

# Healthcare associated infections expanded dataset definitions and frequently asked questions

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## PICU-acquired Central Line Associated Bloodstream Infection (CLABSI)

The PICU CLABSI case definition is based upon guidance from the Centers for Disease Control and Prevention (CDC) and European Centre for Disease Prevention and Control (ECDC) definitions, but have been modified, and simplified for PICANet data collection based on consensus of PICU Healthcare Associated Infection (HCAI) group.

### Case definition for number of episodes of PICU-acquired CLABSI:

Document the number of episodes of PICU-acquired CLABSI ensuring that the child meets all FOUR of the criteria, A, B, C and D:

#### A: Criteria for blood stream infection (BSI) (see below for detailed definition)

Paediatric	Neonate
>28 days of age	≤ 28 days of age regardless of prematurity
<p>A recognised pathogen from at least one blood culture</p> <p><b>OR</b></p> <p>[ A common skin microorganism from 2 blood cultures drawn on separate occasions and taken within a 48 hour period <b>AND</b> the child has at least <u>TWO</u> symptoms of paediatric SIRS <u>at least ONE</u> of which must be abnormal temperature or leucocyte count:</p> <ul style="list-style-type: none"> <li>• Tachycardia or in infants &lt; 1 year bradycardia</li> <li>• temperature &gt;38.5 or &lt;36°C</li> <li>• elevated respiratory rate</li> <li>• leucocyte count elevated or depressed for age that is not secondary to chemotherapy induced</li> <li>• Hypotension (≥13y age) ]</li> </ul>	<p>A recognised pathogen from at least one blood culture</p> <p><b>OR</b></p> <p>[ A common skin microorganism is cultured from blood <b>AND</b> the neonate has ONE of</p> <ul style="list-style-type: none"> <li>• C-reactive protein &gt;20 mg/L</li> <li>• Immature: Total neutrophil ratio &gt;0.2</li> <li>• WCC &lt;5</li> <li>• Platelets &lt;100 ]</li> </ul> <p style="text-align: center;"><b>AND</b></p> <p><b>At least two of the following:</b></p> <ul style="list-style-type: none"> <li>• Temperature &gt;38 or &lt;36.5°C or temperature instability</li> <li>• Tachycardia or bradycardia</li> <li>• Apnoea</li> <li>• Prolonged capillary refill time</li> <li>• Metabolic acidosis ( pH &lt;7.35 with base deficit &gt;5)</li> <li>• Hyperglycaemia (serum glucose &gt; 12 mmol/L on two consecutive values)</li> <li>• Other signs of BSI e.g., apathy</li> </ul>

**AND**

**B: The presence of at least one central venous catheter (CVC) at the time of the positive blood culture or a CVC that was removed within 48 hours before the positive blood culture (see below for detailed definition)**

- Any venous vascular catheter that ends close to or in the great vessels (femoral, subclavian, jugular etc.), chest or within abdominal cavity. This includes peripherally inserted central catheters. CVCs may be short or long term. Common names are PICC, CVC, Portacath, Hickman, Broviac, Leaderflex, UVC etc.

The catheter must have been in place at the time of blood culture which identified the organism in criteria A above or must have been removed within 48 hours prior to the blood culture sampling.

**AND**

**C: The signs and symptoms and the positive laboratory result, including the pathogen cultured from the blood are not primarily related to infection at another site**

- BSI must not be a complication arising from infection at another site such as surgical site infection, UTI, pneumonia, enterocolitis, or meningoencephalitis etc. The signs and symptoms and the positive laboratory result including the pathogen cultured from the blood are not primarily related to infection at another site.

**AND**

**D: The child has been admitted to PICU for >48 hours (i.e. not admitted to PICU for or with a CLABSI), or is within 48 hours of a PICU discharge at the time of blood culture sampling**

- PICU acquired HCAI data collection may lend itself to quality improvement initiatives aimed at reducing/preventing CLABSI. The child should have been admitted to PICU for >48 hours (i.e., not admitted for or with a CLABSI) or is within 48 hours of a PICU discharge at the time of blood culture sampling. If exact time of blood culture sampling is not known for calculation of the 48 hour qualifying period, then blood culture taken after 2 nights in PICU or within 2 nights after a PICU discharge might be used as a criteria.

## CLABSI frequently asked questions

### 1. What if the patient has more than one lumen or CVC?

Presence of a central venous catheter: PCCMDS uses a Yes/No criteria, regardless of number of lumens and nature of the CVC. e.g. Patient with a double lumen Broviac line, and two triple lumen CVCs (total = 8 lumens) counts as 1 line day for denominator line-day calculation. This provides a compromise between ease of use versus need for clarity.

### 2. What common skin micro-organisms should I include?

Some examples of **Common skin micro-organisms list**:

- Coagulase-negative staphylococci,
- Micrococcus sp.,
- Propionibacterium acnes,
- Bacillus sp.,
- Corynebacterium sp.
- Viridans streptococci

### 3. Do you have any guidance for SIRS (Systemic Inflammatory Response Syndrome) criteria:

Age group	Tachycardia	Bradycardia	RR	WCC	Systolic BP
0 days – 1 week	>180	<100	>50	>34	NA
1 week – 1 month	>180	<100	>40	>19.5 or <5	NA
1 month – 1 year	>180	<90	>34	>17.5 or <5	NA
2 – 5 years	>140	NA	>22	>15.5 or <5	NA
6 – 12 years	>130	NA	>18	>13.5 or <4.5	NA
13 – 18 years	>110	NA	>14	>11 or <4.5	<117

### 4. Are Assays required for a diagnosis of CLABSI?

No. Quantitative or semi-quantitative assays are not required for a diagnosis of CLABSI.

Differential delay of central v peripheral cultures or confirmation from cultures simultaneously taken peripherally and centrally are not required. They relate to diagnosis of catheter related BSI (CR-BSI) which is not the focus of this data collection.

## CALBSI example scenarios

1. A 3-year old admitted with road traffic accident to PICU requires central line insertion on 4<sup>th</sup> day of PICU stay because of abdominal distension and shock. Blood culture taken immediately after line insertion grows *Enterobacter*. Patient is diagnosed to have pancreatitis and an intra-abdominal abscess. This does not meet Criteria C (CVC was inserted to treat the signs and symptoms of infection elsewhere), though they might meet Criteria A, B and D.
2. A neonate who had Norwood procedure for hypoplastic left heart syndrome required inotropic support for a prolonged period. They had a CVC removed on post-op day 8. They developed SIRS on post-op day-9 and a blood culture grew coagulase negative staphylococcus 24 hours later. CRP peaked at 50mg/L. No alternative focus was identified. This meets criteria A, B, C and D. This will be reported as a PICU-CLABSI even though the line was removed the day before blood culture sampling and symptoms arising.
3. A child admitted post repair of an intestinal stricture required prolonged TPN via a central venous catheter. The child developed symptoms of sepsis, 7 days after admission and CVC insertion. The child improved after antibiotic therapy and line removal. The clinical diagnosis was that of a suspected central line insertion, though the blood cultures were negative on two occasions. However, they do not meet criteria A and therefore is not reportable as a PICU-CLABSI.
4. Febrile neutropenic patient receiving chemotherapy via a Broviac line is admitted to PICU with shock, and grows *E Coli* from blood culture taken at the time of the PICU admission. No alternative focus of infection identified and the Broviac is removed. This will not qualify as a PICU acquired CLABSI (does not meet Criteria D), though it meets a CLABSI definition (meets Criteria A, B, C). This does not need reporting as a PICU-CLABSI.
5. Febrile neutropenic patient who received a stem cell transplant 1 month ago has been admitted to PICU with graft-versus host disease (suspected gut involvement), mucositis and suspected enterocolitis has *Enterococcus faecalis* bacteraemia from a blood culture taken from a Broviac line 4 days after PICU admission. Mucosal barrier injury (MBI) related blood stream infection is suspected. The patient is managed with antibiotics and gut rest. This is not reportable as a PICU-CLABSI as criteria C is not met, due to mucosal barrier injury being the primary source of bacteraemia. MBI-BSI has specific diagnostic criteria, and expert help may be required to confirm such criteria are met before a decision to not report this as a PICU-CLABSI.

## PICU acquired Catheter associated Urinary Tract Infection (CAUTI)

Case definition of number of episodes of PICU-acquired CAUTI:

Document the number of episodes of PICU-acquired CAUTI ensuring that the child meets all three of the criteria for A, B and C:

**A:** An indwelling urethral or suprapubic catheter that has been in-situ for at least 48 hours or where the urine sample has been obtained within 48 hours of removal of the catheter.

**AND**

**B:** UTI criteria: Meets either one of the two below:

1. A child of any age with a positive urine culture with  $> 10^3$  colony forming units/mL with no more than two species of microorganisms AND at least 1 of the following signs of symptoms:
  - Fever  $> 38^{\circ}\text{C}$
  - suprapubic tenderness
  - costovertebral angle pain
  - costovertebral angle tenderness

**OR**

2. A patient  $< 1$  year of age with a positive urine culture with  $> 10^3$  colony forming units/mL with no more than two species of microorganisms AND at least 1 of the following signs or symptoms:
  - Fever  $> 38^{\circ}\text{C}$  or hypothermia  $< 36$
  - Apnoea
  - Bradycardia
  - Lethargy
  - Vomiting

**AND**

**C:** The child has been admitted to PICU for  $>48$  hours (i.e., not admitted to PICU for or with a CAUTI) or is within 48 hours of a PICU discharge at the time of urine culture.

## CAUTI frequently asked questions

### 1. What definition of urinary catheter should we use?

Urinary catheter: A urethral or suprapubic catheter that is inserted into the bladder, connected to a closed drainage system and left *in-situ*. This category does not include intermittent catheterisation or non-invasive drainage systems such as condom catheter.

### 2. What if the patient has a positive urine culture, but doesn't have any major symptoms?

In a patient with a positive urine culture and minimal symptoms (e.g. low grade temperature or one-off temperature), the culture should be repeated and only regarded as significant with 2 positive cultures of the same organism.

### 3. What if the patient's urine sample comes back as 'Mixed flora'?

A urine specimen with "Mixed flora" cannot be used to meet the urine criterion. Culture of the following organisms cannot be used to meet the UTI definition:

- Any Candida species, as well as a report of "yeast" that is not otherwise specified
- Parasites

However, they do not exclude a UTI, if criteria is also met because of the presence of a positive bacterial culture.