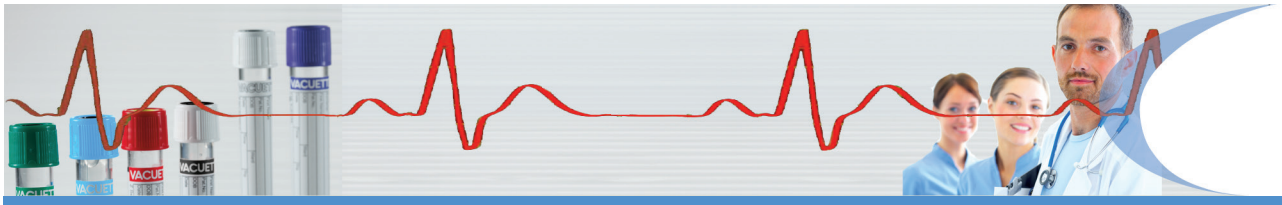

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Published Feb 2012

Understanding Blood Cultures

BacT/ALERT® blood culture bottles form part of the bioMérieux's BacT/ALERT blood culture system. The bottles are typically taken when patients are suspected of suffering from a bloodstream infection, possibly caused by bacteria or fungi. The bottles are inoculated on the ward and then returned to the microbiology laboratory to be incubated in a fully automated blood culture system. As bacteria/fungi are typically present in very low numbers in the patient's blood stream, the blood culture systems have been designed to detect very low numbers of microorganisms. This means that any bacteria introduced into the bottle from an external source, such as the patient's skin, has the potential to flag as an instrument positive culture. The laboratory and the clinical staff then have to try and determine whether the positive result is due to a true bacteremia/fungemia or is a contaminant. Contaminated blood cultures are a common problem and have been shown to account for up to 50% of positive blood cultures insome laboratories[1]. These results complicate patient care and can lead to inappropriate antibiotic therapy. This causes a significant waste of health care resources, exposes the patient unnecessarily to side effects of antimicrobial therapy and contributes to antibiotic resistance[2].

In order to reduce the risk of contamination, it is important that the correct technique is used when collecting these critical samples. The venipuncture site should be thoroughly cleaned in line with site guidelines; bottle tops should be cleansed with alcohol swabs and allowed to dry prior to collection. It is also recognized that the use of safe sampling kits, such as Greiner Bio-One's VACUETTE® Safety Blood Collection Sets reduce the risk of contamination. For further information please see the United Kingdom's Department of Health, Saving Lives Guidelines[3] produced in 2007 and the Health Protection Agency National Standard method for the investigation of Blood Cultures (BSOP 37)[4].

Frequently Asked Questions

How much blood should we collect?

The Health Protection Agency (2010) and ASM guidelines (2005)[5] both recommend the collection of at least two blood culture sets of two bottles per septic episode. The collection of higher volumes of blood significantly increases the probability of detecting bacteria in the blood and providing useful information when trying to determine whether a positive result is due to contamination or true bacteremia. For the BacT/ALERT bottles, optimal fill volumes are 10mls per adult bottle, and 4mls for a pediatric bottle.

Why do we have to take two bottles?

Adult blood culture sets consist of a bottle designed to grow aerobic, anaerobic and facultative anaerobic microorganisms.The two bottles are designed to cover the largest range of clinically significant organisms. Also, recommendations state that, for adults, two sets of two bottles of 10mls should be taken in order to ensure the correct volume of blood is tested. Please see the following references for further information.(Li, Cockerill, Lee, Bouza and Gonsalves) [6, 7, 8, 9, 10]

What is the minimum amount of blood that can be tested?

BacT/ALERT bottles do not have a set minimum amount of blood. The system can test a single drop of blood. However, the greater the volume of blood tested the higher the probability that bacteria will be detected.

What about pediatric samples?

bioMérieux has developed a specific pediatric bottle designed to maximize the recovery of pathogens from often very low volumes of blood. This bottle has an aerobic atmosphere, as literature has shown that anaerobic bacteremia is very rare in children. The volume of blood to be collected should be based on the weight of the patient but, as before, the more blood tested the greater the probability of detecting a pathogen. Please see papers by Kellogg[11] and Connell et al[12] for further reading.

What order should the bottles be inoculated in?

If using a winged blood collection set, then the aerobic bottle should be inoculated first. This avoids the risk of air in the tubing negatively affecting the growth of anaerobic bacteria. For further guidance, please see the BacT/ALERT Instructions for Use.[13]

Will the bottle vacuum collect the recommended volume of blood?

The vacuum in the bottles is not static; the strength varies according to the age of the bottle. It is, therefore, very important that the staff member collecting blood monitors how much blood is inoculated into each bottle.

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All information provided was originally published in February 2012 under the title 'Lab Minute' produced by Greiner Bio-One GmbH | Bad Haller Straße 32 | A-4550 Kremsmünster

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