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INTEGRATED PATHOLOGY SERVICE
GENERAL PATHOLOGY DOCUMENT
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Pathology User Manual Microbiology Investigations Blood Cultures

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Blood culture

Please view the Trust Policy ***- Blood Culture Collection Technique***

Addressograph labels on blood culture bottles should not obscure the barcode nor make it difficult to remove the detachable section of the barcode. These barcode stickers are needed for laboratory processing- **please do not remove.**

Please use the following blood culture bottles:

Adult Blue topped (aerobic) – 8.0 to 10.0mL;
Purple topped (anaerobic) – 8.0 to 10.0mL

Neonate/Paediatric Yellow topped (Paediatric) – 0.5 to 4mL (This bottle may be issued on specific request for use with non-paediatric patients who are extremely difficult to bleed). Please do not use them for this purpose unless absolutely essential

Blood culture collection in GP Practice - On the rare occasion that these are indicated a set of culture bottles may be requested from the lab and will be delivered on the next van run. Culture bottles are too expensive and too rarely used in General Practice for them to be a regular stock item.

Blood culture bottles are not intended or validated for fluids other than blood.

Factors affecting isolation of Causative Organisms

- Method of collection

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- Number and timing of samples

2 sets of blood culture are recommended for PUO and 3 sets if investigating endocarditis. A second or third set taken from a different site not only increases yield but also allows recognition of contamination. These should be taken at different times via separate stabs. In most conditions other than endocarditis, bacteraemia is intermittent, given it is related to the fevers and rigors which occur 30-60 minutes after the entry of organisms into the bloodstream. Samples should be taken as soon as possible after a spike of fever. However, one study has shown no significant difference in isolation rates for blood drawn either at intervals or taken simultaneously with fever spikes. Certainly, the timing is less important for continuous bacteraemia, as seen in infective endocarditis.

- Previous antimicrobial therapy

Ideally, blood samples should be taken prior to antimicrobial treatment. When already receiving antimicrobials, blood culture should be collected just before the next dose is due when antimicrobial concentration in the blood is at the lowest. Any recent antimicrobial therapy can have a significant effect on blood culture results by decreasing the sensitivity of the test. This may be of particular importance in those

patients receiving prophylactic antibiotics and who are at high risk of bloodstream infections. If patients have received previous antimicrobial treatment, bacteraemia should be considered even if blood culture results are negative.

- Volume of blood

Blood culture volume is the most significant factor affecting the detection of organisms in bloodstream infection. There is a direct relationship between blood volume and yield, with approximately a 3% increase in yield per mL of blood cultured. False negatives may occur if inadequate blood culture volumes are submitted. Please note the sample volume stated previously.

For adult blood cultures the optimum volume is 10ml in each of the two bottles (i.e. 20ml total blood volume).

Adult blood cultures have volume monitoring to help ensure compliance with the collection of the recommended blood volume of 8-10ml per bottle as hospital guidelines.

Under-filled and over-filled bottles are processed, but it is highlighted on the result as being under-filled or over-filled with the comment:

“Failure to assure the correct bottle fill volume may lead to incorrect results. Please ensure that aerobic and anaerobic bottles are inoculated with approximately 8-10mls of blood as per trust guidelines. This sample has been processed.”

The adult culture bottles have a fill line (black bar running vertically down the right edge of the label) with a fill-to symbol (arrow indicating the optimal fill level) and a fill-to mark (white line) extending through the fill Line to make it easier to fill bottles to the appropriate level. See figure 1

Figure 1: Adult Blood culture label showing ‘Fill line’

Limitations of examination procedure

- Organisms are often very few in number and may appear intermittently in the blood stream, which is why it is recommended that, under normal circumstances, two blood culture sets are taken per patient

- On rare occasions organisms may be encountered that grow in the culture bottles but do not produce sufficient carbon dioxide to be flagged as positive by the automated system. The presences of antibiotics in samples or oxygen starvation in anaerobic bottles are examples, which may cause this situation.

- It is possible that certain rare, fastidious microorganisms will not grow in the BacT/ALERT culture bottles. If such organisms are suspected, then alternative methods for recovery should be considered

- Certain bacteria undergo autolysis very readily and are thus often not visible in stained preparations from flagged positive bottles. Direct antigen detection methods can be performed in instances where these pathogens are indicated from the available clinical details, e.g. *Strep. pneumoniae* where respiratory symptoms are listed.