Identifying Healthcare-Associated Infections (HAI) in NHSN

(Last updated January 1, 2014)

For the purposes of NHSN surveillance in the acute care setting, a healthcare-associated infection (HAI) is

- A localized or systemic condition

AND

- The condition is resulting from an adverse reaction to the presence of **ONE** Δ of the following:
  - Δ an infectious agent(s)
  - Δ toxin(s) resulting from an infectious agent(s)

AND

- The condition was not present on admission to the acute care facility

NOTE: The HAI definition is NOT to be used in the SSI, VAE or LabID Event protocols.

An infection is considered an HAI if

- All elements of a CDC/NHSN site-specific infection criterion were not present during the POA time period but were all present on or after the 3rd calendar day of admission to the facility (the day of hospital admission is day 1).

NOTE:

- All elements used to meet the CDC/NHSN site-specific infection criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between any two elements.
- **Gap Day:** a calendar day during which no infection criterion elements are present.
- If all elements of a CDC/NHSN site-specific infection criterion are present on day of transfer or the next day from one inpatient location to another in the same facility or a new facility, the infection is attributed to the transferring location or facility.
- Likewise, if all elements of a CDC/NHSN site-specific infection are present on the day of discharge or the next day, the infection is attributed to the discharging location.

ADDITIONAL INFORMATION

NOTE (cont.):

- At present time NHSN does not have a set time period during which 1 infection of the same event type may be reported for the same patient. (VAE and LabID Event reporting is the exception, for which there is a 14-day window [see individual protocols for VAE and LabID Events].) Following an infection, which is either POA or an HAI, clinical information must be utilized to determine that the original infection had resolved before reporting a second infection at the same site. If the original infection had not resolved before subsequent positive cultures are collected from the same site, add the pathogens recovered before subsequent cultures to those reported for the first infection, if it were an HAI. Depending on the infection type, information which may be useful to consider in determining if the infection has resolved includes signs and symptoms, results from diagnostic testing, as well as completion of antimicrobial therapy. For example, a change in blood culture in a patient with extended treatment of endocarditis may represent a new laboratory confirmed bloodstream infection (LCBI).

Three examples of how to apply the HAI definition are shown in the following table:

Day 1	Day 2	Day 3	Day 4	Day 5	Infection is...
50 year-old admit to ICU - No UTI elements	ICU - No UTI elements	ICU - Suprapubic tenderness - Fever >38.0° C - Urine culture collected, >100,000 cfu/ml *E. coli*			HAI attributable to ICU **Rationale:** - UTI criteria not fully met in first 2 hospital calendar days - All UTI elements present on or after hospital calendar day 3
50 year-old admit to ICU - No UTI elements	ICU - Fever >38.0° C	ICU - Fever >38.0° C	ICU - Urine culture collected, >100,000 cfu/ml *E. coli*		HAI attributable to ICU **Rationale:** - UTI criteria not fully met in first 2 hospital calendar days - All UTI elements present on or after hospital calendar day 3
50 year-old admit to ICU - No UTI elements	ICU - No UTI elements	ICU - Fever >38.0° C	ICU - No UTI elements - *GAP day*	ICU - Urine culture collected, >100,000 cfu/ml *E. coli*	HAI attributable to ICU **Rationale:** - UTI criteria not fully met in first 2 hospital calendar days - All UTI elements present on or after hospital calendar day 3

HAIs may be caused by infectious agents from endogenous or exogenous sources:

- Endogenous sources are body sites, such as the skin, nose, mouth, gastrointestinal (GI) tract, or vagina that are normally inhabited by microorganisms.
- Exogenous sources are those external to the patient, such as patient care personnel, visitors, patient care equipment, medical devices, or the healthcare environment.

ADDITIONAL INFORMATION

Other important considerations include the following:

- Clinical evidence may be derived from direct observation of the infection site (e.g., a wound) or review of information in the patient chart or other clinical records.
- For certain types of infection, a physician or surgeon diagnosis of infection derived from direct observation during an invasive procedure, endoscopic examination, or other diagnostic studies or from clinical judgment may be an acceptable criterion for an HAI, unless there is compelling evidence to the contrary. For example, one of the criteria for SSI is ‘‘surgeon or attending physician or other designee diagnosis.’’ Unless stated explicitly, physician diagnosis alone is not an acceptable criterion for any specific type of HAI.
- Infections occurring in infants that result from passage through the birth canal are considered HAIs if they meet the definition of HAI above.

The following infections are not considered healthcare associated:

- Infections associated with complications or extensions of infections already present on admission (see POA definition), unless a change in pathogen or symptoms strongly suggests the acquisition of a new infection. This statement does not apply to SSIs, VAE, or LabID Events.
- Infections in infants that have been acquired transplacentally (e.g., herpes simplex, toxoplasmosis, rubella, cytomegalovirus, or syphilis) and become evident on the day of birth or the next day.
- Reactivation of a latent infection (e.g., herpes zoster [shingles], herpes simplex, syphilis, or tuberculosis).

The following conditions are <u>not</u> infections:

- Colonization, which means the presence of microorganisms on skin, on mucous membranes, in open wounds, or in excretions or secretions but are not causing adverse clinical signs or symptoms.
- Inflammation that results from tissue response to injury or stimulation by noninfectious agents, such as chemicals.

The complete set of CDC/NHSN HAI site-specific infection criteria, and the comments and reporting instructions integral to the correct application of the criteria, can be found:

- HAI surveillance definition checklist corresponding to specific site
- in the Surveillance Definitions chapter

Present on Admission (POA)

(Last updated January 1, 2014)

To standardize the classification of an infection as present on admission (POA) or healthcare-associated (HAI), the following objective surveillance criteria have been adopted by NHSN.

> **<u>NOTE</u>:** This classification should <u>NOT</u> be applied to the SSI, VAE or LabID Events.

If all 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 medial record, the infection would be 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 have 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 the physician diagnosis is an element of specific infection definition.

For example, the admission history could indicate that the physician suspects a UTI. The patient was documented to have a fever in the nursing home the day before admission to the hospital, and upon admission to the hospital (day 1) a urine sample was collected and cultured yielding >100,000 cfu/ml of a pathogen. This infection would be considered a POA because the required elements of the CDC/NHSN site-specific infection criterion (for symptomatic urinary tract infection [SUTI]) were present during the two calendar days before admission, the day of admission, or the day after admission. In this example, items 1 and 2 are elements of SUTI criterion 1:

1. Fever, documented by history receiving from nursing home
2. Positive urine culture >100,000 cfu/ml

Illustration of present on admission (POA) time frame			
2 calendar days before admission	1 calendar day before admission	Day 1 (Day of facility admission)	Day 2 (Day after facility admission)
October 27	October 28	October 29	October 30

NOTE:
- For POA, the temperature value does not need to be known to establish the presence of a fever.
- Physician diagnosis of UTI does not contribute to satisfying POA defection since physician diagnosis is not an element used to meet SUTI criteria.

Criteria for Specific Types of Infections

(Last updated April 1, 2013)

Once an infection is deemed to be healthcare associated according to the definition shown above, the specific type of infection should be determined based on the criteria detailed in the corresponding checklists. These have been grouped into 14 major type categories to facilitate data analysis. For example, there are 3 specific types of urinary tract infections (symptomatic urinary tract infection, asymptomatic bacteremic urinary tract infection, and other infections of the urinary tract) that are grouped under the major type of Urinary Tract Infection. The specific and major types or sites of infection used in NHSN and their abbreviated codes are listed in table below titled “CDC/NHSN Major and Specific Types of Healthcare Associated Infections“, in alphabetical order by major type code and the criteria for each of the specific types of infection follow it.

ADDITIONAL INFORMATION

CDC/NHSN Major and Specific Types of Healthcare-Associated Infections

Type	
BJ	**Bone and joint infection**
BONE	Osteomyelitis
DISC	Disc space infection
JNT	Joint or bursa infection
BSI	**Bloodstream infection**
LCBI	Laboratory-confirmed bloodstream infection
MBI-LCBI	Mucosal barrier injury laboratory-confirmed bloodstream infection
Type	
CNS	**Central nervous system**
IC	Intracranial infection
MEN	Meningitis or ventriculitis
SA	Spinal abscess without meningitis
CVS	**Cardiovascular system infection**
CARD	Myocarditis or pericarditis
ENDO	Endocarditis
MED	Mediastinitis
VASC	Arterial or venous infection
EENT	**Eye, ear, nose, throat, or mouth infection**
CONJ	Conjunctivitis
EAR	Ear, mastoid infection
EYE	Eye infection, other than conjunctivitis
ORAL	Oral cavity infection (mouth, tongue, or gums)
SINU	Sinusitis
UR	Upper respiratory tract infection, pharyngitis, laryngitis, epiglottitis

ADDITIONAL INFORMATION

Type	
GI	**Gastrointestinal system infection**
GE	Gastroenteritis
GIT	Gastrointestinal (GI) tract infection
HEP	Hepatitis
IAB	Intraabdominal infection, not specified elsewhere
NEC	Necrotizing enterocolitis
LRI	**Lower respiratory infection, other than pneumonia**
BRON	Bronchitis, tracheobronchitis, tracheitis, without evidence of pneumonia
LUNG	Other infection of the lower respiratory tract
PNEU	**Pneumonia**
PNEU1	Clinically-defined pneumonia
PNEU2	Pneumonia with specific laboratory findings
PNEU3	Pneumonia in immunocompromised patient
REPR	**Reproductive tract infection**
EMET	Endometritis
EPIS	Episiotomy infection
OREP	Other infection of the male or female reproductive tract
VCUF	Vaginal cuff infection
SSI	**Surgical site infection**
DIP	Deep incisional primary surgical site infection
DIS	Deep incisional secondary surgical site infection
Organ/space – Indicate specific type: BONE, BRST, CARD, DISC, EAR, EMET, ENDO, EYE, GIT, HEP, IAB, IC, JNT, LUNG, MED, MEN, ORAL, OREP, OUTI, SA, SINU, UR, VASC, VCUF	
SIP	Superficial incisional primary surgical site infection
SIS	Superficial incisional secondary surgical site infection

Type	
SST	**Skin and soft tissue infection**
BRST	Breast abscess or mastitis
BURN	Burn infection
CIRC	Newborn circumcision infection
DECU	Decubitus ulcer infection
PUST	Infant pustulosis
SKIN	Skin infection
ST	Soft tissue infection
UMB	Omphalitis
SYS	**SYS – Systemic infection**
DI	DI – Disseminated infection
UTI	**UTI - Urinary tract infection**
ABUTI	ABUTI – Asymptomatic bacteremic urinary tract infection
OUTI	OUTI – Other urinary tract infection
SUIT	SUTI – Symptomatic urinary tract infection
VAE	**VAE – Ventilator-associated event**
VAC	Ventilator-associated condition
IVAC	Infection-related ventilator-associated complication
Possible VAP	Possible ventilator-associated pneumonia
Probable VAP	Probable ventilator-associated pneumonia

Physician Diagnosis

(Last updated October 31, 2012)

Can physician diagnosis be used to identify an infection that is present on admission to the facility?

If physician diagnosis is used to meet any part of the NHSN criteria, then it can continue to be used as one of the elements of a CDC/NHSN site-specific infection criterion to identify an infection that was present on admission. However, if physician diagnosis is not included as part of the CDC/NHSN site-specific criteria, then only documentation of signs or symptoms (e.g., fever) that was assessed by a healthcare provider and that are part of the CDC/NSHN site-specific criteria can be used as an element to identify an infection as present on admission. For example, since the BSI criteria does not include physician diagnosis as part of the criteria, a physician documented BSI cannot be used as an element to meet CDC/NHSN criteria for BSI. As a reminder, a patient must meet all elements of a CDC/NHSN site-specific infection criterion within the first two days of admission to be considered

present on admission. This is regardless of admission diagnosis or treatment the patient may be receiving upon admission (e.g., antibiotics).

Transfer Rule

(Last updated January 1, 2013)

Location of Attribution: The inpatient location where the patient was assigned on the date of the event (either BSI or UTI), which is further defined as the date when the last element used to meet the UTI criterion occurred (see exception below).

> **NOTE:** When hemodialysis through a central line is provided by contracted staff members who are not employees of the facility, CLABSIs that are identified in these patients are attributed to the inpatient location where the patient was assigned. Facilities are responsible for the care provided within their confines and infection prevention issues related to contracted staff or their agencies should be addressed by the facility.

EXCEPTION TO LOCATION OF ATTRIBUTION:

- Patient with a device (central line or Foley catheter) in place in the SICU is transferred to the surgical ward. On the next day, all elements of LCBI or UTI are first present together. This is reported to NHSN as a CLABSI for the SICU.
- Patient without a central line is transferred from the medical ward to MICU. Later that day a central line is inserted. The next day, all elements of LCBI are first present together. This would be considered a BSI and attributed to the medical ward; however, it is not a CLABSI because the central line was not in place >2 days before all elements of LCBI were first present together.
- Patient with a central line in place is transferred from the medical ward to the coronary care ICU (CCU). After 4 days in the CCU and with the central line still in place, all elements of LCBI are first present together. This is reported to NHSN as a CLABSI for the CCU.
- Patient on the urology ward of Hospital A had the central line removed and is discharged home a few hours later. The IP from Hospital B calls the next day to report that this patient has been admitted to Hospital B and meets all elements of LCBI criteria. This CLABSI should be reported to NHSN for, and by, Hospital A and attributed to the urology ward.
- Patient is transferred in the morning to the medical ward from the MSICU after having the Foley catheter removed. Later that night, all elements for a UTI are first present together. This is reported to NHSN as a CAUTI for the MSICU.
- On Monday, patient with a Foley catheter in place is transferred from the medical ward to the coronary care ICU (CCU). Wednesday in the CCU, all elements for UTI are first present together. This is reported to NHSN as a CAUTI for the CCU, as the UTI event date is on the 3rd calendar day after transfer.
- Patient on the urology ward of Hospital A had the Foley catheter removed after it had been in place for 5 days and is discharged home a few hours later. The IP from Hospital B calls the next day to report that this patient has been admitted to Hospital B with a UTI. This CAUTI should be reported to NHSN for Hospital A and attributed to the urology ward. .

ADDITIONAL INFORMATION

EXCEPTION TO TRANSFER RULE:

Locations which do not house patients overnight (e.g., Emergency Department or Operating Room) will have no denominator data, i.e., patient days or central line days. Therefore, CLABSIs cannot be attributed to these locations. Instead, the event (CLABSI or CAUTI) must be attributed to the next inpatient location in which the patient stays.

EXAMPLE:

Patient, who had no clinical signs or symptoms of sepsis upon arrival to the Emergency Department, has a central line inserted there and then is admitted to the MICU on the same day. All elements of LCBI are first present together on MICU Day 3. This is reported as a CLABSI for the MICU because all elements of LCBI are first present together >2 calendar days after hospital admission and the central line was in place for >2 calendar days

---

Temperature Measurement

(Last updated October 31, 2012)

Is there a standard or recommendation regarding the use of, or the conversion of, axillary temperature readings to an oral or core equivalent?

The issue of the route of temperature measurement was considered here at NHSN and a decision was made to forego requiring a certain route of measurement, since our aim is not to direct care, but rather to measure the effect of care on outcomes. A detailed literature search was performed and subject matter experts consulted regarding the many routes of measurement and what they may mean when compared to others. The final determination was that there are no research-based guidelines concerning converting temperatures based on route of measurement. Therefore, NHSN's guidance on this issue is that users should follow their facilities' policies and utilized temperatures which they deem to be accurate and upon which clinical decisions are based.

Patient Reported Fever

(Last updated October 31, 2012)

Can I use patient reported fever to meet CDC/NHSN UTI criteria for present on admission?

Patient reported signs and symptoms (e.g., fever) cannot be used as an element to meet CDC/NHSN site-specific criteria unless also observed and documented by a healthcare provider. For example, a patient is transferred from a nursing home and is afebrile upon admission to the hospital. The nursing home documentation indicates that the patient had a fever the morning of admission. If the nursing home documentation or reported fever is included as part of the patient's admission/facility record, then it can be used as one of the elements to meet CDC/NHSN UTI criteria.

ADDITIONAL INFORMATION

Surveillance vs. Clinical

(Last updated October 31, 2012)

What is the difference between a surveillance definition of an infection and a clinical diagnosis? I.e., my physician states that a patient is not infected although the patient clearly meets the NHSN criteria. How do I respond?

Surveillance definitions are designed to study and identify trends in a population. The application of their standardized criteria, and only these criteria, in a constant manner allows, confidence in aggregation an analysis of data. Alternately, clinical diagnoses are patient specific. Unlike surveillance definitions, ALL available diagnostic data are considered in a clinical diagnosis, including additional clinical, epidemiological and laboratory data. Therefore a clinical diagnosis may be met even when a surveillance definition may not be met. Failure to meet a surveillance definition should never impede or override clinical judgment during diagnosis, management or treatment of patients.

Positive Surveillance Screening and HAI

(Last updated October 31, 2012)

If a patient is admitted to a facility and is methicillin-resistant Staphylococcus aureus (MRSA) positive by admission screening and then develops an infection with MRSA, is that infection a healthcare-associated infection (HAI)?

Yes. A positive screening culture at admission does not mean that any subsequent infection with that organism is not a healthcare-associated infection (HAI). Many HAIs are caused by organisms from endogenous patient sources and prevention efforts may be employed to prevent these organisms from causing an HAI. A positive screening culture without evidence of infection usually represents colonization NOT incubation. See also definition of HAI.

Distinguishing Serial Reportable Infections from Single, Unresolved Infection

(Last updated January 1, 2014)

Is there a time period following the identification of an infection during which another of the same type of infection cannot be reported?

No. At present time NHSN does not have a set time period during which 1 infection of the same event type may be reported for the same patient (with the exception of VAE and LabID Event reporting for which there is a 14-day window [see individual protocols for VAE and LabID Events]). Following an infection, which is either POA or an HAI, clinical information must be utilized to determine that the original infection had resolved before reporting a second infection at the same site. If the original infection had not resolved before subsequent positive cultures are collected from the same site, add the pathogens recovered from the subsequent cultures to those reported for the first infection, if it was an HAI. Depending on the infection type, information which may be useful to consider in determining if the infection has resolved includes signs and symptoms, results from diagnostic testing, as well as completion of antimicrobial therapy. For example, a change in blood culture in a patient with extended treatment for endocarditis may represent a new laboratory confirmed bloodstream infection (LCBI).