Healthier Communities, Outstanding Care

Sherwood Forest Hospitals NHS Foundation Trust

BLOOD CULTURES FROM PATIENTS WITH SUSPECTED OR CONFIRMED INFECTIONS POLICY

POLICY

Reference	ICP 32		
Approving Body	Infection Prevention and Control Committee		
Date Approved	27/04/2023		
For publication to external SFH website	**Positive confirmation received from the approving body that the content does not risk the safety of patients or the public:**		
	YES	**NO**	**N/A**
	X		
Issue Date	9th May 2023		
Version	4.0		
Summary of Changes from Previous Version	• Minor wording changes		
Supersedes	v3.0, issued 1st November 2019, for review January 2023 (ext[1])		
Document Category	• CLINICAL		
Consultation Undertaken	• Infection Prevention and Control Committee Members		
Date of Completion of Equality Impact Assessment	07/03/2023		
Date of Environmental Impact Assessment (if applicable)	07/03/2023		
Legal and/or Accreditation Implications	Compliance with Health and social Care Act 2008 (DH 2015)		
Target Audience	• Clinical staff trained and competent to take blood cultures		
Review Date	April 2026		
Sponsor (Position)	Director of Infection Prevention and Control		
Author (Position & Name)	Nurse Consultant Infection Prevention and Control – Sally Palmer		
Lead Division/ Directorate	Clinical Service, Therapies and Outpatients		
Lead Specialty/ Service/ Department	Infection Prevention and Control		
Position of Person able to provide Further Guidance/Information	Infection Prevention and Control Nurse Consultant		

Associated Documents/ Information	**Date Associated Documents/ Information was reviewed**
Not applicable	Not applicable
Template control	June 2020

CONTENTS

1.0 INTRODUCTION

This policy is intended to provide some general principles related to venepuncture and safe transport of samples from patients with suspected or confirmed infections, of the precautions required and why they are required as well as the rationale behind their use for the reduction and prevention of infections. These precautions must be used for patients who are either known or suspected to have an infectious disease, or are carrying multi-resistant microorganisms or are particularly vulnerable to infection, this ensures the safe care and management of all patients, visitors and staff.

2.0 POLICY STATEMENT

The objective of this policy is to reduce the number of false positive blood cultures and reduce inappropriate sampling for blood cultures. It is important that staff ensure that standard infection prevention and control precautions are used for all patients regardless of their infection status.

This clinical document applies to:

Staff group(s)

- all clinical staff who take a sample i.e. blood culture for the purpose of identifying a causative agent

Clinical area(s)

- all clinical environments

Patient group(s)

- all in-patient and out-patient groups (adult, maternity, paediatric)

Exclusions

- none

3.0 DEFINITIONS/ ABBREVIATIONS

Trust	Sherwood Forest Hospitals NHS Foundation Trust
Staff	All employees of the Trust including those managed by a third party on behalf of the Trust
Bacteraemia	occurrence of microorganisms in the blood; this may be transient, intermittent or continuous ([4])
Contaminant	a microorganism inadvertently introduced into the sample and leading to a false-positive culture result. Contamination can arise in 3 distinct ways, poor storage of blood culture bottles and cross contamination with saprophytic bacteria from non-sterile containers, skin organisms through poor venepuncture technique and laboratory based contamination
Aseptic technique	clinical practices used to protect the patient from microorganisms by preventing contamination of wounds, manipulated devices and other susceptible sites. Aseptic technique involves the use of appropriate hand hygiene, use of sterile equipment and robust skin/site decontamination
Culture and sensitivity	A microbiological investigation to assist in the clinical management of the septic patient, identification of the causative organism and antibiotic profiles will inform effective antibiotic therapy
Sepsis	Clinical evidence of infection in the presence of a systemic inflammatory response
Vascular Access Device	Any device used to gain access to the vascular blood system including peripheral and central venous catheters
False positive	is defined as growth of bacteria in the blood culture bottle that were not present in the patients' blood stream but were introduced during sample collection

HCAI	Healthcare Associated Infection
HAI	Hospital Acquired Infections
IPCT	Infection Prevention and Control Team
DIPC	Director of Infection Prevention and Control
IPCD	Infection Prevention and Control Doctor
IPCN	Infection Prevention and Control Nurse
IPCC	Infection Prevention and Control Committee
BBV	Blood Borne Virus
PPE	Personal Protective Equipment
SIRS	Systemic inflammatory response syndrome
DOB	Date of birth

4.0 ROLES AND RESPONSIBILITIES

Blood cultures must only be collected by members of staff, be that medical staff, nursing staff, healthcare support workers and phlebotomists who have been trained in the collection procedure and whose competence in blood culture collection has been assessed and maintained. All staff are responsible for ensuring that consent has been gained from the patient prior to examination, treatment and care. If a patient is thought to lack capacity, undertake a two stage test and, where necessary, plan care in the patient's best interests. Ensure the appropriate lawful consent has been documented accordingly.

5.0 APPROVAL

Following appropriate consultation, this policy has been approved by the Infection Prevention and Control Committee.

6.0 DOCUMENT REQUIREMENTS (POLICY NARRATIVE)

Contaminated blood cultures (pseudo-bacteraemias) result in an increase in the duration of hospital stay. The cost of the hospital stay can be misleading and confusing to interpret. Coagulase negative staphylococcus (e.g. *Staphylococcus epidermidis*) is a particularly common contaminant yet these microorganisms can equally be significant pathogens in venous line related infection and bacteraemia associated with vascular and other devices and recent surgery. This policy details how to take venepuncture samples for blood cultures correctly.

Blood cultures enable a diagnosis to be confirmed, by detecting microorganisms in a normally sterile body fluid, and have important diagnostic, therapeutic and prognostic implications. Culturing a microorganism allows identification and antibiotic susceptibility testing also to be carried out, this enhances the identification of the focus of the infection and enables the correct antibiotic therapy to be prescribed. It is sometimes difficult to determine the significance of a positive blood culture when only one set of blood cultures have been taken. The positive culture could be due to a true bacteraemia or could be a false positive caused by contamination. To aid distinguishing between contamination and true bacteraemia it is recommended that a second set of blood cultures is taken from a different site, before starting antibiotics. Single sets should not be used to evaluate any patient with suspected bacteraemia or fungaemia (candidaemia). If bacterial endocarditis or endovascular infection is suspected, take **three sets** of blood cultures at separate time intervals (1 hour intervals are a minimum; ideally take samples at 6 hours apart, no more than 3 blood culture sets should be obtained in any 24 hour period) to demonstrate persistent bacteraemia as a result of an endovascular focus of infection. Blood cultures should only be taken when there is a clinical suspicion of bacteraemia or fungaemia (candidaemia), and there is every intention to treat the patient if the cultures are positive, **they must not be part of**

a routine assessment. There are many signs and symptoms in a patient which may suggest bacteraemia and clinical judgement is required, for more in-depth guidance on when to take a sample refer to the Clinical Guidelines for the Treatment of Suspected Sepsis. If a patient is on antibiotics, blood cultures should ideally be taken immediately before the next dose, with the exception of paediatric patients (DH 2010).

6.1 Taking blood cultures in relation to antibiotics

a. Do not delay patient treatment for the sake of blood cultures
b. Preferably take cultures before antibiotics are commenced
c. Inform the laboratory if the patient is already on antibiotics (write the details on the request form or ICE request)
d. If the patient has been on short term antibiotics, one should wait, if possible, at least 3 days after discontinuing antibiotic treatment before taking new blood culture
e. If the patient has been on long term antibiotics, one should wait, if possible, at least 6 days after discontinuing antibiotic treatment before taking new blood cultures.

6.2 Blood sampling sites

Blood cultures must be taken by peripheral stab and **not** via peripheral cannulae. Blood culture should not be taken from veins which are immediately proximal to existing venous cannulae. Blood should only be taken from an arterial line or central line when there is **no** other option, unless the lines are thought to be the cause of the infection. Blood should be obtained from peripheral or arterial sites, for example:

1. Antecubital fossa
2. Prominent vein in forearm

In patients with suspected bacteraemia, blood cultures must not be taken from existing peripheral venous cannulas or sites immediately above peripheral lines (DH 2010). If a central venous line is present blood may be taken from this and from a separate peripheral site when investigating potential infection related to the central line; the peripheral and central line blood culture must be taken at same time. Blood samples for blood culture or routine blood testing must not be taken from single lumen central lines, which are used for the purpose of administration of TPN.

Groin stabs of the femoral vein is not recommended, as this increases the risk of obtaining a false positive blood culture from contamination from the normal skin flora, however if this is the only site available it is imperative that the site is thoroughly decontaminated prior to taking the blood sample.

Taking a sample through a central line is sometimes required, this should only be done when the central lines is thought to be the cause of the infection. Turn off the IV fluids; clean the hub with 2% Chlorhexidine Gluconate and 70% Isopropyl alcohol impregnated swab, then follow the method about re taking sample and inoculating the blood culture bottles. It is important that a peripheral stab is also taken and this must be completed prior to taking the sample from the central line.

Taking blood cultures through central/arterial lines when they have just been sited (less than 30 mins) is an acceptable practice, when there is great difficulty in locating a vein for a venous stab. If blood for blood cultures has been taken through lines it is prudent to state what line (arterial or central line) and whether old or new line to assist in the interpretation of a positive culture.

6.3 Competence

Each individual practitioner is responsible for preventing microbial contamination by maintaining the principles of asepsis throughout the blood sampling procedure (Refer to Aseptic Non-Touch Technique). Blood cultures must only be collected by a member of staff (medical, nursing, healthcare assistant, phlebotomist etc) who have been trained in all the collection procedures and whose competence in blood culture collection has been assessed and maintained (DH 2010).

6.4 Equipment required

- Clean ANTT / White plastic tray
- Sterile blood collection set (butterfly needle with adapter cap attached to it).
- Blood culture pack (which includes blood culture bottles, ChlorPrep® (skin disinfection swab), microbiology form/bag). If the request is made on ICE then a blue Microbiology ICE bag will be required.
- Tourniquet
- 2 pairs of gloves
- Plastic disposable apron
- Sharps container
- Dressing for post procedure

6.5 Procedure

- Collect all required equipment, ensuring that a sharps disposal container is available in the immediate vicinity to where the blood cultures are to be taken
- Ensure that the blood cultures bottles have attained ambient temperature
- Check the bottles are in date
- Hand asepsis and proper aseptic technique
    a. Decontaminate hands by washing with soap and water or alcohol based hand rub ensuring correct technique is used
    b. Use an Aseptic non-touch technique (ANTT)
    c. Don disposable non sterile gloves
- If the site is visibly soiled it must be cleaned with soap and water prior to disinfecting the site. Remove gloves and dispose as clinical waste, decontaminate hands and don a clean pair of disposable non sterile gloves
- Apply a tourniquet and palpate to identify a suitable venepuncture site before disinfecting the skin

- Clean the venepuncture site with 2% Chlorhexidine Gluconate and 70% Isopropyl alcohol impregnated swab for 30 secs, in the event of the patient having an intolerance to chlorhexidine, 70% alcohol can be used, and allow to dry for another 30 seconds
- If a culture is being collected from a central venous catheter, disinfect the access port with 2% Chlorhexidine Gluconate and 70% Isopropyl alcohol impregnated swab, and allow to dry for 30 seconds
- Remove the plastic cover from the blood cultures bottle immediately before collecting the sample, the tops will be clean but not sterile. Disinfect the tops of the culture bottles with a 2% Chlorhexidine Gluconate and 70% Isopropyl alcohol impregnated swab, again allowing time for drying before proceeding with bottle inoculation
- **10ml** of blood to be inoculated into each blood culture bottle (the volume of blood withdrawn is the single most important factor in isolating bacteria and fungi). Important; the vacuum in the bottles will exceed 10ml, do not overfill. There is a direct relationship between the volume of blood obtained and the yield from a blood culture. The number of bacteria present in the blood of a bacteraemic patient is often less than 1 cfu/ml). In infants, a denser bacteraemia is experienced and adequate results may be obtained from a much smaller volume of blood; 1-2ml for neonates, 2-3ml for infants, 3-5ml in pre-teen children and 10ml in young adults

6.6 Vacuette/Winged blood collection set method (first choice):

This is the Trust preferred method as there is less chance of contaminating the blood cultures and less risk of a needle-stick injury.

- Clean hands, and don non-sterile gloves and a disposable plastic apron
- Open the sterile winged blood collection with blood collection adapter cap attached to it.
- Insert needle into prepared site (do not palpate again after cleaning)
- Place adapter cap over blood collection bottle and pierce septum
- Hold bottle upright and use bottle graduation lines to accurately gauge sample volume and collect sample; inoculate aerobic culture first
- If blood is being collected for other tests, always collect the blood culture bottles first
- Ensure tourniquet is released
- Remove the needle from the vein
- Only apply pressure for venestasis after the needle has been removed from the patient
- Discard winged blood collection set into sharp container
- Remove and dispose of personal protective equipment (PPE) in accordance with the Trust waste policy
- Cover the site with an appropriate sterile dressing
- Decontaminate hands
- Complete appropriate documentation, with indication for blood culture, time, site of venepuncture and any complications in the patient's health records

6.7 Needle and syringe method (second choice):

This method is an option only in exceptional circumstances.

- Clean hands, and don non-sterile gloves and a disposable plastic apron
- Insert needle, do not palpate again after cleaning, collect sample and release tourniquet
- Only apply pressure for venestasis after the needle has been removed from the patient
- Cover the puncture site with an appropriate dressing
- If blood is being collected for other tests, always inoculate the blood culture bottles first
- Inoculate blood into culture bottles using the blood transfer device, inoculate anaerobic culture first
- Discard needle, and syringe attached to the medical device as one unit into sharp container
- Remove and dispose of PPE in accordance with the Trust waste policy
- Cover the site with an appropriate sterile dressing
- Decontaminate hands
- Complete appropriate documentation, with indication for blood culture, time, site of venepuncture and any complication in the patient's health records

6.8 Transferring sample from a syringe using the blood transfer device

This method must be used when a needle and syringe is used for venepuncture, or a syringe is used to obtain a sample from a central line

- After blood collection with a syringe from the hub of the central line, with gloved hands peel back the packaging and remove the blood transfer device
- Insert the syringe tip into the hub of the blood transfer device and rotate the syringe clockwise to secure the syringe to the hub
- With the syringe tip held facing down, push a BD Vacutainer® tube or BD Bactec™blood culture bottle into the blood transfer device. Do not push the syringe plunger, allow the vacuum of the tube/bottle to transfer the blood sample
- Inoculate blood into anaerobic culture first
- Once the blood has been transferred dispose of the entire assembly as one unit into an approved sharps container. **On no account must you unthread the syringe from the blood transfer device** prior to disposal
- Remove and dispose of PPE in accordance with the Trust waste policy
- Decontaminate hands
- Complete appropriate documentation, with indication for blood culture, time, site of central line and any complications in the patients' medical history

6.9 For all blood culture samples:

- Mix the contents of the bottles by inverting the bottles after inoculation
- Do not remove or write over the bar codes on the bottles
- Label all bottles correctly with the patients details, date and time and most importantly the site that the blood sample has been taken from

- Ensure blood culture bottles are rapidly despatched to the Microbiology Laboratory for incubation to aid recovery of organisms and prevent false negative results:
    i. Complete the request card in full with all the relevant clinical details or complete an electronic request on ICE and print the ICE labels
    ii. Label the bottles with the patients name, date of birth (DOB) and hospital number, or attach the ICE labels
    iii. Place the bottles into the sample plastic bag attached to the request form and seal or if using ICE place into a Blue Microbiology ICE bag and seal
    iv. Send the blood cultures in the pneumatic tube (as the bottles are now plastic) or arrange for a porter via the Helpdesk Ext 3005 to collect the blood cultures and take them to the Microbiology Laboratory

Blood Cultures can be sent in the pneumatic tube system to the laboratory as the bottles are now plastic. Blood Culture bottles must be stored at room temperature if they are waiting to be delivered to the Microbiology Laboratory

6.10 Microbiology laboratory

Deliver the blood culture bottles to the Microbiology Laboratory so they can be loaded directly onto the automated continuous monitoring system in the laboratory. Blood Cultures should be stored at room temperature whilst waiting to be received by the laboratory. There is no need to contact the Microbiology BMS on-call to process the sample urgently as initial incubation of the bottle is required. When a bottle flags positive, following incubation, the bottle will be processed and a member of staff responsible for the patient will be informed of the preliminary and, subsequently, the final results. Blood cultures are incubated for a total of 5 days unless there is an indication for prolonged incubation e.g. endocarditis.

6.11 Results

All significant positive blood culture results will be telephoned as soon as they are available by the Consultant Microbiologist to the patient's clinical team. It is **not** necessary to telephone the Microbiology Laboratory to request blood culture results. Blood cultures, which remains negative after 5 days incubation are reported as negative. Once authorised by the laboratory all results are available to view electronically on ORION and ICE.

7.0 MONITORING COMPLIANCE AND EFFECTIVENESS

Minimum Requirement to be Monitored (WHAT – element of compliance or effectiveness within the document will be monitored)	Responsible Individual (WHO – is going to monitor this element)	Process for Monitoring e.g. Audit (HOW – will this element be monitored (method used))	Frequency of Monitoring (WHEN – will this element be monitored (frequency/ how often))	Responsible Individual or Committee/ Group for Review of Results (WHERE – Which individual/ committee or group will this be reported to, in what format (eg verbal, formal report etc) and by who)
Number of Blood Cultures requested	IPCT/Data Analysts	Data Analysts provide a breakdown of number of blood cultures taken by area	Monthly	IPCC
Monitor the incidence of sample contamination	IPCT	Audit	Monthly	IPCC

8.0 TRAINING AND IMPLEMENTATION -

There is specific training requirement in relation to this policy, which is provided by the Training, Education and Development Department for appropriate staff to practice taking blood for blood cultures. An attendance register of any training completed will be sent to the OLM Administration Officer: Training, Education and Development Department, King's Mill Hospital. A copy of complete competence will be kept by the member of staff trained, Ward Leader and the Training, Education and Development Department.

9.0 IMPACT ASSESSMENTS

- This document has been subject to an Equality Impact Assessment, see completed form at Appendix A
- This document has been subject to an Environmental Impact Assessment, see completed form at Appendix B

10.0 EVIDENCE BASE (Relevant Legislation/ National Guidance) AND RELATED SFHFT DOCUMENTS

Evidence Base:

- Department of Health. 2010. *Taking Blood Cultures; a summary of best practice. Saving Lives: reducing infection, reducing infection, delivering clean and safe care.*
- http://webarchive.nationalarchives.gov.uk/20120118171812/http://hcai.dh.gov.uk/files/2011/03/Document_Blood_culture_FINAL_100826.pdf
- Souvenir et al 2002. Journal of Clinical Microbiology. 2437-2444, Vol 40. No7
- Madeo. M., Davies. D., Owen. L., Wadsworth. P., Johnson. G., Martin. C. 2003. *Reduction in the contamination rate of blood cultures collected by medical staff in the accident and emergency department.* Clinical effectiveness in Nursing 7, 30-32
- Loveday. H., Wilson. J., Pratt. R., Golosorkhi. A., Bak. A., Browne. J., Prieto. J., Wilcox. M. 2014. *Epic 3. National evidence based guidelines for preventing healthcare associated infections in NHS Hospitals in England.* Journal of Hospital Infection. Vol. 86. Supplement 1. S1-S70

Related SFHFT Documents:

- other relevant infection, prevention and control policies/ procedures as applicable

11.0 KEYWORDS

Venepuncture, taking, collecting, transporting, sampling, culture

12.0 APPENDICES

- Appendix A – Equality Impact Assessment Form
- Appendix B – Environmental Impact Assessment Form

APPENDIX A – EQUALITY IMPACT ASSESSMENT FORM (EQIA)

Name of service/policy/procedure being reviewed: Blood cultures from patients with suspected or confirmed infections policy			
New or existing service/policy/procedure: N/A			
Date of Assessment: 07/03/2023			
For the service/policy/procedure and its implementation answer the questions a – c below against each characteristic (if relevant consider breaking the policy or implementation down into areas)			
Protected Characteristic	**a) Using data and supporting information, what issues, needs or barriers could the protected characteristic groups' experience? For example, are there any known health inequality or access issues to consider?**	**b) What is already in place in the policy or its implementation to address any inequalities or barriers to access including under representation at clinics, screening?**	**c) Please state any barriers that still need to be addressed and any proposed actions to eliminate inequality**
The area of policy or its implementation being assessed:			
Race and Ethnicity	None	N/A	None
Gender	None	N/A	None
Age	None	N/A	None
Religion	None	N/A	None
Disability	None	N/A	None
Sexuality	None	N/A	None
Pregnancy and Maternity	None	N/A	None
Gender Reassignment	None	N/A	None
Marriage and Civil Partnership	None	N/A	None
Socio-Economic Factors (i.e. living in a poorer neighbourhood / social deprivation)	None	N/A	None

What consultation with protected characteristic groups including patient groups have you carried out? • **Sent to all members of IPCC**
What data or information did you use in support of this EqIA? • **National Guidance**
As far as you are aware are there any Human Rights issues be taken into account such as arising from surveys, questionnaires, comments, concerns, complaints or compliments? • **No**
Level of impact From the information provided above and following EQIA guidance document Guidance on how to complete an EIA (click here), please indicate the perceived level of impact: Low Level of Impact For high or medium levels of impact, please forward a copy of this form to the HR Secretaries for inclusion at the next Diversity and Inclusivity meeting.
Name of Responsible Person undertaking this assessment: Sally Palmer
Signature: **S Palmer**
Date: 07/03/2023

APPENDIX B – ENVIRONMENTAL IMPACT ASSESSMENT

The purpose of an environmental impact assessment is to identify the environmental impact, assess the significance of the consequences and, if required, reduce and mitigate the effect by either, a) amend the policy b) implement mitigating actions.

Area of impact	Environmental Risk/Impacts to consider	Yes/No	Action Taken (where necessary)
Waste and materials	• Is the policy encouraging using more materials/supplies? • Is the policy likely to increase the waste produced? • Does the policy fail to utilise opportunities for introduction/replacement of materials that can be recycled?	No	
Soil/Land	• Is the policy likely to promote the use of substances dangerous to the land if released? (e.g. lubricants, liquid chemicals) • Does the policy fail to consider the need to provide adequate containment for these substances? (For example bunded containers, etc.)	No	
Water	• Is the policy likely to result in an increase of water usage? (estimate quantities) • Is the policy likely to result in water being polluted? (e.g. dangerous chemicals being introduced in the water) • Does the policy fail to include a mitigating procedure? (e.g. modify procedure to prevent water from being polluted; polluted water containment for adequate disposal)	No	
Air	• Is the policy likely to result in the introduction of procedures and equipment with resulting emissions to air? (For example use of a furnaces; combustion of fuels, emission or particles to the atmosphere, etc.) • Does the policy fail to include a procedure to mitigate the effects? • Does the policy fail to require compliance with the limits of emission imposed by the relevant regulations?	No	
Energy	• Does the policy result in an increase in energy consumption levels in the Trust? (estimate quantities)	No	
Nuisances	• Would the policy result in the creation of nuisances such as noise or odour (for staff, patients, visitors, neighbours and other relevant stakeholders)?	No	