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Healthcare-associated infections studies project: An American Journal of Infection Control and National Healthcare Safety Network data quality collaboration 2015 Case #1

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This is the first case study published in a series in the American Journal of Infection Control (AJIC) since the Centers for Disease Control and Prevention/ National Healthcare Safety Network (NHSN) surveillance definition update of 2015. These cases reflect some of the complex patient scenarios IPs have encountered in their daily surveillance of healthcare-associated infections (HAI) using NHSN definitions. Objectives have been previously published. (1)

With each case, a link to an online survey is provided, where you may answer the questions posed and receive immediate feedback in the form of answers and explanations. All individual participant answers will remain confidential, although it is the authors' intention to share a summary of the findings at a later date. Cases, answers, and explanations have been reviewed and approved by NHSN staff. We encourage you to take advantage of this offering, and we look forward to your active participation.

We strongly recommend that you review/reference the NHSN Patient Safety Component Manual for information you may need to answer the case study questions. The website links are:

NOTE: NHSN has developed a surveillance worksheet to promote consistent surveillance data collection. That worksheet, as well as an example of a completed worksheet with explanation, is available as the first 2 documents listed under "Supporting Materials" at this site: http://www.cdc.gov/nhsn/acute-care-hospital/CAUTI/index.html Please note that there are 2 tabs at the bottom of each of these excel documents, and review information in both tabs. We recommend that you access and print these forms to use as you work through this exercise and in your routine surveillance activities.

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http://www.cdc.gov/nhsn/PDFs/pscManual/2PSC_IdentifyingHAIs_NHSNcurrent.pdf

http://www.cdc.gov/nhsn/PDFs/pscManual/7pscCAUTIcurrent.pdf

http://www.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf

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

For each question, please select the **most correct answer.**

Assume your facility is actively enrolled with NHSN and that your monthly reporting plan includes central line-associated bloodstream infection (CLABSI) and catheter-associated urinary tract infection (CAUTI) surveillance in all ICUs, medical, surgical, and medical-surgical wards.

Just before midnight on February 2, 2015, the third hospital day on the orthopedic surgical floor, an 87-year-oldfemale exhibited altered mental status, foul smelling urine output, suprapubic tenderness and lethargy. A Foley catheter and a central line had been in place since admission January 31, 2015. Orders were obtained for urine and blood cultures and these were collected February 3rd. On February 5th the urine culture was finalized with a report of ≥100,000 cfu/ml *Citrobacter freundii.*

Question 1. Which NHSN UTI definition does this patient meet?

1) SUTI 1a – Present on Admission (POA)

2) SUTI 1b – Present on Admission (POA)

3) SUTI 1a – Healthcare-associated Infection (HAI)

4) SUTI 1b – Healthcare-associated Infection (HAI)

Explanation:

The infection window period (see Table 2) for the UTI was set using the positive urine culture with a collection date of February 3rd. An eligible pathogen, *Citrobacter freundii,* in a quantity ≥10^5 CFU/ml was reported. The additional element used to meet the SUTI 1a definition (suprapubic tenderness) occurred on February 2nd. The date of event, February 2nd (date the first element used to meet the site specific infection criterion occurs for the first time) was after day-2 of admission, making the event a healthcare-associated infection. On the date of the event a Foley catheter was in place and had been in place > 2 days therefore the UTI was catheter –associated (CAUTI).

Later in the day on February 5th the laboratory reported the blood cultures drawn on February 3rd also positive for *Citrobacter freundii*. On February 9th the patient's status continued to decline. Repeat urine and blood cultures were collected. The repeat urine culture was finalized on February 11th with a report of ≥ 100,000 cfu/ml Citrobacter *freundii* and ≥ 100,000 cfu/ml *Proteus mirabilis*. The blood cultures drawn on February 9th were

finalized on February 12th with a report of *Candida albicans* (see Table 1). The central line was removed that same day and a PICC line was inserted.

Question 2. With the additional laboratory findings what should the IP report to NHSN?

1) SUTI with secondary BSI, pathogens: *Citrobacter freundii, Proteus mirabilis* and *Candida albicans*

2) SUTI with secondary BSI, pathogens: *Citrobacter freundii, Proteus mirabilis* and a CLABSI, pathogen: *Candida albicans*

3) Nothing, all infections were present on admission

4) SUTI, pathogens: *Citrobacter freundii, Proteus mirabilis* and LCBI, pathogens *Citrobacter freundii* and *Candida albicans*

Explanation:

The blood culture collected on February 3rd within the SUTI secondary BSI attribution period (infection window period combined with the repeat infection timeframe) was positive with *Citrobacter freundii*. This satisfied the Secondary BSI Guide Scenario 1 requirement: Blood and site-specific specimen cultures match for at least one organism[2]. Therefore, a secondary bloodstream infection was reported for the SUTI. Additionally, because the repeat urine culture collected on February 9th, occurred within the SUTI 14 day repeat infection timeframe (RIT) (Table 2) and was positive with eligible UTI pathogens, *Citrobacter freundii* and *Proteus mirabilis,* a new SUTI was not identified. *Proteus mirabilis* was reported as an additional pathogen for the SUTI[3]. The February 9th blood culture was also collected within the SUTI secondary BSI attribution period. However, because, *Candida albicans,* is a non-bacteria and an ineligible pathogen for meeting UTI infection criteria and because another site specific infection for which the *Candida albicans* bloodstream infection could be attributed as a secondary BSI was not found, LCBI 1 criterion was met and a new infection window period was opened for an LCBI 1 (Table 2)[3,4]. The date that the first element of the infection criterion occurred for the first time in the LCBI 1 infection window period was February 9th, the collection date of the blood culture. This was after day 2 of admission and a central line was in place > 2 days on the date of event, therefore a CLABSI with pathogen, *Candida albicans* was reported to NHSN.

References

1. Wright MO, Hebden JN, Bridson KA, Morrell GC, Horan T. Healthcare-associated Infections Studies Project: An American Journal of Infection Control and National Healthcare Safety Network Data Quality Collaboration. American Journal of Infection Control. Jun; 2010 5(38):416–418. [PubMed: 20583335]
2. p. 4-21.http://www.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf
3. p. 2-12.http://www.cdc.gov/nhsn/PDFs/pscManual/2PSC_IdentifyingHAIs_NHSNcurrent.pdf
4. p. 7-5.http://www.cdc.gov/nhsn/PDFs/pscManual/7pscCAUTIcurrent.pdf

Table 1

Specimen collection and culture results

	Blood Culture Collection	Urine Culture Collection
January 31 (admission date)		
February 1		
February 2		
February 3	*Citrobacter freundii*	>100,000 cfu/ml *Citrobacter freundii*
February 4		
February 5		
February 6		
February 7		
February 8		
February 9	*Candida albicans*	>100,000 cfu/ml *Citrobacter freundii* >100,000 cfu/ml *Proteus mirabilis*

Table 2

Worksheet for Determining Date of Event, Infection Window Period, Repeat Infection Timeframe, and Secondary BSI Attribution Period

	Device (Foley) in place	First diagnostic test or sign/ symptom	Infection Window Period	Date of Event	Repeat Infection Timeframe (RIT)	Secondary BSI Attribution Period		Calendar Date	Device (central line) in place	First diagnostic test or sign/ symptom	Infection Window Period	Date of Event	Repeat Infection Timeframe (RIT)	Secondary BSI Attribution Period*
31	X							31						N/A
1	X							1	X					N/A
2	X		Suprapubic tenderness	X				2	X					N/A
3	X	Urine CX *C. freundii*				Blood CX *C.freundii*		3	X					N/A
4	X							4	X					N/A
5	X							5	X					N/A
6	X							6	X					N/A
7	X							7	X					N/A
8	X							8	X					N/A
9	X				Urine CX *C.freundii/ P.mirabilis*	Blood CX *C.albicans*		9	X	Blood CX *C.albicans*		X		N/A
10	X							10	X					N/A
11	X							11	X					N/A
12	X							12	X					N/A
13	X							13	X					N/A
14	X							14	X					N/A
15	X							15	X					N/A
16	X							16	X					N/A
17	X							17	X					N/A
18	X							18	X					N/A
19	X							19	X					N/A
20	X							20	X					N/A
21	X							21	X					N/A

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	Device (Foley) in place	First diagnostic test or sign/ symptom	Infection Window Period	Date of Event	Repeat Infection Timeframe (RIT)	Secondary BSI Attribution Period		Calendar Date	Device (central line) in place	First diagnostic test or sign/ symptom	Infection Window Period	Date of Event	Repeat Infection Timeframe (RIT)	Secondary BSI Attribution Period*
22	X							22	X					N/A
23	X							23	X					N/A

* LCBI events do not have a Secondary BSI Attribution Period