



## **TargetBSI.com Webinar Frequently Asked Questions**

*CLABSI Prevention Strategies:  
Understanding the Risks of Peripherally Inserted Central Catheters*  
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## Defining a CLABSI and Collecting Cultures

### 1. What criteria are used to define/diagnose CLABSI?

For surveillance purposes many healthcare organizations use the definitions for a Central Line-Associated Bloodstream Infection (CLABSI) Event from the Centers for Disease Control and Prevention's (CDC) National Healthcare Safety Network (NHSN). These can be found at: [http://www.cdc.gov/nhsn/psc\\_da.html](http://www.cdc.gov/nhsn/psc_da.html).

Keep in mind that the surveillance definition (i.e., the definition that is used to compare and benchmark institutions reporting to the National Healthcare Safety Network [NHSN]) differs from the clinical criteria that physicians use to treat a CLABSI. Examples of clinical criteria can be found in Mermel LA, et al. Clinical Practice Guidelines for the Diagnosis and Management of Intravascular Catheter-Related Infection: 2009 Update by the Infectious Diseases Society of America. *Clinical Infectious Diseases* 2009;49:1-45.<sup>1</sup> The document is also available at: <http://www.journals.uchicago.edu/doi/pdf/10.1086/599376>.

### 2. The central line tip I sent for culture had > 15 colony forming units (CFU) of *S. aureus* but all blood cultures are negative. Is this a CLABSI?

No. This would not fit either the NHSN or the 2009 IDSA Practice Guidelines definitions for a CLABSI. According to the IDSA Guidelines: Growth of >15 colony-forming units (cfu) from a 5-cm segment of the catheter tip by semiquantitative (roll-plate) culture or growth of >10<sup>2</sup> cfu from a catheter by quantitative (sonication) broth culture reflects catheter colonization".<sup>1</sup>

### 3. What cultures should be drawn to diagnose a CLABSI?

Ideally, for suspected CLABSI, paired blood samples, drawn from the catheter and a peripheral vein, should be cultured whenever possible before initiation of antimicrobial therapy, and the bottles should be appropriately marked to reflect the site from which the samples were obtained. If a blood sample cannot be drawn from a peripheral vein, it is recommended that at least 2 blood samples be drawn through different catheter lumens.<sup>1</sup>

### 4. When drawing blood cultures from a catheter, should a sample be discarded first? Is there a concern that heparin indwelling in the catheter will alter the culture results?

Some authorities recommend discarding the initial 5-10 mL drawn to reduce the sample contamination and remove inhibitory substances; however, some studies have shown that this may not significantly reduce contamination rates. Each organization should develop a standardized protocol in conjunction with the microbiology laboratory.

### 5. Are routine cultures of central lines considered good practice? Should tips be cultured on removal?

Routine cultures are not recommended. Blood and catheter tip should be cultured when infection is suspected.<sup>1</sup>

**6. If a patient has a suspected or confirmed CLABSI and the PICC line is removed, what is the recommended amount of time before another line should be inserted?**

There is no recommended time; however, the new catheter should be placed at a different site.<sup>1</sup>

**7. Should a catheter be removed in all cases for positive blood cultures from the catheter? If the peripheral blood cultures are positive but the blood cultures from the catheter are negative, should the catheter remain in or be removed?**

The decision on whether or not to remove the PICC/CVC depends on the patient's clinical status, duration of treatment, availability of alternative access sites, and the suspected or known organism causing the infection.<sup>1</sup>

**8. Is it possible to insert a new PICC despite positive culture results?**

What we have been taught all these years may not hold true, i.e., wait 2-3 days and have the patient on peripheral IV antibiotics to decrease bacteria count in the blood. If the patient needs reliable vascular access, the PICC should be placed after weighing the risks and benefits.<sup>1</sup>

**9. How do the lines become contaminated, and what can we do to prevent contamination?**

Contamination and the causes for CLABSIs are essentially from 4 different sources:

1. Extraluminally from the catheter insertion site. – Most common
2. Intraluminally from the hub of the catheter or needleless connector. – Second most common
3. Seeding from a non-catheter source. - Third most common but is rare.
4. Contaminated infusate or flushes. – Fourth most common but is extremely rare.

The usual source of infection will be colonization from the skin down the insertion site. To prevent contamination, one must use strict aseptic technique when inserting and caring for the PICC and ensure that all personnel inserting and maintaining the catheters have been trained and their competency verified.<sup>2,3</sup>

**10. Are more CVCs (including PICCs) contaminated extraluminally or intraluminally?**

Evidence still points to most CLABSIs being related to extraluminal contamination. Some studies have shown that extraluminal contamination appears to be greater with short-term or non-tunneled CVCs and intraluminal contamination occurs more often with long-term CVCs.<sup>3-5</sup>

## **Clots and Thrombosis**

**11. How much infection is related to RNs not assessing the lines for blood return and not declotting earlier before the line becomes fully occluded?**

Occlusions include: total, unable to flush or aspirate; partial, able to flush but cannot aspirate; sluggish flow or sluggish blood return. Any or all these may be associated with clot formation. We have known about the association of clots and infection for a long time. Fibrin is a nidus for infection.<sup>6-8</sup>

There is evidence that the earlier CVCs and PICCs are assessed for occlusions and declotted, the better the outcomes of restoring catheter function.<sup>9</sup>

Hence, early recognition of occlusion does reduce the risk of CLABSI.

## **Central Line Insertion**

### **12. Have there been any studies to indicate if the use of ultrasound reduces CLABSI rates due to better rates of successful initial placement?**

The fewer the number of attempts of skin penetration and disruption, the lower the risk of insertion complications including CLABSIs. Many PICCs are placed in the upper arm where the skin microbial burden is less compared to the chest area.<sup>10,11</sup>

### **13. Should a patient's face and head be covered with the drape to adhere to maximal barrier precautions?**

Yes. Please also remember that every patient is different and may not tolerate the feeling of being closed in with a drape over his/her head. It may require that the drape be positioned in such a way that the area away from the insertion site is open. You want to consider having the patient wear a mask.<sup>12,13</sup>

“For the patient, maximal barrier precautions means covering the patient from head to toe with a sterile drape with a small opening for the site of insertion.”<sup>14</sup>

### **14. What options are there to maintain sterility when needing to reposition a PICC just after initial insertion?**

As long as the sterile field has not been torn down or compromised the procedure can continue. However, if the PICC needs to be repositioned after the field is dismantled then a complete new field and prepping needs to be done. Repositioning and setting up a new field holds the same risk of infection as doing a catheter exchange. The risk and benefits of tip placement weighed against the risk of infection needs to be considered heavily.<sup>15</sup>

PICC tip locating systems seem to have improved initial insertion tip position. This technology should be researched heavily.

### **15. Are PICCs safer than other CVCs?**

Jamie Bowen Santolucito, RN,CRNI summed it up the best:

“Undoubtedly, future research is desperately needed to establish the risk-benefit ratio of the use of PICCs vs. conventional, non-cuffed CVCs in hospitalized patients. It is vitally important that such studies address all aspects of patient outcomes, including risks associated with catheter insertion, incidence of thrombotic and infectious complications, catheter function and performance, patient comfort and preference as well as overall costs.”<sup>16</sup> Many references are cited in her article.<sup>16</sup>

An oral abstract titled, “Peripherally Inserted Central Line (PICC) Blood Stream Infection Surveillance Rates in Medical Intensive Care, Medical-Surgical Ward, Extended Care, and

Outpatient,”presented by Timothy Royer, RN, BSN at the APIC Educational Conference at Baltimore, Maryland, June 2005, showed the medical ICU CR-BSI rate for PICC lines was 0.33/1000 PICC days compared to the medical ICU NNIS rate of all central lines 3.9/1000 catheter days at the 50 percentile.<sup>17</sup>

**16. Would upper arm placement have a positive impact regarding infection and mechanical phlebitis?**

Evidence over the last 10 years on upper arm placements indicate that there is a much lower mechanical phlebitis rate and improved infection rates. It has been well known for many years that phlebitis is associated with increased risk of infection. Studies have shown that better securement and less pistoning of venous catheters in veins have lower phlebitis rates and therefore have a lesser infection rate. [INS Standards #37]. Site Selection state “The vasculature shall accommodate the size and length of the catheter required by the prescribed therapy.” If we are placing PICCs in an area that is not flexible and has a skin platform that can provide proper securement the risk of phlebitis is decreased.<sup>18,19</sup>

**17. Should we be using a new needle for each attempt to cannulate the vein on a PICC insertion?**

Yes, because the first needle will likely be contaminated with skin organisms and these organisms will be pushed into the insertion site if the needle is reused.

**18. The presentation mentioned the use of ultrasound probes being a potential source of contamination. I thought it was a standard of practice to use sterile probe covers for line insertion.**

Ultrasound probes can be a potential source of contamination when inserting a CVC/PICC. For this reason many practitioners use sterile probe covers, although this is not yet a standard of practice. Even when a probe cover is used, it is necessary to clean and disinfect the probe after use with an appropriate disinfectant.

**19. Can the central line check off be completed by the inserting PICC nurse or must it be a secondary person trained in sterile technique and trained to observe? Is the central line insertion checklist mandatory as of 2010, and are we required to have a second person present to observe for the checklist?**

The CVC insertion checklist should be completed by an observer because it is a monitoring device used to ensure that the proper insertion protocols are followed. As of 2010, organizations accredited by the Joint Commission must use a CVC insertion checklist to meet the requirements of National Patient Safety Goal 07.04.01. See: <http://www.jointcommission.org/PatientSafety>

Marschall et al recommend the following: 1) the CVC insertion should be observed by a nurse, physician, or other healthcare personnel who has received appropriate education, to ensure that aseptic technique is maintained; and 2) these healthcare personnel should be empowered to stop the procedure if breaches in aseptic technique are observed.<sup>20</sup>

**20. Do you monitor/audit 100% of central line insertions?**

Yes, all CVCs including PICCs insertions need to be monitored. Most of the catheter-related bloodstream infections (BSIs) occur with CVCs.<sup>21,22</sup>

## Care and Maintenance of the Insertion Site and System

### 21. Of all the best practices, which one will help the most?

Hands down – hand hygiene.<sup>23,24</sup>

### 22. Is it common practice to change out the PICC after a specified time?

As long as the CVC and PICC are without signs or symptoms of complications or infection, the CVC and PICC can remain in place as long as it is necessary. But remove unnecessary lines. It is the recommendation of the 2002 CDC IV Guidelines and others that changing out CVCs, which includes PICCs, should not be done after a specified time period in order to prevent infection.<sup>13,15</sup>

### 23. What is your recommended time of hub scrub?

There is not much current data out there right now, and it is still controversial. However, a study published in The Journal of the Association for Vascular Access indicated that a 15 second scrub with 70% alcohol or chlorhexidine is sufficient.<sup>25</sup>

### 24. Could heparin flushes be a factor in causing infections?

There is evidence indicating that heparin may be a factor in *lowering* the risk of CLABSI.<sup>26</sup>

We also must consider the following factors and critical thinking path. Evidence shows that heparin stimulates biofilm formation.<sup>27,28</sup>

### 25. What is your position on turbulent flushing in relation to biofilm in the catheter?

There is no evidence available at this time.

### 26. Are there any evidenced-based studies to show how frequently needleless connectors should be changed? Also, would you recommend changing the needleless connector after every blood draw?

Per the 2002 CDC Guidelines<sup>13</sup>, change the needleless components at least as frequently as the administration set but no more frequently than every 72 hours or according to manufacturers' recommendations. Whenever the integrity of the injection or access cap is compromised, or if residual blood remains within the cap, it should be replaced immediately.

### 27. Could you talk about the use of antibacterial ointment at PICC removal and/or routine care?

For routine care, the 2002 CDC Guidelines (pg 14) state: “Do not use topical antibiotic ointment or creams on insertion sites because of their potential to promote fungal infections and antimicrobial resistance.”<sup>13</sup>

The Infusion Nurses Society addresses this in their Standards of Practice for removal: INS Standard 49 Catheter removal, Standard III: “Digital pressure should be applied until hemostasis

is achieved, then antiseptic ointment and a sterile occlusive dressing should be applied to the access site.”<sup>19</sup> This is to help prevent air embolism.

**28. What is your recommendation for PICC flushes? We use every 8 hr saline flush and have recently added expectations to use pulsatile flush technique.**

PICC flushing should be done to clear the catheter and needleless connector. Pulsatile flush technique is what we were taught and what many of us have taught through the years; however, there is no scientific evidence or published research on the practice. Yes, it does make sense, just no evidence.

**29. Drainage under dressing how much is too much and when to change?**

Per the 2002 CDC IV Guidelines and the INS standards, the dressing should be changed if it is damp, loosened, or visibly soiled.<sup>13,19</sup> Any drainage on the dressing will have an impact on the integrity of the dressing remaining occlusive. This panel cannot make a quantitative measurement of how much is too much.

**30. Most of the infections within my institution are 7 days post insertion and beyond. Everything seems to be focused on insertion. How do you change that focus to maintenance?**

Evidence indicates that strict adherence to aseptic technique and hand hygiene, along with staff and patient education, reduces the risk of CVC and PICC infection as well as other complications for patients with a CVC.<sup>20,28,29</sup> Some institutions have developed CVC maintenance bundles to increase compliance. References 20, 28, and 29 below show this. Present these to your vascular access committee, infection control committee, and hospital executives. They will want to reduce the risk of infection.

**31. Is there enough evidence that shows that IV/PICC teams help prevent complications including infection?**

Specialized "IV teams" have shown unequivocal effectiveness in reducing the incidence of catheter-related infections, associated complications, and costs. Evidence goes way back.<sup>13,30-36</sup>

However, there are only a few studies published on the impact of teams or services in decreasing CLABSI rates.<sup>37-39</sup> PICC teams can reduce CLABSI rates when they perform all PICC insertions, conduct daily surveillance of each catheter and dressing, perform dressing changes, provide staff education, and conduct outcome monitoring and performance improvement initiatives. More research is needed on the impact of PICC teams on reducing CLABSI rates.

**32. Please clarify blood administration set replacement time.**

- Replace tubing used to administer blood, blood products, or lipid emulsions within 24 hours of initiating infusion<sup>13,19</sup>
- Replace administration sets not used for blood, blood products, or lipids (including secondary sets and add-on devices) no more frequently than 72-hour intervals<sup>13,19</sup>

## Staff and Patient Education

### **33. How are patients and home care givers taught care and maintenance for PICCs at your facility?**

Same principles apply when teaching patients as it does for staff. See references 28 and 29, below.

Per McGoldrick (2009): "If home caregivers, patients, and patients' families are better educated about CLABSI prevention, patients will have a better chance of receiving appropriate care at home and caregivers will be better positioned to advocate for that same level of care when patients are in other settings."<sup>40,41</sup>

An example of a patient teaching guide titled "*Catheter-Associated Bloodstream Infections*" can be found on the website of the Society for Health Epidemiology of America at: <http://www.shea-online.org/about/compendium.cfm>

Some infusion therapy departments have developed a video that reviews catheter care (e.g., step by step- flushing, cap changing and sterile dressing changes, complication to look for and how to cover for bathing). In some units, all patients going home with a catheter and/or their caregivers must attend at least one class for cap changes/flushes and repeat the class for dressing changes. Some practice is done in the class, and written handouts are given for all the steps in each procedure. The patient and the caregiver must demonstrate the actual care on the patient in front of an infusion therapy nurse to be checked off in sterile technique.

## Home Care

### **34. Do any other facilities use a community-wide guide for CVC care in the home, to bring same care/supplies from all entities (home health, inpatient, outpatient infusion companies)?**

We have struggled with patients getting educated at the hospital, then getting different types of supplies from the outpatient service. See references in the Staff and Patient Education above.

It is essential for the patient, family, or caregivers to be educated in the hospital. If the patient is going to have home care, the home care provider should come to the facility and be part of the educational process using the equipment that will be provided. Continuity of care is extremely important. The key here is communication between the IV Team/Discharge Planner/Case Manager/MD/Home Care.

There is no evidence that specifically addresses using the same supplies as issued by the facility for home care.

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