HYWEL DDA UNIVERSITY HEALTH BOARD

OBTAINING BLOOD CULTURE SAMPLES POLICY

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V3	**24/6/2021**	Clinical Written Control Documentation Group	15.7.2021	12.5.2021	12.5.2024
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Brief Summary of Document:	The policy for obtaining blood culture samples from patients/residents/ clients
Scope:	This policy applies to all medical staff and healthcare staff who have received training and deemed competent in the collection of blood cultures
To be read in conjunction with:	149 - Hand Hygiene Policy 151 - Personal Protective Equipment Policy 187 - Exposure Management including Sharps Injuries 236 – Waste Management Policy 354 - Policy for Standard Infection Control Precautions (SICP's) 230 – Policy for the Management of Blood and Body Fluids https://phw.nhs.wales/services-and-teams/harp/infection-prevention-and-control/antt/model-policy-aseptic-non-touch-technique-antt-a-national-standardised-approach-to-aseptic-technique/

HYWEL DDA UNIVERSITY HEALTH BOARD

Owning Committee	Infection Prevention Strategic Steering Group (IPSSG)

Executive Director:	Mandy Rayani	Job Title	Director of Nursing, Quality & Patient Experience

Reviews and updates		
Version no:	Summary of Amendments:	Date Approved:
1	New Policy	25.2.14
2	Revised policy – minor changes only Uploaded 28.4.2017	27/4/2017
3	Full review August 2020 – Revised, Addition of Appendix 2	12/5/2021
	Approved at CWCDG meeting formally and EqIA reviewed	15.7.2021

Glossary of terms

Term	Definition
Bacteraemia	A bacterial infection that has spread to the bloodstream

Keywords	Blood culture, standard infection control precautions, aseptic non touch technique [ANTT]

CONTENTS

1. INTRODUCTION

Blood cultures are taken to identify the presence of bacteria in the blood stream. A strict aseptic technique is required when taking blood cultures to ensure sample contamination does not occur, as this can affect patient treatment and outcomes. By following this policy staff will take blood cultures only when there is a clinical need to do so, blood cultures must not be taken as a matter of routine.

2. POLICY STATEMENT

There has been little consistent or definitive advice to the NHS on how and when to take blood cultures and how to best avoid sample contamination. There is also variation in practice amongst NHS staff in taking blood for culture and following this policy ensures practice is consistent and contamination is reduced.

The culture of micro-organisms from blood is essential for microbiological diagnosis of bacteraemia, fungaemia, infective endocarditis and conditions associated with clinical presentation of pyrexia of unknown origin [PUO].

Carelessly collected blood cultures are often contaminated with bacteria of the normal skin flora of the patient or the blood culture taker and can lead to false positive results. This complicates patient care potentially resulting in needless / inappropriate use of antibiotic treatments and artificially raises the incidence rate of infection. All positive blood cultures yielding alert organisms [i.e. MSSA, MRSA etc.] are reportable under the national surveillance scheme. The number of false positives are included in the monthly surveillance reports and have an adverse impact on achievement of the infection reduction expectations aligned to the NHS Wales Delivery Framework. .

The essential components to ensure appropriate blood culture collection are:

- Only take a blood culture if there is a clinical need to do so and **not** as routine.
- Staff are competent and trained.
- Using Aseptic Non-Touch Technique (ANTT), ensure asepsis is maintained throughout the procedure.

3. SCOPE

This policy applies to all healthcare staff who have undertaken.

Training and achieved the set competencies in ANTT and the collection of blood cultures. It is a medical decision to take or request a blood culture in response to at least two of the signs/ symptoms of new infection (see Section 6.1), and when sepsis is suspected. Staff must also refer to the Sepsis Screening Tool (see appendix 1).

4. AIMS

The aim of this policy is to ensure that blood cultures are taken correctly to improve the quality and clinical value of blood cultures investigations by reducing the incidence of sample contamination and the occurrence of pseudo bacteraemia i.e. false positives blood culture result.

5. OBJECTIVES

The aim of this policy shall be achieved by the following objectives;

- Taking blood cultures when patients are showing signs of bacteraemia

- Taking blood cultures at the right time
- Completing the procedure correctly using ANTT.

6. TAKING BLOOD CULTURES

6.1. Indication

Blood cultures are taken to identify patients with bacteraemia (the presence of bacteria in the blood). There are many signs and symptoms in a patient which may suggest bacteraemia and clinical judgement is required. The following indicators must be taken into account when assessing a patient for signs of bacteraemia or sepsis:

- Body temperature of >38.0ºC/< 36ºC
- Raised heart rate >90bpm
- Low systolic BP< 90mmHg/ or fall of 40mmHg from the patients normal range or MAP<65mmHg
- Raised respiratory rate > 20 breaths per minute
- Neutrophilia or neutropenia (WCC > 12000 or <4000 units)
- Rigors, headache with stiff neck
- New or worsening confusion
- Hyperglycaemia in the absence of diabetes
- Lactate > 2mmol/L.
- Focal signs of infection

Any other situations (not exhaustive) such as, suspected endocarditis, osteomyelitis, septic arthritis, cholangitis etc which may not have classic sepsis associated symptoms.

Additional Paediatric Indications;

- Toxic appearance including lethargy
- Decreased Glasgow coma scale
- Increase capillary refill time
- Increased pulse and respiratory rates
- Thrombocytopenia in neonates

(REFER TO SEPSIS SCREENING TOOL FOR ADDITIONAL GUIDANCE – SEE APPENDIX 1).

6.2. Timing

Blood cultures must be taken:

- As soon as possible after identification of need; and as soon as possible after a spike in temperature. Bacteraemia is intermittent and is related to the fevers and rigors which occur 30-60 minutes after the entry of organisms into the blood stream.

- Early and appropriate empirical antibiotic treatment is associated with decreased mortality rates and improved clinical outcomes. In severe sepsis cases each hour of delay in antibiotic treatment results in increased mortality.

- Septic shock – is more often seen with Gram negative septicaemia; but may also be associated with Gram positive organisms e.g. fulminant pneumococcal, Lancefield Group A streptococcal and staphylococcal bacteraemia.

The first set of blood cultures should be taken before starting antimicrobial treatments because the presence of antibiotics and antifungals may inhibit the growth of pathogens in

the blood culture. If antibiotics have already been given, blood cultures must be taken immediately before the next dose is to be given when the antibiotic level in the blood will be at its lowest (NICE 2020)

- A blood culture set for diagnosing bloodstream infection is defined as 1 aerobic bottle and 1 anaerobic bottle. For adults it is recommended that 20 ml of blood is cultured per set, and that 2 consecutive blood culture sets from 2 separate venepuncture sites must be collected during any 24‑hour period for each septic episode. [PHE 2019]. For neonates, take a single aerobic bottle or special low volume bottle.

- Take 2 sets during the first hour in cases of severe sepsis before commencing antibiotic treatment provided this does not significantly delay antibiotic administration.

- If endocarditis is suspected – three consecutive samples must be collected. Collect three sets of blood cultures from peripheral veins at regularly spaced intervals – usually 30 minutes. It is important that the labels and forms document that endocarditis is suspected so that the bottles are cultured for 10 days rather than 5 days.

6.3. **Equipment**

In a clean point of care plastic tray with sharps bin and place:

- Blood culture bottles (aerobic & anaerobic) – CHECK EXPIRY dates
- Blood Culture pack
- Decontaminate the skin using the 2% chlorhexidine gluconate/70% isopropyl alcohol solutionthat is provided within the Blood Culture pack (this product can be used for the skin preparation of babies and under the age of 2).
- Single use tourniquet, sterile dressing and gauze as supplied within Blood Culture pack to be used only. DO NOT use cotton wool.
- Personal Protective Equipment- i.e. gloves & apron
- A Microbiology form (High risk stickers if appropriate)

If taking other bloods following blood cultures you may also need:

- Multi adapter
- Membrane adapter
- Monovette needle
- Blood bottles

6.4. **Technique**

6.4.1. Site

- ALWAYS aim to take the blood using a fresh peripheral stab.
- Preferred sites would be the veins of the antecubital fossa or veins of the dorsum of the hands. Femoral vein must only be used as a LAST RESORT due to the risk of contamination from the groin area.

- If any invasive line is a potential source of infection, take another set of blood cultures from the line itself.

- Discarding the first aliquot of blood taken from a vascular catheter has no effect on the contamination rate of these samples. Even following strict sterile precautions, samples obtained from central venous catheters have higher contamination rates than those taken from peripheral or arterial lines.

- Specimens taken from arterial lines have been reported to be superior in detecting disseminated fungal disease.

- Only in an emergency situation when venous access is difficult to obtain, can blood cultures be taken from a newly inserted peripheral cannula. As soon as possible, a second set of blood cultures must be collected from a separate peripheral stab.

- If other blood samples are required [e.g. FBC, ESR] in addition to blood cultures, the blood culture bottles must be inoculated first to avoid contamination. It is recommended that blood cultures samples be taken separately.

7. PROCEDURE

Blood cultures must only be collected by healthcare staff who have been trained in the collection procedure and whose competence has been assessed and maintained. For the complete procedure using ANTT see appendix 2).

It is good practice to enlist an appropriately trained helper. This enables the person taking the culture to focus on transferring the blood aseptically into the bottles whilst the helper releases the tourniquet and cares for the patient.

- Identify the patient verbally where possible and with name band
- Explain the procedure to the patient
- Prepare the environment and assist the patient into a comfortable position
- Wash hands with soap and water then dry and/or decontaminate hands using alcohol based sanitiser; apply personal protective equipment
- Clean patients visibly soiled skin with soap and water then dry
- Apply personal protective equipment – gloves and apron
- Check you have one aerobic and one anaerobic blood culture bottle; ensuring that the blood culture bottles are in date and appear in good order
- Label the sample bottles appropriately with the patient identification labels, avoiding the bottle barcodes.
- Open blood culture pack and decontaminate hands again. Remove cover of blood culture bottles and clean each membrane top with separate chlorhexidine 2% swabs and allow to dry fully.
- Apply disposable tourniquet and palpate to identify vein
- Prepare skin using Chloraprep Frepp 1.5ml using back and forth, up and down motion for 30 seconds and allow to dry completely.
- DO NOT RE-PALPATE THE VEIN AFTER CLEANING
- Insert the winged butterfly needle into prepared site using ANTT. Place adaptor barrel over blood culture bottle and pierce septum. Collect 20ml of blood per set of bottles.10mls per bottle (adult) 1- 3mls for children
- When using both aerobic and anaerobic, fill the aerobic bottle first.

- IMPORTANT: always draw blood culture before filling chemistry/haematology blood tubes.
- Keep bottles upright when filling, using the graduation lines to accurately gauge sample volumes.
- Cover puncture site with gauze dressing. DO NOT use cotton wool.
- Discard needle and syringe in sharps container at the point of care
- Remove personal protective equipment, wash hands and dry
- Ensure blood culture bottle exterior and laboratory request forms are free of any contamination with blood
- Inoculated bottles must be incubated as soon as possible, ideally within a maximum of 4 hours. They must therefore be transported to the laboratory promptly.
- Deliver blood cultures to the lab with correctly filled in labels and the microbiology form which must include clinical details for the test and any antibiotics the patient is receiving
- Plastic blood culture bottles [where used] may be sent to microbiology laboratory via the Pod system [glass bottles must be hand delivered].
- Blood cultures samples must NOT be refrigerated.
- Document procedure in patient's health record using the audit traceable label [found on the exterior of the Blood Culture pack] stating:
    - Date
    - Time
    - Site(s) i.e. peripheral stab or via invasive line

If results are positive, the Microbiologist will contact staff caring for patient to discuss need for further testing, treatment and identification of source of infection.
Only positive results will be phoned through to the relevant ward/department.

The staff receiving the information from the microbiologist must ensure that all details are recorded accurately in the nursing and/or medical notes. If nursing staff receive the results they must contact the patient's medical team or on-call doctors notifying them of the results.

8. ROLES & RESPONSIBILITIES

8.1. Chief Executive

The Chief Executive has overall responsibility and is accountable for ensuring that there is a safely managed environment which minimises the risk of infection to patients, visitors and staff .

8.2. Director of Nursing, Quality & Patient Experience

The Director of Nursing, Quality & Patient Experience is the Chief Executives nominated Director for Infection Prevention /Control and is responsible for ensuring that there are effective and appropriate arrangements for the prevention and control of infection throughout the Health Board

8.3. Assistant Director of Nursing Professional Standards and Workforce

Operational responsibility for infection prevention and control within the Health Board lies with the Assistant Director Infection Prevention & Control who is responsible for ensuring that this policy is available to staff and processes for monitoring compliance are in place.

8.4. **The Infection Prevention Team (IPT)**
The Infection Prevention Team report directly to the Assistant Director of Nursing and are responsible for aspects of surveillance, prevention and control of infection within the Health Board. The Infection Prevention Team are responsible for the implementation of the Health Board Infection Prevention/ Control programme and for the development and dissemination of policies, guidelines and procedures. The Infection Prevention/Control Team are responsible for the initial investigation of a positive MRSA/MSSA/, *Escherichia coli, pseudomonas or Klebsiella* bacteraemia and ensure the subsequent investigation through root cause analysis with the Clinical Team when required.

8.5. **Microbiology Laboratory**
The microbiology staff process the microbiological specimens, providing immediate notification of a bacteraemia; this allows prompt identification of infection and subsequent investigation and treatment by the relevant medical team.

8.6. **Directors / Lead Clinicians / Senior Managers**
All Directors, Lead Clinicians and Senior Managers have delegated responsibility for ensuring that this policy is known to their staff and that its requirements are followed by all staff within their Directorate / County / Department.

This includes the requirement of ensuring their staff whom will conduct these procedures are trained and deemed competent [by assessors] in procedures such as Aseptic Non-Touch Technique (ANTT) and Blood Cultures sampling.

8.7. **All Managers**
All managers are responsible for ensuring that staff have access to up to date training to enable them to adopt safe working practices at all times and are appropriately trained to minimise risks to themselves and others.

8.8. **Ward /Senior Nurse / Directorate Nurses**
Are responsible for ensuring infection control risk assessments are undertaken and that all possible measures are taken to reduce the spread of infection to patients, visitors and staff.

8.9. **All Clinical Staff**
All staff are responsible for following the Blood Culture Procedure. Blood cultures must only be collected by members of staff who have been trained and assessed competent in the collection procedure.

9. **TRAINING**
Infection Prevention training is mandatory every 3 years and contents of the policy are included in this training. Infection Prevention staff along with ANTT assessors perform this training and assessment. ANTT e-learning must be completed yearly and competency assessments must be completed every 3 years.

All training records are retained by the health board.; It is the Managers responsibility to ensure ALL staff who are required to take Blood Cultures attend this training at the required time.

10. IMPLEMENTATION

Implementation of policies and procedures can only be effective if adequate evaluation and monitoring is used to check the system and ensure any shortcomings are identified and dealt with. Locally, Managers are responsible for initiating an ongoing monitoring process within their areas of responsibility.

From an organisation perspective, the Infection Prevention Strategic Steering Group shall be responsible for monitoring that this Policy and that appropriate actions are being taken to maintain patient safety.

11. REFERENCES

ANTT.Org Blood Culture Collection https://phw.nhs.wales/services-and-teams/harp/infection-prevention-and-control/antt/implimentation-programme-audit-cycle/step-3-education-and-training/antt-guidelines/the-antt-clinical-guideline-for-blood-culture-collection/ [accessed 07 Sept 2020]

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Sepsis Screening Tool

HYWEL DDA UNIVERSITY Addressograph

Date .....

Ward .....

12. APPENDIX 1 – SEPSIS

Are any ≥**2** of the following SIRS* criteria present and **new** to your patient?

Obs:
- ☐ Temperature <36 ºC or > 38.3ºC
- ☐ Respiratory rate > 20/ min
- ☐ Heart Rate > 90 bpm
- ☐ Acutely altered mental state

Bloods:
- ☐ WCC < 4 x10^9/l or > 12 x10^9/l
- ☐ Glucose > 7.7 mmol/l *(if patient is not diabetic)*
- ☐ **Neutropenic or suspected neutropenia after any treatment, tick ☐ 'yes'.**

Patient has ≥2 of above criteria: NO ☐ YES ☐

Follow standard NEWS referral protocol
Re-apply screening tool if situation changes

NO

YES

Does your patient have a history or signs suggestive of a NEW infection?

For example

- ☐ Cough/ sputum/ chest pain (Pleuritic)
- ☐ Dysuria (Urinary Tract Infection)
- ☐ Abdo pain/ distension/ diarrhoea
- ☐ Headache with neck stiffness (Meningitis)
- ☐ Catheter/Line infection
- ☐ Cellulitis/ wound infection/ septic arthritis
- ☐ Endocarditis

This is **SEPSIS** commence **Sepsis Six** deliver within **1hour.**
Reassess **HOURLY** for Severe Sepsis

Any signs of **NEW** organ dysfunction?

- ☐ SBP < 90mmHg or MAP < 65mmHg (after initial fluid challenge)
- ☐ Lactate more than 2mmol/1
- ☐ Urine output <0.5ml/kg/hr for 2hrs
- ☐ Oxygen needed to keep SpO_2 > 90%
- ☐ INR > 1.5 or APTT >60s
- ☐ Platelets < 100 x 10^9/1
- ☐ Bilirubin >34umol/l
- ☐ Creatinine > 177 µmol/l

This is **SEVERE SEPSIS**
Review and optimise sepsis management.
Reg/Consultant to attend within **30mins.**

☐ **Systolic BP <90mmHg or a fall of >40 mmHg from baseline and/or Lactate >4mmol/l**

This is **SEPTIC SHOCK**
Urgent review/discussion with registrar/consultant.
Urgent referral to Critical Care Intensivist. Time_____

(* **SIRS** = Systemic Inflammatory Response Syndrome)

(Modified from survivesepsis.org)

Review and consider appropriateness of therapy and any limitations of treatment. DOCUMENT in NOTES.

Recognition **time** .... Staff name ..... Designation.....

	Sepsis Six Delivered within 1hr	Action	Time	Initial/ Grade	Reason not done or result
1	**Give oxygen** (target O_2 sats >94%) Give high-flow O_2 in severe sepsis	Severe Sepsis: give **100% oxygen** via non-recreate mask with reservoir bag. Care with patients with known severe **COPD**, but low PO_2 is the greater risk in sepsis.			
2	**Take blood cultures if immediately available.** *(**Do Not** **delay** giving antibiotics)* **Following IV antibiotics Must do:** ☐ chest X ray ☐ Sputum ☐ Urine ☐ Swabs (if indicated). Consider imaging to find source	Take **blood cultures** percutaneously and from each vascular access device. Consider other cultures and diagnostic imaging.			
3	**Give IV antibiotics** (see 1st line antibiotic sepsis guidance)	Give **intravenous antibiotics** within the **first hour**.			
4	**Give a fluid challenge** If Sys BP< 90mmHg: STAT 20ml/kg up to 60ml/kg Hartmann's or 0.9% Saline **Not hypotensive:** At least 500ml Hartmann's or 0.9% Saline *(alternatively use a colloid)*	If hypotensive give **20-60 ml/kg** of crystalloid or the colloid equivalent as a total volume in boluses of 500-1000ml			
5	**Measure lactate* & Hb** (>7g/dl) If lactate > 2mmol/l: give 20ml/kg Hartmann's or 0.9% Saline (unless already given)	Serial lactate levels as an indicator of tissue perfusion in patients without liver failure to guide fluid resuscitation. **Maintain lactate <4**.			
6	**Measure accurate Urine Output** **Must start** fluid balance chart **Severe Sepsis MUST consider**	Maintain urine output above **0.5ml/kg/hr.**			

* **Blood Vials for Lactate blood sample**:
Bronglais: Grey Top Blood Vial or Arterial Blood Gas Syringe (ICU Blood Gas analyser only).
GGH: Green Top Blood Vial or Blood Gas Syringe.
PPH : Green Top Blood Vial or Arterial Blood Gas Syringe (ICU Blood Gas analyser only)
Withybush: Yellow Top Blood Vial or Arterial Blood Gas Syringe.
NB: Lactate samples must be taken to the **labs/analysed and result acted on immediately.**

APPENDIX 2 – ANTT BLOOD CULTURE PROCEDURE