

Laying a Strong Foundation for NHSN Surveillance and Device-associated Infections

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Objectives

At the end of the presentation, participants will be able to:

- Define the general NHSN surveillance definitions provided in the NHSN Patient Safety Component Chapter 2 “Identifying Healthcare-associated Infections (HAI) for NHSN Surveillance”
- Identify which NHSN events use the definitions found in Chapter 2
- Apply NHSN surveillance concepts/criteria to clinical case scenarios

Welcome!



IT'S BEEN A LONG TIME



Who Says You Can't Teach an Old Dog New Tricks?




13 years young

- You **CAN** teach an old dog new tricks.....if they are willing to learn.

(and have plenty of treats)

Patient Safety Component Manual

- Chapter 2: Identifying Healthcare-associated Infections for NHSN Surveillance
 - Device-associated infections
 - CLABSI (Chapter 4)
 - CAUTI (Chapter 7)
 - Pneumonia (Chapter 6)
 - Specific Types of Infections (Chapter 17)
- Does not apply to: 
 - SSI (Chapter 9)
 - VAE (Chapter 10)
 - PedVAE (Chapter 11)
 - LabID (Chapter 12)

National Healthcare Safety Network (NHSN) Patient Safety Component Manual

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Chapter 1: National Healthcare Safety Network (NHSN) Overview
Chapter 2: Identifying Healthcare-associated Infections (HAI) for NHSN Surveillance
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Chapter 4: Bloodstream Infection Event (Central Line-Associated Bloodstream Infection and non- central line-associated Bloodstream Infection)
Chapter 5: Central Line Insertion Practices (CLIP) Adherence Monitoring
Chapter 6: Pneumonia (Ventilator-associated [VAP] and non-ventilator-associated Pneumonia [PNEU]) Event
Chapter 7: Urinary Tract Infection (Catheter-Associated Urinary Tract Infection [CAUTI] and non- catheter-associated Urinary Tract Infection [UTI]) and Other Urinary System Infection (USI) Events
Chapter 9: Surgical Site Infection (SSI) Event
Chapter 10: Ventilator-Associated Event (VAE)
Chapter 11: Pediatric Ventilator-Associated Event (PedVAE)
Chapter 12: Multidrug-Resistant Organism & <i>Clostridioides difficile</i> Infection (MDRO/CDI) Module
Chapter 14: Antimicrobial Use and Resistance (AUR)
Chapter 15: CDC Locations and Descriptions and Instructions for Mapping Patient Care Locations
Chapter 16: General Key Terms
Chapter 17: CDC/NHSN Surveillance Definitions for Specific Types of Infections

2024 Updates

Organ Donation Exclusion Clarification

- Clarification provided for organ donation exclusion for criteria without a specimen collected
 - General Instructions #3, page 2-2

2024

3. If the date of specimen collection is on or after the date of documentation of evidence of consent **AND** the patient is being supported for organ donation purposes, an event identified using the specimen culture result or microbiologic non-culture based diagnostic test result should not be reported as an HAI. For criteria without a specimen collected, if the date of event (DOE) is on or after the date of documentation of evidence of consent **AND** the patient is being supported for organ donation purposes, the event identified should not be reported as an HAI. The patient should, however, still be included in device and patient day denominator data collection.

Infections in Newborns Clarification

- Clarification provided for excluded infections occurring in newborns
 - General Instructions #6, page 2-2

2024

6. Infections occurring in newborns with date of event on hospital day 1 or day 2 are considered POA. Those with a date of event on day 3 or later, are an HAI. Infections acquired as a result of passage through the birth canal and transplacentally-acquired viral, parasite and spirochete infections are excluded (for example, but not limited to herpes simplex, toxoplasmosis, rubella, CMV, or syphilis). Exception: See guidance about non-reporting of CLABSIs with Group B Streptococcus during a neonate's first 6 days of life found in the Comments and Reporting Instructions section of the Bloodstream Infection Event (Central Line-Associated Bloodstream Infection and Non-central line-associated Bloodstream Infection) protocol.

General Information

Excluded Organisms

- Rarely or not known to be causes of healthcare-associated infections
 - *Blastomyces*, *Histoplasma*, *Coccidioides*, *Paracoccidioides*, *Cryptococcus* and *Pneumocystis*
- Latent infections
 - For example, but not limited to herpes, shingles, syphilis, or tuberculosis
- Individual event protocols for pathogen exclusions specific to the event

The following excluded organisms cannot be used to meet the UTI definition:

- Any *Candida* species as well as a report of “yeast” that is not otherwise specified
- mold
- dimorphic fungi or
- parasites

Additional Notes

- Hospice, palliative, or comfort care patients are NOT excluded
- Autopsy specimens/reports are NOT eligible for use except for:
 - Central nervous system (CNS)/intracranial (IC) infection
 - Pneumonia (PNEU)
 - lung tissue specimen obtained by transthoracic or transbronchial biopsy immediately post-mortem

Observation Patients

- If an observation patient is **admitted to an inpatient location**:
 - included in all surveillance events in the monthly reporting plan
 - included in patient and device day counts
- 24-hour observation unit is **NOT** considered an **inpatient unit** per NHSN
 - Mapped as OUT:ACUTE:WARD

Physician/Physician Designee Diagnosis

- **ONLY** can be used when physician/physician designee diagnosis is an element of the specific infection definition:

- Physician diagnosis is an element of UR definition

1. Patient has at least **two** of the following signs or symptoms: fever ($>38.0^{\circ}\text{C}$), erythema of pharynx*, sore throat*, cough*, hoarseness*, tachypnea*, nasal discharge*, or purulent exudate in throat*
And at least one of the following:
 - a. organism(s) identified from upper respiratory site [specifically: larynx, nasopharynx, pharynx, and epiglottis] by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST). Note: excludes sputum and tracheal aspirate because these are not upper respiratory specimens.
 - b. diagnostic single antibody titer (IgM) or 4-fold increase in paired sera (IgG) for organism.
 - c. Physician or physician designee diagnosis of an upper respiratory infection.

- Physician diagnosis is an element of EAR definition

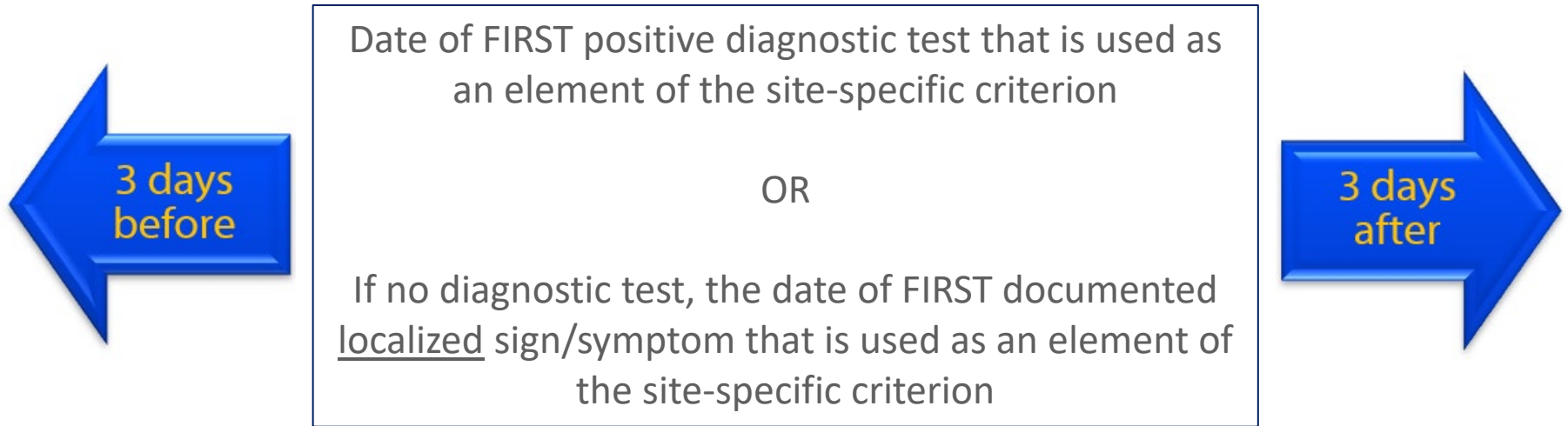
Otitis interna (labyrinthitis) must meet at least **one** of the following criteria:

5. Patient has organism(s) identified from fluid from inner ear obtained during an invasive procedure by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
6. Patient has a physician or physician designee diagnosis of inner ear infection.

Foundational Concepts

Infection Window Period (IWP)

- The 7-days during which ALL site-specific infection criteria must be met



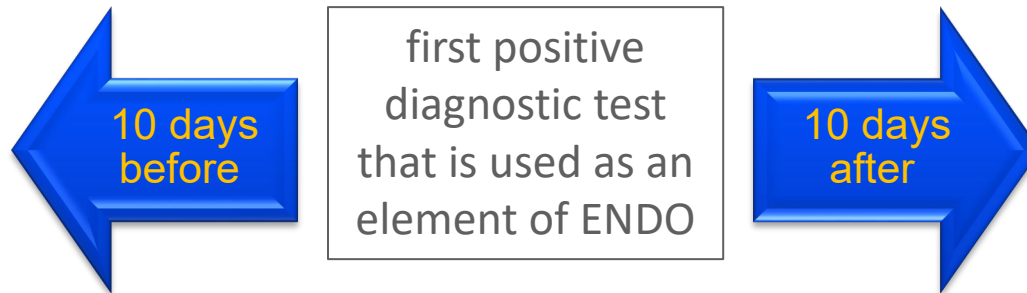
Infection Window Period Considerations

- Use the FIRST diagnostic test* that creates an IWP during which **ALL** elements of the criterion can be found
 - *Examples of diagnostic test include:
 - Laboratory specimen collection
 - Imaging test
 - Procedure or exam
- Localized signs or symptoms may be used to set the IWP when no diagnostic test
 - diarrhea
 - site specific pain
 - purulent exudate

Cannot use a non-specific sign/symptom such as fever

Additional IWP Considerations

- Identify an IWP that results in the **EARLIEST** date of event (DOE)
 - Occurs when you meet more than one criterion
- Endocarditis (ENDO) has an extended IWP of 21 days
 - Accommodates the extended diagnostic timeframe that can occur to reach a clinical determination



IWP Example #1

Hospital Day	Criterion
8	
9	
10	
11	
12	
13	blood culture : <i>Staphylococcus aureus</i>
14	
15	
16	
17	

1st Diagnostic test

3-days before

3-days after

7-Day IWP

IWP Example #2

Hospital Day	Criterion	
6/14		3-days before
6/15		
6/16	fever > 38.0°C	
6/17	CT:liver abscess noted	3-days after
6/18		
6/19	blood culture : <i>Klebsiella oxytoca</i>	
6/20	hypotension	
6/21		
6/22		
6/30		

1st Diagnostic test

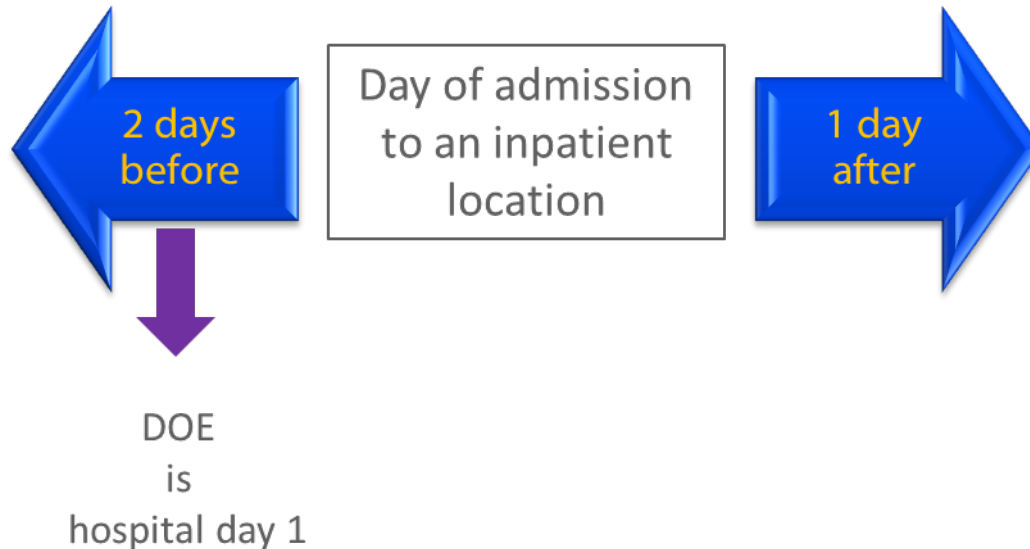
7-Day IWP

Date of Event (DOE)

- Date the **FIRST** element used to meet an NHSN site-specific infection criterion occurs for the **FIRST** time with the IWP
 - Determines
 - Present on admission (POA) or healthcare-associated infection (HAI)
 - Location of Attribution (LOA)
 - Device association
 - CLABSI/CAUTI
 - Repeat Infection Timeframe (RIT)
 - Day 1 of RIT is set by the DOE

Present on Admission (POA)

- If the DOE of the NHSN site-specific infection criterion occurs during the POA time period



Day of Admission

- Time spent in any outpatient locations (for example, ED or 24-Hour Observation Unit)
 - NOT to be used to set the date of admission

Date	Patient Location	Hospital Day
8/6	ED	-2
8/7	ED	-1
8/8	SICU	1
8/9	SICU	2
8/10	SICU	3

Patient-reported Signs/Symptoms

- Accepted if within the POA time period
- Needs to be documented in the current facility's medical record
 - Cannot be communicated verbally or found/viewable in another facility's medical record without documentation
- Examples:
 - patient states measured fever > 38.0° C or >100.4° F occurring in the POA timeframe
 - nursing home reports fever > 38.0° C or >100.4° F prior to arrival to the hospital and occurring in the POA timeframe
 - patient complains of dysuria
 - copy of laboratory test result from another facility

Healthcare-associated Infection (HAI)

- The DOE of the NHSN site-specific infection criterion occurs on or after the 3rd calendar day of admission to an inpatient location

Hospital Day	Date of Event Assignment for RIT	Classification
2 days before admit	Hospital Day 1	POA
1 day before admit	Hospital Day 1	
1	Hospital Day 1	
2	Hospital Day 2	
3	Hospital Day 3	HAI
4	Hospital Day 4	
5	Hospital Day 5	

DOE Example #1

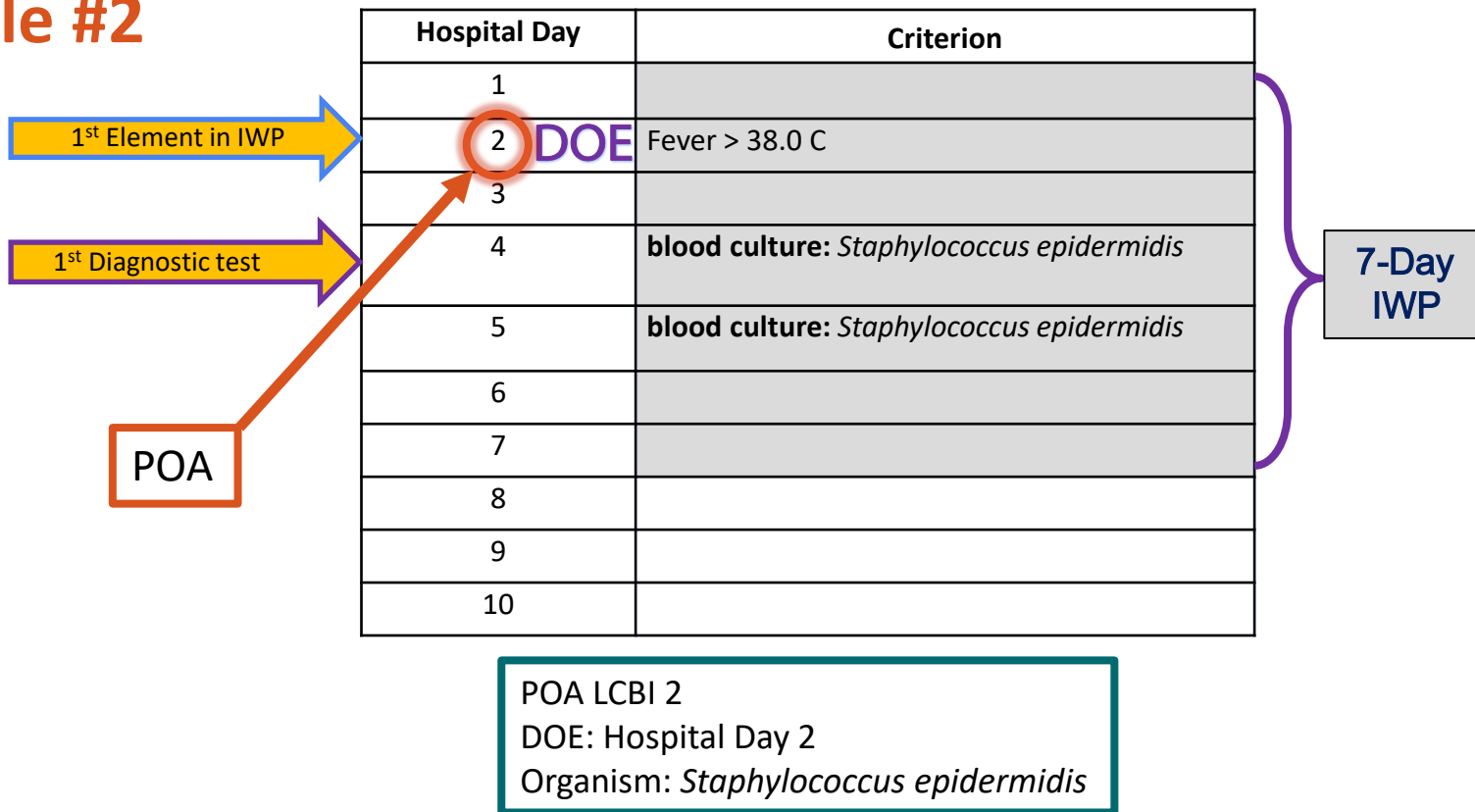
Hospital Day	Criterion
6/14	
6/15	
6/16 DOE	fever > 38.0°C
6/17	CT:liver abscess noted
6/18	
6/19	blood culture : <i>Klebsiella oxytoca</i>
6/20	hypotension
6/21	
6/22	
6/30	

1st Element in IWP →

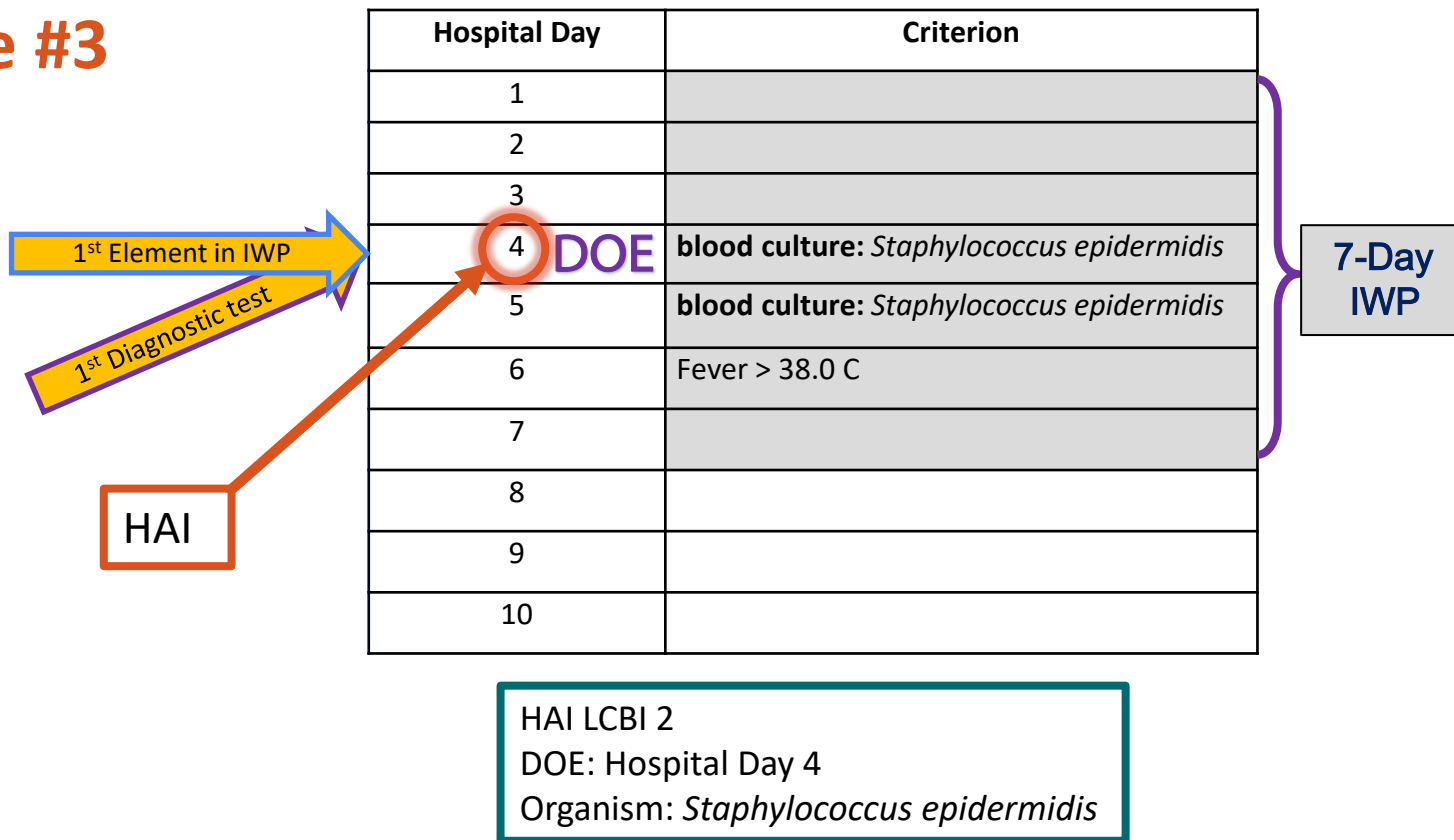
1st Diagnostic test →

7-Day IWP

DOE Example #2




DOE Example #3





Location of Attribution (LOA)

- Inpatient location where the patient is assigned on the DOE
 - Non-bedded locations (example: OR/IR) are not eligible for assignment
- Exception = Transfer Rule
 - DOE on date of transfer or discharge, or the next day:
 - Attribute to the transferring/discharging location or facility
- If the patient is in multiple locations within the transfer rule time frame:
 - Attribute to the **FIRST** location in which the patient was housed on the day before the DOE

Transfer Rule Examples

Date	Patient Location	Location of Attribution
8/14	Unit A	
8/15	Unit A	
 8/16	Unit A Unit B	Unit A
8/17	Unit B	
8/18	Unit B	
8/19	Unit B	

Date	Patient Location	Location of Attribution
7/8	SICU	
7/9	SICU	
7/10	 3 West 4 East	
 7/11	4 East	3 West
7/12	4 East	
7/13	4 East	

Transfer Rule Discharge Examples

Date	Patient Location	Location of Attribution
1/24	Facility 1	
1/25	Facility 1	
1/26	Facility 1	
1/27	Facility 1 Facility 2	
1/28	Facility 2	Facility 1
1/29	Facility 2	

Date	Patient Location	Location of Attribution
3/20	Unit A	
3/21	Unit A	
3/22	Unit A (discharged)	
3/23	ED (Readmission) Unit B	Unit A
3/24	Unit B	

- Different facilities

- Same facility

Repeat Infection Timeframe (RIT)

- 14-day time period during which no new infections of the same type are reported
 - Day 1 of the RIT is the DOE
 - Negative cultures during the RIT do NOT impact the RIT
- Applies during a patient's single admission
 - Includes the day of and day after discharge (transfer rule)
 - Does NOT carry from one admission to another
- *Endocarditis (ENDO)* RIT is extended
 - Remainder of the patient's current admission

Repeat Infection Timeframe (RIT) cont'd

- If a subsequent infection of the same type occurs within this 14-day time frame
 - Do not report a new event
 - Additional eligible pathogens identified from same type of infection are added to the event
 - Keep the same device association determination and location of attribution (LOA)
 - Original DOE and RIT are maintained

RIT Example #1

DOE

14-Day
RIT

POA LCBI 2
DOE: Hospital Day 2
Organism: *Staphylococcus epidermidis*
RIT: Hospital Day 2-17

Hospital Day	Criterion
1	
2	Fever > 38.0 C
3	
4	blood culture: <i>Staphylococcus epidermidis</i>
5	blood culture: <i>Staphylococcus epidermidis</i>
6	
7	
8	
11	
12	
13	
14	
15	
16	
17	
18	
19	

RIT Example #2

DOE

14-Day
RIT

HAI LCBI 2
DOE: Hospital Day 4
Organism: *Staphylococcus epidermidis*
RIT: Hospital Day 4-19

Hospital Day	Criterion
1	
2	
3	
4	blood culture: <i>Staphylococcus epidermidis</i>
5	blood culture: <i>Staphylococcus epidermidis</i>
6	Fever > 38.0 C
7	
8	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Secondary Bloodstream Infection (BSI) Attribution Period (SBAP)

- Period in which a positive blood specimen must be collected to be considered a secondary bloodstream infection to a primary site infection when matching a primary site organism
- Infection Window Period (IWP) + the Repeat Infection Timeframe (RIT)
 - 14 – 17 days depending on DOE



Two Scenarios for Secondary BSI Attribution Period (SBAP)

NHSN site-specific definition must be met

AND

One of two scenarios below

■ Scenario 1

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

■ Scenario 2

- organism identified in the blood specimen is an element that is used to meet the NHSN site-specific infection criterion
- collected during the site-specific infection window period

Pathogen Assignment During a Secondary BSI Attribution Period

- At least 1 matching pathogen to the organism from a specimen (site-specific or blood) that was used to meet a site-specific infection criterion
 - Eligible BSI pathogens from same blood specimen are also considered secondary to the event
- Pathogen exclusions for specific infection definitions (such as yeast in UTI) also apply to secondary bloodstream infection pathogen assignment
 - Excluded pathogens must be attributed to another primary site-specific infection as either a secondary BSI or identified as a primary BSI

Test Your Knowledge

Case Study

- A 43-year-old male presents to the emergency department (ED) with body aches, nausea and shortness of breath on July 10th.
- They were found to be positive for COVID and are admitted to the medical intensive care unit (MICU) on July 11th.
- On July 13th, the patient has a fever of 101.5°F. The nurse notes urinary frequency on July 14th, and a urine culture is collected which is positive for >100,000 CFU/ml *Pseudomonas aeruginosa*.
- The patient is transferred on July 17th to 7 East pulmonary ward. The patient was well enough to be discharged home on July 20th.

Knowledge Check #1

- What is the correct infection window period (IWP)?

A. 7/10-7/16

B. 7/11-7/17

C. 7/15-7/21

- 7/10: ED, body aches, nausea and shortness of breath
- 7/11: COVID positive, admitted to MICU
- 7/13: temperature of 101.5°F
- 7/14: urinary frequency, urine culture collected >100,000 CFU/ml *Pseudomonas aeruginosa*
- 7/17: transferred to 7 East
- 7/20: discharged home

Knowledge Check #1 Rationale

Date	Criterion
7/10	admitted c/o body aches, nausea and shortness of breath
7/11	COVID positive
7/12	
7/13	Fever 101.5°F
7/14	urine culture: >100,000 CFU/ml <i>Pseudomonas aeruginosa</i> Urinary frequency
7/15	
7/16	
7/17	
7/18	
7/19	

1st Diagnostic test

7-Day IWP

Knowledge Check #2

- What is the date of event (DOE)?

A. 7/13

B. 7/14

C. 7/10

D. 7/18

- 7/10: ED, body aches, nausea and shortness of breath
- 7/11: COVID positive, admitted to MICU
- 7/13: temperature of 101.5°F
- 7/14: urinary frequency, urine culture collected >100,000 CFU/ml *Pseudomonas aeruginosa*
- 7/17: transferred to 7 East
- 7/20: discharged home

Knowledge Check #2 Rationale

Date	Criterion
7/10	admitted c/o body aches, nausea and shortness of breath
7/11	COVID positive
7/12	
7/13	Fever 101.5°F
7/14	urine culture: >100,000 CFU/ml <i>Pseudomonas aeruginosa</i> Urinary frequency
7/15	
7/16	
7/18	
7/19	
7/20	

1st Element in IWP

1st Diagnostic test

DOE

7-Day IWP

SUTI
DOE: 7/13
Organism: *Pseudomonas aeruginosa*

Knowledge Check #3

- Is this present on admission (POA) or healthcare-associated infection (HAI) event?

A. Present on admission (POA)


B. Healthcare-associated infection (HAI)

- 7/10: ED, body aches, nausea and shortness of breath
- 7/11: COVID positive, admitted to MICU
- 7/13: temperature of 101.5°F
- 7/14: urinary frequency, urine culture collected >100,000 CFU/ml *Pseudomonas aeruginosa*
- 7/17: transferred to 7 East
- 7/20: discharged home

Knowledge Check #3 Rationale

- The time spent in the ED on 7/10 was not used to begin the hospital day count since it is not an inpatient location
- 1st inpatient location on 7/11
 - Starts the count
- DOE occurs on the 3rd calendar day of admission
 - Healthcare-associated infection (HAI)



Date	Patient Location	Hospital Day
7/10		-1
7/11	MICU	1
7/12	MICU	2
7/13	MICU	3
7/14	MICU	4
7/15	MICU	5
7/16	MICU	7
7/17	MICU 7East	8
7/18	MICU	9

Knowledge Check #4

- What is the location of attribution (LOA)?

A. ED

B. MICU

C. 7 East

- 7/10: ED, body aches, nausea and shortness of breath
- 7/11: COVID positive, admitted to MICU
- 7/13: temperature of 101.5°F
- 7/14: urinary frequency, urine culture collected >100,000 CFU/ml *Pseudomonas aeruginosa*
- 7/17: transferred to 7 East
- 7/20: discharged home

Knowledge Check #4 Rationale

- The infection would be attributed to the MICU because that is the inpatient location where the patient was assigned on the DOE



Date	Patient Location	Location of Attribution
7/10	ED	
7/11	MICU	
7/12	MICU	
7/13	MICU	MICU
7/14	MICU	
7/15	MICU	
7/16	MICU	
7/17	MICU 7East	
7/18	MICU	

Knowledge Check #5

- What is the repeat infection timeframe (RIT)?

A. 7/13-7/26

B. 7/14-7/27

C. 7/10-7/23

D. 7/18-7/31

- 7/10: ED, body aches, nausea and shortness of breath
- 7/11: COVID positive, admitted to MICU
- 7/13: temperature of 101.5°F
- 7/14: urinary frequency, urine culture collected >100,000 CFU/ml *Pseudomonas aeruginosa*
- 7/17: transferred to 7 East
- 7/20: discharged home

Knowledge Check #5 Rationale

DOE

14-Day
RIT

HAI SUTI
DOE: 7/13
Organism: *Pseudomonas aeruginosa*
RIT: 7/13-7/26

Date	Criterion
7/10	admitted c/o body aches, nausea and shortness of breath
7/11	COVID positive
7/12	
7/13	Fever 101.5°F
7/14	urine culture: >100,000 CFU/ml <i>Pseudomonas aeruginosa</i> Urinary frequency
7/15	
7/16	
7/17	
7/18	
7/19	
7/20	
7/21	
7/22	
7/23	
7/24	
7/25	
7/26	
7/27	

Helpful Tips

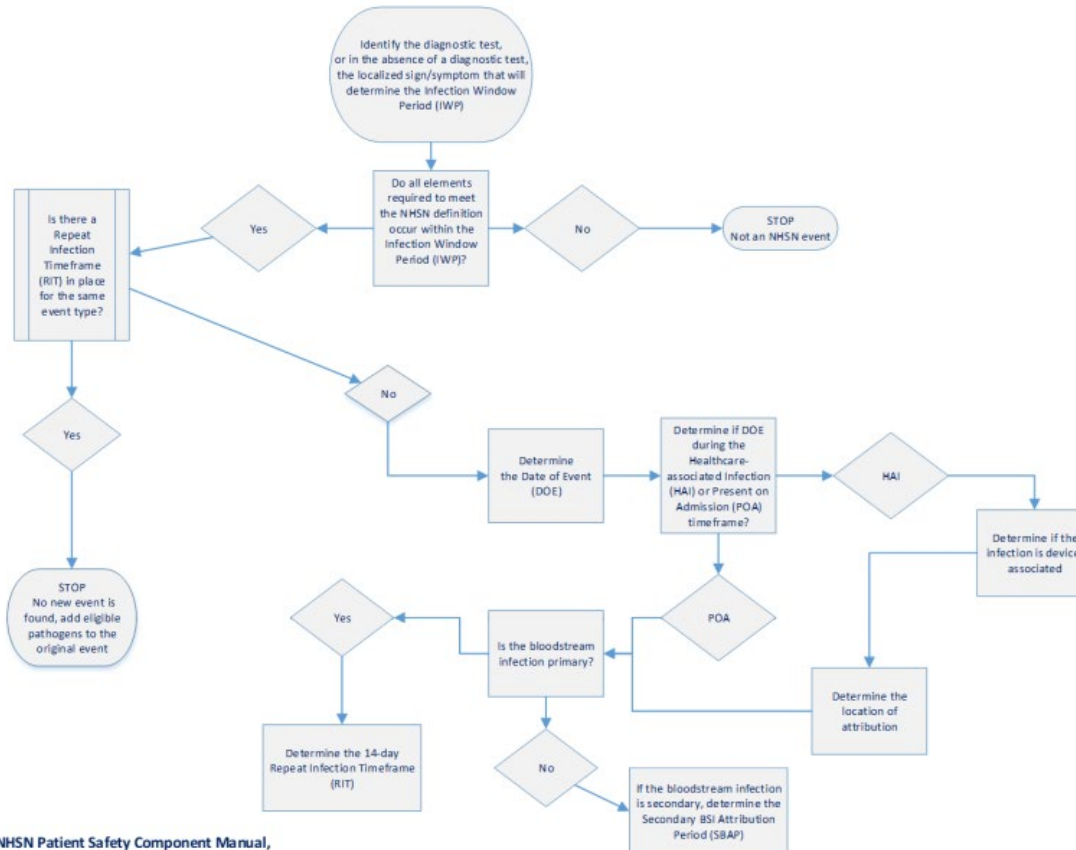
Steps to Case Determination

Save this slide

1. First determine the date of the diagnostic test that is an element of the NHSN site-specific infection criterion that is met.
2. Next determine the infection window period (3 days before the diagnostic test, the day of the test and 3 days after for a total of 7 days). NOTE: when the diagnostic test used to set the IWP is hospital day 3 or earlier, the days before the diagnostic test can only include those that occur in the POA timeframe specifically 2 days prior to admission.
3. Then determine if all the elements of the criterion are met during the infection window period. If they are, there is an infection event. If they are not, there is no event.
4. If there is an event, next determine the date of event, specifically, the date that the first element used to meet the infection criterion occurs for the first time within the infection window period.
5. Is the date of event in the POA time-period (specifically during the 2 days before admission, the day of admission or the next day)? If yes, the infection is POA, if not, it is an HAI.

Flow Diagram for NSHN Event Determination Page 2-28

Appendix: Flow Diagram for NHSN Event Determination



Refer to the NHSN Patient Safety Component Manual, Chapter 2 for detailed guidance.

Calculator & Worksheet

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[HAI & POA Worksheet Generator](#)

[MDRO & CDI LabID Event Calculator](#)

Healthcare-associated Infection (HAI) and Present on Admission Infection (POA) Worksheet Generator

[Print](#)

Welcome to the NHSN Healthcare-associated Infection (HAI) and Present on Admission Infection (POA) Worksheet Generator Version 1.0. The Generator operates based upon the currently posted guidance found in the Patient Safety Component Manual, Chapter 2, [Identifying Healthcare-associated Infections \(HAIs\) in NHSN](#). [PDF - 1M].

The Worksheet Generator is a web-based tool that is designed to identify the:

- 7-day Infection Window Period
- Date of Event and POA or HAI determination
- 14-day Repeat Infection Timeframe (RIT)
- Secondary Bloodstream Infection Attribution Period (if applicable)

This Worksheet Generator **does not** determine that all NHSN infection criteria have been met. It is incumbent upon the user to determine that the infection criterion was met as reflected in the dates and information supplied.

Please note that the Worksheet Generator will not ask you to enter any patient identifiers. The Worksheet Generator does not store any data that you enter, and it will not report any data that you enter or any determinations to the NHSN. You will not be able to export data entered into the Worksheet Generator but you will be able to print the worksheet.

Use the [VAE calculator](#) and [MDRO & CDI LabID Event calculator](#) when conducting VAE or MDRO/LabID event surveillance. Also note, the Worksheet Generator is not for use when conducting SSI surveillance or when making determinations for meeting the ENDO definition.



Healthcare-associated Infection (HAI) and Present on Admission Infection (POA) Worksheet Generator

Version 1.0 (must have javascript enabled)



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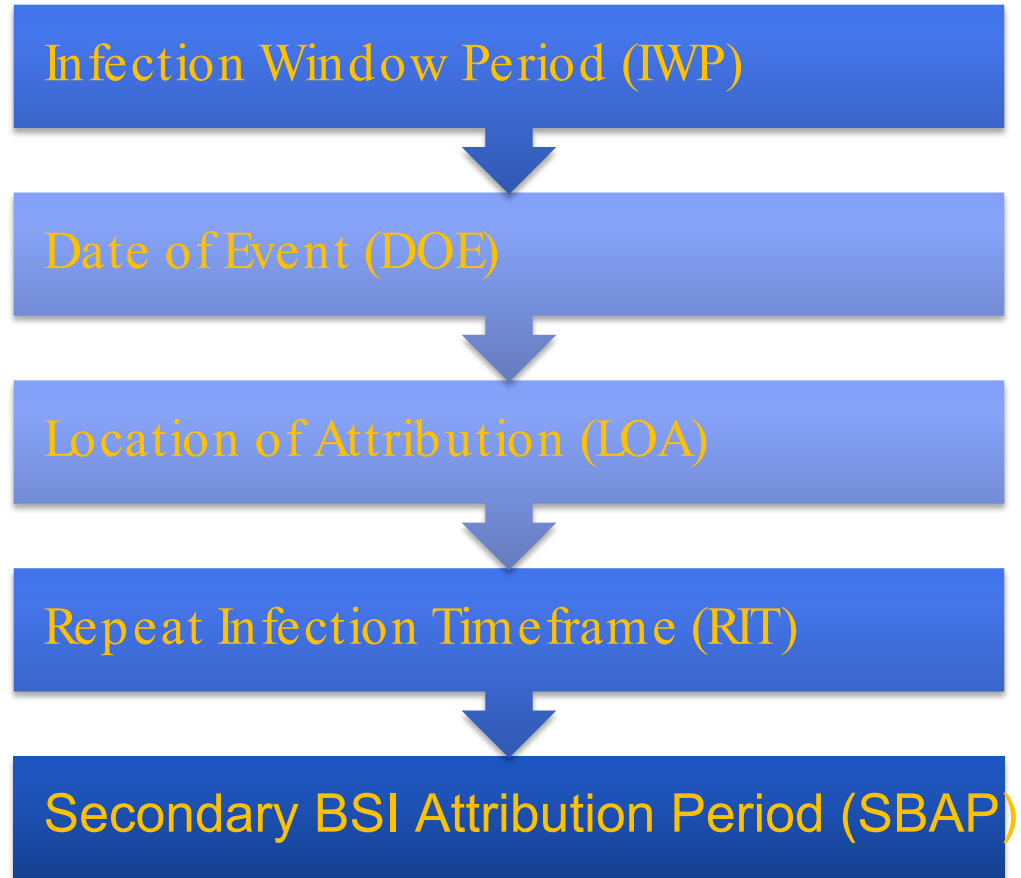
[Health Department HAI/AR Programs](#)

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Content source: Centers for Disease Control and Prevention,



In Closing



Resources

- Patient Safety Component Manual
 - https://www.cdc.gov/nhsn/pdfs/pscmanual/pcsmanual_current.pdf
- Chapter 2 - “Identifying Healthcare-associated Infections (HAI) for NHSN Surveillance”
 - https://www.cdc.gov/nhsn/pdfs/pscmanual/2psc_identifyinghais_nhsncurrent.pdf
- Quick Learn Videos
 - <https://www.cdc.gov/nhsn/training/patient-safety-component/index.html>
- Miscellaneous Frequently Asked Questions
 - <https://www.cdc.gov/nhsn/faqs/faqs-miscellaneous.html>

For any questions or concerns, contact the NHSN Helpdesk using

NHSN-ServiceNow to submit questions to the NHSN Help Desk.

The new portal can be accessed at **<https://servicedesk.cdc.gov/nhsncsp>**.

Users will be authenticated using CDC's Secure Access Management Services (SAMS) the same way you access NHSN. If you do not have a SAMS login, or are unable to access ServiceNow, you can still email the NHSN Help Desk at nhsn@cdc.gov.

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333

Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

