

KNHSS

Kuwait National Healthcare-associated

Infections Surveillance System

Identifying Healthcare-associated Infections (HAI) for NHSN Surveillance

To standardize the classification of an infection as present on admission (POA) or a healthcare-associated infection (HAI), the following objective surveillance definitions and guidance will be used for NHSN surveillance:

- 7-day Infection Window Period
- Date of Event
- POA
- HAI
- 14-day Repeat Infection Timeframe (RIT)
- Secondary Bloodstream Infection Attribution Period
- Pathogen Assignment Guidance

These changes address a variety of scenarios to include repeat infections of the same type, concurrent infections of differing types, and pathogen assignment in multi-pathogen infections. These new approaches are intended to align criteria and definitions and decrease subjectivity while maintaining epidemiologic standardization and clinical relevance.

Notes:

- Infection window period, POA, HAI, and RIT and secondary bloodstream infection attribution period definitions **do not** apply to SSI, VAE, or LabID Events. (Secondary BSIs may be attributed to SSI events. For guidance specific to SSIs see Secondary BSI Attribution Period and the SSI and BSI protocols).
- Date of Event, as defined in this chapter, **does not** apply to VAE or LabID Events; however, it is used to identify SSI.

Table 1: Definition Application

	SSI	LabID	VAE
Infection Window Period	N/A	Not Applicable	Not Applicable
Date of Event	Yes		
POA	N/A		
HAI	N/A		
Repeat Infection Timeframe(RIT	N/A		
Secondary BSI Attribution Period	*		

* See SSI specific guidance; N/A=Not Applicable

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Observation Patients in Inpatient Locations:

For purposes of KNHSS, if an observation patient is sent to an inpatient location, the patient must be included in infection surveillance, patient day, and device day counts. The facility assignment of the patient as an observation patient or an inpatient has no bearing in this instance for counting purposes. The patient is being housed, monitored, and cared for in an inpatient location and therefore is at risk for acquisition of an HAI.

NHSN Infection Window Period:

The NHSN Infection Window Period is defined as the 7-days during which all site-specific infection criteria must be met. It includes the day the first positive diagnostic test that is an element of the site-specific infection criterion, was obtained, the 3 calendar days before and the 3 calendar days after. For purposes of defining the Infection Window Period the following are considered diagnostic tests:

- Laboratory specimen collection
- Imaging test
- Procedure or exam
- Physician diagnosis
- Initiation of treatment

For site-specific infection criteria that do not include a diagnostic test, the first documented localized sign or symptom that is an element of NHSN infection criterion should be used to define the window (e.g., diarrhea, site specific pain, purulent exudates).

Table 2: Infection Window Period

Infection Window Period		3 days Before
	First positive diagnostic test OR First documented localized sign and/or symptom in the absence of a diagnostic test	
		3 days After

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Date of Event (Event Date):

The Date of Event is the date the **first** element used to meet an NHSN site-specific infection criterion occurs for the **first** time within the seven-day infection window period.

An infection is considered **Present on Admission (POA)** if the date of event of the NHSN site-specific infection criterion occurs during the POA time period, which is defined as the day of admission to an inpatient location (calendar day 1), the 2 days before admission, and the calendar day after admission. For purposes of KNHSS and determination of the Repeat Infection Timeframe (as defined below) if the date of event is determined to be either of the two days prior to inpatient admission, then the date of event will be hospital day 1.

An infection is considered a **Healthcare-associated Infection (HAI)** if the date of event of the NHSN site-specific infection criterion occurs on or after the 3rd calendar day of admission to an inpatient location where day of admission is calendar day 1.

Table 3: Date of Event and Classification Determination

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	

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Table 4: Infection Window Period and Date of Event

Infection Window Period
(First positive diagnostic test, 3 days before and 3

Date of Event
(Date the first element occurs for the first time within the infection window period)

Hospital Day	Infection Window Period
1.	
2.	Fever > 38.0 °C
3.	Fever > 38.0 °C
4.	Urine Culture: >100,000 cfu/ml <i>E. Coli</i>
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
	SUTI – POA Date of Event = 2 Pathogen = <i>E.coli</i>

Hospital Day	Infection Window Period
1.	
2.	
3.	
4.	Urine Culture: >100,000 cfu/ml <i>E. Coli</i>
5.	Fever > 38.0 °C
6.	Fever > 38.0 °C
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
	SUTI – HAI Date of Event = 4 Pathogen = <i>E.coli</i>

Notes:

- Acceptable documentation includes patient-reported signs or symptoms documented in the chart by a healthcare professional (e.g., patients states measured fever > 38.0° C or 100.4° F, nursing home documents fever prior to arrival to the hospital, patient complains of dysuria).
- Physician diagnosis can be accepted as evidence of an infection only when physician diagnosis is an element of the specific infection definition. For example, physician diagnosis is not an element of any UTI criteria; therefore, physician diagnosis of a UTI may not be used to satisfy POA status of a UTI.
- Infections occurring in newborns with date of event on hospital day 1 or day 2 are considered POA. Those with date of event on day 3 or later are HAI. This would include infections

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acquired transplacentally (e.g., herpes simplex, toxoplasmosis, rubella, cytomegalovirus, or syphilis) or as a result from passage through the birth canal (e.g., Group B Streptococcus).

- Reactivation of a latent infection (e.g., herpes zoster [shingles], herpes simplex, syphilis, or tuberculosis) is not considered to be HAI.

Repeat Infection Timeframe (RIT):

The RIT is a 14-day timeframe during which no new infections of the same type are reported. The date of event is Day 1 of the 14-day RIT. Additional pathogens recovered during the RIT from the same type of infection is added to the event.

The RIT will apply at the level of specific type of infection with the exception of BSI, UTI, and PNEU where the RIT will apply at the major type of infection.

Specific Type Example:

- Patients will have no more than one BONE infection in an RIT, but may have a BONE and DISC in two overlapping RITs (specific type)

Major Type Examples:

- Patients will have no more than one LCBI in an RIT (e.g., LCBI 1, LCBI 2, MBI-LCBI 1, etc.)
- Patients will have no more than one PNEU in an RIT (e.g., PNU1, PNU2, PNU3)
- Patients will have no more than one UTI in an RIT (e.g., SUTI, ABUTI)

The RIT applies during a patient's single admission, including the day of discharge and the day after, in keeping with the Transfer Rule.

In the example below (**Table 5**), the Date of Event is hospital day 4. The 14-day RIT is hospital day 4 through day 17. On hospital day 12, within the RIT, a urine culture with > 100,000 cfu/ml *S. aureus* is identified. The urine pathogen identified from the hospital day 12 culture is added to the original infection reported on day 4. Determination of a new infection or continuation of ongoing infection is not required.

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Table 5: Repeat Infection Timeframe

Infection Window Period
(First positive diagnostic test, 3 days before and 3 days after)

Repeat Infection Timeframe (RIT)
(Date of event = day 1)

Date of Event
(Date the first element occurs for the first time within the infection window period)

Hospital Day	RIT	Infection Window Period
1.		
2.		
3.		
4.	1.	Urine Culture: >100,000 cfu/ml <i>E. Coli</i>
5.	2.	Fever > 38.0 °C
6.	3.	Fever > 38.0 °C
7.	4.	
8.	5.	
9.	6.	Urine culture: No growth
10.	7.	
11.	8.	
12.	9.	Urine Culture: >100,000 cfu/ml <i>S. aureus</i>
13.	10.	
14.	11.	
15.	12.	
16.	13.	
17.	14.	
18.		
19.		
		SUTI –HAI Date of Event = 4 Pathogen= <i>E.coli</i>, <i>S. aureus</i>

Notes:

- A patient may have negative cultures during the RIT without impact on the RIT.
- Do not change the device-association determination during the RIT.
 - Example: A non-catheterized UTI is identified and initiates an RIT. During the RIT, a Foley catheter is placed and more than 2 days later, still in the RIT, another urine culture is collected and reported positive for > 100,000 cfu/ml with a different

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bacteria. Add this pathogen to the original UTI but do not change the non-catheter associated UTI to CAUTI.

Secondary BSI Attribution Period (Refer to Appendix 1, Secondary BSI Guide of the BSI Event Protocol):

The Secondary BSI Attribution Period* is the period in which a positive blood culture must be collected to be considered as a secondary bloodstream infection to a primary site infection. This period includes the Infection Window Period combined with the Repeat Infection Timeframe (RIT). It is 14-17 days in length depending upon the date of event.

For a bloodstream infection to be determined secondary to another site of infection, the blood culture must be collected during the site-specific infection Secondary BSI Attribution Period and satisfy one of the following ‡ (See Appendix 1: Secondary BSI Guide)

1. The blood culture must contain at least one organism that matches an organism found in a site-specific infection culture used to meet the site-specific infection criterion

OR

2. The blood culture must be an element used to meet the site-specific infection criterion.

***Note:** SSI surveillance utilizes a 30 or 90 day surveillance period. Since the Infection Window Period and RIT do not apply, the secondary BSI attribution period, by name, also cannot apply. However, a 17-day period that includes the date of SSI event, 3 days prior and 13 days after, is still used to attribute a BSI as secondary to an SSI.

‡ **Exception:**

Since necrotizing enterocolitis (NEC) criteria include neither a site specific culture nor a positive blood culture, an exception for assigning a BSI secondary to NEC is provided.

A BSI is considered secondary to NEC if the patient meets one of the two NEC criteria AND a positive blood culture(s) collected during the secondary BSI attribution period is positive for an LCBI pathogen or the same common commensal is cultured from two or more blood cultures drawn on separate occasions collected on the same or consecutive days.

In the example below (**Table 6**), the Date of Event is hospital day 4. The 14-day RIT is hospital day 4 through day 17. The Secondary BSI Attribution Timeframe is the Infection Window Period combined with the Repeat Infection Timeframe (RIT), 17 days in this example. The blood culture

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collected on hospital day 10 has a matching pathogen to the SUTI and therefore a secondary BSI is reported.

Table 6: Secondary BSI Attribution Period

Infection Window Period

(First positive diagnostic test, 3 days before and 3 days after)

Repeat Infection Timeframe (RIT)

(Date of event = day 1)

Secondary BSI Attribution Period

(Infection Window Period + RIT)

Date of Event

(Date the first element occurs for the first time within the infection window period)

Hospital Day	BSI	RIT	Infection Window Period
1.			
2.			
3.			
4.		1.	Urine Culture: >100,000 cfu/ml <i>E. Coli</i>
5.		2.	Fever > 38.0 °C
6.		3.	Fever > 38.0 °C
7.		4.	
8.		5.	
9.		6.	
10.		7.	Blood culture : <i>E.coli</i>
11.		8.	
12.		9.	Urine Culture: >100,000 cfu/ml <i>S. aureus</i>
13.		10.	
14.		11.	
15.		12.	
16.		13.	
17.		14.	
18.			
19.			
			SUTI & Secondary BSI Date of Event = 4 Pathogen=<i>E.coli</i>, <i>S. aureus</i>

Pathogen Assignment Guidance:

The following provides guidance for reporting pathogens associated with site-specific infections that are identified during the RIT or during the secondary BSI attribution period.

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- Additional pathogens recovered during the RIT from the same type of infection are added to the event.
- Report all site-specific pathogens before secondary BSI pathogens
 - SUTIs can only have two organisms entered according to KNHSS rules. However, if yes is selected for the secondary BSI field, the third pathogen can be entered.
- BSI pathogens may be assigned to more than one infection source at the same time in the following scenarios:
 - 1) Secondary BSI pathogen assigned to two different site-specific infections (*see example 1*)OR
 - 2) Secondary BSI pathogen assigned to a site-specific infection and assigned as pathogen to a primary BSI event (*see example 2*).

Example 1:

K. pneumoniae is identified in a blood culture during the RIT of a SUTI with *K. pneumoniae*. The patient is also recovering from COLO surgery performed at your facility in the past week and now has:

- Fever > 38.0° C
- Abdominal pain, and
- CT showing abdominal abscess

These three elements, when combined with a positive blood culture, meet the 2015 IAB criterion 3b. If a facility includes both UTI and SSI (for COLO) in their monthly reporting plan, an UTI and SSI would be reported, both with a secondary BSI and with pathogen *K. pneumoniae*.

Note: SSI-IAB does not have an Infection Window Period or RIT. The secondary BSI attribution period is 17 days in duration including the date of event, 3 days prior and 13 days after the date of event.

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Cont. Example 1

Infection Window Period

(First positive diagnostic test, 3 days before and 3 days after)

Repeat Infection Timeframe

(RIT)

(Date of event = day 1)

Secondary BSI Attribution Period

(Infection Window Period + RIT)

Secondary BSI Attribution Period for SSI

Date of Event

(Date the first element occurs for the first time within the infection window period)

Hospital Day	BSI	RIT	Infection Window Period	Infection Window Period	BSI-SSI
1.					
2.					
3.					
4.		1.	Urine Culture: >100,000 cfu/ml <i>K.pneumoniae</i>		
5.		2.	Fever > 38.0 °C		
6.		3.			
7.		4.			
8.		5.		Fever > 38.0 °C Abdominal pain	
9.		6.		CT scan: Abdominal abscess	
10.		7.	Blood culture : <i>K.pneumoniae</i>	Blood culture : <i>K.pneumoniae</i>	
11.		8.			
12.		9.			
13.		10.			
14.		11.			
15.		12.			
16.		13.			
17.		14.			
18.					
19.					
20.					
21.					
22.					
23.					
			SUTI & Secondary BSI Date of Event = 4 Pathogen = <i>K.pneumoniae</i>	SSI- IAB & Secondary BSI Date of Event = 8 Pathogen= <i>K.pneumoniae</i>	

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Example 2:

On day 4 of hospital admission *S. aureus* is identified in a blood culture meeting the HAI, LCBI 1 criterion. On day 8 the patient has a fever > 38.0° C and *E. coli* is identified in a urine culture meeting the SUTI definition. On hospital day 13, a blood culture positive for *E.coli* is identified. Because the blood culture occurs within both the LCBI RIT and the SUTI RIT, the pathogen, *E.coli* is assigned to both events.

Infection Window Period

(First positive diagnostic test, 3 days before and 3 days after)

Repeat Infection Timeframe (RIT)

(Date of event = day 1)

Secondary BSI Attribution Period

(Infection Window Period + RIT)

Date of Event

(Date the first element occurs for the first time within the infection window period)

Hospital Day	RIT	Infection Window Period	Infection Window Period	RIT	BSI
1.					
2.					
3.					
4.	1.	Blood Culture: <i>S.aureus</i>			
5.	2.				
6.	3.				
7.	4.				
8.	5.		Fever > 38.0 °C	1.	
9.	6.		Urine Culture: >100,000 cfu/ml <i>E.coli</i>	2.	
10.	7.			3.	
11.	8.			4.	
12.	9.			5.	
13.	10.			6.	
14.	11.			7.	
15.	12.			8.	
16.	13.	Blood culture : <i>E.coli</i>	Blood culture : <i>E.coli</i>	9.	
17.	14.			10.	
18.				11.	
19.				12.	
20.				13.	
21.				14.	
22.					
		LCBI Date of Event = 4 Pathogen = <i>S.aureus</i> , and <i>E.coli</i>	SUTI & Secondary BSI Date of Event = 8 Pathogen = <i>E.coli</i>		

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- Pathogens excluded from specific infection definitions (e.g., yeast in UTI, *Enterococcus* spp. in PNEU) are also excluded as pathogens for BSIs secondary to that type of infection (i.e., they cannot be added to one of these infections as a pathogen). The excluded organism must be accounted for as either:
 - 1) A primary bloodstream infection (BSI/CLABSI) (*see example 3*)

OR

 - 2) A secondary BSI attributed to another primary infection (e.g., IAB, SINU, etc.), in accordance with Appendix 1, Secondary BSI Guide of the BSI Event protocol (*see example 4*).

Example 3:

A SUTI with *Enterococcus faecalis* is identified and a subsequent blood culture with yeast and *E. faecalis* is collected during the SUTI RIT. A BSI secondary to SUTI is identified. *E. faecalis* is already documented as a pathogen, but the yeast will not be reported as a secondary BSI pathogen, because yeasts are excluded as organisms in the UTI definition. In this example, no other primary source of infection for which the yeast BSI can be assigned as secondary is identified. Therefore a primary BSI with yeast only is identified.

Note: The *Enterococcus faecalis* is not reported as a pathogen for the primary BSI because if an excluded organism had not been identified, a primary BSI would not have been reported

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Infection Window Period

(First positive diagnostic test, 3 days before and 3 days after)

Repeat Infection Timeframe (RIT)

(Date of event = day 1)

Secondary BSI Attribution Period

(Infection Window Period + RIT)

Date of Event

(Date the first element occurs for the first time within the infection window period)

Hospital Day	BSI	RIT	Infection Window Period	Infection Window Period	RIT
1.					
2.					
3.		1.	Dysuria		
4.		2.	Urine Culture: >100,000 cfu/ml <i>E.faecalis</i>		
5.		3.			
6.		4.			
7.		5.			
8.		6.			
9.		7.			
10.		8.			
11.		9.	Blood culture : <i>E.faecalis/ yeast</i>	Blood culture : <i>E.faecalis/ yeast</i>	1.
12.		10.			2.
13.		11.			3.
14.		12.			4.
15.		13.			5.
16.		14.			6.
17.					7.
18.					8.
19.					9.
20.					10.
21.					11.
22.					12.
23.					13.
24.					14.
25.					
			UTI & Secondary BSI Date of Event = 3 Pathogen = <i>E.faecalis</i>	Primary BSI Date of Event = 11 Pathogen = <i>Yeast</i>	

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Example 4:

A PNU2 with *Acinetobacter baumannii* cultured from blood is identified. **Note:** the positive chest imaging result is the diagnostic test that is used to define the infection window period. A subsequent blood culture with *Enterococcus faecalis* and *A. baumannii* is collected during the RIT of this PNU2 event. *Enterococcus faecalis* will not be reported as a pathogen for the PNU2, because *Enterococcus* spp. are excluded as organisms in the PNEU definition. Another primary source of infection, SUTI, is found and *Enterococcus faecalis* is assigned as a secondary BSI pathogen.

Infection Window Period
(First positive diagnostic test, 3 days before and 3 days after)

Repeat Infection Timeframe (RIT)
(Date of event = day 1)

Secondary BSI Attribution Period
(Infection Window Period + RIT)

Date of Event
(Date the first element occurs for the first time within the infection window period)

Hospital Day	BSI	RIT	Infection Window Period	Infection Window Period	RIT	BSI
1.						
2.						
3.						
4.						
5.						
6.						
7.		1.	New onset cough			
8.		2.	Imaging test: infiltrate			
9.		3.	Fever > 38.0 °C	Fever > 38.0 °C	1.	
10.		4.	Fever > 38.0 °C	Fever > 38.0 °C	2.	
11.		5.	Blood culture : <i>A.baumannii</i>	Urine Culture: >100,000 cfu/ml <i>E.faecalis</i>	3.	
12.		6.	Blood culture : <i>A.baumannii</i> , <i>E.faecalis</i>	Blood culture : <i>A.baumannii</i> , <i>E.faecalis</i>	4.	
13.		7.			5.	
14.		8.			6.	
15.		9.			7.	
16.		10.			8.	
17.		11.			9.	
18.		12.			10.	
19.		13.			11.	
20.		14.			12.	
21.					13.	
22.					14.	
23.						
24.						
25.						
26.						
			PNU2 & Secondary BSI Date of Event =7 Pathogen = <i>A.baumannii</i>	SUTI & Secondary BSI Date of Event =9 Pathogen= <i>E.faecalis</i> , <i>A.baumannii</i>		

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Location of Attribution:

The inpatient location where the patient was assigned on the date of event is the location of attribution (see Date of Event definition).

Exception to Location of Attribution:

Transfer Rule: If the date of event is on the date of transfer or discharge, or the next day, the infection is attributed to the transferring/discharging location. This is called the Transfer Rule and examples are found in UTI, BSI and PNEU modules. Receiving facilities should share information about such HAIs with the transferring location or facility to enable reporting.

Multiple Transfers:

In instances where a patient has been transferred to more than one location on the date of an infection, or the day before, attribute the infection to the **first** location in which the patient was housed the **day before** the infection's date of event.

Example of multiple transfers within the transfer rule time-frame:

	3/22	3/23	3/24
Locations in which patient was housed	Unit A	Unit A Unit B Unit C	Unit C Unit D This is also the date of event for a CAUTI. CAUTI is attributed to Unit A since Unit A was the first location in which the patient was housed the day before the date of event.

Note: 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 in Chapter 17, CDC/NHSN Surveillance Definitions for Specific Types of Infections.