

## Blood Culture

### Aim of the test

An etiological diagnosis of bacteremia by aerobic and anaerobic cultivation of the blood, with identification and susceptibility test of the isolated organism(s). Blood culture should be made for cases with suspected septicemia, endocarditis, and bacteremia secondary to localized infections (pneumonia, intraabdominal abscesses, pyelonephritis, epiglottitis, meningitis). In this case the blood culture may provide an etiological diagnosis of the localized infection.

### Types of specimen

Whole blood

### Criteria of specimen rejection

Blood collected in tubes or bottles other than aerobic and anaerobic blood culture bottles. If the information on the label does not match that of the request form. Specimens for anaerobic blood culture received in aerobic bottles or vice versa.

### Pathogens

Blood is a sterile body fluid and normally contains ~~commensals~~ <sup>No</sup>

Common pathogens	
<i>Streptococcus spp</i>	<i>Bacteroides fragilis</i> and other anaerobic bacteria
<i>Staphylococcus aureus</i>	Coagulase negative staphylococci
<i>Listeria monocytogenes</i>	Enteric gram negative bacilli
<i>Corynebacterium jeikeium</i>	<i>Neisseria meningitidis</i>
<i>Haemophilus influenza</i>	Non fermenter gram negative bacilli
<i>Salmonella typhi</i>	
<i>Pseudomonas aeruginosa</i>	
Fungi	
<i>Candida albicans</i>	<i>Cryptococcus neoformans</i>
Other candida spp	<i>Coccidioides immitis</i>
<i>Histoplasma capsulatum</i>	

### Pre specimen processing

#### Patient preparing

The major difficulty in interpretation of blood cultures is potential contamination by skin flora. This difficulty can be markedly reduced by careful attention to the details of skin preparation and antisepsis prior to collection of the specimen.

**Skin preparation:** First cleanse the vein puncture site with isopropanol. Then use tincture of iodine or povidone iodine to disinfect the site using progressively larger concentric circles. Iodine should remain in contact with skin for about 1 minute or until dry to ensure disinfection. The vein puncture site must not be palpated after preparation. Blood is then drawn. Following vein puncture, alcohol is used to remove the iodine from the site.

### Specimen collection

Blood cultures should be drawn prior to initiation of antimicrobial therapy. If more than one culture is ordered, the specimens should be drawn separately at no less than 30 minutes apart to rule out the possibility of transient bacteremia by self-manipulation by the patient of mucous membranes in the mouth caused by brushing teeth, etc or by local irritations caused by scratching of the skin.

The time of collection must be indicated. Strict aseptic technique is essential. If present remove the plastic cap from the blood culture bottles, swab the stoppers with tincture of iodine or povidone iodine and allow to dry. Collect 20 mL blood in a sterile plastic syringe and inoculate at least 10 mL blood (as indicated on bottle) into each bottle or use Vacutainer® and butterfly collection set and monitor the fill using the graduations on the side of the bottle. For more information about the amount of blood, please refer to the blood bottles manufacturer's user guide.

### Quantity of specimen

Volume inoculated in sets of culture bottles for aerobic and anaerobic cultivation

Children below 2 years	1 mL of venous blood in 2 bottles
Children 2-5 years	2 mL of venous blood in 4 bottles
Children 6-10 years	3 mL of venous blood in 4 bottles
Children 11-15 years	5 mL of venous blood in 4 bottles
Children above 15 years and adults	5 mL venous blood in three sets of bottles (6 bottles).

### Storage

Pre-incubate or maintain specimen at room temperature. Do not refrigerate

### Container

One aerobic and one anaerobic blood culture bottle. Do not vent.

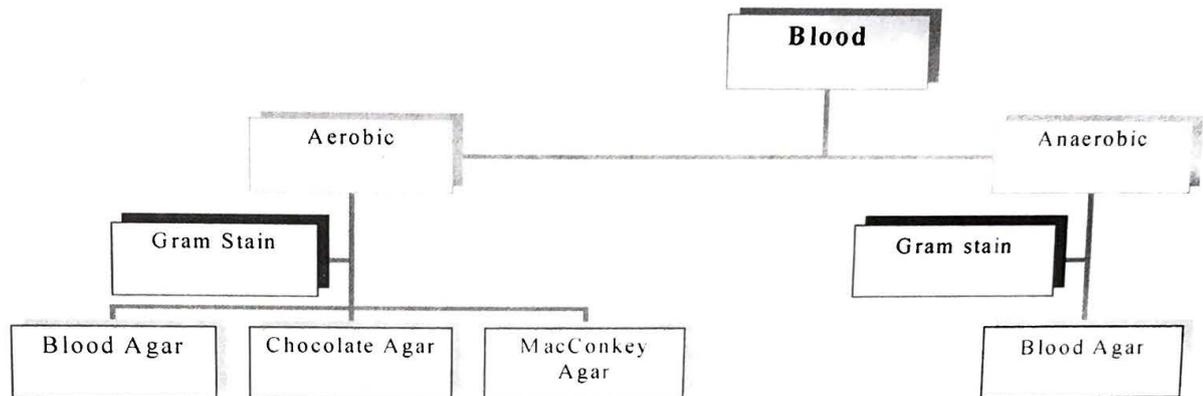
### Specimen processing

#### Media

Aerobic Blood culture bottle  
 Anaerobic Blood culture bottle  
 MacConkey Agar  
 Blood Agar  
 Chocolate Agar

## Method

Blood is injected to both aerobic and anaerobic bottles and incubated for up to 10 days at 37 °C. Discard as negative after the 10 days incubation period is expired. During the incubation period, a gram stain and subculture onto appropriate media should be done. See diagram below:



## Post specimen processing

### Interfering factors

Patient on antibiotic therapy

### Result reporting:

Any isolated organism will be reported. Antibiotic sensitivity will also be included with the report.

### Turn around time

Initial blood culture results will be reported as soon as it shows growth. Final results with sensitivity will be issued after 24-48 hours of the initial report. Negative results will be issued after 10 days of culture submission.

### Interpretation of Positive Blood Cultures

- Virtually any organism, including normal flora, can cause bacteremia
- A negative culture result does not necessarily rule out bacteremia; false-negative results occur when pathogens fail to grow
- A positive culture result does not necessarily indicate bacteremia; false-positive results occur when contaminants grow.
- Gram-negative bacilli, anaerobes, and fungi should be considered pathogens until proven otherwise.
- The most difficult interpretation problem is to determine whether an organism that is usually considered normal skin flora is a true pathogen.

### Limitations

Three negative sets of blood cultures in the absence of antimicrobial therapy are usually sufficient to exclude the presence of bacteremia. One set is seldom ever sufficient.<sup>1</sup> Prior antibiotic therapy may cause negative blood cultures or delayed growth. Blood cultures from patients suspected of having *Brucella* or *Leptospira* must be requested as special cultures. Consultation with the laboratory for special culture procedures for the recovery of these organisms prior to collecting the specimen is recommended. Yeast often are isolated from routine blood cultures. However, if yeast or other fungi are specifically suspected, a separate fungal blood culture should be drawn along with each of the routine blood culture specimens. See separate listing for proper collection of Blood Fungus Culture. *Mycobacterium avium* complex (MAC) is frequently recovered from blood of immunocompromised patients, particularly those with acquired immunodeficiency syndrome, AIDS. Special procedures are required for the recovery of these organisms; Contact lab.

