

Best Practices for Obtaining Blood Cultures in Adults (≥age 18)

Indications for Blood Cultures

- Patient has suspected sepsis
- New fever in a patient in an Intensive Care Unit
- Suspected endocarditis
- Fever in a neutropenic patient
 - No more frequently than every 72 hours for persistent fevers unless there is clinical deterioration in the patient
- Suspected bacteremia/fungemia
- Consider not sending blood cultures in conditions with low probability for bacteremia (such as post-op fever within 48 hours in clinically stable patients, isolated fever, patients with non-severe cellulitis, or non-severe pneumonia), as blood cultures in these cases are generally negative.
- “Test of cure” ≥48 hours after the initiation of appropriate antimicrobial therapy is routinely recommended for patients with the following pathogens:
 - *Candida sp.*
 - Carbapenem-resistant *Enterobacteriaceae*,
 - *Enterococcus*
 - *Staphylococcus aureus* (MRSA or MSSA)
 - *Staphylococcus lugdunens*
- For patients with other pathogens who are clinically improving, evidence is weak that a test of cure improves clinical outcomes.

Optimal Procedures for Obtaining Blood Cultures

- **The preferred method for obtaining blood cultures is by peripheral venipuncture.** These have the lowest rate of false positive cultures.
- **Strict aseptic technique** and best practice should be used to obtain blood cultures. (see [Phlebotomy Services](#), [Blood Culture Collection policy](#) and [Nursing Policy, Blood Cultures for protocol](#))
- **Always obtain at least 2 sets of blood cultures for adults**



A blood culture set contains two bottles: one aerobic and one anaerobic. For the recommended two sets of blood cultures for adults, a total of four bottles are needed.

- The yield of obtaining a pathogen with blood cultures depends on the volume of blood collected (**8-10 ml/bottle for adults recommended-suboptimal volume can significantly decrease sensitivity**) and the number of blood culture sets obtained. (Each blood culture set has two bottles.)
- If endocarditis is suspected, consider obtaining at least three sets from different sites separated in time by at least one hour.
 - Obtain blood cultures **prior to** initiating antibiotic therapy.
 - In a neutropenic patient, routine serial blood cultures in a stable patient with persistent fevers is not evidence-based and therefore not recommended.
 - Do NOT obtain blood cultures via a peripheral intravenous catheter (PIV) or arterial catheter, even when the catheter is newly placed (This is associated with a higher rate of false positive cultures)
 - Do NOT obtain a single blood sample and then split the blood among multiple blood culture sets
 - Do NOT obtain blood cultures in an asymptomatic patient unless the cultures are being obtained as a “test of cure” for an indicated pathogen (as listed above)

Continued

Additional Guidelines for Patients with Central Lines

- **AVOID obtaining blood cultures via central venous catheter if possible (higher risk for contamination). If not feasible to obtain two sets of blood cultures by separate peripheral venipunctures or if trying to salvage the line (see below), one set from peripheral venipuncture and one from the central line can be obtained.**
- Do NOT obtain cultures from multiple ports of a multi-lumen central venous catheter.
- Obtaining a set of blood cultures through a central line along with a set of blood cultures via a peripheral venipuncture can be appropriate if there is a *medical reason to salvage the central line* and the following guidance is observed:
 - In general, patients with bacteremia/fungemia should have all central lines removed and replaced in a different location once the patient has been started on appropriate antimicrobial therapy.
 - If there is a medical reason to salvage the central line, consult Infectious Diseases for recommendations on appropriate treatment, which may include IV antimicrobials, “lock therapy,” and/or line exchange over a guidewire.
 - Attempted salvage of a central line is generally not appropriate for lines infected with *S. aureus*, *P. aeruginosa*, Gram-negative bacilli, enterococci, fungi, or mycobacteria.
- Ensure that a waste is drawn prior to collecting the culture specimen when drawing from a central line to prevent contamination of culture from heparin or other medications. Heparin and other medications may inhibit bacterial growth and must be withdrawn before sampling the blood for culture. (See [Nursing Policy, CVAD Care & Maintenance](#), for waste volumes by line type.)
- Catheter tip cultures are generally not recommended.

Additional Guidance

See the following references from American College of Critical Care Medicine and Infectious Diseases Society of America for definitions of fever in adult ICU patients, key guidelines for blood cultures, and potential non-infectious sources of fever.

O’Grady NP, et al. Guidelines for evaluation of new fever in critically ill adult patients: 2008 update from the American College of Critical Care Medicine and the Infectious Diseases Society of America. Crit Care Med 2008;36:1330-49. Available at: https://journals.lww.com/ccmjournal/Fulltext/2008/04000/Guidelines_for_evaluation_of_new_fever_in.40.aspx

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. Clin Infect Dis 2009;49:1-45. Available at: <https://academic.oup.com/cid/article/49/1/1/369414?login=true>

Taplitz, et al. Outpatient Management of Fever and Neutropenia in Adults Treated for Malignancy: American Society of Clinical Oncology and Infectious Diseases Society of America Clinical Practice Guideline Update. J. Clin. Oncol 2018; 36: 1443-1453. Available at: <https://pubmed.ncbi.nlm.nih.gov/29517953/>

This document was created by UNC Hospitals’ SHINE (Stop Healthcare-associated INfections in Everyone) Workgroup and the Carolina Antimicrobial Stewardship Program ([CASP](#)). Please contact the Dept. of Infection Prevention with questions: 984-974-7500 or see the [CLABSI Prevention Initiative](#).