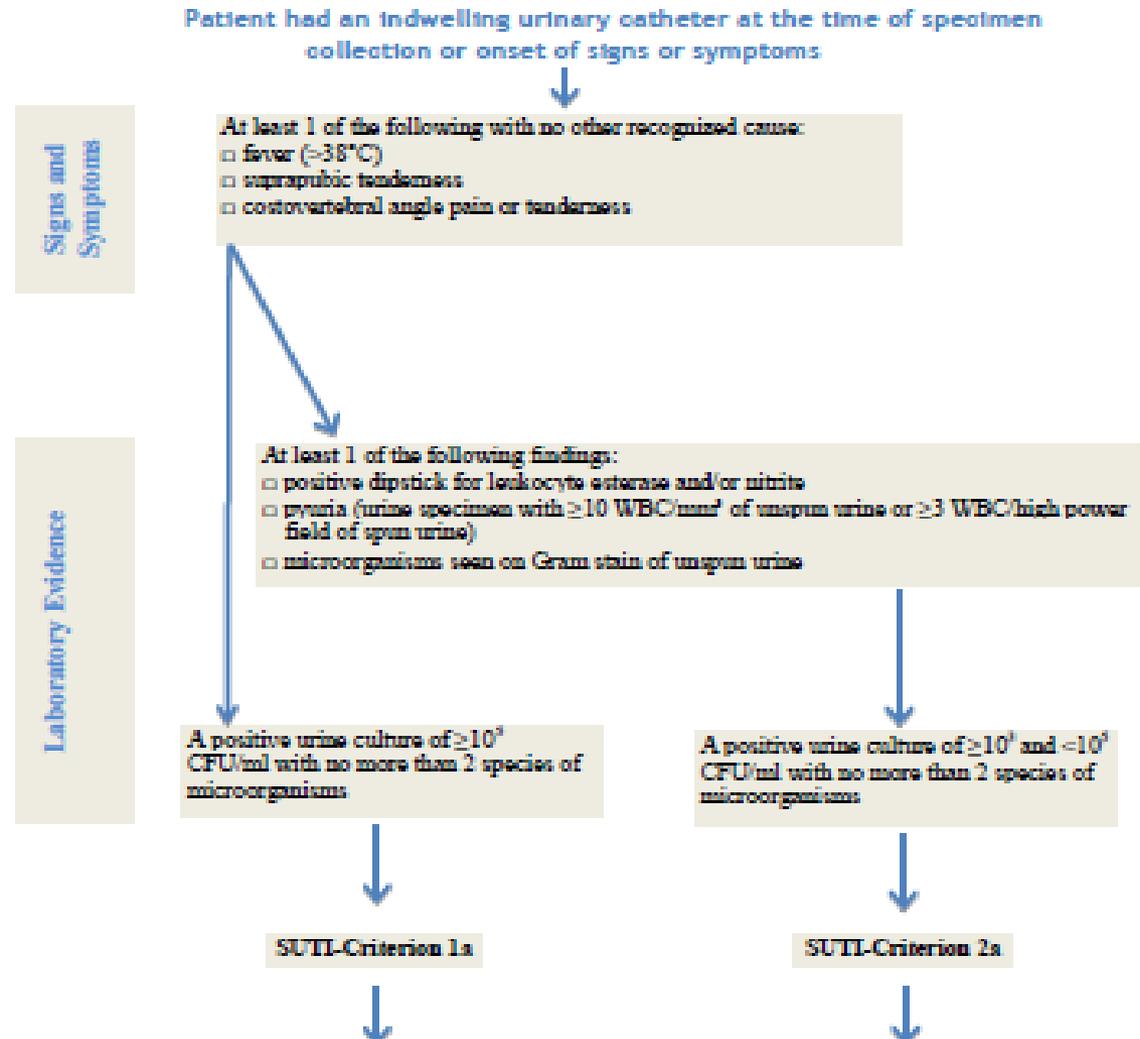


# Example: SUTI

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

Meaning, BSI is not needed or used to define SUTI

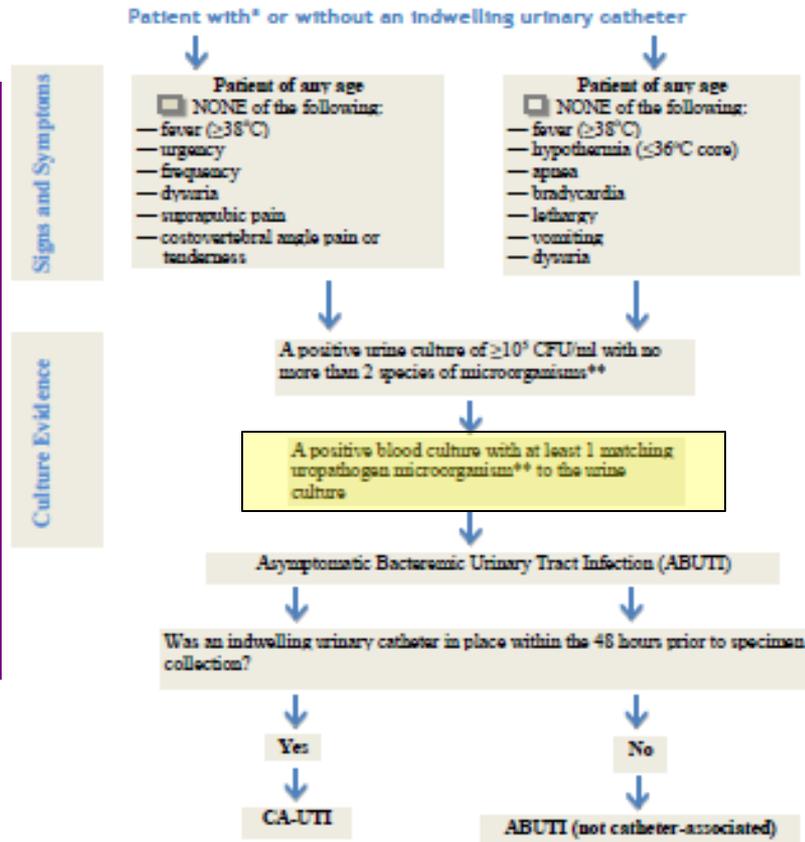
Figure 1: Identification and Categorization of SUTI with Indwelling Catheter (see comments section page 7-8 thru 7-9 for important details)



# Example: 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.

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

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

†Report *Corynebacterium* (urease positive) as either *Corynebacterium* species unspecified (COS) or as *C. urealyticum* (CAUTI) if so associated.

NHSN Ch7 p13



# 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: 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

# Improving SSI Surveillance



# Protocol Review for SSI Surveillance

- SSI surveillance was not part of 2011 data validation
- Areas to highlight determined by HAI Liaison Program IPs based on common questions and observed issues

# Primary and Secondary Incisional SSI

- SSI infections involving the incision can be
  - Superficial Incisional Primary or Secondary (SIP or SIS)
  - Deep Incisional Primary or Secondary (DIP or DIS)
- Simply stated, an SSI is “Primary” if the infection involves incision made for the primary surgical procedure
  - e.g. chest incision for a CABG, abdominal incision for COLO
- SSI is “Secondary” if infection involves another incision made during a procedure other than the primary incision
  - e.g. leg incision for CABG donor graft

Most surgeries have only 1 incision

Vast majority of superficial or deep incisional SSI are Primary and reported as SIP or DIP

# Superficial Incisional SSI

## Surveillance Definition

- Infection occurs within 30 days after surgical procedure
- AND**
- Involve only skin and subcutaneous tissue of the incision
- AND**

Patient has at least **1**:

- Purulent drainage from incision
- Organism isolated from incision culture or fluid (obtained aseptically)
- Pain or tenderness
- Localized swelling, redness, or heat
- Incision opened by surgeon and found to be culture positive or was not cultured
- Diagnosis of superficial SSI by surgeon or attending physician

# Superficial SSI – additional reporting instructions

- Do not report stitch abscess as an SSI
  - “Minimal inflammation and discharge confined to points of suture penetration”
- Do not report a localized stab wound infection as an SSI
- Cellulitis by itself is not an SSI

# Deep Incisional SSI

## Surveillance Definition

Infection occurs within 30 days after surgical procedure if no implant or within 1 year if implant

**AND**

Involves deep soft tissues of the incision, e.g. fascial & muscle layers

**AND**

Patient has at least **1**:

Purulent drainage from deep incision but not from the organ/space of the surgical site

Deep incision spontaneously dehisces **or** opened by surgeon **AND** is culture positive or not cultured **AND** fever >38 C, localized pain, or tenderness

Abscess or evidence of deep infection found on direct exam, during reoperation, by histopathologic or radiologic exam

Diagnosis of deep SSI by surgeon or attending physician

# Organ Space SSI

## Surveillance Definition

Infection occurs within 30 after surgical procedure if no implant or within 1 year if implant

**AND**

Involves any part of body that is opened or manipulated during the surgical procedure; excludes skin, fascia, or muscle layers, and subcutaneous tissue of the incision

**AND**

Patient has at least **1**:

Purulent drainage from drain placed through stab wound into organ/space

Organism isolated from incision culture or fluid (obtained aseptically)

Abscess or evidence of organ/space infection found on direct exam, during reoperation, by histopathologic or radiologic exam

# Organ Space SSI

## Surveillance Definition

Infection occurs within 30 after surgical procedure if no implant or within 1 year if implant

**AND**

Involves any part of body that is opened or manipulated during the surgical procedure; excludes skin, fascia, or muscle layers, and subcutaneous tissue of the incision

**AND**

Patient has at least **1**:

Purulent drainage from drain placed through stab wound into organ/space

Organism isolated from incision culture or fluid (obtained aseptically)

Abscess or evidence of organ/space infection found on direct exam, during reoperation, by histopathologic or radiologic exam

# Wound Class

- Must be assessed at the time of the operation by a person present during the surgical procedure
  - e.g., surgeon, circulating nurse, etc.
- If the wound class is always assigned prior to surgery will lead to both inaccurate reporting and inaccurate risk adjustment!

## Wound Class

### Clean

Operation where no inflammation encountered  
Respiratory, alimentary, genital, urinary tracts **not** entered  
Operation following non-penetrating (blunt) trauma  
Primarily closed with no open drainage

### Clean - Contaminated

Operation entering respiratory, alimentary, genital, or urinary tracts  
No evidence of infection, no major break in technique, no unusual contamination encountered  
Operation involving biliary tract, appendix, vagina, and oropharynx

### Contaminated

Operation following open, fresh, accidental wounds  
Operation with major breaks in sterile technique (e.g., open cardiac massage) or gross spillage from GI tract  
Includes operation where acute, non-purulent inflammation encountered

### Dirty

Operation involving old traumatic wounds with retained devitalized tissue, **or** existing clinical infection **or** perforated viscera  
Definition suggests the organisms causing post-op infection were present before the operation

# Defining an Implant

- A nonhuman-derived object, material, or tissue that is placed in a patient during an operative procedure
- Requires 1 year post-op follow-up for SSI
- Includes
  - Porcine or synthetic heart valves
  - Mechanical heart
  - Metal rods
  - **Mesh**
  - Sternal wires
  - Screws
  - **Cements**
  - Internal **staples**
  - Hemoclips
  - **Other devices**
- Excludes
  - Non-absorbable sutures

Rationale: IPs “may not easily identify and/or differentiate the soluble nature of suture material used”

NHSN Newsletter v6.6 (Feb. 2012)  
 NHSN Manual Ch16, pg 4-5.  
 NHSN Manual, Ch 17 pg 313-314

## Once an implant, always an implant?

- An object is considered an implant **until** it or the surrounding structures are **manipulated** for diagnostic or therapeutic purposes
  - “If infection develops after manipulation, do not attribute it to the operation in which the implant was inserted; instead attribute it to the latter procedure.

# 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 system issues that change your data to help understand variation over time

## Examples include:

- Improved (more sensitive) testing methods
- New lab computer software
- Focused education on specimen collection processes



*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*



# Reporting and Using Surveillance Data

- Plan for distribution of NHSN data and findings
- Use NHSN analysis features to review and interpret your data
- Report to health care providers most able to impact patient care
- Report in a manner to stimulate process improvement
  - Use visual displays of data - charts, graphs, tables

*AJIC Am J Infect Control 2007; 35:427-40*



# Steps for Advancing HAI Prevention Using HAI Data

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

# 10-MINUTE BREAK

Next up:

Performing data validation in YOUR hospital

Practicing NHSN using case-scenarios

# Using the Data Validation Process and Forms



**Form 1  
Summary of Laboratory Data**

**Instructions:** Determine which HAI(s) you wish to validate. Ask your laboratory to produce line lists directly from the laboratory information system for a 3-month time period.

- Toxin-**Positive C difficile tests** (PCR, assay, culture) from both inpatients and ED patients.
- Positive blood cultures** for inpatients and ED patients (needed for MRSA/VRE BSI validation)
- Positive blood cultures** from inpatients for each of 3 months (needed for CLABSI validation)

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

**Source data system for laboratory line lists:** \_\_\_\_\_ e.g. Meditech, Sunquest, Cerner

**For CDI LabID Validation**

# Positive **CDI** from 3 mo \_\_\_\_\_ **[INCLUDE IN CDI REVIEW]** Include **each** positive CDI test result even if from same patient

Number each positive CDI on your lab line list. Enter corresponding specimen dates in table on **Form 2**. Follow instruction on **Form 2** to complete validation review.

**For MRSA & VRE BSI LabID Validation**

From positive **blood cultures** (3 mo): Include **each** positive blood culture even if from same patient

# VRE-positive blood cultures \_\_\_\_\_ **[INCLUDE IN VRE BSI REVIEW]**

# MRSA-positive blood cultures \_\_\_\_\_ **[INCLUDE IN MRSA BSI REVIEW]**

Number each VRE/MRSA blood culture on your lab line list. Enter the corresponding specimen dates in VRE or MRSA tables on **Form 3**. Follow instructions on **Form 3** to complete review.

**For CLABSI Validation**

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

Month \_\_\_\_\_ # \_\_\_\_\_  Month \_\_\_\_\_ # \_\_\_\_\_  Month \_\_\_\_\_ # \_\_\_\_\_  
*Use Table (page 2) to determine how many months feasible to include in review.  
 Check which months (above) you will include in the CLABSI validation review.*

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

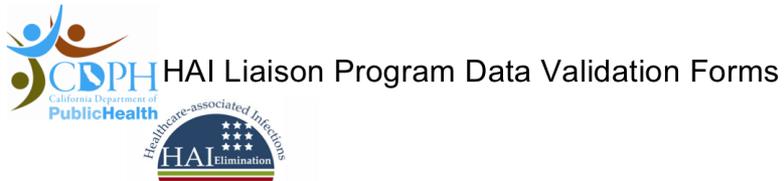
# Separate BSI Events\* \_\_\_\_\_ \*\*"Cluster" of positive blood cultures near same date for same patient counts as 1 event; single positive also counts as 1 event  
**[INCLUDE IN CLABSI REVIEW]**

Number each BSI event on your lab line list. Enter the corresponding culture date (1st positive) and admission date in table on **Form 4**. Follow instructions on **Form 4** to complete review.

For most comprehensive review, review positive blood cultures from ED patients for recent hospital discharge:

# \_\_\_\_\_ **[INCLUDE IN CLABSI REVIEW AS POSSIBLE]** Add to table on Form 4.





Review Date: \_\_\_/\_\_\_/11 Initials: \_\_\_\_\_

*Determining time period for validation review: In general, starting with 60 positive blood cultures results in approximately 40-55 infectious events and 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.*

Determine number of months to include in CLABSI validation.  boxes next to corresponding months on Form 1.

<b>Total inpatient positive blood cultures in 3 mo.</b>	<b>Review</b>	
$\leq 60$	<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>



**Form 2  
CDI Events**

**Instructions:**

1. Fill in the specimen date for each toxin-positive *C difficile* test as corresponds to the number on your laboratory line list (see Form1).
2. Using NHSN Analysis, produce a line list of CDI LabID Events reported by your hospital for the same 3-month validation review period.
3. For each numbered specimen, answer Q1 by referring to your NHSN line list. For CDI cases reported to NHSN, record NHSN Event #. If cases on your NHSN list are not included (i.e. were not on lab line list), add to the bottom of table.
4. Using patient information on the lab line list (i.e. name or medical record number), for each numbered CDI specimen, review patient's medical record to verify your decision to report or not report to NHSN. Carefully follow NHSN CDI LabID protocols/definitions; refer to them often.
  - o For each specimen **NOT** reported to NHSN, indicate reason why in the appropriate column. If case should have been reported but was not, record as missed. Indicate a reason the case may have been missed.
  - o For each specimen **Reported** to NHSN, verify if case met inpatient LabID criteria. If no, record reporting error and indicate reason. If yes, CDI LabID criteria met, compare specimen date, admission, and location as reported on NHSN line list to the same info in the medical record. Verify accuracy. Check box if correct as reported. If incorrectly reported, record accurate data in table.
5. Complete CDI section of Form 6, Validation Findings.

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

**CDI Events Table.**

Lab list #	Positive <i>Cdifficile</i> specimen date	Q1. Was CDI Event reported to NHSN?		If Q1 answer is <b>NO</b> , complete this section			If Q1 answer is <b>YES</b> , complete this section			
		YES √ NHSN Event #	NO √	Outpatient or ED specimen from patient not admitted to hospital same calendar day	Duplicate <14 days since last positive	MISSED Should have been reported √ Reason?	Reported in ERROR Does not meet inpatient LabID criteria √ Reason?	Correctly Reported Met inpatient LabID criteria Per instructions, √ box if data entered correctly in NHSN –or– enter correction.		
								Specimen date	Admission date	Location attribution
C1	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ___/___/11	<input type="checkbox"/> ___/___/11	<input type="checkbox"/>
C2	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ___/___/11	<input type="checkbox"/> ___/___/11	<input type="checkbox"/>
C3	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ___/___/11	<input type="checkbox"/> ___/___/11	<input type="checkbox"/>
C4	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ___/___/11	<input type="checkbox"/> ___/___/11	<input type="checkbox"/>
C5	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ___/___/11	<input type="checkbox"/> ___/___/11	<input type="checkbox"/>
C6	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ___/___/11	<input type="checkbox"/> ___/___/11	<input type="checkbox"/>
C7	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ___/___/11	<input type="checkbox"/> ___/___/11	<input type="checkbox"/>
C8	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ___/___/11	<input type="checkbox"/> ___/___/11	<input type="checkbox"/>
C9	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ___/___/11	<input type="checkbox"/> ___/___/11	<input type="checkbox"/>
C10	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ___/___/11	<input type="checkbox"/> ___/___/11	<input type="checkbox"/>

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

### Form 3 MRSA & VRE BSI Events

**Instructions:**

1. Fill in the specimen dates for each MRSA and VRE positive blood culture in separate tables below. Numbers should correspond to numbers on your laboratory line list (see Form1).
2. Use NHSN Analysis to produce a line list of MRSA & VRE BSI Events reported by your hospital for the 3-month validation review period.
3. For each numbered blood culture below, answer Q1 by referring to your NHSN line list. For cases reported to NHSN, record NHSN Event #. If cases on your NHSN list are not included (i.e. were not on lab line list), add to the bottom of the appropriate table (MRSA or VRE).
4. Using patient information on the lab line list (i.e. name or medical record number), for each numbered blood culture, review patient's medical record to verify your decision to report or not report to NHSN. Carefully follow NHSN MDRO LabID protocols/definitions; refer to them often.
  - o For each specimen **NOT** reported to NHSN, indicate reason why in the appropriate column. If case should have been reported but was not, record as missed. Indicate a reason the case may have been missed.
  - o For each specimen **Reported** to NHSN, verify if case met inpatient LabID criteria. If no, record reporting error and indicate reason. If yes, CDI LabID criteria met, compare specimen date, admission, and location as reported on NHSN line list to the same info in the medical record. Verify accuracy. Check box if correct as reported. If incorrectly reported, record accurate data in table.
5. Complete MRSA and VRE sections of Form 6, Validation Findings.

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

**MRSA Events Table**

Lab list #	MRSA-positive blood culture specimen date	Q1. Was MRSA Event reported to NHSN? YES <input type="checkbox"/> NHSN Event # <input type="checkbox"/> NO <input type="checkbox"/>		If Q1 answer is <b>NO</b> , complete this section			If Q1 answer is <b>YES</b> , complete this section					
				Outpatient or ED specimen from patient not admitted to hospital same calendar day	Duplicate <14 days since last positive	<b>MISSED</b> Should have been reported <input type="checkbox"/> Reason?	<b>Reported in ERROR</b> Does not meet inpatient LabID criteria <input type="checkbox"/> Reason?	<b>Correctly Reported</b> Met inpatient LabID criteria Per instructions, <input type="checkbox"/> box if data entered correctly in NHSN –or– <b>enter correction.</b>				
								Specimen date	Admission date	Location attribution		
M1	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M2	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M3	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M4	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M5	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M6	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M7	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M8	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M9	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M10	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	___/___/11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**VRE Events Table**

Lab list #	VRE-positive blood culture specimen date	Q1. Was MRSA Event reported to NHSN?		If Q1 answer is <b>NO</b> , complete this section			If Q1 answer is <b>YES</b> , complete this section			
		YES √ NHSN Event #	NO √	Outpatient or ED specimen from patient not admitted to hospital same calendar day	Duplicate <14 days since last positive	MISSED Should have been reported	Reported in ERROR Does not meet inpatient LabID criteria	Correctly Reported Met inpatient LabID criteria Per instructions, √ box if data entered correctly in NHSN –or– enter correction.		
								Specimen date	Admission date	Location attribution
V1	___/___/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"/>
V2	___/___/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"/>
V3	___/___/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"/>
V4	___/___/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"/>
V5	___/___/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"/>
V6	___/___/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"/>
V7	___/___/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"/>
V8	___/___/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"/>
V9	___/___/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"/>
V10	___/___/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"/>
V11	___/___/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"/>
V12	___/___/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"/>
V13	___/___/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"/>
V14	___/___/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"/>
V15	___/___/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"/>
V16	___/___/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"/>
V17	___/___/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"/>
V18	___/___/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"/>
V19	___/___/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"/>

Add additional pages as needed

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

### Form 4 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 Form1).
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 5, 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. If case should have been reported but was not, record as missed. Indicate a reason the case may have been missed.
5. Complete CLABSI section of Form 6, 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		
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"/>
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"/>
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"/>
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"/>
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"/>
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"/>
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"/>
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"/>
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"/>
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"/>

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



Form 5
CLABSI Review

one: [ ] Confirm Accuracy of Reported CLABSI [ ] Report CLABSI that was Missed

Instructions: Complete for each reported CLABSI. Check box (X) 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# \_\_\_ 1st 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

X Mark Relevant Location [X] 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

Notes:

Event Details

Specific Event: Laboratory-confirmed BSI

Criteria:

Signs & Symptoms NOTE: S/S needed only if common skin commensal

Any patient <= 1 year old

- [ ] Fever [ ] Fever
[ ] Chills [ ] Hypothermia
[ ] Hypotension [ ] 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





**Chart Review Work Sheet**

**Instructions:** Use for notes to rule out or confirm CLABSI. Record final determination by checking appropriate boxes. Transfer findings to BSI Events table, Form 4.

- 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**

---

---

---

---

---





**Form 6  
Data 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 ("Gold Standard" or truth)	
		HAI	Not an HAI
Routine Hospital Surveillance	HAI	True positives	<b>False positives</b>
	Not an HAI	<b>False negatives</b>	True negatives

**Positive Predictive Value (PPV) =**  

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

**Positive Predictive Value (PPV)**

- Also called the precision rate.
- For HAI surveillance, PPV is the proportion of HAI reported that met the case definition.
- If PPV is high, it means the identified and reported HAIs really *are* HAIs.
- Measures **accuracy** in applying surveillance definitions and/or protocols.

**Sensitivity =**  

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

**Specificity =**  

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

**Sensitivity**

- Answers question "How likely are all true infections found?"
- For HAI surveillance, sensitivity is defined as the proportion of HAIs identified and reported from the total of all patients who had an HAI.
- If sensitivity is low, it means HAIs were missed. The hospital's HAI rate could be higher than what is being reported.
- Measures **completeness** and implies effective surveillance methods.

**Specificity**

- Answers question "How likely are patients without an infection accurately identified as not having an infection?"
- For HAI surveillance, specificity is defined as the proportion of HAIs not reported from the total of all patients who did not have an HAI.
- If specificity is low it means not all the HAIs reported were actually HAIs. The hospital's HAI rate may actually be lower than what is being reported.

**Example**

Positive urine cultures reviewed for CAUTI validation = **100**

		Validation Review ("Gold Standard" or truth)	
		CAUTI	No CAUTI
Routine Hospital Surveillance	CAUTI <b>10</b>	8	<u>2</u> Reported in error
	No CAUTI <b>90</b>	<u>3</u> Missed	87

**Positive Predictive Value (PPV) =**  

$$\frac{8 \text{ True positives}}{8 \text{ True pos.} + 2 \text{ False pos.}} \times 100$$

**80%**

**Sensitivity =**  

$$\frac{8 \text{ True positives}}{8 \text{ True pos.} + 3 \text{ False neg.}} \times 100$$

**73%**

**Specificity =**  

$$\frac{87 \text{ True negatives}}{7 \text{ True neg.} + 2 \text{ False pos.}} \times 100$$

**98%**

**Interpretation:**

For the 100 urine cultures reviewed for CAUTI, the validation reviewers found **5** disparities.

The hospital had identified and reported 10 CAUTI. The validation reviewers determined only 8 should have been reported; **2** did not meet the surveillance criteria.

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

For the other 90 positive urine cultures reviewed in which routine hospital surveillance identified no CAUTI, the validation reviewers identified **3** additional CAUTI.

The calculated **sensitivity** reveals routine hospital surveillance is identifying only 73% of the CAUTI occurring.

The calculated **specificity** reveals hospital routine surveillance accurately "rules out" CAUTI 98% of the time.

**Data Validation for *C. difficile* Infections**

Surveillance ime period: \_\_\_\_\_

From CDI Events Table, Form 2

		Validation Review	
		CDI	No CDI
Number of positive specimens in review = _____		A	B <i>Reported in Error</i>
<b>Routine Hospital Surveillance</b>	<b>CDI _____</b> <i>Form 2, total Q1=Yes</i>	C <i>Missed</i>	D
	<b>No CDI _____</b> <i>Form 2, total Q1 = No</i>		

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

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

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

**Data Validation for MRSA Bloodstream Infections**

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

From MRSA Events Table, Form 3

		Validation Review	
		MRSA BSI	No MRSA BSI
Number of MRSA+ blood cultures in review = _____		A	B <i>Reported in Error</i>
<b>Routine Hospital Surveillance</b>	<b>MRSA BSI _____</b> <i>Form 3, M total Q1 = Yes</i>	C <i>Missed</i>	D
	<b>No MRSA BSI _____</b> <i>Form 3, M total Q1 = No</i>		

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

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

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



**Data Validation for CLABSI**

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

From BSI Events Table, Form 4

Number of positive blood culture "clusters" = \_\_\_\_\_

		Validation Review	
		CLABSI	Not CLABSI
<b>Routine Hospital Surveillance</b>	<b>CLABSI _____</b> <i>Form 4, total Q1 = Yes</i>	A	<b>B</b> <i>Reported in Error</i>
	<b>Not CLABSI _____</b> <i>Form 4 total Q1 = No</i>	<b>C</b> <i>Missed</i>	D

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

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

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



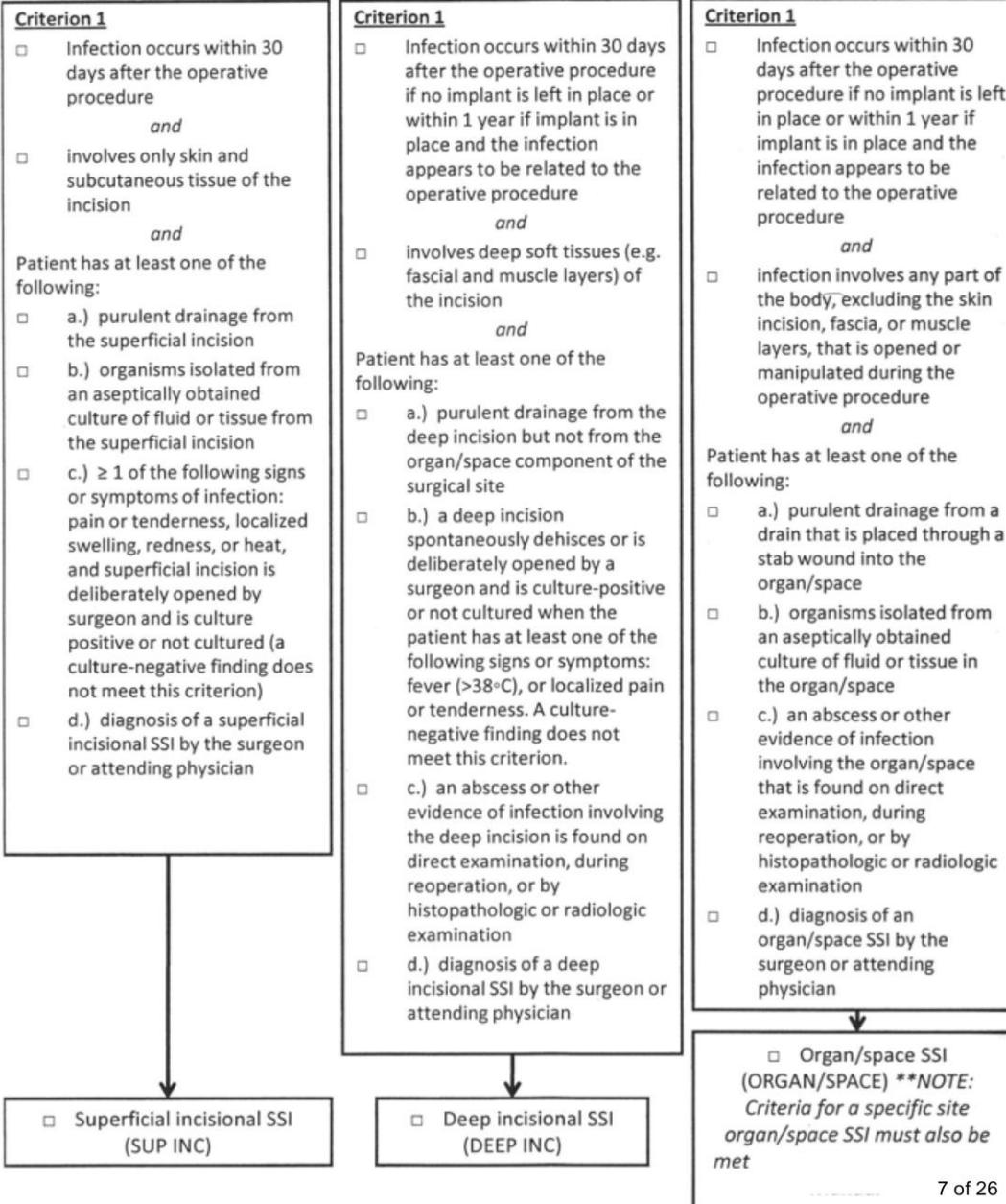
## Infection Definitions Worksheets

### 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		
	• GIT - 19 • UR - 18	<b>21</b>	<b>Lower respiratory tract infection, other than Pneu</b>
	• IAB - 20 • VASC - 14	BRON	Bronchitis, tracheobronchitis,
	• IC - 12 • VCUF - 22	LUNG	tracheitis, without evidence of pneu
			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
		BRST	Breast abscess or mastitis
		UMB	Omphalitis
<b>12</b>	<b>Central nervous system infections</b>	PUST	Pustulosis
	IC Intracranial infection	CIRC	Newborn circumcision
	MEN Meningitis or ventriculitis	<b>26</b>	<b>Systemic Infection</b>
	SA Spinal abscess without meningitis	DI	Disseminated infection

**SURGICAL SITE 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).

**en 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**

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

**Healthcare Associated Infections - Advisory Committee**

- » [HAI Advisory Committee](#)

**Information for Infection Prevention Programs**

- » [AFLs, Legislation, and Regulations](#)
- » [New 2012 Educational Road Show](#)
- » [March Madness 2012](#)
- » [2 Day Mini Course](#)
- » [NHSN Guidance Specific to California Hospitals](#)
- » [Healthcare Associated Infections and Infection Control Guidelines](#)
- » [HAI Liaison IP Assignments by County \(PDF, New Window\)](#)

**Resources**

- » [New Selected links to the Association of Professionals in Infection Control and Hospital Epidemiology \(APIC\)](#)
- » [New Selected links to the Centers for Disease Control and Prevention \(CDC\)](#)
- » [Selected links to the Society for Healthcare Epidemiology of America \(SHEA\)](#)
- » [Infectious Diseases Society of America \(IDSA\) \(New Window\)](#)
- » [UCSD Infection Prevention Course -- Designed to Meet CA SB 158 Requirements \(PDF, New Window\)](#)

**Public Reporting and Information**

- » [New Surgical Site Infection Prevention Measures Mandatory Reporting](#)
- » [New Interactive Map - Surgical Site Infections, April 2011--June 2011](#)  
An easy way to view SSIs by hospital
- » [Central Line associated Bloodstream Infection \(CLABSI\)](#)
- » [Methicillin-resistant Staphylococcus aureus \(MRSA\) and Vancomycin-resistant Enterococcus \(VRE\)](#)
- » [Clostridium difficile Infection \(CDI\)](#)
- » [Central Line Insertion Practices \(CLIP\)](#)
- » [Surgical Site Infections -January-2009--March-2011](#)

**Influenza Information**

- » [Healthcare Personnel Influenza Vaccination](#)
- » [New Current Reporting and Data Collection Forms and Information](#)  
Includes Influenza Vaccination Forms
- » [Influenza Vaccination Information for Consumers](#)

**Antimicrobial Resistance**

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

**Contact**

- » [HAI Program](#)

# Questions?

Email

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

or

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

