

Reference Acknowledgement: 2024 NHSN Annual Training

Dominique Godfrey MPH, CPH, CIC

LaTasha Boswell BSN, MPH, RN, CIC

Marissa McMeen, MPH, MLS (ASCP), CIC, FAPIC

Amber Taylor, MPH, BSN, RN, a-IPC

Part 1

On 2/27/24, a 32-year-old patient is seen in the ED with fever (100.6° F) and abdominal tenderness. There is an implanted port in place at the time of admission.

Past medical history: Intravenous drug use (IVDU), diabetes, and kidney stones. On 2/28, the patient is admitted to the medical floor (Unit 5B) and the port is flushed. Two days later, on 3/1, the patient complains of 10 out of 10 pain at the port site and the insertion site is red. Blood cultures collected on 3/2 are positive for *Staphylococcus capitis* x 1, *Staphylococcus species*, and *Streptococcus oralis* X 1.

Question 1

Are the *Staphylococcus species* and *Staphylococcus capitis* considered matching organisms?

- A. Yes
- B. No
- C. More information is needed

Question 2

Is there a laboratory confirmed blood stream infection (LCBI) criterion met?

- A. LCBI 2
- B. MBI-LCBI 1
- C. LCBI 1
- D. No criterion is met.

Question 3

What is the LCBI date of event (DOE)?

- A. 2/27
- B. 2/28
- C. 3/1
- D. 3/2

Question 4

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

- A. POA
- B. HAI

Part 2

On 3/2 the port is de-accessed after blood specimen collection and the port is removed. A peripherally inserted central catheter (PICC) is placed in the right arm on 3/4. The patient spikes a fever (100.5°F) on 3/5 and has an increased white blood cell (WBC) count. Another blood specimen is collected on 3/5 with positive results for *Escherichia coli* x2 on 3/6. Per physician orders, antimicrobials are administered on 3/6 and over the next few days the patient's health improves.

Question 1

Is laboratory confirmed bloodstream infection (LCBI) criterion met?

- A. LCBI 2
- B. MBI-LCBI 1 1
- C. LCBI 1
- D. No criterion is met

Question 2

Is the BSI event a central line-associated bloodstream infection (CLABSI)?

- A. Yes
- B. No

Question 3

Does the 3/6 blood culture create a new BSI event?

- A. Yes
- B. No

Part 3

On 3/9, the patient is told to prepare for discharge and arrange transportation. While the nurse is preparing the discharge instructions, the patient's friends arrive to the room to wait until the patient is discharged. When the nurse returns to the room to review the patient's medications, he notices the patient is having difficulty staying awake and answering questions. During his examination of the patient, he finds a syringe with a white substance in the bed. He documents suspicion of line tampering, and the attending physician is notified.

On the same day (3/9), the physician cancelled the patient's discharge orders and asked the patient about the syringe during daily rounds. Initially, the patient denies knowledge of the syringe, but later suggested his friends may have "messed with" his CL.

On 3/10 orders are written to discontinue the CL and all narcotics; the PICC is removed the same day. The patient becomes febrile (T max=38.4°C) on the medical floor (Unit 5B) with increased white blood cell (WBC) count, and tachycardia. A triple lumen catheter is inserted on 3/13 for fluid resuscitation, and blood cultures collected on 3/16 are positive for *Enterobacter cloacae*, *Pseudomonas spp.*, and *Candida glabrata*. The patient transferred to ICU.

BSI Case Study

Question 1

Is there an LCBI criteria met?

- A. LCBI 2
- B. MBI-LCBI 1
- C. LCBI 1
- D. No LCBI criteria are met

Question 2

Is the BSI event a central line-associated bloodstream infection (CLABSI)?

- A. Yes
- B. No

Question 3

Is the self-infection CLABSI exclusion met using the documentation by the nurse on 3/9?

- A. Yes
- B. No

Urinary Tract Infection Case Studies

Case 1:

- 2/2 Ms. Jones presented to the ED from a local nursing home with altered mental status. She has an indwelling urinary catheter (IUC) in place.
- 2/3 She is admitted to the ICU.
- 2/4 IUC removed.
- 2/5 Ms. Jones is unable to void and the IUC is replaced. A urine culture is collected and results positive for >100K CFU/ml E.coli.
- 2/6 Ms. Jones transfers to an acute care floor, she then has a temp of 38.2°C.
- 2/10 She is discharged back to her nursing home.

Question:

1. Does this patient have a UTI?
 - a. Yes, SUTI 1A (CAUTI)
 - b. Yes, SUTI 1B (non-catheter associated)
 - c. Yes, SUTI 2 (CAUTI)
 - d. Yes, SUTI 2 (non-catheter associated)
 - e. Yes, ABUTI (CAUTI)
 - f. Yes. ABUTI (non-catheter associated)
 - g. No UTI

Case 2:

- 2/2 Letsall Dogood, a post-op surgery patient, presents to the ED with a several days history of weakness, poor oral intake, and inability to void. An indwelling urinary catheter (IUC) is inserted in the ED.
- 2/3 they are admitted to the inpatient surgery unit for further work-up. Temp noted to be 38.3° C on admission to the unit.
- 2/4 continues to have fevers, with a temp of 38.2° C. A urine culture is collected which yields > 100K Coagulase Negative Staphylococcus.

Question:

1. Does this patient have a UTI?
 - a. Yes, SUTI 1A (CAUTI)
 - b. Yes, SUTI 1B (non-catheter associated)
 - c. Yes, SUTI 2 (CAUTI)
 - d. Yes, SUTI 2 (non-catheter associated)
 - e. Yes, ABUTI (CAUTI)
 - f. Yes. ABUTI (non-catheter associated)
 - g. No UTI

Urinary Tract Infection Case Studies

Bonus Question:

- Is this POA or HAI?

Case 3:

- 5/1 Mr. Coude is admitted to the ICU with DKA and is unresponsive. An indwelling urinary catheter (IUC) is inserted on admission.
- 5/6 Mr. Coude is responsive and his IUC is removed.
- 5/15 His IUC is replaced due to urinary retention
- 5/19 the IUC is removed
- 5/20 the IUC is replaced due to retention
- 6/2 WBC increased
- 6/3 temps 38.2°C. A urine culture is obtained and is positive for >100K CFU/ml *Pseudomonas aeruginosa*. Central line inserted and antibiotics started.
- 6/15 temp 39.2°C, blood and urine cultures obtained. Urine cultures positive for >100K *E.coli* and *C.albicans*. Blood cultures positive for *E.coli* and *C. albicans*.

Questions:

1. Does this patient have a UTI?
 - a. Yes, SUTI 1A (CAUTI)
 - b. Yes, SUTI 1B (non-catheter associated)
 - c. Yes, SUTI 2 (CAUTI)
 - d. Yes, SUTI 2 (non-catheter associated)
 - e. Yes, ABUTI (CAUTI)
 - f. Yes. ABUTI (non-catheter associated)
 - g. No UTI

Bonus Question:

2. Does the patient also have a BSI and if so what type?
 - a. Primary BSI with *E. coli* and *C. albicans*
 - b. Secondary BSI with *E. coli* and *C. albicans*
 - c. Primary BSI with *C. albicans* and secondary BSI with *E. coli*
 - d. Primary BSI with *E. coli*; *C. albicans* is a contaminant.

Surgical Site Infection (SSI) Case Study

Case 1:

- 1/8 40-year-old female undergoes an abdominal hysterectomy (HYST)
- 1/15 patient returns with lower aspect of incision with “thick yellow drainage”. Culture was performed and negative. Antibiotic was given at the time.

Questions:

1. Does this patient have an SSI?
 - a. Yes – If yes, what type?
 - b. No – If no, why?
2. How long would you monitor this this patient for a deep or organ space SSI?
 - a. 30 days
 - b. 60 days
 - c. 90 days

Case 1 Part 2:

- 2/5 patient returns with significant abdominal pain and a CT of the abdomen/pelvis is performed and indicates pelvic fluid collection.
- 2/6 Patient taken to VIR for drainage of the fluid collection and 5ml of purulent drainage is aspirated and sent for culture. Culture results with E.coli.

Questions:

1. Does this patient have an SSI?
 - a. No, still in the RIT for the previous SSI on 1/15
 - b. Yes, Organ Space SSI
 - c. Yes, Deep Incision SSI
2. If Organ Space, which Specific Type of Infection definition is met?
 - a. IAB
 - b. GI
 - c. OREP
3. If Yes, what is the DOE?
 - a. 1/15
 - b. 2/5

Surgical Site Infection (SSI) Case Study

Case 2:

- 12/20 - 30yr old male admitted following MVA, CT scan showed moderate hemoperitoneum.
 - Shortly after admission the patient became hemodynamically unstable.
 - Patient was rushed to the OR where the following procedures were performed:
 - Splenectomy (SPLE),
 - repair liver laceration (BILI),
 - colon resection with primary anastomosis (COLO),
 - drainage of abdominal wall hematoma
 - Operative note: upon opening the fascia, a large abdominal wall hematoma was encountered. The peritoneum was entered, and we encountered a large amount of blood and fecal spillage. Drains were placed in the right and left upper quadrants through separate stab wounds prior to completion of the case. The midline fascia was closed with running suture and the skin was closed with staples.
- 12/30 – Patient discharged home.

Question:

1. What would you assign PATOS as?
 - a. PATOS = Yes
 - b. PATOS = No

Surgical Site Infection (SSI) Case Study

Case 2 Part 2:

- 1/5- Patient admitted to a different acute care hospital with abdominal pain and distension. The patient is nauseous, diaphoretic, febrile (T=38.3°C), and hypotensive on arrival.
- A CT of the abdomen/pelvis reports multiple fluid collections throughout the abdomen, which are suspicious for early abscess formation.
- Patient taken to the OR for a re-exploration of the abdomen under general anesthesia. Procedures performed:
 - exploratory laparotomy (XLAP)
 - colon re-anastomosis (COLO)
 - abdominal washout (XLAP)
 - drain placement.
- Operative Note: The abdomen was entered through the prior midline incision. Upon entering the abdominal cavity, a large amount of murky fluid consistent with peritonitis was encountered. The abdominal fluid was aspirated and sent for culture.
- Based on the details of the procedure, the ICD-10-PCS codes map as an NSHN COLO procedure.
- The abdominal fluid culture resulted positive for *E. coli* and *E. faecium*.

Questions:

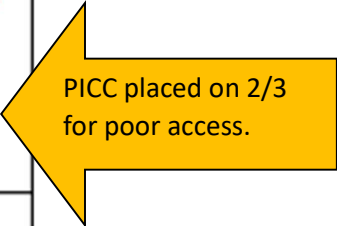
1. What SSI criteria would be most appropriate to apply?
 - a. Not an SSI
 - b. Organ/space SSI – IAB
 - c. Organ/space SSI – OREP
 - d. Deep incisional SSI
2. Which procedure is the SSI attributed to?
 - a. 12/20 COLO
 - b. 12/20 BILI
 - c. 12/20 SPLE
 - d. 1/5 COLO
3. Which hospital would report the SSI to NHSN, and what designation would be selected in the “Detected” field on the SSI Event form?
 - a. Second hospital, A (during admission)
 - b. First hospital, P (post-discharge surveillance)
 - c. First hospital, RO (readmission to facility other than where procedure was performed)
 - d. Second hospital, RF (readmission to facility where procedure performed)

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LaTasha Boswell BSN, MPH, RN, CIC

Part 1: Scenario 1 of Secondary BSI Definition

2/3	25-year-old female admitted with history of diabetes, fever (103°F), severe abdominal pain, nausea, vomiting and purulent vaginal drainage. Pt reported frequent tampon use. Blood cultures negative on admission. Toxic Shock Syndrome suspected. Antibiotics started. Blood glucose: 400
2/4	Fever (101.5°F); Hypotensive; Blood glucose: 350
2/5	Blood glucose: 250
2/6	Blood glucose: 190
2/7	Blood culture: <i>Streptococcus pyogenes</i> / <i>Candida albicans</i>
2/8	Endometrial biopsy and cultures collected during a non-NHSN operative procedure. Endometrial culture: <i>Streptococcus pyogenes</i>
2/9	Blood culture: <i>Candida albicans</i>



PICC placed on 2/3 for poor access.

Question 1

What event(s) can be cited in this case?

- A. POA LCBI 1
- B. HAI OREP 1
- C. HAI OREP 3a
- D. HAI LCBI 1
- E. Both A & C
- F. Both B & D

Secondary BSI Case Study

Question 2

Can the 2/7 *S. pyogenes* and *Candida* blood cultures be secondary to the HAI OREP 1?

- A. Yes
- B. No

Question 3

Is the LCBI 1 event on 2/9 a CLABSI?

- A. Yes
- B. No

Part 2: Scenario 2 of the Secondary BSI Definition

1/27	60-year-old male admitted to the hospital with abdominal pain and fever (102°F).
1/28	CT scan “fluid collection adjacent to the spleen”. Blood cultures x2: <i>E. coli</i>
1/29	Fever (100.5°F) Progress note: Zosyn started for bacteremia
1/30	Abdominal pain, nausea
1/31	Hypotension
2/1	BC positive x 2: <i>Bacteroides fragilis</i> ; Abdominal pain; Fever (101°F)
2/2	CT scan: Splenic abscess
2/3	Pt remains in hospital.

Question 1

What event(s) can be cited in this case?

- A. POA IAB 3b
- B. POA LCBI 1
- C. HAI IAB 3b
- D. Both B & C
- E. Both A & B

Question 2

Can the *Bacteroides fragilis* blood culture be deemed secondary to the HAI IAB 3b?

- A. Yes
- B. No

Reference Acknowledgement: 2024 NHSN Annual Training

Jennifer Watkins, MPH, BSN, RN

Emily Witt, MPH

Part 1- PNEU

Mr. Brown, a 52-year-old man, is admitted to the hospital on February 20, 2024 with upper gastrointestinal bleeding. He is admitted to the medical ICU due to hemodynamic instability. Two central lines and a urinary catheter are placed on February 20. The patient's most recent previous hospitalization was in March 2023. He has no recent surgeries. His medical history is significant for hypertension and alcoholism. The patient is afebrile on admission. Blood products and intravenous fluids are administered, and an upper endoscopy is performed on February 20. Chest x-ray on admit shows lungs are clear.

The patient's blood pressure stabilizes on February 21. He remains afebrile. On February 23, the patient experience copious hematemesis (vomiting of blood), aspirates gastric contents, and develops respiratory distress. He is placed on a nonrebreather mask, and maintains stable oxygenation overnight. Chest x-ray on February 23 includes findings of infiltrate in the right lung base.

Question 1

Is the chest x-ray performed on February 23 eligible for use to meet a PNEU definition?

- A. Yes
- B. No
- C. Maybe

Part 2

On February 24, he has a fever to 38.4°C at 5am and has developed a new cough. A chest x-ray at 6am shows infiltrates in the right lower lung field. Antibiotics are started (vancomycin and piperacillin/tazobactam). February 24 at 8am, he develops increasing shortness of breath, and his oxygen saturation drops from 92% to 84% while on the non-rebreather mask. He is intubated and placed on mechanical ventilation at 8:45am. A chest x-ray done immediately after intubation shows worsening right lower lobe infiltrates.

On February 24, urine, blood, and endotracheal aspirate cultures are collected. The urine culture is negative. Blood and endotracheal aspirate cultures are positive for *Enterococcus faecalis*. On February 25, the patient is febrile to 39.0°C. Antibiotics are continued. On February 26, the patient's maximum temperature is 37.9°C. Antibiotics are continued. A chest x-ray is performed and shows improved right lower lung infiltrate with atelectasis. On February 27, the patient is afebrile and chest imaging shows stable right lower lung infiltrate.

Question 1

Do the subsequent chest imaging results demonstrate findings that are eligible to meet a PNEU definition?

- A. Yes
- B. No
- C. Maybe

Question 2

Are the blood culture and/or endotracheal cultures eligible to use to meet the laboratory component of a PNEU (PNU2 or PNU3) definition?

- A. Yes
- B. No

Question 3

Is a PNU1 event met in this case?

- A. Yes
- B. No

Question 4

What is the date and the diagnostic test used to set an Infection Window Period (IWP) for the PNEU event?

- A. Feb. 20 chest x-ray
- B. Feb. 23 chest x-ray
- C. Feb. 24 chest x-ray
- D. Feb. 24 blood and endotracheal culture

Question 5

What is the DOE?

- A. Feb. 22
- B. Feb. 23
- C. Feb. 24
- D. Feb. 25

Question 6

What is the IWP?

- A. Feb. 21 – 27
- B. Feb. 20 – 26
- C. Feb. 22 – 28
- D. Feb. 19 – 25

Part 3: VAE

The patient presents to the ED at 9pm on 2/1 with an admitting diagnosis of influenza with a suspicion of a complication related to bacterial pneumonia. The patient experiences respiratory distress and is intubated and placed on the ventilator in the ED.

The patient remains in the ED for a couple of hours before admission to an inpatient unit. The patient is admitted to an adult inpatient location (ICU) at 2330 on 2/1. VAE surveillance is performed in the monthly reporting plan for the adult ICU.

Question 1

What are the daily minimum FiO₂ and PEEP values for the patient on 2/1?

Date and Time	February 1 2100	2200	2330	February 2 2400 (midnight)	0300	1200	1500	2000	2200
Location	ED	ED	ICU	ICU	ICU	ICU	ICU	ICU	ICU
FiO ₂	0.40	0.40	0.60	0.70	0.40	0.40	0.75	0.75	0.75
PEEP	5	8	10	10	8	8	5	8	8

- A. 0.40 and 5
- B. 0.40 and 8
- C. 0.40 and 10
- D. 0.60 and 10

Question 2

Is a VAE identified for this patient?

Case Example

Vent Day	PEEP min	FiO ₂ min	Temp min	Temp max	WBC min	WBC max	ABX	Spec	Polys /Epis	Org
1	10	60								
2	5	40					Ceftriaxone			
3	5	40	36.9	37.6	12.1	12.1	Ceftriaxone			
4	5	55	38.1	39.2	14.5	16.8	Ceftriaxone	BAL		3+ <i>P. aeruginosa</i>
5	8	50	38.4	38.9	12.6	15.9	Ceftriaxone			
6	8	40	36.5	37.8	11.1	13.6	Ceftriaxone			
7	8	40								
8	5	30								

A: Yes

B: No

Question 3

What level of the VAE algorithm does this patient meet?

Vent Day	PEEP min	FiO ₂ min	Temp min	Temp max	WBC min	WBC max	ABX	Spec	Polys /Epis	Org
1	10	60								
2	5	40					Ceftriaxone			
3	5	40	36.9	37.6	12.1	12.1	Ceftriaxone			
4	5	55	38.1	39.2	14.5	16.8	Ceftriaxone	BAL		3+ <i>P. aeruginosa</i>
5	8	50	38.4	38.9	12.6	15.9	Ceftriaxone			
6	8	40	36.5	37.8	11.1	13.6	Ceftriaxone			
7	8	40								
8	5	30								

A. VAC

B. IVAC

C. PVAP