Blood Culture Sampling in Patients receiving Haemodialysis

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

INTRODUCTION

Blood cultures provide vital information in the diagnosis and treatment of patients with bacteraemias. Saving lives: reducing infection, delivering clean and safe care, DH, October 2007, provides advice on how trusts should review their policies on sampling for blood cultures. Patients receiving haemodialysis often require blood cultures to be taken differently to most other patients, because of the access or areas of the body that could be the focal sepsis point. For this reason blood cultures are to be taken in a specific manner and extra samples taken to correctly identify the source of the infection or confirmation of a false positive. Contamination of blood samples during the process of taking blood for cultures produces a significant level of false positive readings which falsely effects the bacteraemia rates and complicates the treatment and patient care delivered. It is thought that false positive contaminated results account for 10% of all results. A false positive is defined as the growth of bacteraemia present in a blood culture bottle which is not present in the patients bloodstream, and therefore introduced during sample collection.

Contamination can come from a number of sources: the patients skin, equipment used to sample followed by the transfer of the sample into the blood culture bottle, the hands of the person taking the blood sample or just the general environment.

THIS GUIDELINE IS FOR USE BY THE FOLLOWING STAFF GROUPS:

Lead Clinician(s)

Liz Wittich	Lead Nurse Renal Services
Approved by Renal Specialty Meeting on:	27th February 2023
Review Date: This is the most current document and is to be used until a revised version is available	27th February 2026

Key amendments to this guideline

Date	Amendment	By:
27.03.2012	Extended for three years. No changes made.	M Ferring
06.08.2015	Document extended for 12 months as per TMC paper approved on 22nd July 2015	TMC
17.08.2016	Document extended for 12 months as per TMC paper approved on 22nd July 2015	TMC
August 2017	Document extended for 12 months as per TMC paper approved on 22nd July 2015	TMC
December 2017	Sentence added in at the request of the Coroner	
June 2018	Document extended for 3 months as per TLG recommendation	TLG
January 2020	Document extended for 3 months whilst undergoing approval process	Dr Martin Ferring
15th December 2021	Document extended for 6 months to allow for thorough review	Specialist Medicine Divisional Governance
17th March 2022	Document extended until the end of the year to allow for thorough review	Dr Jasper Trevelyan
January 2023	Document reviewed with no changes	

Blood Culture sampling in Patients Receiving Haemodialysis

INTRODUCTION

Blood cultures provide vital information in the diagnosis and treatment of patients with bacteraemias. Saving lives: reducing infection, delivering clean and safe care, DH, October 2007, provides advice on how trusts should review their policies on sampling for blood cultures. Blood cultures require two samples an aerobic bottle (pink), (where bacteria are provided with an environment containing oxygen to grow in) and anaerobic (blue) (where the environment medium is starved of oxygen).

DETAILS OF GUIDELINE

It appears there are many variations in practice among NHS staff in taking blood for cultures, most likely because there has been little consistent and definitive advice available. Contamination of blood samples during the process of taking blood for cultures produces a significant level of false positive readings which falsely effects the bacteraemia rates and complicates the treatment and patient care delivered. It is thought that false positive contaminated results account for 10% of all results. A false positive is defined as the growth of bacteraemia present in a blood culture bottle which is not present in the patients bloodstream, and therefore introduced during sample collection.

Contamination can come from a number of sources: the patients skin, equipment used to sample followed by the transfer of the sample into the blood culture bottle, the hands of the person taking the blood sample or just the general environment.

The guideline will aim to ensure that blood cultures are taken:

- For the correct indication
- At the correct time
- Using the correct technique in order to prevent contamination of the sample and minimise risk to patients and staff
- Consistency of practice

MONITORING TOOL

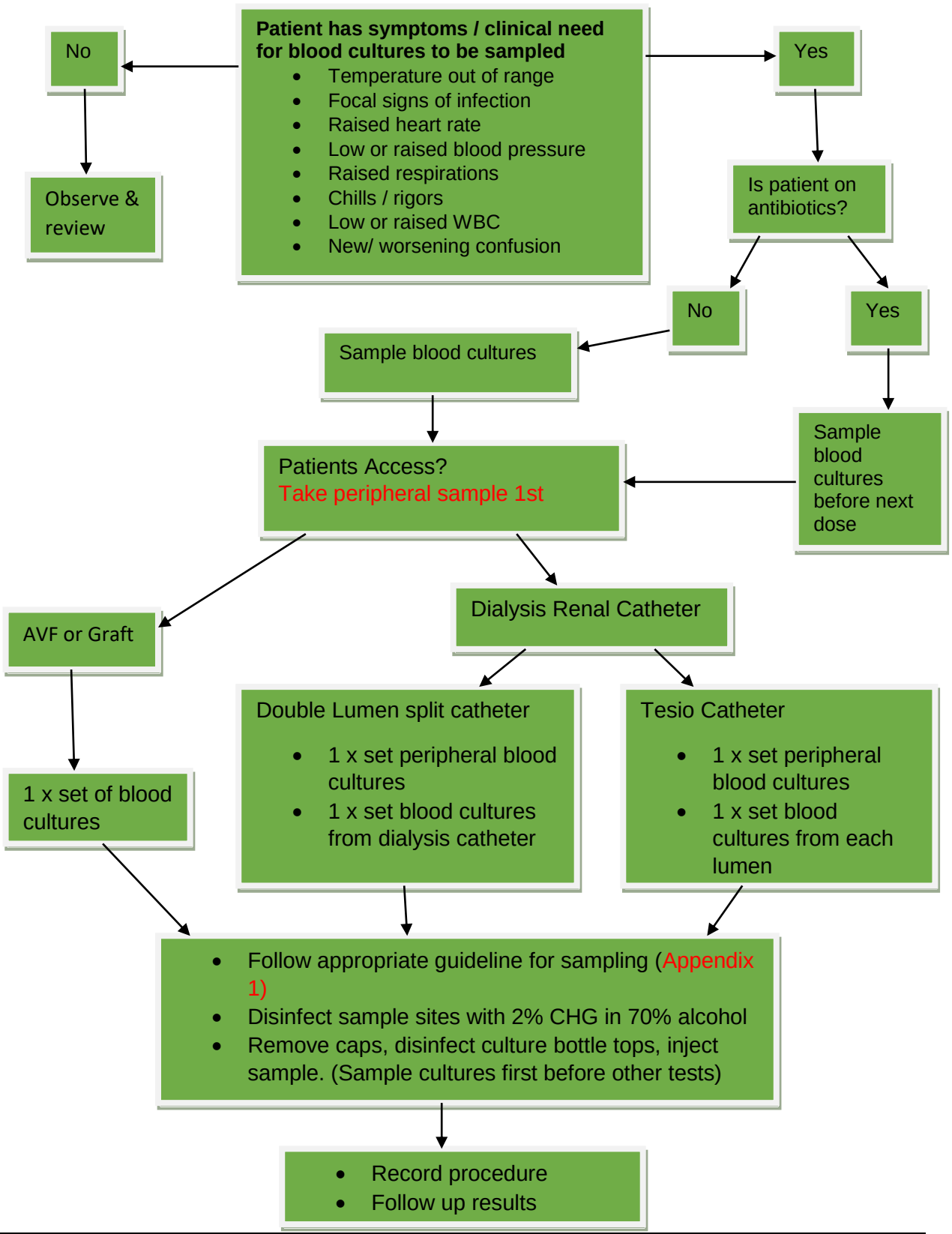
Monitoring will be identified via staffs training & competencies. Auditing of indication, time, technique of blood cultures taken will provide evidence and for any positive results RCA will be conducted within 24 hours of reported results.

The overall objective of the guideline is to ensure blood cultures are sampled correctly and false positive results are eliminated. As the target for bacteraemia's in the directorate is zero, false positive results will affect target figures, effecting the overall reputation of the team and Trust, and could result in the patient receiving unnecessary antibiotics or treatment. Other objectives and guidance has been taken from the: Saving Lives: reducing infection, delivering clean and safe care - Taking blood cultures. A summary of best practice.

STANDARDS	%	CLINICAL EXCEPTIONS
For all blood culture sampling to be taken for the correct reasons and using the correct technique. Standard is for zero bacteraemia within Renal	100	None

Flow Chart

Sampling Blood Cultures



Guideline Indications

This guideline refers to all patients receiving haemodialysis, with either a fistula or renal dialysis catheter. To analyse and confirm a result from a blood culture medium, two samples are required one from an anaerobic bottle (pink) and one from an aerobic (blue) bottle. Blood cultures are only to be taken when there is clinical need and when the patient shows signs and symptoms of bacteraemia / sepsis being present. Blood cultures should be taken after the identification of possible bacteraemia or sepsis and before the administration of antibiotics, (or if antibiotics are administered then before the next dose and green toped bottles must be used). All blood cultures should be documented in the patients notes, including date, time, site and indications.

Signs & symptoms warranting the need for blood cultures.

- Core temperature <36°C or >38°C
- Focal signs of infection
- Heart rate >90 bpm
- Systolic blood pressure <90 mmHg
- Respiratory rate >20 rpm
- Chills or rigors
- White cell count $<4 \times 10^9$/L or $>12 \times 10^9$/L
- New or worsening confusion

Guideline Steps

Blood cultures must only be sampled by trained competent personnel and when the patient shows signs and symptoms of sepsis or a bacteraemia (as in above table). Patients receiving haemodialysis use either an arterio venous fistula (AVF), graft or renal dialysis catheter to access the blood. For those patients with an AVF or graft, one set of peripheral blood cultures will be adequate. In patients with a renal dialysis catheter, additional sampling is required. In these patients with suspected bacteraemia, two sets of blood cultures (4 bottles) are to be taken from two sites. Central lines and dialysis catheters can be sampled and one other peripheral site when investigating potential infection. For Tesio dialysis catheters three sets (6 bottles) of blood cultures are to be sampled as each lumen is a separate catheter tube and requires sampling in addition to a peripheral sample. Strict adherence to the guidelines for Continuing Care of Renal Dialysis Catheters must be adhered to, when accessing the catheter. The peripheral vein sample should always be collected first before any other blood culture sample. Existing peripheral lines / cannulae or sites immediately above a peripheral line are not to be used for sampling. (If the patient has already been prescribed and administered antibiotics then green topped blood culture bottles are to be used)

Peripheral Sampling

Equipment required

- Sani cloth Plus 70% alcohol wipe
- Apron, visor and disposable gloves
- Renal dialysis pack
- Plaster / dressing
- Blood culture bottles (1 x aerobic and 1 x anaerobic = 1 set)
- Blood culture butterfly collection kit
- Disposable tourniquet
- 2% chlorhexidine in 70% alcohol Chlorap sepp
- 2% chlorhexidine in 70% alcohol wipes (CHG 2%)

Procedure Steps

- Wash your hands with soap and water and dry
- Clean table with sani cloth plus alcohol wipe allow to dry
- Prepare equipment
- Clean any visibly soiled skin on the patient with soap and water then dry
- Apply a disposable tourniquet and palpate to identify vein
- Clean skin with Chloraprep sepp and allow to dry al least 30 seconds
- Remove culture bottle cap and clean bottle bung tops with sani cloth CHG 2% wipes and allow to dry
- Wash hands again or alcohol rub and apply disposable gloves. Do not palpate area to be sampled again
- Using butterfly and vacutainer collection system, withdraw sample release tourniquet.
- Cover the site with an appropriate dressing
- If blood is being collected for other tests, always inoculate the blood culture bottles immediately with equal volumes of blood and do not change the needle, filling the blood culture bottles before any other bottles.
- Discard winged butterfly in sharps container
- Wash hands after removing gloves. Label the bottles ensuring the bar codes are not covered and record the procedure in the patients notes for culture, time, site or venepuncture and any complications. Do not remove bar codes.

Renal Dialysis Catheter Sampling (sample peripheral first)

- Refer to guideline for Continuing Care of Renal Dialysis catheters

Equipment

- All necessary equipment to access renal catheter as per guideline
- Blood culture bottles (1 set for split regular dialysis catheter and 2 sets for Tesio + set for peripheral sample for both types of catheter)
- 2% Chlorhexidine in 70% alcohol (Sani cloth CHG 2% wipes)
- 1 green needle
- 1 x 5ml syringe (2 for tesio)

Procedure Steps

- Wash hands and prepare equipment and blood culture bottles cleaning top with 2% Chlorhexidine in 70% alcohol sani cloth CHG 2% wipes
- Prepare equipment
- Remove caps from top of blood culture bottles and wipe with CHG wipe
- Access the renal dialysis catheter as per Guideline for Continuing Care of Renal Dialysis Catheters
- Following the guideline, discard 5mls from each lumen length
- Collect sample using a clean 5ml syringe, attach the needle and inject into cleaned blood culture bottle immediately. If taking additional samples at the same time, always inoculate blood culture bottles first.
- Continue caring for the renal catheter following the guideline.
- Discard of sharps safely
- Label bottles and document in patients notes, indication for culture, time, dialysis catheter sample and any complications. Leave bar codes intact.

Monitoring

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the Policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	These are the 'key' parts of the process that we are relying on to manage risk. We may not be able to monitor every part of the process, but we MUST monitor the key elements, otherwise we won't know whether we are keeping patients, visitors and/or staff safe.	What are we going to do to make sure the key parts of the process we have identified are being followed? (Some techniques to consider are; audits, spot-checks, analysis of incident trends, monitoring of attendance at training.)	Be realistic. Set achievable frequencies. Use terms such as '10 times a year' instead of 'monthly'.	Who is responsible for the check? Is it listed in the 'duties' section of the Policy? Is it in the job description?	Who will receive the monitoring results? Where this is a committee the committee's specific responsibility for monitoring the process must be described within its terms of reference.	Use terms such as '10 times a year' instead of 'monthly'.

REFERENCES

Saving Lives. Department of Health. 2005, 2007 (saving Lives : reducing infection, delivering clean and safe care – Taking blood cultures. A summary of best practice.)

Identifying Sepsis Early. 2006

Surviving Sepsis Campaign. www.survivingsepsis.org

CONTRIBUTION LIST

Key individuals involved in developing the document

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Circulated to the following CD's/Heads of dept for comments from their directorates / departments

Name	Directorate / Department

Circulated to the chair of the following committee's / groups for comments

Name	Committee / group

Appendix 1


ANTT®
Aseptic Non Touch Technique
Blood Culture Collection
(Using Standard-ANTT)
for the ANTT Practice Framework see: www.antt.org
Preparation:
Consent patient, assess veins visually. Patient or nurse cleans arm
Preparation zone
With clean hands clean tray creating a General Aseptic Field
Gather Equipment & place around tray
3
Clean hands with alcohol hand rub or soap & water
Prepare Equipment protecting Key-Parts with non-touch technique (NTT) & Micro Critical Aseptic Fields (Caps & Covers)
Patient zone
Apply disposable apron
6
Clean hands with alcohol hand rub or soap & water
Scrub bottle ports Creating friction for 15 secs with a 2% chlorhexidine / 70% alcohol wipe using NTT
Position arm on drape and pillow
Apply disposable tourniquet, identify a vein, relax tourniquet
10
Clean hands with alcohol hand rub or soap & water
11
Re-tighten tourniquet
12
Apply non-sterilized gloves
Clean skin with 2% chlorhexidine/70% alcohol applicator using a cross hatch method for 30 seconds. Allow to dry
Puncture vein (If re-palpation is required re-clean skin before puncture)
Inoculate blood into bottles using NTT. Release tourniquet
Apply a sterilized dressing using NTT
Dispose of Sharps & equipment. Label bottles
Dispose of Gloves then apron & immediately ... clean hands
Decontamination zone
1
Clean tray according to local policy
20
Clean hands with alcohol hand rub or soap & water
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Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and included as an appendix to key document when submitted to the appropriate committee for consideration and approval.

Please complete assessment form on next page;

Herefordshire & Worcestershire STP - Equality Impact Assessment (EIA) Form
Please read EIA guidelines when completing this form

Section 1 - Name of Organisation (please tick)

Herefordshire & Worcestershire STP		Herefordshire Council		Herefordshire CCG	
Worcestershire Acute Hospitals NHS Trust		Worcestershire County Council		Worcestershire CCGs	
Worcestershire Health and Care NHS Trust		Wye Valley NHS Trust		Other (please state)	

Name of Lead for Activity	

Details of individuals completing this assessment	**Name**	**Job title**	**e-mail contact**
Date assessment completed			

Section 2

Activity being assessed (e.g. policy/procedure, document, service redesign, policy, strategy etc.)	**Title:**			
What is the aim, purpose and/or intended outcomes of this Activity?				
Who will be affected by the development & implementation of this activity?	❑ Service User ❑ Patient ❑ Carers ❑ Visitors		❑ Staff ❑ Communities ❑ Other _____	
Is this:	❑ Review of an existing activity ❑ New activity ❑ Planning to withdraw or reduce a service, activity or presence?			
What information and evidence have you reviewed to help inform this assessment? (Please name sources, eg demographic				

information for patients / services / staff groups affected, complaints etc.	
Summary of engagement or consultation undertaken (e.g. who and how have you engaged with, or why do you believe this is not required)	
Summary of relevant findings	

Section 3

Please consider the potential impact of this activity (during development & implementation) on each of the equality groups outlined below. **Please tick one or more impact box below for each Equality Group and explain your rationale**. Please note it is possible for the potential impact to be both positive and negative within the same equality group and this should be recorded. Remember to consider the impact on e.g. staff, public, patients, carers etc. in these equality groups.

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Age				
Disability				
Gender Reassignment				
Marriage & Civil Partnerships				
Pregnancy & Maternity				
Race including Traveling Communities				
Religion & Belief				
Sex				
Sexual Orientation				
Other Vulnerable and Disadvantaged Groups (e.g. carers; care leavers; homeless; Social/Economic deprivation, travelling communities etc.)				
Health Inequalities (any preventable, unfair & unjust differences in health status				

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
between groups, populations or individuals that arise from the unequal distribution of social, environmental & economic conditions within societies)				

Section 4

What actions will you take to mitigate any potential negative impacts?	Risk identified	Actions required to reduce / eliminate negative impact	Who will lead on the action?	Timeframe
		.		
How will you monitor these actions?				
When will you review this EIA? (e.g in a service redesign, this EIA should be revisited regularly throughout the design & implementation)				

Section 5 - Please read and agree to the following Equality Statement

1. Equality Statement

1.1. All public bodies have a statutory duty under the Equality Act 2010 to set out arrangements to assess and consult on how their policies and functions impact on the 9 protected characteristics: Age; Disability; Gender Reassignment; Marriage & Civil Partnership; Pregnancy & Maternity; Race; Religion & Belief; Sex; Sexual Orientation

1.2. Our Organisations will challenge discrimination, promote equality, respect human rights, and aims to design and implement services, policies and measures that meet the diverse needs of our service, and population, ensuring that none are placed at a disadvantage over others.

1.3. All staff are expected to deliver services and provide services and care in a manner which respects the individuality of service users, patients, carer's etc, and as such treat them and members of the workforce respectfully, paying due regard to the 9 protected characteristics.

Signature of person completing EIA	
Date signed	
Comments:	

Signature of person the Leader Person for this activity	
Date signed	
Comments:	

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	
2.	Does the implementation of this document require additional revenue	
3.	Does the implementation of this document require additional manpower	
4.	Does the implementation of this document release any manpower costs through a change in practice	
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval.