The Newcastle upon Tyne Hospitals NHS Foundation Trust

Blood Culture Collection Policy

<table>
<thead>
<tr>
<th>Version No.:</th>
<th>1.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective From:</td>
<td>14 December 2017</td>
</tr>
<tr>
<td>Expiry Date:</td>
<td>14 December 2020</td>
</tr>
<tr>
<td>Date Ratified:</td>
<td>08 December 2017</td>
</tr>
<tr>
<td>Ratified By:</td>
<td>Infection Prevention and Control Committee</td>
</tr>
</tbody>
</table>

**SUMMARY**

This Policy was updated December 2017 to include the requirement for PAIRED aerobic and anaerobic bottle sets in adults

- **ONLY** take blood cultures when appropriate to do so.
- **WASH** your hands with an antiseptic solution (e.g. Hibiscrub) prior to taking blood cultures.
- **CHOOSE** your venepuncture site carefully.
- **ALWAYS CLEAN** the patient’s skin with a 2% chlorhexidine in 70% isopropyl alcohol impregnated wipe e.g. Sani-cloth or Clinell for 20-30 seconds and allow to air dry prior to taking blood cultures.
- **ALWAYS USE** an ASEPTIC NON TOUCH TECHNIQUE (ANTT) to obtain the blood sample.
- **DO NOT** re-palpate the skin after cleaning.
- **ALWAYS** inoculate blood culture bottles FIRST.

1 Introduction

Blood culture is considered to be the “gold-standard” investigation for the detection of micro-organisms in blood. Culturing microorganisms from blood can provide invaluable information relating to the diagnosis of bacteraemia and indeed the cause of many infective conditions, whilst helping to guide subsequent therapy. Used appropriately, blood cultures can help reduce morbidity and mortality.

Conversely, contaminated blood cultures can cause confusion and lead to unnecessary further tests and treatments. Contamination is defined as the growth of organisms in the blood culture bottle that were not present in the patient’s bloodstream at the time the culture was taken. Poor practice in the taking of blood cultures can also result in the introduction of organisms into the bloodstream with potentially catastrophic consequences for the patient.

The source of contamination / infection could be patient’s skin, equipment used in blood collection or the hands of person collecting blood culture. This is of concern because of the risk to patient safety. However this can also have financial implications, both in terms of direct costs and through adversely affecting national surveillance targets. The Department of Health’s *Saving Lives* document estimates that blood culture contamination rates could be as high as 10%.
This policy aims to ensure that blood cultures are taken:
- for the correct indications;
- at the correct time and;
- using correct technique in order to prevent contamination of the sample and minimise risk to patients and staff

2 Policy Scope

This policy is intended to inform all staff who undertake the procedure of blood culture collection on the correct rationale and technique for this.

Blood cultures should ONLY be taken by staff that have been trained and documented as competent to do so and are familiar with this policy. The competency document for Nursing and AHPs can be found on the intranet under Patient Services, Clinical Competencies.

3 Aims of the Policy

The aims of the policy are to promote best practice in the collection of blood culture and thus reduce the number of false positive results and patient infection as well as reducing inappropriate blood culture collection.

4 Roles and Responsibilities

4.1 The Executive Team is accountable to the Trust Board for ensuring Trust-wide compliance with policy.

4.2 The Chief Executive has overall responsibility for implementation, monitoring and review of this policy. This responsibility is delegated to the Director of Infection Prevention and Control (DIPC).

4.3 The Infection Prevention and Control Committee (IPCC) will review and ratify the policy and any new evidence base within the time frame set out in the policy.

4.4 The Infection Prevention and Control Team (IPCT) are responsible giving IPC advice as necessary and for assisting with the review of this policy to ensure the policy contains current evidence based guidance.

4.5 Clinical Directors, Directorate Managers, Matrons, Line Managers and Heads of Department are responsible for ensuring that policies, procedures and access to education and training are made available to all appropriate staff to ensure staff competence, minimise the risk of infection and ensure clinical practice is in line with Trust policy.

4.6 All staff are responsible for ensuring they understand and implement this policy and attend training sessions as specified in their role.
5 Definitions

Definitions are explained throughout the policy as necessary.

6 Taking Blood Cultures

6.1 Indications for taking blood cultures

Blood cultures should only be taken when there is reason to suspect an infection, i.e.
- Fever or hypothermia (temperature <36C or >38C)
- Unexplained hypotension (Systolic BP <90*)
- Tachycardia (Pulse >90*) and / or Tachypnoea (RR >20breaths/pm*)
- Requirement for supplemental oxygen
- Chills or rigors
- Unexplained deterioration in the patient’s condition
- ‘V’ or less on AVPU scale
- Focal signs of infection
- Purpuric rash
- Leucocytosis or Leukopenia
- Lactate >2 mmol/l*

* Parameters for adult patients only

Clinical judgement needs to be exercised and it should be remembered that early signs of infection might be absent or minimal in the young and the elderly.

A blood culture should only be taken if the result will affect patient management. A blood culture should not be taken if there is no intention to treat (e.g. the terminally ill).

Indication to take a blood culture should be determined by the team looking after the patient and may be performed by another competent practitioner on request of the team.

6.2 Timing of blood cultures

Blood cultures should be taken as soon as bacteraemia is suspected and ideally before the administration of antibiotic therapy.

To achieve the greatest chance of detecting a bacteraemia it is recommended that TWO paired sets of blood cultures are taken an hour apart from separate sites.

If chronic or sub-acute endocarditis is suspected, at least THREE paired sets of blood cultures should be taken ideally, if the patient’s condition permits, >6 hours apart from different sites. In patients with suspected endocarditis and severe sepsis or septic shock at the time of presentation, TWO paired sets of blood cultures should be taken at different times in the hour prior to commencing empirical antibiotics.
6.3 Ideal sites to take blood cultures from

Blood cultures should always be taken from **FRESH venepuncture sites** ideally either in the anterior cubital fossa or the back of the hand. Other sites (especially femoral stabs) should only be used as a last resort due to high likelihood of contamination and infection. Where the person has a disability that precludes use of these sites other sites can be considered.

Blood cultures should **ONLY** be taken from peripheral cannula **in exceptional circumstances** when it is not possible to collect them from a fresh venepuncture site. There is an increased risk of isolating contaminants from blood cultures taken through a peripheral cannula. Therefore, it is imperative if a culture can’t be taken from a fresh venepuncture site and is taken from a cannula that it is **ONLY** taken with the **UTMOST** care **AT THE TIME OF CANNULA INSERTION** and NOT thereafter under any circumstance.

6.4 Equipment required for taking a blood culture

6.4.1 Peripheral Stab

- Plastic tray (cleaned with Clinell universal sanitising wipe and allowed to dry prior to use)
- Sterile blood collection set (Vacuette) OR Needle and 10ml Syringe
- 2% chlorhexidine in 70% isopropyl alcohol impregnated swabs e.g. Clinell skin disinfecting wipes or Sani-Cloth
- Two blood culture bottles (Aerobic and Anaerobic pair).
- Clean Tourniquet (use disposable where possible or as a minimum a cleanable tourniquet for any venepuncture/cannulation)
- Non-sterile gloves.
- Dressing for post procedure.

6.4.2 Central line cultures

- Cleaned trolley.
- Sterile drape.
- Sterile gloves.
- 2% chlorhexidine in 70% isopropyl alcohol impregnated wipes e.g. Clinell skin disinfecting swabs or Sani-Cloth
- Two blood culture bottles (Aerobic and Anaerobic pair).
- 10mls 0.9% saline flush.
- Green needle.
- Three 10ml syringes.

6.5 Recommended procedure for taking blood cultures

It is recommended that peripheral blood cultures are taken using the sterile blood collection set (Vacuette). It is however recognised that in some circumstances it is not possible to obtain blood using the sterile Vacuette and therefore a recommended procedure has also been included for the needle and syringe technique.
### 6.5.1 Taking Peripheral Blood Cultures (Adults and Paediatrics)

#### Step 1 - Preparation

Where required ensure that communication support is available to explain the procedure.

- Clean plastic tray with a Clinell universal sanitising wipe, from inside to outside and allow to dry
- Collect appropriate equipment and assemble, maintaining ANTT, prior to placing into the cleaned tray. Ensuring no unnecessary packing is put into the tray.
- Ensure the blood culture bottles to be used are in date and not already positive (the bottom of the bottle should be green prior to inoculation).
- If the patient’s skin is visibly soiled wash with soap and water and dry
- Wash your hands with an antiseptic solution (e.g. Hibiscrub).
- Explain and obtain consent for the procedure from the patient.
- Remove the plastic cover top of the blood culture bottles and disinfect each rubber bung top with a new 2% chlorhexidine in 70% isopropyl alcohol impregnated wipe for 20-30 seconds and allow to air dry.

#### Step 2a – Taking the sample using needle and syringe

- Apply tourniquet and palpate the vein.
- Clean hands with alcohol hand rub and don non-sterile gloves.
- Disinfect the skin with a 2% chlorhexidine in 70% isopropyl alcohol impregnated wipe for 20-30 seconds and allow to air dry for 30 seconds.
- Insert the needle (Do not palpate the vein again after cleaning the skin).
- Collect the sample maintaining ANTT throughout the procedure
- **For paediatrics** collect the sample. 1-2 ml for neonates, 2-3ml for infants, 3-5 ml in pre-teen children and 10 ml in young adults.
  - Note for paediatrics a single blood culture collection bottle is used
- Release the tourniquet and apply pressure to achieve haemostasis.
- Cover the puncture site with the appropriate dressing.
- Inoculate the blood into culture bottles (If blood is being collected for other tests ALWAYS inoculate the blood culture bottles first).
- AVOID completely emptying the syringe into the ANAEROBIC (purple) bottle as air may enter the bottle.
- Do not change the needle between sample collection and inoculation.

#### Step 2b – Taking the sample using vacuette system

- Apply tourniquet and palpate the vein.
- Clean hands with alcohol hand rub and don non-sterile gloves.
- Disinfect the skin with a 2% chlorhexidine in 70% isopropyl alcohol impregnated wipe for 20-30 seconds and allow to air dry for 30 seconds.
- Use sterile blood culture collection kit if available, if not attach the butterfly blood collection set to the adapter cap maintaining ANTT.
- Insert the needle (Do not palpate the vein again after cleaning the skin).
- Place the adapter cap over each blood culture bottle in turn, piercing the rubber bung to collect the sample, and maintaining ANTT throughout the procedure.
Fill the AEROBIC (blue) bottle first.
Hold bottles upright and use the bottle graduation lines to gauge the sample volume being collected.
• For paediatrics collect the sample. 1-2 ml for neonates, 2-3ml for infants, 3-5 ml in pre-teen children and 10 ml in young adults.
  ∙ Note for paediatrics a single blood culture collection bottle is used
• If blood is being collected for other tests ALWAYS inoculate the blood culture bottles first.
• Collect the sample then release the tourniquet and apply pressure to achieve haemostasis.
• Cover the puncture site with the appropriate dressing.

Step 3 - Finishing
• Discard sharps into a sharps container at the point of use.
• Label blood culture bottles with patient’s details while with the patient.
• Remove gloves and wash hands.
• Clean procedure tray with a Clinell universal sanitising wipe
• Record the procedure in the patients’ medical notes including the indication, date, time and site of venepuncture.

6.5.2 Taking Central Venous Catheter (CVC) Blood Cultures
Confirming that a central venous catheter is the source of an infection can be difficult. Blood culture contaminants can create diagnostic uncertainty and lead to the unnecessary removal of lines. Therefore, it is essential that line cultures are only taken by appropriately trained staff and using ANTT. Paired line and peripheral cultures should be taken at the same time, preferably before anti-microbial therapy to aid interpretation of cultures. If the line is to be immediately removed, it is recommended instead that the line tip is sent for culture along with a peripheral blood culture.

Step 1 – Preparation
As for preparation when taking a peripheral blood culture.

Step 2 - Taking the sample from the central venous catheter
• Clean your hands with alcohol hand rub and don non-sterile gloves.
• Scrub the port/hub with a 2% chlorhexidine in 70% isopropyl alcohol impregnated wipe for 20-30 seconds and allow to air dry (unless contraindicated by manufacturers’ instructions in which case aqueous povidone iodine can be used).
• Maintaining ANTT, withdraw 5-10 ml (adults) / 3-5ml (paediatrics) of blood into a syringe and discard this syringe OR in specific areas follow local protocol for use of discarded blood. For diagnosis of catheter related sepsis this blood needs to go into the blood bottles and labelled appropriately. Using a new syringe, withdraw the 20ml of blood for the sample (10ml for each blood culture bottle), maintaining ANTT.
• For paediatrics collect 1-2 ml for neonates, 2-3ml for infants, 3-5 ml in pre-teen children and 10 ml in young adults.
• Attach the needle to this syringe or use an appropriate safety device to inoculate 10ml blood into each blood culture bottle (If blood is being collected for other tests ALWAYS inoculate the blood culture bottles first).
• AVOID completely emptying the syringe into the ANAEROBIC (purple) bottle as air may enter the bottle.
• Flush the CVC line with 10mls of 0.9% saline solution using a push-pause technique. (for paediatrics flush the line with 5-10 ml of saline)

Step 3 - Finishing
• Discard sharps into a sharps container at the point of use.
• Label the blood culture bottles with patient’s details, while with the patient.
• Dispose of equipment appropriately and wash your hands.
• Clean procedure tray with Clinell universal sanitising wipe
• Record the procedure in the patients’ medical notes including the indication, date, time, and lines from which cultures have been taken.
• Proceed to take peripheral culture as previously described (if required).

6.6 Documentation in medical notes

After blood cultures have been taken, the procedure MUST be clearly documented in the patient’s medical notes to aid subsequent interpretation of positive results. The date, time, site(s) of venepuncture, indication for the blood culture being taken and if ANTT was used should be recorded as well as a record of who has taken the culture.

Blood cultures should in the majority of cases be requested via eRecord. If this is not possible, conventional specimen request forms can be used. The date, time and site of collection along with pertinent clinical details, antibiotic exposure, details of the person responsible for taking the culture and details of the clinical team responsible for the patient’s care should all be included on the request form.

6.7 Transport of Blood Cultures to the laboratory

Blood cultures are processed in the Microbiology laboratory at the Freeman Hospital. Once taken, samples should be sent to the Pathology Reception at either the RVI or the Freeman from where they will be sent to the microbiology laboratory to be processed.

For further details please refer to the Trusts policy on the Transport of Clinical Specimens.

Out of hours there is no need to contact the Microbiology BMS on call to process the sample urgently. Bottles can be taken to Pathology Reception where they will be incubated on arrival in the Microbiology department. Samples should NOT be refrigerated.
6.8 Positive blood culture results

Blood cultures are routinely incubated for 5 days (for 7 days in suspected endocarditis). Positive results will be communicated directly between the microbiologists and the clinical team responsible for the patient as soon as the result becomes available.

Once the culture flags positive, a Gram stain result will be available +/- a provisional identity. Formal identity and sensitivities will usually be available 24 hours later but in some instances this may take longer. Results will be placed on the eRecord results system.

An early report will be issued for negative blood culture results at 36hrs for paediatric samples and 48hrs for adults. These interim results will be available via e-Record immediately after their release. A final electronic report will be issued for negative blood cultures after incubation is complete.

7 Training

Staff taking blood cultures MUST be trained in the blood culture collection procedure and competence has to be assessed and maintained.

The ANTTT aspects of blood culture collection are also included in the IPC eLearning programme for Medical staff.

8 Equality and diversity

The Trust is committed to ensuring that, as far as reasonably practicable, the way we provide services to the public and the way we treat our staff reflects their individual needs and does not discriminate against individuals or groups on any grounds. This policy has been appropriately assessed.

9 Monitoring compliance with this policy

<table>
<thead>
<tr>
<th>Standard / Process / Issue</th>
<th>Monitoring and audit</th>
<th>Method</th>
<th>By</th>
<th>Committee</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of contaminated blood cultures per alert organisms by directorate (sample contamination rate: &lt;3%)</td>
<td></td>
<td>Cognos search of Apex</td>
<td>Laboratory staff</td>
<td>IPC committee</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Competence in undertaking ANTT</td>
<td></td>
<td>Audit of Nursing and Midwifery staff via electronic audit and medical staff via ESR</td>
<td>Senior Nurse (Practice Development IPC)</td>
<td>IPC committee</td>
<td>Annually</td>
</tr>
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</table>
10 Consultation and Review

This policy has been reviewed by the Infection Prevention Control Committee prior to ratification and implementation. The policy will be reviewed three yearly by the Infection Prevention Control Committee.

11 Implementation

This policy will be communicated to all Trust staff who undertake this procedure. The policy will be made available on the intranet and summary posters displayed in areas where blood cultures are most frequently taken.

12 References


Related Policies

- Asepsis policy
- Hand hygiene policy
- Policy for the prevention and management of Needle stick Injuries and Blood Borne Virus Exposures
- Transport of clinical specimens policy
The Newcastle upon Tyne Hospitals NHS Foundation Trust

Equality Analysis Form A

This form must be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval.

PART 1

1. **Assessment Date:** 16/12/2016

2. **Name of policy / strategy / service:**
   - Blood culture collection policy

3. **Name and designation of Author:**
   - Allison Sykes, Practice Development Lead IPC, Ali Robb, Consultant Microbiologist

4. **Names & designations of those involved in the impact analysis screening process:**
   - Ashley Price, Director of IPC

5. **Is this a: Policy **Yes** Strategy **No** Service **No**
   - **Is this:**
     - New **No** Revised **Yes**
   - **Who is affected**
     - Employees **Yes** Service Users **Yes** Wider Community **No**

6. **What are the main aims, objectives of the policy, strategy, or service and the intended outcomes?** *(These can be cut and pasted from your policy)*
   - The aims of the policy are to promote best practice in the collection of blood culture and thus reduce the number of false positive results and patient infection as well as reducing inappropriate blood culture collection

7. **Does this policy, strategy, or service have any equality implications?** **Yes** **X** **No**

   If No, state reasons and the information used to make this decision, please refer to paragraph 2.3 of the Equality Analysis Guidance before providing reasons:
8. Summary of evidence related to protected characteristics

<table>
<thead>
<tr>
<th>Protected Characteristic</th>
<th>Evidence, i.e. What evidence do you have that the Trust is meeting the needs of people in various protected groups</th>
<th>Does evidence/engagement highlight areas of direct or indirect discrimination? If yes describe steps to be taken to address (by whom, completion date and review date)</th>
<th>Does the evidence highlight any areas to advance opportunities or foster good relations. If yes what steps will be taken? (by whom, completion date and review date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race / Ethnic origin (including gypsies and travellers)</td>
<td>Interpreter services provided if needed to discuss and explain the procedure E&amp;D Training for staff</td>
<td>Studies show that when interpreters were provided patients had a better understanding of their diagnoses and treatment plan than patients without interpreters. Communication support is available (section 6.5.1)</td>
<td>None</td>
</tr>
<tr>
<td>Sex (male/ female)</td>
<td>Male and female practitioners are available to promote the dignity of patients when required</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Religion and Belief</td>
<td>None relevant to this policy</td>
<td>When fasting people of some faiths do not wish blood to be taken. However if a patient is ill enough to need a blood culture they are most likely to be persuaded of the necessity. It will be important to discuss the serious need to take blood in a manner sympathetic to their religious belief.</td>
<td>None</td>
</tr>
<tr>
<td>Sexual orientation including lesbian, gay and bisexual people</td>
<td>None relevant to this policy</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
| Age | -Innovations to support people with Dementia  
-Nurse Specialist Dementia Care available for further advice and support | None | None |
| Disability – learning difficulties, physical disability, sensory impairment and mental health. Consider the needs of carers in this section | -Equality and Diversity training incorporates general principles in relation to meeting the need of disabled people.  
-The learning disability liaison nurse is available to support staff working with patients who have a learning disability | Some disabled people may not have limbs or be able to cooperate with using particular sites. Policy suggests that where the person has a disability that precludes use of these sites other sites can be considered. | None |
| Gender Re-assignment | None relevant to this policy | None | None |
9. Are there any gaps in the evidence outlined above? If ‘yes’ how will these be rectified?

No

10. Engagement has taken place with people who have protected characteristics and will continue through the Equality Delivery System and the Equality Diversity and Human Rights Group. Please note you may require further engagement in respect of any significant changes to policies, new developments and or changes to service delivery. In such circumstances please contact the Equality and Diversity Lead or the Involvement and Equalities Officer.

Do you require further engagement? Yes ☐ No ☑

11. Could the policy, strategy or service have a negative impact on human rights? (E.g. the right to respect for private and family life, the right to a fair hearing and the right to education?)

No

PART 2

Name: Ali Robb

Date of completion: 16/12/2016

(If any reader of this procedural document identifies a potential discriminatory impact that has not been identified, please refer to the Policy Author identified above, together with any suggestions for action required to avoid/reduce the impact.)