



NHSN Monthly Training: CLABSI Case Studies

Florida Department of Health
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Outline

- NHSN Updates
- CLABSI case studies
- Q&A about CLABSI case definition



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NHSN Data Import

- FDOH has resources available to assist facilities with implementing electronic data import into NHSN
- In order to better assist facilities with this function, we invite you to participate in a survey about how you are currently reporting data into NHSN
- If you are interested in FDOH assistance with electronic data import, indicate your interest in the survey – the link will be included in the follow-up email to this call

Future Case Definition Changes?

- NHSN is doing work to revise the surveillance definition for ventilator-associated pneumonia (VAP)
- Draft definition does not include chest radiograph findings; does include measures of worsening oxygenation, objective signs of inflammation/infection
- Goal is to reduce variability introduced by subjective components of the current case definition

Updated SSI Procedure Codes

- The National Center for Health Statistics (NCHS) and Centers for Medicare and Medicaid Services (CMS) have published annual update of ICD-9-CM codes
- Next update of NHSN (expected in April) will be updated to reflect these changes

Conferring Rights to a Group

- Also in next update of NHSN (April), there will be changes to how facilities confer rights to Groups
 - Instead of the facility selecting what to share, the Group will define a template for what they are requesting from facilities and facilities will choose whether to accept the template
 - Makes joining a Group easier for facilities
 - More information to come
- Remember – FDOH User Group is still recruiting facilities to share their CLABSI data!

Case Study 1

- A 35-year-old man is involved in a multi-vehicular accident and sustains multiple internal and external traumatic injuries. On 12/5 in the emergency department, a triple lumen subclavian line and Foley catheter are placed and the stabilized patient is transferred to the intensive care unit. • On 12/8, the patient spikes a temperature to 101°F and a urine culture and blood cultures x 2 were taken.
- On 12/10, the subclavian line is discontinued and the catheter tip is sent for culture. Later that afternoon, the blood culture results from 12/8 are reported as *Staphylococcus hominis* in both sets. The physician notes: “Positive blood culture = contaminant; no antibiotics required.” All other specimens cultured are negative.
- On 12/12, catheter tip results are reported as *Staphylococcus epidermidis*.

Case Study 1

- Does this patient have a healthcare-associated infection (HAI)?
 - A. Yes, a CLABSI because the patient had a central line in place, had a fever, and there were 2 positive blood cultures with common skin contaminant organisms collected within two days of each other.
 - B. Yes, a central line-associated bloodstream infection (CLABSI) because both the blood and catheter tip cultures grew coagulase-negative staphylococci.
 - C. No, because the ID consulting physician stated that the blood culture results were contaminants and did not treat the patient with antibiotics.
 - D. No, because the blood cultures grew only common skin contaminant organisms.



Case Study 1 (A)

- Yes, a CLABSI because the patient had a central line in place, had a fever, and there were 2 positive blood cultures with common skin contaminant organisms, collected within two days of each other.

Case Study 1

- What if additionally the patient has suprapubic tenderness and the urine culture obtained on 12/8 grows >100,000 CFU/ml of *Escherichia coli*. What HAI(s) would be reported?
 - A. SUTI with secondary BSI with *S. hominis* and *E. coli*
 - B. Both a CLABSI with *S. hominis* & a symptomatic urinary tract infection (SUTI) with *E. coli*
 - C. A CLABSI with *S. hominis*
 - D. No HAI
 - E. A symptomatic urinary tract infection (SUTI) with *E. coli*

Case Study 1 (B)

- Both a CLABSI with *S. hominis* & a symptomatic urinary tract infection (SUTI) with *E. coli*
- The case meets SUTI criterion 1a.
- Because the organism from the blood cultures is not the same as that found in the urine, the BSI cannot be secondary to the UTI.
- Fever is a non-specific symptom of infection and could be attributed to the UTI or BSI or both. However, even without fever, the patient meets the SUTI 1a criterion due to the finding of suprapubic tenderness.

Case Study 1

- In further revising the scenario, the subclavian line tip culture instead grows *Staphylococcus hominis*. Does this finding change your HAI assessment?
 - A. Yes
 - B. No

Case Study 1 (B)

- **No**
- Catheter tip culture results are not part of the surveillance criteria for BSI.
- A CLABSI is reported based on the presence of the central line, the absence of infection at another site with the same organism as was growing in the blood, presence of fever, and 2 blood cultures positive for the same common skin contaminant organism.

Case Study 2

- A 27-year-old man is admitted on 8/22 from another hospital with alcohol-induced pancreatitis. Admission abdominal CT showed severe pancreatitis with peripancreatic inflammatory changes. Patient is ventilator-dependent requiring a tracheostomy and has vascular catheters in place in the right subclavian and right internal jugular (IJ) veins.
- On 9/3, an ultrasound-guided aspiration of pancreatic fluid revealed few polymorphonuclear cells and a negative bacterial culture.
- On 9/11, a repeat abdominal CT revealed unchanged pancreatitis but interval development of multi-loculated fluid collections in the abdomen.

Case Study 2

- On 9/14, patient is taken to the OR for pancreatic debridement and placement of drains. Later that evening, patient had a temperature spike to 102° F. The right IJ line was discontinued and the catheter tip and blood specimens x 2 were sent for culture.
- On 9/16, culture results were reported as follows:
 - Pancreatic fluid = no growth
 - Catheter tip = <15 CFU/ml of *Enterococcus* species
 - Blood cultures = 2 for 2 positive for *Enterococcus faecalis*.
- No other sites of suspected infection were identified.

Case Study 2

- Does this patient have a healthcare-associated infection (HAI)?
 - A. Yes, a central line-associated BSI (CLABSI) because the blood and catheter tip cultures grew the same organisms.
 - B. No, these organisms are contaminants.
 - C. Yes, an intrabdominal (IAB) infection with secondary bloodstream infection (BSI) with *Enterococcus* species.
 - D. Yes, a CLABSI because the blood cultures are positive for a pathogen (*E. faecalis*), there is no evidence of infection at another site, and the patient had a central line in place.



Case Study 2

- Yes, a CLABSI because the blood cultures are positive for a pathogen (*E. faecalis*), there is no evidence of infection at another site, and the patient had a central line in place.

Case Study 2

- What if instead, the intraoperative cultures obtained on 9/14 grew *Eschericia coli*. What HAI(s) would be reported?
 - A. Both "IAB infection with *E. coli*" and "CLABSI because the blood and catheter tip are the same species"
 - B. Both "IAB infection with *E. coli*" and "CLABSI with *Enterococcus faecalis*"
 - C. CLABSI because the blood and catheter tip are the same species
 - D. CLABSI with *Enterococcus faecalis*
 - E. IAB infection with *E. coli*

Case Study 2

- Both "IAB infection with *E. coli*" and "CLABSI with *Enterococcus faecalis*"
- In the revised scenario, the patient now has an IAB (criterion 1) and a CLABSI (criterion 1) because the blood isolate is distinct from the pancreatic fluid isolate, and the patient meets criteria for healthcare-associated IAB (criterion 1)

Case Study 2

- In further revising the scenario, let's say that the patient was afebrile on 9/14 (i.e., has no temperature spike). Does this finding change your assessment of the blood culture results?
 - A. Yes
 - B. No

Case Study 2

- **No**
- Signs and symptoms are not part of criterion 1 for laboratory-confirmed BSI with a recognized pathogen. Therefore the presence or absence of fever does not change the CLABSI determination.

Case Study 3

- James is a 28 year old patient with a central line who is 3 days post colon surgery. He spikes a fever and has blood cultures x2 drawn; 1 set is negative, 1 bottle from the second set is positive for *Bacillus cereus*. His doctor orders antibiotics and notes “postop sepsis” in the chart.
- How should this be reported?

Case Study 3

➤ Not an HAI

Case Study 4

- A patient with a PICC placed in another facility has been in our hospital for the past week and now has a blood culture growing *Acinetobacter baumannii*.

Case Study 4

- Is this a BSI?
- Is it a CLABSI?

Case Study 4

- Yes it meets the definition for BSI (Criterion 1). It is a CLABSI because the patient had a central line in place at the time the samples were drawn.

**Patient has a recognized pathogen cultured from one or more blood cultures
and
organism cultured from blood is not related to an infection at another site.**

Case Study 4

- Should the CLABSI be attributed to our hospital or to the facility that placed the PICC?

Case Study 4

➤ Our hospital

Location of attribution: The location where the patient was assigned on the date of the BSI event, which is further defined as the date when the first clinical evidence appeared or the date the specimen used to meet the BSI criteria was collected, whichever came first.

EXCEPTION: If a CLABSI develops within 48 hours of transfer from one inpatient location to another in the same facility, the infection is attributed to the transferring location. This is called the Transfer Rule and examples are shown below:

Case Study 5

- Day 1 – One-day-old twin male infant admitted and emergently transferred to NICU. Vented in isolette during transport. Peripheral IV in scalp, IV fluid at 1cc/hr with Prostin (0.05mcg/kg/min) started prior to transport, and umbilical catheter inserted upon admission to NICU
- Neonatal History: gestational age=term infant, birth weight=1810 grams. Apgars 8 & 9. A cardiac echocardiogram showed transposition of the great vessels of the heart.

Case Study 5

- Day 3 – Repair of the Patent Ductus Arteriosus and Atrial Septal Defect performed; later that day the umbilical catheter site was noted to be slightly red
- Day 4 – Umbilical catheter site remained slightly red and a low grade temperature developed
- Day 5 – Umbilical line was pulled, blood cultures were drawn, and the umbilical catheter tip was sent for culture
- Day 6 – Continued elevated temp of 38.1°C and antibiotics were started

Case Study 5

- Day 7 – Blood cultures and umbilical catheter tip were all positive for *Staphylococcus aureus* (MSSA). Antibiotics adjusted.
- Does this patient have an HAI?

Case Study 5

➤ Yes, LCBI criterion 1

Laboratory-confirmed bloodstream infection (LCBI): Must meet one of the following criteria:

Criterion 1: Patient has a recognized pathogen cultured from one or more blood cultures
and
organism cultured from blood is not related to an infection at another site. (See Notes 1 and 2 below.)

Case Study 5

- Is it central line-associated?

Case Study 5

- Yes, to the umbilical catheter

Case Study 5

- What if, instead of the peripheral line, the patient also had a non-umbilical central line, how would the device-day data be recorded?

Case Study 5

- As 1 umbilical catheter day
- Device days are collected differently according to the location of the patients being monitored
 - For ICUs and locations other than specialty care areas (SCAs) and NICUs, the number of patients with ≥ 1 central line days of any type is collected daily, at the same time each month, and the totals for the month are entered into NHSN
 - For SCAs – if a patient has both a temporary and a permanent central line, count the day as a temporary line day only
 - In NICUs – if a patient has both an umbilical catheter and a central line, count the day only as an umbilical catheter day

Case Study 6

- An 81-year-old patient was in MICU for a week with a central line in place the entire time. On the day of transfer from the MICU to a medical ward, the line was pulled. Within 36 hours, she became disoriented and hypotensive. Blood cultures x2 were drawn and 3 of 4 bottles grew micrococci and coagulase-negative staphylococci.
- Is this a BSI?

Case Study 6

➤ Yes, Criterion 2

Criterion 2: Patient has at least one of the following signs or symptoms: fever (>38°C), chills, or hypotension
and
signs and symptoms and positive laboratory results are not related to an infection at another site
and
common skin contaminant (i.e., diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] spp., *Propionibacterium* spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.) is cultured from two or more blood cultures drawn on separate occasions.

➤ Is it a CLABSI?

Case Study 6

- Yes, it is a CLABSI
- Where is the location of attribution?
- What organism(s) should be reported with it?

Case Study 6

- Location of attribution is the MICU
- Organisms are micrococci and CoNS

Case Study 7

- Patient admitted to the MICU on 1/21 due to GI bleed
- L subclavian line placed on 1/22
- 1/28 patient spikes a fever (102.1°F); blood specimen for culture drawn through the line x1; line removed and tip sent for culture
- 1/30 blood and tip cultures positive for coagulase-negative staphylococci

- Is this a CLABSI?

Case Study 7

- No – only one bottle positive for a common skin contaminant. Catheter tip culture is irrelevant to determination of CLABSI.

Criterion 2: Patient has at least one of the following signs or symptoms: fever (>38°C), chills, or hypotension

and

signs and symptoms and positive laboratory results are not related to an infection at another site

and

common skin contaminant (i.e., diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] spp., *Propionibacterium* spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.) is cultured from two or more blood cultures drawn on separate occasions.

Case Study 8

- Patient had a tunneled central line placed in our hospital due to failure of a hemodialysis fistula on April 8. He was discharged after 3 days on April 11 and continued on outpatient hemodialysis in the community.
- Patient was readmitted on August 22 with overwhelming sepsis with positive VRE blood cultures, and expired in the ICU.
- Would this be a CLABSI attributed to our hospital because the tunneled central line was inserted in our hospital and the infection occurred within 1 year of insertion?

Case Study 8

- No; tunneled lines are not implants since they are accessed routinely and the infection occurred >48 hours after discharge from our hospital
- This is likely attributable to the outpatient dialysis facility and you should notify them

Q&A

- **Q:** What is the meaning of the phrase “not related to infection at another site” as part of the Laboratory- Confirmed Bloodstream Infection (LCBI) criteria?
- **A:** The goal of NHSN (CDC) infection site criteria is to identify and consistently categorize infections that are healthcare-associated into major and specific infection sites or types. Several of the criteria include the caveat that signs, symptoms, and laboratory findings may not be related to infection at another site. When assessing positive blood cultures in particular, one must be sure that there is no other CDC-defined primary source of HAI that may have seeded the bloodstream secondarily, otherwise the infection may be misclassified as a primary BSI or erroneously associated with the use of a central line. (*continued*)

A (*continued*)

- If the CDC criteria for the remote infection require a culture, then the organism(s) cultured from that site must match the organism(s) in the blood culture. In instances where a culture of the involved site is not required for NHSN criteria, and no such culture is collected, it may be necessary to use clinical judgment regarding the likelihood of it causing a secondary blood stream infection (BSI). In these instances, the following guidance may be used to help determine the relatedness of remote sources of infection to a positive blood culture:

A (continued)

Positive Blood Culture

Does the patient meet the criteria for HAI at another site? (if infection is CA, or if NHSN criteria for the specific site HAI has not been met, answer “No”.)

Yes

No

CA or HA?

CA

HA

Is the blood isolate a common pathogen for this site?

Yes

No

This CA infection with secondary BSI is not reported thru NHSN nor is the BSI

Primary BSI

Site infection with secondary BSI

Primary BSI

Q&A

- **Q:** Are intraaortic balloon pumps (IABP) considered central lines?
- **A:** No. Because IABPs are not generally used for infusion, blood withdrawal or for hemodynamic monitoring, they are not considered central lines.

Q&A

- **Q:** When patients are admitted to an inpatient unit with a permanent (tunneled) pre-existing central line in place, which is not accessed during the hospitalization, are those days included in the central line-day count?
- **A:** Permanent central lines should be included in the central line-day count only on days when they are being accessed.

Q&A

- **Q:** The central line-associated blood-stream infection protocol states that “Ideally, blood specimens should be obtained from two to four blood draws from separate venipuncture sites...not through a vascular catheter....” Does this mean that I have a choice whether or not to utilize positive blood cultures obtained through a vascular access device in my BSI surveillance?
- **A:** No. Blood cultures collected by any means, either through venipuncture or collected through existing vascular catheters must be considered in your surveillance of BSI.

CLABSI Q&A

- **Q:** Our critical care unit is actually both a medical critical care and step down unit because we don't have a step down unit in our hospital. So would the location designation for this type of unit be "Mixed Acuity" ward, and if yes, would CLABSIs need to be reported for participation in the CMS Hospital Inpatient Quality Reporting Program?
- **A:** When mapping your location to CDC location descriptions, apply the 80% rule. If the 80% rule cannot be met, you should determine if there is a way of separating the medical critical care and step-down patient data (infections, device days, patient days). If this is possible, the unit should be "divided" into 2 separate location types and approximately mapped. Only if your unit does not meet the 80% rule and you cannot "divide" it, should you label it "Mixed Acuity." Based on current CMS information, Mixed Acuity wards do not have to report CLABSI data to CMS. Your Quality Improvement or CMS-compliance staff may be able to provide further guidance on CMS reporting requirements.

Take Home Points

- To be a CLABSI, the BSI must NOT be secondary to an infection at another site – this may require good clinical judgment, a comparison of culture results, and a review of the NHSN manual
- Catheter-tips are NOT considered in the CLABSI case definition
- If the Blood Culture is a Recognized pathogen
No symptoms required
- *If the Blood Culture is a common skin contaminant then Symptoms are required*

Take Home Points

- If your unit is not labeled an ICU/NICU, the data will not be sent to CMS
- If you are not collecting patient-days and central line-days in the NICU by birth weight, you need to start doing that **IMMEDIATELY** – if you can't report this summary data, you can't meet the CMS/NHSN reporting requirement

Questions?

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