

Blood Culture Sample Collection Safety for Patients and Healthcare Workers

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Each year there are over 18 million cases of severe sepsis worldwide. Sepsis is a major cause of mortality throughout the world, killing approximately 1,400 people each day.¹ In the US it is estimated that 750,000 patients suffer from sepsis annually. Between 30 and 50% of these patients die, which is one reason why sepsis is the 10th leading cause of death in the United States.² The accurate and timely identification of the infection is critical for patient survival.

When a patient has symptoms indicative of a systemic infection, such as sudden temperature spike, chills or tachycardia, a blood culture test can verify that an infection is present. This blood culture test will aid in the identification of the microorganism that is responsible for the infection, such as type of bacteria or fungi. The identification of the causative organism is critical since sepsis can lead to systemic inflammatory response, potential organ failure and death.

A positive blood culture confirms the presence of an infectious agent and the subsequent identification of the organism can guide appropriate antibiotic therapy. It is extremely important that collection of blood used for blood culturing is performed correctly and aseptically. Correct and aseptic sample collection procedures are not only critical for the patient, incorrect procedures have a significant impact on the institution.

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¹ Angus, DC, Linda-Zwirble WT, Lidicker J, Clermont G, Carcillo J, Pinsky MR. Epidemiology of severe sepsis in the United States: analysis of

Contamination leading to false positive blood cultures often can result in a delay of appropriate treatment for the patient. The patient may receive unnecessary antibiotics as well as require additional tests to determine correct infectious organism. There is much data showing that false positive blood culture results/contaminated samples can and do result in increased length of hospital stay and costs. Blood culture contamination can extend the hospital stay by as much as 4 ½ days and increase the cost of treatment by as much as \$5000^{3,4}. These costs may include laboratory charges, pharmacy charges and hospital stay charges. It can also present the patient with additional exposure to potential harm.

When bacteria is present in a blood culture bottle but is not actually in the patient's blood stream this is called a False Positive. Physicians must interpret if bacteria in the bottle are a true pathogen or just a contaminant and whether or not to treat the patient.

Blood culture contamination can result from several factors; **improper skin preparation, non-use of gloves and improper cleaning of culture bottle tops**. Improper skin preparation is one of the most common causes of blood culture contamination. The bacteria that are found on the skin at the collection site can contaminate the specimen if the skin is not cleaned, scrubbed properly. Equally important in preparing the

incidence, outcome and associated costs of care. *Critical Care Medicine*. 2001 Jul;29(7):1303-10

² Alan E. Jones, Alan C. Heffner, James M. Horton, and Michael R. Marchick; Etiology of Illness in Patients with Severe Sepsis Admitted to the Hospital from the Emergency Department; *Clinical Infectious Diseases* (2010); Volume 50, Issue 6Pp. 814-820

³ Ernst, Dennis T. (2004); Controlling blood-culture contamination rates; MLO-Online, March 2004, pp. 14-18; accessed and downloaded November 2013.

⁴ Schiffman R. Editorial. *Mayo Clin Proc*. 1998;73:703-704

venipuncture site is ensuring adequate drying time of the antiseptic prior to venipuncture. The use of sterile gloves is associated with lower incidence of blood culture contamination.⁵ A third area of potential contamination is the improper cleaning of culture bottle tops.

The blood culture process typically uses a two bottle system; one for aerobic bacteria detection and one for anaerobic bacteria detection. The bottles contain media that enables bacterial growth. The media also includes an anticoagulant to prevent the blood from clotting within the bottle. The culture bottles have different colored caps to help distinguish the aerobic from the anaerobic media. Additional color coding identifies pediatric and mycobacterium culture bottles. The blood culture bottles contain a vacuum similar to blood collection tubes used to collect blood for other tests.

Blood culture bottles are filled in one of two ways:

- The blood can be withdrawn from the patient using a winged (butterfly) set and a tube holder or adapter or,
- The patient blood sample can be drawn into a syringe and then transferred from the syringe to the blood culture bottle using a blood transfer device.

Long necked blood culture bottles are designed for use with standard “adapters” or tube holders. Short neck blood culture bottles require the use of a special adapter to fit the bottle top.

One such product that is used to fill blood culture bottles with blood sample is the SampLok[®] Adapter Cap from ITL Corporation. It is a versatile device for safe blood sample collection and sample transfer into blood culture bottles and test tubes. With an integrated safety lid, the SampLok Adapter Cap provides safety to healthcare workers by reducing the risk of needle stick injury. The SampLok Adapter Cap’s flexible design allows sampling with

a variety of culture bottles and vacuum test tubes.

The SampLok Adapter Cap fits securely over the blood culture bottle top ensuring that the sampling needle is well-positioned in the culture bottle septum. The integrated safety lid provides added protection from the sampling needle. At the end of the blood sample collection and transfer into the blood culture bottle, the safety lid is closed to shield the needle away. This helps to protect healthcare workers and others against potential exposure and needlestick injury from the back end needle.



The SampLok Adapter Cap fits a range of blood culture bottles and is available with or without a pre-attached sampling luer needle. The adapter cap can be attached to winged needle sets. The SampLok Adapter cap has a glove like fit over vacuum blood culture bottles from bioMerieux. An optional insert is available for use with long neck culture bottles and standard vacuum test tubes.



This is how easy this product is to use.

1. Bottle preparation is started by removing the protective flip top cap on the blood culture bottle. The septum of bottle is cleansed with an alcohol pad. The alcohol is allowed to dry for at least one minute before inoculation.

⁵ 2012 ENA Emergency Nursing Resources Development Committee Clinical Practice Guideline: Prevention of Blood Culture Contamination; ; Emergency Nurses Association December 2012

This helps eliminate contamination of the specimen.

2. Perform venipuncture after preparing skin at the venipuncture site according to your facility's standard operating procedure. As discussed above, performing this step correctly, use of appropriate antiseptic scrub, duration and quality of the scrub, and allowing the antiseptic to dry on the skin prior to venipuncture is critical to a successful blood culture collection.
3. Open the safety lid of the SampLok Adapter Cap by releasing the finger tabs.
4. Fully open the safety lid so that the cap opening is clear.
 - a. Place SampLok Adapter Cap over blood culture bottle and press down to collect sample into the culture bottle
 - b. Lift SampLok Adapter Cap up off the bottle when sufficient sample has been transferred into the bottle. (There are fill indicator lines on the bottle label to assist with collecting the desired volume)
5. Repeat step 4 when collecting additional blood culture bottles as required.
 - a. Close the safety lid as follows. After lifting the cap off of the final blood culture bottle, place the safety lid against a firm surface and press down on the safety lid until it snaps closed.
6. Dispose in a sharps-biohazard container.

The SampLok Adapter Cap is an easy-to-use safety product for the collection of sample into blood culture bottles. The optional insert can aid in the collection of samples into vacuum tubes. The safety lid snaps shut at the end of the procedure to protect from accidental needle stick injuries. SampLok Adapter Cap is available without a pre-attached luer, non-sterile and bulk packaged (product code A100706), or with a pre-attached luer,

sterile and individually packaged (product code A100710). It is also available as a component in the SampLok Plus Blood Culture Collection Kit (product code A100711).



For more information on this product contact ITL Corporation at 888-411-2851 or visit their website at www.itlcorporation.com.