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Major Article

Health care–associated infections studies project: An *American Journal of Infection Control* and National Healthcare Safety Network data quality collaboration

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This case study is part of a series centered on the Centers for Disease Control and Prevention's National Healthcare Safety Network's (NHSN) health care–associated infection (HAI) surveillance definitions. The intent of the case study series is to foster standardized application of the NHSN's HAI surveillance definitions among infection preventionists and accurate determination of HAI events. This specific case study focuses on the definitions found within the surgical site infection (SSI) protocol. It aims to reflect the real life and complex patient scenario surrounding a bloodstream infection that is secondary to an SSI and the application of the Present at the Time of Surgery event detail. An online survey link is provided where participants may confidentially answer questions related to the case study and receive immediate feedback in the form of correct answers and explanations and rationales. Details of the case study, answers, and explanations have been reviewed and approved by NHSN staff. We hope that participants take advantage of this educational offering and thereby gain a greater understanding of the NHSN's HAI surveillance definitions.

This case study is part of a series centered on the Centers for Disease Control and Prevention's National Healthcare Safety Network's (NHSN) health care–associated infection (HAI) surveillance definitions. These cases reflect some of the complex patient scenarios infection preventionists have encountered in their daily surveillance of HAIs using the NHSN's definitions and protocols. Objectives have been previously published.[1]

With each case, a link to an online survey is provided, where you may enter answers to questions and receive immediate feedback in the form of correct answers and explanations. All individual participant answers will remain confidential; however, it is our intention to share a summary of the survey responses at a later date. Cases, answers, and explanations have been reviewed and approved by the NHSN. We hope that you will take advantage of this offering, and we look forward to your active participation. The online survey may be found at https://www.surveymonkey.com/r/NHSNCaseStudy2016-2.

We strongly recommend review or reference of the NHSN's Patient Safety Component Manual, for information that may be needed to answer the case study questions. The Web site links are as follows:

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Disclaimer: 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.

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- Surgical Site Infection (SSI) Event protocol is available from http://www.cdc.gov/nhsn/pdfs/pscmanual/9pscssicurrent.pdf.
- Surveillance Definitions for Specific Types of Infections is available from http://www.cdc.gov/nhsn/pdfs/pscmanual/17pscnosinfdef_current.pdf.
- Bloodstream Infection Event (Central Line-Associated Bloodstream Infection and Non-central line-associated Bloodstream Infection) protocol is available from http://www.cdc.gov/nhsn/pdfs/pscmanual/4psc_clabscurrent.pdf.

For each question, please select the most correct answer.

SCENARIO

On June 1, 11:30 PM, a 50-year-old man survives a motor vehicle collision with a crash to the driver's side. At the scene the patient is awake, alert, and oriented to person and complains of pain in the lower abdomen and left shoulder and arm. The patient is immobilized and transported to a local emergency department, in stable but guarded condition.

During the emergency department assessment, the following information is obtained:

- Vital signs are stable with slight elevation in respiratory rate of 24 breaths per minute.
- Patient reports pain level of 8 on a scale of 10 (maximum level) with "pain all over my body."
- Patient scores 18 of 22 on the Acute Concussion Evaluation.
- A dislocated left shoulder and fractures to the left hand, thumb, and forefinger are identified.
- Significant bruises are noted on the middle and lower abdomen consistent with seatbelt placement.
- Patient's abdomen is tender on palpation, with increased pain near bruised area.

On June 2, emergent computed tomography (CT) scan with contrast of the abdomen results show possible free air bubbles in close proximity to the ascending colon wall and may suggest bowel perforation. Patient is taken to the operating room for possible colon repair. Patient is prepped and draped; on opening the abdomen, fecal contents are observed in the abdominal cavity, and the area is copiously irrigated. Partial colectomy (COLO) with anastomosis is performed to repair bowel perforation. Five centimeters of ascending colon is removed. Drains are secured and brought out through the lower right anterior abdominal wall and secured to bulb suction. The midline fascia is closed using retention sutures; subcutaneous tissue and the skin is closed using loosely approximated staples. Dry gauze dressing is placed, and patient is transported to recovery in stable condition. The American Society of Anesthesiologist Physical Classification is 3, and wound class is 3. Intravenous metronidazole and gentamycin are started in the recovery room.

On June 5, the patient is noted to have a maximum temperature of 100.7°F; blood cultures are collected and reported positive for *Escherichia coli* and *Bacteroides fragilis*. Patient's abdomen is distended, and patient reports severe pain on palpation; surgeon suspects an anastomotic leak. Gentamycin is discontinued, and cefepime is started.

On June 6, the patient is taken back to the operating room because of a possible anastomotic leak. On opening the abdominal cavity, a pus-filled intra-abdominal abscess is noted adjacent to an anastomotic leak. COLO is performed to repair the leak, and the abdomen is again copiously irrigated, but no cultures are collected. Drains are again placed deep into the abdominal cavity, and the abdomen is loosely closed at the skin. The patient is transported to the recovery room in stable condition. ASA score of 3 and wound class 4 are documented. The surgeon's intraoperative notes document the aforementioned findings.

On June 11, the patient complains of nausea and vomiting with a painful, distended abdomen. Temperature of 101°F are noted, and blood cultures are collected, which are later reported positive for methicillin-resistant *Staphylococcus aureus* (MRSA). CT scan is performed, showing a loculated fluid collection lateral to the ascending colon. Then 30 cm^3 of serosanguinous fluid is collected for culture via CT-guided aspiration and later reported positive for *B fragilis*.

On June 17, the patient begins to show signs of improvement with maximum temperature of 99.5°F for >48 hours and is able to tolerate clear liquids. The patient is transferred to the inpatient rehabilitation unit for conditioning and strength training.

(Note that the facility's NHSN Monthly Reporting Plan for the Procedure-Associated Module includes COLO.[2])

Question 1: Does the June 2 COLO procedure qualify for submission into the facility's NHSN denominator data?

A. No, because trauma = yes.
B. No, because the wound class is 3 and the wound is only loosely closed.
C. No, because there was fecal contamination of the abdominal cavity.
D. Yes, because there are no exclusions for procedure denominators.

Question 2: Is the June 2 COLO procedure eligible for SSI surveillance?

A. Yes, there is no reason this procedure should be excluded from SSI surveillance.
B. No, because the bowel perforation and fecal contamination exclude the case from SSI surveillance.
C. No, because procedures with a high wound class are excluded from SSI surveillance.
D. No, because the drains were placed and the abdomen was loosely closed, the case is excluded from SSI surveillance.

Question 3: If an SSI event was identified and attributed to the June 2 COLO procedure, which type of infection criteria would be met?

A. SSI, Deep Incisional Primary.
B. SSI, Organ/Space, Gastrointestinal Tract.
C. SSI, Organ/Space, Intra-abdominal (SSI-IAB), with secondary bloodstream infection (BSI).
D. SSI-IAB, and also a primary BSI.
E. No SSI criteria are met.

Question 4: If an SSI event was identified and attributed to the June 2 COLO procedure, how should the infection Present at the Time of Surgery (PATOS) field be completed?

A. PATOS = Yes.
B. PATOS = No.
C. The event is not an SSI, and the PATOS field can be left blank.

Question 5: Should the June 6 COLO procedure be included in the facility's SSI denominator data?

A. Yes, the procedure is a new NHSN operative procedure, which carries its own unique surveillance period based on the procedure category assigned to the case and should be included in the SSI denominator data.

B. No, the June 6 COLO should not be included because the infection is PATOS, which disqualifies the procedure from being included in the denominator.
C. No, the procedure is not considered an NHSN operative procedure because this patient has already had a COLO procedure included in the June SSI denominator on June 2.
D. No, the surgery is combined with the prior COLO case performed on June 2.

Question 6: Is there a new SSI event attributable to the June 6 COLO procedure?

A. Yes, SSI criteria are met within the appropriate surveillance period after the June 6 COLO.
B. No, an SSI has already been cited for this patient on June 5.
C. No, the procedure does not qualify for SSI surveillance.
D. No, there was an infection PATOS on June 6 when the COLO was performed.

Question 7: If there is an Organ/Space SSI for the June 6 COLO procedure, what specific Organ/Space infection site is met?

A. SSI-IAB criterion 3b with a secondary BSI with MRSA.
B. SSI-IAB criterion 3a without a secondary BSI.
C. SSI-IAB criterion 1 with a secondary BSI.
D. SSI-IAB criterion 2b with a secondary BSI with MRSA.
E. No SSI criteria are met.

Question 8: If there is an SSI event attributable to the June 6 COLO procedure, how should the PATOS field be completed?

A. PATOS = Yes.
B. PATOS = No.
C. The event is not an SSI, and the field can be left blank.

Reference

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. Am J Infect Control 2010;38:416-8.
2. Centers for Disease Control and Prevention (CDC). Monthly reporting plan and annual surveys. Available from: https://www.cdc.gov/nhsn/pdfs/pscmanual/3psc_monthlyreportingplancurrent.pdf. Accessed April 11, 2017.