

Welcome to *California*



Surgical Site Infection Reporting in NHSN

2014 San Diego APIC Annual Conference
September 26, 2014

Tracy Lanier, RN, BSN, CIC
CDPH HAI Liaison Infection Preventionist
Healthcare-Associated Infections Program
Center for Health Care Quality
California Department of Public Health



Today's Presentation

1. Demonstrate how to use NHSN as both a surveillance system and a web-based platform for SSI reporting
2. Identify best practices for surgical site infection prevention
3. Review key methods of SSI data reporting, utilizing NHSN
4. Describe how the SSI data validation process can be used to improve data accuracy and quality

National Healthcare Safety Network (NHSN)

- Surveillance system used nationwide for reporting HAI from hospitals, long term care facilities, and hemodialysis clinics
- Providing more transparency and accountability in healthcare
- Surveillance system used by CDPH, other state health departments, and CMS for HAI reporting
- Data used for HAI public reporting, pay for reporting, and pay for performance programs
- Accessed through a secure, web-based interface; open to all US healthcare facilities at no charge

NHSN Data Access

- Facilities own their NHSN surveillance data
 - May edit at any time to improve accuracy, completeness
- Facilities can (or may be required) to join one or more NHSN Group
 - Examples: healthcare organization, CDPH
 - Facility confers rights for data access to the Group
 - CDPH accesses data required by statute
 - Facilities within Group cannot see each other's data
- Facility signed a data use agreement with CDC; allows CMS access to specific NHSN data



NHSN Strengths

- Provides standards for surveillance across healthcare facilities
- Data risk-adjusted for comparison to national data
- Web-based; data housed remotely; data quality checks
- Data analysis tools built into system
- Adapting to electronic reporting using national electronic health record standards (e.g. HL7, CDA)
- Expandable to many health care settings

NHSN Limitations

- Data validation methods in development
- Requires following all NHSN protocols - detailed, lengthy
- Not easily integrated with electronic medical record for data import
- While training and support is provided by NHSN, its use is not as intuitive as initially assumed or hoped

- NHSN**
- About NHSN
- Enroll Here
- Materials for Enrolled Facilities**
- Acute Care Hospitals/Facilities
- Long-term Acute Care Facilities
- Long-term Care Facilities
- Outpatient Dialysis Facilities
- Inpatient Rehabilitation Facilities
- Ambulatory Surgery Centers
- Ventilator-Associated Event Calculator
- FAQs about Healthcare Personnel (HCP)
- Influenza Vaccination Summary Reporting in NHSN
- Group Users
- Patient Safety Analysis Resources
- Annual Reports
- Newsletters
- E-mail Updates
- CMS Requirements
- Clinical Document Architecture (CDA)
- HIPAA Privacy Rule

- NHSN Manuals**
- Dialysis Event Surveillance Manual [PDF - 1.65 MB]
 - Healthcare Personnel Safety Component Manual [PDF - 1.96 MB]
 - Biovigilance Component Protocol [PDF - 326 KB]

NHSN

Recommend 1 Tweet Share

Surveillance Reporting for Enrolled Facilities

Select Your Facility Type



Acute Care Hospitals/Facilities

Urgent care or other short-term stay facilities (e.g., critical access facilities, oncology facilities, military/VA facilities).



Outpatient Dialysis Facilities

Outpatient dialysis clinics.



Long-term Acute Care Facilities

Long-term acute care hospitals (LTACs).



Inpatient Rehabilitation Facilities

Inpatient rehabilitation hospitals.



Long-term Care Facilities

Nursing homes, assisted living and residential care, chronic care facilities, and skilled nursing facilities.



Ambulatory Surgery Centers

Outpatient surgery centers.



[Training / Demo](#)

[Newsletters / Members Meeting Updates](#)

[E-mail Updates](#)

[State-based HAI Prevention Activities](#)

[HIPAA Privacy Rule](#)

www.cdc.gov/nhsn/settings.html

[Email page link](#)

[Print page](#)

[NHSN Login](#)

[Continuing Education Opportunities](#)

Get email updates

To receive email updates about this page, enter your email address:

What's this?

Submit

Click here for more information

Contact NHSN:

Centers for Disease Control and Prevention
National Healthcare Safety Network
MS-A24
1600 Clifton Rd
Atlanta, GA 30333

Contact NHSN@cdc.gov

Contact Us:

Centers for Disease Control and Prevention
1600 Clifton Rd
Atlanta, GA 30333
 800-CDC-INFO



“For Enrolled Facilities” Web Page



National Healthcare Safety Network (NHSN)
Tracking Infections in Acute Care Hospitals/Facilities

NHSN is the HAI surveillance gold standard. The system (and its predecessors) started years ago helping a few hundred healthcare facilities; today, more than 11,000 healthcare facilities use NHSN as the cornerstone of their HAI elimination strategies. Specifically, facilities use NHSN to:

- Access NHSN enrollment requirements for CMS Hospital Inpatient Quality Reporting Program,
- Obtain baseline HAI rates,
- Compare rates to CDC's national data,
- Participate in state or national HAI prevention collaboratives,
- Devise and implement HAI elimination strategies,
- Evaluate immediate and long-term results of elimination efforts,
- Refocus efforts as needed, or advance to different areas.



Email page link
 Print page
 NHSN Login
 Continuing Education Opportunities
 Get email updates
 To receive email updates about this page, enter your email address:

 What's this?

CLABSI - Surveillance for Central Line-associated Bloodstream Infections

- Training
- Protocols
- Forms
- Support Materials
- Analysis Resources
- FAQs

CAUTI - Surveillance for Catheter-associated Urinary Tract Infections

- Training
- Protocols
- Forms
- Support Materials
- Analysis Resources
- FAQs

CMS NHSN Requirements
 Click here for more information

CLIP - Surveillance for Central Line Insertion Practices Adherence

- Training
- Protocols
- Forms
- Support Materials
- Analysis Resources
- FAQs

SSI - Surveillance for Surgical Site Infections

- Training
- Protocols
- Forms
- Support Materials
- Analysis Resources
- FAQs



MDRO/CDI - Surveillance for C. difficile, MRSA, and Other Drug-Resistant Infections

- Training
- Protocols
- Forms
- Support Materials
- Analysis Resources
- FAQs

AUR - Surveillance for Antimicrobial Use and Antimicrobial Resistance Option

- Training
- Protocols
- Forms
- Support Materials
- Analysis Resources
- FAQs

Contact NHSN:
 Centers for Disease Control and Prevention
 National Healthcare Safety Network
 MS-A24
 1600 Clifton Rd
 Atlanta, GA 30333
 Contact NHSN@cdc.gov

VAP - Surveillance for Ventilator-associated Pneumonia Events *In Plan for Pediatric Patients Only

- Training
- Protocols
- Forms
- Support Materials
- Analysis Resources
- FAQs

VAE - Surveillance for Ventilator-associated Events *In-Plan Adult Locations Only

- Training
- Protocols
- Forms
- Support Materials
- Analysis Resources
- FAQs

Contact Us:
 Centers for Disease Control and Prevention
 1600 Clifton Rd
 Atlanta, GA 30333
 800-CDC-INFO (800-232-4636)
 (800-232-4636)
 TTY: (888) 232-6348
 New Hours of Operation
 9am-5pm ET/Monday-Friday
 Closed [Holidays](#)
 [Contact CDC-INFO](#)

Surveillance for Healthcare Personnel Influenza Vaccination

- Training
- Protocols
- Forms
- Support Materials
- Analysis Resources
- FAQs

Surveillance for Healthcare Personnel Exposure

- Training
- Protocols
- Forms
- Support Materials
- Analysis Resources
- FAQs

Blood Safety Surveillance

- Training
- Protocols
- Forms
- Support Materials
- Analysis Resources
- FAQs

About CMS HAI IPPS Acute Care Hospitals Quality Reporting Program, click here.

- CCN
- Training
- Digital Certificates
- Monthly Data Submission

NHSN Acute Care Hospital-Specific Page

- Contains educational modules
- CMS requirements
- Links to emails and past newsletters



- SSI Surveillance**
- Training
 - Protocols
 - Forms
 - Support Materials
 - Analysis Resources
 - FAQs

www.cdc.gov/nhsn/acute-care-hospital

To review

CDC Prevention Strategies

Core Strategies

High levels of scientific evidence

Demonstrated feasibility

- Should become standard practice

Supplemental Strategies

Some scientific evidence

Variable levels of feasibility

- Consider implementing in addition to Core when infections persist or rates are high

SSI Prevention Strategies: **Core**

- Administer antimicrobial prophylaxis in accordance with evidence based standards and guidelines
 - Administer within 1-hour prior to incision
(2hr for vancomycin and fluoroquinolones)
 - Select appropriate agents on basis of:
 - Surgical procedure
 - Most common SSI pathogens for the procedure
 - Published recommendations
 - Discontinue antibiotics within 24hrs after surgery
(48 hrs for cardiac)

SSI Prevention Strategies: **Core**

- Identify and treat remote infections – when possible
 - Before elective operation
 - Postpone operation until infection resolved
- Hair removal
 - Do not remove hair at the operative site unless it will interfere with the operation
 - Do not use razors
 - If necessary, remove by clipping or by use of a depilatory agent

SSI Prevention Strategies: **Core**

- Skin Prep
 - Use appropriate antiseptic agent and technique for skin preparation
- Operating Room (OR) Traffic
 - Keep OR doors closed during surgery except as needed for passage of equipment, personnel, and the patient
- Colorectal surgery patients
 - Mechanically prepare the colon (e.g. enemas, cathartic agents)
 - Administer non-absorbable oral antimicrobial agents in divided doses on the day before the operation

SSI Prevention Strategies: **Core**

- Maintain immediate postoperative normothermia
- Surgical Wound Dressing
 - Protect primary closure incisions with sterile dressing for 24-48 hours post-op
- Control blood glucose level during the immediate post-operative period - cardiac
 - Measure blood glucose level at 6 am on post-op day 1 and 2 (procedure day = day 0)
 - Maintain post-op blood glucose level at <200mg/dL

SSI Prevention Strategies: **Supplemental**

- Nasal screen for *Staphylococcus aureus* on patients undergoing
 - elective cardiac surgery, orthopedic, neurosurgery procedures with implants
 - decolonize carriers with mupirocin prior to surgery
- Screen preoperative blood glucose levels and maintain tight glucose control post-op day 1 and 2 in patients undergoing select elective procedures
 - i.e., arthroplasties, spinal fusions, etc.



NOTE: These supplemental strategies are not part of the 1999 HICPAC Guideline for Prevention of Surgical Site Infections

SSI Prevention Strategies: **Supplemental**

- Redose antibiotic at 3 hour intervals in procedures with duration >3 hours
 - *See exceptions to this recommendation in Engelmann, 2007
- Adjust antimicrobial prophylaxis dose for patients who are obese (body mass index >30)
- Use at least 50% fraction of inspired oxygen intraoperatively and immediately postoperatively in select procedure(s)
- Perform surveillance for SSI
- Feedback surgeon-specific infection rates

NHSN HAI Surveillance Definitions

Look for annual
updates to definitions
www.cdc.gov/nhsn



CDC/NHSN Surveillance Definitions for Specific Types of Infections

INTRODUCTION

This chapter contains the CDC/NHSN surveillance definitions and criteria for all specific types of infections. Comments and reporting instructions that follow the site-specific criteria provide further explanation and are integral to the correct application of the criteria. This chapter also provides further required criteria for the specific infection types that constitute organ/space surgical site infections (SSI) (e.g., mediastinitis [MED] that may follow a coronary artery bypass graft, intra-abdominal abscess [IAB] after colon surgery).

Additionally, it is necessary to refer to the criteria in this chapter when determining whether a positive blood culture represents a primary bloodstream infection (BSI) or is secondary to a different type of HAI (see [Appendix 1](#) Secondary Bloodstream Infection (BSI) Guide). A BSI that is identified as secondary to another site of HAI must meet one of the criteria of HAI detailed in this chapter. Secondary BSIs are not reported as separate events in NHSN, nor can they be associated with the use of a central line.

Also included in this chapter are the criteria for Ventilator-Associated Events (VAEs). It should be noted that Ventilator-Associated Condition (VAC), the first definition within the VAE surveillance definition algorithm and the foundation for the other definitions within the algorithm (IVAC, Possible VAP, Probable VAP) may or may not be infection-related.

CDC/NHSN SURVEILLANCE DEFINITIONS OF HEALTHCARE-ASSOCIATED INFECTION

Present on Admission (POA) Infections

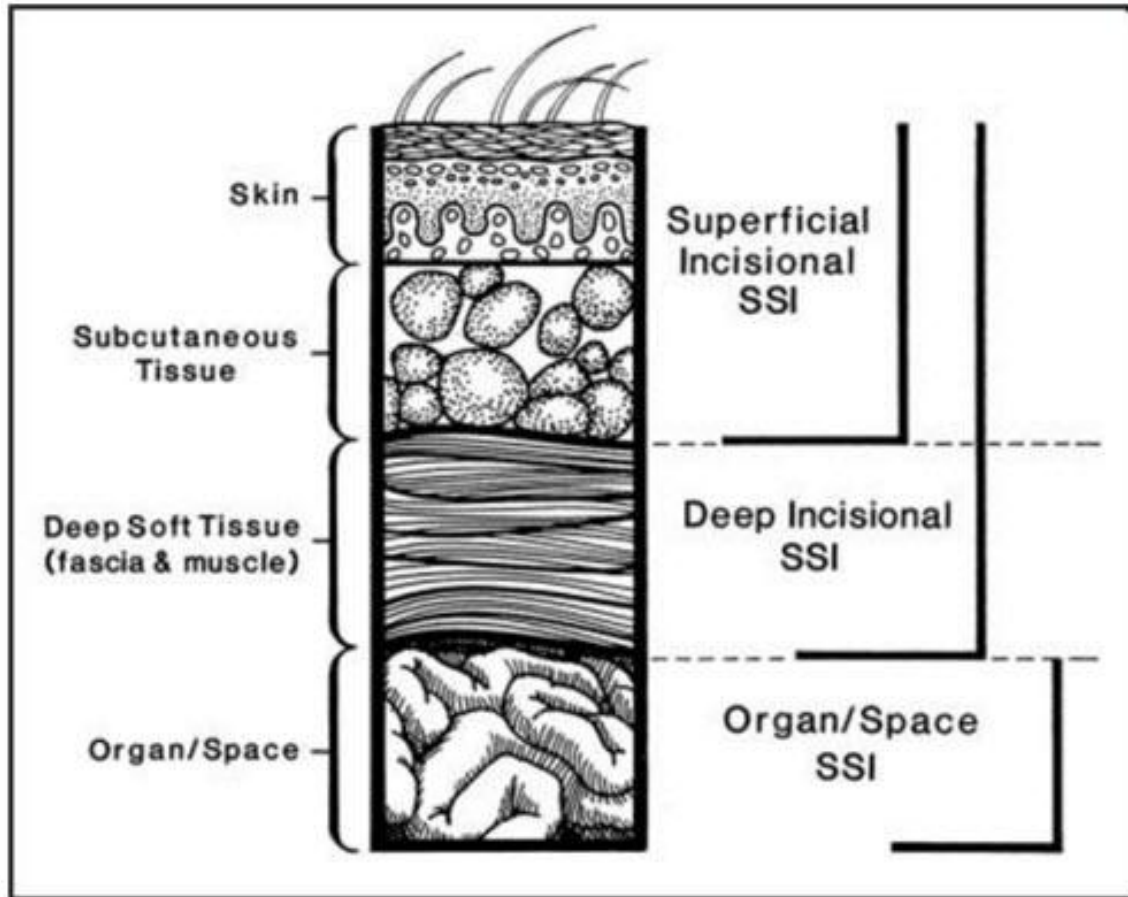
To standardize the classification of an infection as present on admission (POA) or a healthcare-associated infection (HAI), the following objective surveillance criteria have been adopted by NHSN. NOTE: This classification should not be applied to SSI, VAE, or LabID Events.

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

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
 - Physician diagnosis of infection is acceptable for some infections

NHSN SSI Surveillance Definition



- Categorized based on depth of infection

Superficial Incisional SSI

NHSN Surveillance Definition, 2014

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

AND

Patient has at least **1**:

- Purulent drainage from the superficial incision
 - Organism isolated from incision culture or fluid (obtained aseptically)
 - Diagnosis of superficial SSI by surgeon or attending physician or other designee
 - Pain, tenderness, localized swelling, redness, or heat
- AND
- Incision opened by surgeon; culture positive or not cultured

Deep Incisional SSI

NHSN Surveillance Definition, 2014

- Infection occurs within 30 after surgical procedure (**UNLESS** its one of the 13 procedures followed for **90 days**)

AND

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

AND

Patient has at least **1**:

- Purulent drainage from deep incision
- Abscess or evidence of infection involving deep incision detected on direct exam, during invasive procedure, or by histopathologic or imaging test
- Deep incision spontaneously dehisces
-OR- opened by surgeon, attending physician or designee

AND

Patient has at least **1**:*

- fever >38°C
- localized pain, or
- tenderness

*Unless culture-negative

SSI Surveillance Period

- Post-operative monitoring period now determined by NHSN Procedure Category
- 14 NHSN procedure types require 90-day monitoring period

BRST*	CRAN	HPRO	RFUSN
CARD	FUSN	KPRO	VSHN*
CBGB	FX	PACE	
CBGC	HER	PVBY*	

***Not a required CA-reportable procedure**

- All other procedure categories monitored for 30 days regardless of presence of an implant
- For all NHSN procedure categories, superficial SSI are monitored for 30 days only

Organ/Space SSI

NHSN Surveillance Definition, 2014

- Infection occurs within 30 after surgical procedure (**UNLESS** its one of the 13 procedures followed for **90 days**)

AND

- Involves any part of body opened or manipulated during the surgical procedure

AND

Patient has at least **1**:

- Purulent drainage from drain placed into organ/space
- Organism isolated from an aseptically-obtained culture of fluid or tissue in the organ/space
- Abscess or evidence of infection involving the organ/space that is detected on direct exam, during invasive procedure, or by histopathologic or imaging test

AND

- Meets surveillance definition for a **specific NHSN infection site**

Table 13. Specific Sites of an Organ/Space SSI

Code	Site	Code	Site
BONE	Osteomyelitis	LUNG	Other infections of the respiratory tract
BRST	Breast abscess or mastitis	MED	Mediastinitis
CARD	Myocarditis or pericarditis	MEN	Meningitis or ventriculitis
DISC	Disc space	ORAL	Oral cavity (mouth, tongue, or gums)
EAR	Ear, mastoid	OREP	Other infections of the male or female reproductive tract
EMET	Endometritis	OUTI	Other infections of the urinary tract
ENDO	Endocarditis	PJI	Periprosthetic Joint Infection
EYE	Eye, other than conjunctivitis	SA	Spinal abscess without meningitis
GIT	GI tract	SINU	Sinusitis
HEP	Hepatitis	UR	Upper respiratory tract
IAB	Intraabdominal, not specified	VASC	Arterial or venous infection
IC	Intracranial, brain abscess or dura	VCUF	Vaginal cuff
JNT	Joint or bursa		

Gastrointestinal Tract (GIT) Infection

NHSN Surveillance Definition, 2014

Patient meets **1** of 2 criteria:

- 1. Abscess or other evidence of infection seen during invasive procedure or histopathologic exam
 - 2. **2** signs/symptoms of organ/tissue involved
 - fever(>38C)
 - nausea*
 - vomiting*
 - abdominal pain*
 - tenderness*
 - diarrhea*
- *with no other recognized cause*
- AND**
- At least **1** of the following:
 - Organisms cultured from drainage or tissue obtained during an invasive procedure /endoscopy or from a drain
 - Organisms seen on Gram's/KOH stain or giant cells seen on micro exam of drainage or tissue obtained during invasive procedure or from drain
 - Organisms cultured from the blood
 - Evidence of pathologic findings on imaging test**
 - Evidence of pathologic findings on endoscopic exam (*e.g., Candida esophagitis, proctitis, toxic megacolon*)

Wound Class

- Per CA reporting requirements, ALL mandated procedures, **regardless of wound class**, must be reported to NHSN
 - Includes clean (C), clean contaminated (CC), contaminated (CO), and dirty (D) procedures
 - CDC risk-adjustment requires reporting all procedures; SIR accounts for higher infection risk for CO and D procedures
- Wound class must be assessed at the time of the operation by a person present during the surgical procedure
 - End-of-case assessment done by surgeon, circulating nurse, etc.
 - Wound class 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

Identifying SSI

- Surgical Services, surgical units, and OR staff need to assist in SSI surveillance
- Evaluate both clinical and microbiologic findings post-op
 - Can't rely on wound cultures alone to find SSI (!)
- Evaluate surgical patients during hospital stay
 - Rounds on units
 - Pharmacy reports of antimicrobial use
 - Temperature charts / logs
 - Operating room schedule of surgeries/ re-operations
- Monitor surgical patients for re-admission
- Perform post-discharge surveillance
 - Consider using procedure billing codes (ICD-9) to validate data

$$\text{SIR} = \frac{\text{Observed HAIs}}{\text{Predicted HAIs}}$$

Examples:

If your hospital has 2 CLABSI per 1000 line days and national data predict 2.0 CLABSI per 1000 line days:

$$\text{SIR} = \frac{2}{2.0} = 1.0$$

If your hospital has 4 SSI per 100 Hip prosthesis procedures and national data predict 2.5 SSI:

$$\text{SIR} = \frac{4}{2.5} = 1.6$$

Procedure Risk Factor Data

* New reporting variables beginning 2014

For EACH procedure

- Gender
- Age
- Surgical wound class
 - clean, clean-contaminated, contaminated, or dirty
- ASA score - as proxy for underlying illness
- Yes/No: Emergency, Trauma, Anesthesia type
- Endoscope (*decreases risk*)
- Duration
- * Diabetes status
- * Incisional closure type

* Height

* Weight

Optional in 2014. Required Jan 2015
Work with your IT department now

SSI Risk Adjustment

- Models developed for each NHSN operative procedure
 - Specific factors found to increase SSI risk for that procedure
- Every patient undergoing a procedure in your hospital has a calculated SSI risk
- Based on your surgical patient population, the expected (predicted) number of SSI can be calculated

Example: HYST

Factors in the risk adjustment model that add to SSI risk are

- Age equal to or younger than 44 years
- ASA score of 3, 4, or 5
- Duration of surgery longer than 100 minutes (incision to close time)
- Procedure done at major teaching hospital (from NHSN Annual Survey)

This table represents a partial list of 100 hypothetical patients who have undergone a HYST procedure and the risk factors present for each.

Patient	Age	Duration	ASA	Medical School Aff.	SSI	Probability of SSI
1	40	117	4	Y	0	0.050
2	53	95	2	N	0	0.004
3	30	107	2	Y	1	0.033
.
.
.
100	37	128	4	Y	1	0.050
TOTAL					Observed (O)	Expected (E)
					3	2.91
SIR = O/E = 3/2.91					= 1.03	

Interpreted as a 5.0% risk of SSI for patient 1

Probability of SSI is calculated for each surgical patient

The SSI probabilities are added together to get the predicted (expected) number of SSI for this surgical patient population

SSI SIR is not different than predicted

- 3 SSI observed
- 2.9 SSI expected

Using SSI Surveillance Data

"The power of [HAI] surveillance is in sharing findings with those who need to know and who can act on the findings to improve patient safety"

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



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

NHSN for Mandatory HAI Reporting

Required by [CDPH](#) to meet mandated HAI reporting requirements in California acute care hospitals (including LTACs)

- CLIP in ICUs
- CLABSI facility-wide
- **SSI from 29 operative procedures (per AFL 11-32)**
- *C difficile* from inpatients*
- MRSA and VRE bacteremia from inpatients*
 - If inpatient MRSA BSI related to central line, event must be reported also as CLABSI (entered in both NHSN modules)

* and ED patients admitted to facility same day



CMS HAI Reporting Requirements - via NHSN

Healthcare Facility HAI Reporting Requirements to CMS via NHSN-- Current Requirements

CMS Reporting Program	HAI Event	Reporting Specifications	Reporting Start Date
	CLABSI	Adult, Pediatric, and Neonatal ICUs	January 2011
	CAUTI	Adult and Pediatric ICUs	January 2012
	SSI: COLO	Inpatient COLO Procedures	January 2012
	SSI: HYST	Inpatient HYST Procedures	January 2012
Hospital Inpatient Quality Reporting (IQR) Program	MRSA Bacteremia LabID Event	FacWideIN	January 2013
	<i>C. difficile</i> LabID Event	FacWideIN	January 2013
	Healthcare Personnel Influenza Vaccination	All Inpatient Healthcare Personnel	January 2013
	Medicare Beneficiary Number	All Medicare Patients Reported into NHSN	July 2014
	CLABSI	Adult & Pediatric Medical, Surgical, & Medical/Surgical Wards	January 2015
	CAUTI	Adult & Pediatric Medical, Surgical, & Medical/Surgical Wards	January 2015
Ambulatory Surgery Centers Quality Reporting Program	Healthcare Personnel Influenza Vaccination	All ASC Healthcare Personnel	October 2014

Recommended SSI Surveillance Methods

NHSN

- Direct examination of wounds
 - Are any IPs really doing this?
- Review of medical records
 - Ok, but which ones?
- Surgeon surveys by mail or telephone
- Patient surveys by mail or telephone

CMS Validation

- Using ICD9 procedure and diagnosis code-sets for COLO and HYST

SSI Validation

1. Traditional methods of SSI case finding are likely inadequate and fail to identify all infections
 - Resulting in inaccurate calculations and understanding of true SSI incidence
 - Potential failure to identify highest-risk procedures and alert surgeons of need for action
2. Hospitals are strongly encouraged to incorporate the use of post-op diagnostic/procedure ICD9 “flag” codes into routine surveillance methods
 - May improve efficiency of SSI case finding by as much as 50% for colon and abdominal hysterectomy
 - Will be incorporated into CDPH HAI Program 2014 and 2015 validation (all CA hospitals are expected to participate)
 - Already used by CMS for validation

Objectives of CDPH SSI Validation, 2013

- HAI Program Liaison IPs performed onsite data validation to
- Gain a better understanding of how well SSI surveillance is being performed
 - Provide immediate one-on-one education and coaching to volunteer hospitals
 - Develop targeted education for all CA hospitals based on common errors, identified gaps, misinterpretations

What this validation process was NOT:

- A research study
- Formal evaluation of SSI reporting implementation

Important to remember that findings may not be generalizable

SSI Validation Process

- Onsite 2-day review at each hospital by 1 or 2 HAI Program Liaison IPs
- Requested list of Colon (COLO) and abdominal hysterectomy (HYST) procedures performed over 1 or 2 quarter period of 2013
 - Requested search for post-op billing codes, including diagnosis and procedure codes
 - All “flagged” patient records reviewed during onsite visit
 - Required Liaison IP to have access to all medical records
 - Reviewed additional SSI reported to NHSN not identified by “flag” code
- Standardized collection tool to enter data and produce hospital-specific findings for presentation prior to exit

Procedure Codes Required by NHSN for Defining and Reporting COLO and HYST

ICD-9 Procedure Codes That Define an NHSN Colon Procedure

17.31	17.32	17.33	17.34	17.35	17.36
17.39	45.03	45.26	17.39	45.03	45.26
45.41	45.49	45.52	45.71	45.72	45.73
45.74	45.75	45.76	45.79	45.81	45.82
45.83	45.92	45.93	45.94	45.95	46.03
46.04	46.10	46.11	46.13	46.14	46.43
46.52	46.75	46.76	49.94		

ICD-9 Procedure Codes That Define an NHSN Abdominal Hysterectomy

68.31	68.39	68.41	68.49	68.61	68.69
-------	-------	-------	-------	-------	-------

Post-Operative ICD-9 Procedure Codes for “Flagging” Possible COLO SSI

ICD9 Procedure Codes That MIGHT Indicate a Colon SSI	
54.0	Incision and drainage (I&D) of abdominal wall
54.11	Exploratory laparotomy
54.19	Drainage of intraperitoneal abscess or hematoma
86.04	Skin and subcutaneous I&D NEC
86.22	Excision debridement of wound, infection, burn
86.28	Non-excision debridement of wound, infection, burn

Post-Operative ICD-9 **Diagnosis Codes** for “Flagging” Possible COLO SSI

ICD9 **Diagnosis Codes** That MIGHT Indicate a **Colon SSI**

567.21, 567.22	Intra-abdominal abscess, intra- or retroperitoneal abscess
567.29	Other suppurative peritonitis
567.38	Pelvic abscess
569.5	Intestinal abscess
569.61	Infection of colostomy or enterotomy
569.81	Fistula of intestine
682.2	Abdominal wall abscess, cellulitis of trunk
879.9	Open wound of unspecified site, complicated
998.31, 998.32	Disruption of internal or external surgical wound
998.51	Postoperative infection, seroma
998.59	Postoperative infection, abscess
998.6	Non-healing surgical wound, persistent post op fistula

Post-Operative ICD-9 **Diagnosis Codes** for “Flagging” Possible HYST SSI

ICD9 **Diagnosis Codes** That MIGHT Indicate a **HYST SSI**

567.21, 567.22	Peritonitis, intra-abdominal abscess, intraperitoneal or retroperitoneal abscess
567.29	Other suppurative peritonitis
682.2	Abdominal wall abscess, cellulitis of trunk
998.31, 998.32	Disruption of internal or external surgical wound
998.51	Postoperative infection, seroma
998.59	Postoperative infection, abscess

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
 - Hospitals expected to incorporate ICD9-based surveillance to improve SSI case-finding moving forward
- 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

Presentation of SSI Validation Findings

- **Sensitivity**

- Proportion of SSI reported by hospital among all patients with an SSI
- High sensitivity indicates SSI are being identified and reported

- **Specificity**

- Proportion of SSI not reported by hospital among patients without SSI
- High specificity indicates accuracy in “ruling out” SSI

- **Positive Predicted Value**

- Proportion of SSI detected by hospital that actually are SSI
- 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
	Not an HAI	False negatives	True negatives

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

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

SSI Validation Findings: **Colon**

- Colon SSI missed by hospital surveillance were:
 1. More likely to have occurred during the surgical admission, opposed to post-discharge or readmission ($p < 0.01$)
 2. Less likely to have positive culture of fluid or tissue from incision or organ space ($p = 0.02$)
- Documentation of SSI by surgeon or attending physician was similar in Colon SSI cases reported by hospitals and in cases missed ($p = 0.57$)

SSI Validation Findings: **Colon** *(continued)*

- Use of ICD9 post-operative “flag” codes identified additional unreported Colon SSIs in 31 of 42 (74%) hospitals
 - 7 of these hospitals had previously reported 0 Colon SSIs
- Only 11 of 42 (**26%**) hospitals demonstrated complete identification* and reporting of Colon SSI

*Defined as 100% sensitivity or case-finding

SSI Validation Findings: **Abdominal HYST**

- HYST SSI cases missed by hospitals met similar CDC/NHSN criteria as cases that had been reported
- Comparing cases found by ICD9 flag codes to cases found/reported by hospital (prior to validation visit):
 1. ICD9 flag codes identified fewer cases in outpatient setting (57% vs. 81%, although p-value was NS)
 2. ICD9 flag codes identified more cases on readmission (79% vs. 67%, p-value = NS)

SSI Validation Findings: **Abdominal HYST**

(continued)

- Use of ICD-9 post-operative “flag” codes identified additional unreported HYST SSIs in 12 of 34 (35%) hospitals
 - 6 of these hospitals had previously reported 0 HYST SSIs
- 22 of 34 (65%) hospitals demonstrated complete identification and reporting of HYST SSI

In Summary

NHSN is a surveillance system

- It is also the platform for recording data, which meets the regulatory reporting requirements for CDPH and CMS

SSI surveillance (and reporting) is a team sport!

- Successful surveillance programs require participation from all members of the team including:
 - Infection Control
 - OR Staff
 - PACU
 - EVS
 - Nursing
 - Surgeons
 - Physicians
 - Laboratory
 - Administration
 - Home Care
 - PACU
 - Anesthesiology
 - Radiology
 - Respiratory Therapy
 - And more!

Sharing SSI surveillance findings is critical to improve rates

Validate your data to ensure it is accurate and complete



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

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

Healthcare Associated Infections - Advisory Committee

» [New HAI Advisory Committee](#)

Information for Infection Prevention Programs

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

Antimicrobial Resistance

- » [New Carbapenem-resistant Enterobacteriaceae](#)
- » [California Antibioqram Project](#)
- » [The California Antimicrobial Stewardship Program Initiative](#)

Influenza Information

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

Public Reporting - Healthcare Associated Infections

- » [New My Hospital 411 - Healthcare Associated Infections Interactive Map 2012 Data](#)
- » [New Central Line associated Bloodstream Infection \(CLABSI\) 2012](#)
- » [New Methicillin-resistant Staphylococcus aureus \(MRSA\) and Vancomycin-resistant Enterococcus \(VRE\) 2012](#)
- » [New Surgical Site Infections 2012](#)
- » [New Clostridium difficile Infection \(CDI\) 2012](#)

Public Reporting - Prevention Measures

- » [Central Line Insertion Practices \(CLIP\)](#)
- » [Healthcare Personnel Influenza Vaccination](#)
- » [Surgical Site Infection Prevention Measures Mandatory Reporting](#)

Long-Term Care (LTC)

» [New Guidelines and Information for Long-Term Care Facilities \(LTCF\) Includes New Survey](#)

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 \(SHEA\)](#)
- » [Infectious Diseases Society of America \(IDSA\) \(New Window\)](#)
- » [UCSD Infection Prevention Course -- Designed to Meet CA SB 158 Requirements \(PDF, New Window\)](#)

Contact

» [HAI Program](#)

For issues specific to California, NHSN help is also available from the CDPH HAI Program

www.cdph.ca.gov/hai

Includes tailored guides, slide sets, implementation tools

Questions?

Email

HAIProgram@cdph.ca.gov

