Ear Lobe Capillary Blood Gas Sampling Procedure-Adults RRCV	University Hospitals of Leicester NHS NHS Trust **Trust Reference:C1/2025**

1. Introduction and Who Guideline applies to

1.1 This document sets out the University Hospitals of Leicester (UHL) NHS trust procedure for taking ear lobe capillary blood gas samples (ELCG) to guide non-invasive ventilation treatment in adults. The procedural document aims to support safe and effective care and prevent infection caused by the introduction of micro-organisms.

1.2 Arterial blood gas sampling is the most accurate blood gas sampling method to use in acutely unwell patients and should remain first choice.

1.3 Capillary blood gas sampling is a method of obtaining information on the patient's respiratory and metabolic status. It is less painful and easier to obtain then arterial sampling. For stable patients requiring or weaning from ventilation, capillary sampling can be used to establish pH and PCO_2 values. The PaO_2 is less reliable in its correlation between capillary and arterial gases. This effect is magnified in hyperoxaemic patients and less evident in hypoxic patients. To ensure good correlation the sample should be collected as per the procedure outlined and the SpO_2 on the blood gas results should correlate with the SpO_2 on the sats probe (+/- 2%).

1.4 Do not attempt capillary sampling in patients with signs of shock and poor perfusion in the extremities, as the sample will not be accurate.

1.5 This procedure applies to all UHL staff involved in undertaking this ELCG sampling including those on a bank or Locum contract.

1.6 This procedure applies to non-medical practitioners, such as physiotherapists, nurses, physiologists and advanced care practitioners (List not exhaustive) working within the trust who have been authorised by their line manager to carry out this activity as an integral part of the key responsibilities of their role.

1.7 This procedure maybe carried out in the hospital or other community settings such as a hospice or the patient's home.

1.8 To undertake this skill all staff must undergo training and a period of supervised practice and deemed competent.

1.9 This Procedure uses the principles of Aseptic Non-Touch Technique (ANTT) and protecting key parts.

2. Guideline Standards and Procedures

Step	Action	Rational
1	Confirm patient ID, explain what the procedure	Legal consent and ensure

	entails and obtain verbal consent from the patient.	the patient understands. Refer to trust policy.
2	Gather the equipment (Lancet, capillary tube, alcohol skin wipe, cotton wool, tape, vasodilator cream required into a clean receiver tray. Wash hands in accordance with trust policy	Safe preparation and to prevent cross infection.
3	Ask the patient to remove any earnings if applicable and ensure skin to earlobe is not broken or damaged.	Prevent skin or property damage.
4	Apply examination gloves. Apply vasodilation cream liberally, cover with cotton wool and medical tape and leave for 10 minutes.	Improve blood flow to capillary bed to reduce likelihood of haemolysis and contamination with tissue fluid.
5	Place gauze or tissue on the patient's shoulder.	To protect clothing from blood spillage.
6	Wipe cream from ear lobe using cotton wool. Clean the earlobe with a alcohol skin wipe and leave to dry.	Prevent infection.
7	Attach pulse oximeter to patient and record SpO_2 level. Make a note of any supplementary oxygen or ventilation the patient is receiving.	To correlate with blood gas sample
8	Wearing examination gloves support the back of the ear with sterile gauze or cotton wool.	To support the earlobe and prevent movement on insertion of lancet.
8	Applying firm pressure, pierce the earlobe as near to the tip of the pinna as possible, using the lancet.	To obtain optimal blood flow.
10	Blood from the puncture site should flow freely. If blood flow is insufficient repeat the above process. Wipe away the first drop of blood.	Too much pressure will affect the results and the first drop contains serous fluid.
12	Place one end of the heparinised capillary tube in the centre of the blood and fill the tube until no air bubbles are evident. The tube is best held horizontally. As the blood droplet is formed it should run into the capillary tube. If bubbles are present, gently tilt the tube until the bubbles are expelled. Do not allow smearing of the blood as contact with the atmospheric air for more than a few seconds will affect the partial pressure of oxygen and carbon dioxide.	Air bubbles will void the results.
12	Mix blood collected in the tube with anticoagulant	To maintain anaerobic

	by gentle rolling of the tube between thumb and finger. Place a rubber cap over each end of the capillary tube.	conditions and prevent clotting.
13	Following sampling, wipe the patient's ear with a gauze swab or cotton wool and ask the patient to gently apply pressure. Leave puncture site covered with cotton wool and medical tape until no evidence of further bleeding.	To ensure site has stopped bleeding.
14	Dispose of sharps immediately, wash hands and clean equipment.	To comply with trust health and safety and infection control policies.
15	**Test immediately using the appropriate blood gas analyser. Only staff with appropriate training should use the blood gas analysers.**	To ensure the equipment is used appropriately and safely.
16	The blood gas results should be immediately highlighted to and interpreted by an appropriate clinician.	To ensure blood gas result acted upon in a timely way.
17	Document results in notes and include that it is an arterialised capillary blood sample, the oxygen flow rate or room air, on/off ventilator, with any action taken and sign, along with date and time. Printout of blood gas results should be secured in the patients notes.	To comply with trust policy and ensure clear action if needed. FiO_2 and ventilation status will allow better interpretation of results.
18	Ensure the patient is informed of blood gas results (As appropriate).	Informed patient choices and treatment options. To comply with UHL policy.
19	Advise the patient not to rub the earlobe or reinsert earnings for at least one hour following the procedure.	To minimise risk of bleeding.

3. Education and Training

3.1 Staff undertaking this procedure must have had the necessary training and assessment of competence using a suitable competency assessment tool such as Leicester clinical assessment tool (LCAT) or direct observation of supervised practice (DOPS). See appendix A for suggested LCAT competency document.

3.2 Training should be delivered by a competent, nurse, physiotherapist, physiologist, doctor, clinical educator or technician with line managers approval. Training should include and understanding of blood gas interpretation theory and physiology of sampling, potential sources of error.

3.3 Observe a practical demonstration by a competent practitioner and undertake a period of supervised practice. It is suggested that an individual may need to complete around 10 supervised procedures to be able to demonstrate competency.

3.4 It is the individual's responsibility to seek further training if they feel their competency has lapsed.

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Incidents reported on Datix of incorrect procedure followed.	Via Datix reports provided to CMG's	CMG'S quality safety board	As reported.	CMG quality and safety board.

5. Supporting References (maximum of 3)

Zavorsky et al. Arterial versus capillary blood gases: a meta-analysis. Respiratory Physiology Neurobiology, 2007 Mar 15;155(3):268-79.

Dar K, Williams T, Aitkin R et al. Arterial versus capillary sampling for analysing blood gas pressures . Br Med J *1995; 309: 24–25*.

Wimpress, S. Vara, DD, & Brightling C.E. Improving the sampling technique of arterialized capillary samples to obtain more accurate PaO2 measurement. Chronic respiratory disease, 2005; 2 (1): 47-5.

6. Key Words

Ear Lobe Capillary Blood gas Sampling. ELCG.

CONTACT AND REVIEW DETAILS	
Guideline Lead (Name and Title) **Clare Rossall** **NIV Specialist Practitioner Physiotherapist Lead for the Respiratory Support Team**	**Executive Lead**
Details of Changes made during review: **N/a**	

University Hospitals of Leicester NHS
NHS Trust

Ear Lobe Capillary Blood Gas Sampling

A multi-disciplinary competency document to guide ear lobe capillary blood gas sampling.

Training Date ……..

Completion Date ……. (within 6 months)

Date Received (CSU) …….

University Hospitals of Leicester NHS
NHS Trust

Clinical Skills

Record of Supervised Practice

Candidate Name

Clinical Skill

The Clinical Skills Unit,
Level 1,
The Robert Kilpatrick Clinical Sciences Building,
PO Box 65,
Leicester Royal Infirmary,
Leicester,
LE2 7LX
0116 252 3291

Please photocopy and send the original to the above address

PERSONAL INFORMATION

1. Name (Please print)

_____

2. Current Ward and Hospital

_____

3. Current job title

_____

4. Professional qualifications NMC / HCPC Registration Number

_____ _____

5. Mentor's name

_____

6. Manager's Name Manager's Contact Details

_____ _____

Evidence of underpinning Knowledge

Please complete this page as evidence of completing your underpinning knowledge.
Have you completed any other theoretical study for this particular skill?

Yes No

If yes, please list i.e. reading journal articles, websites etc.

"I confirm that I have read, understand and shall practice the skill as per the relevant UHL policy(s) / guideline(s) for this skill.

_____ _____

(Candidate signature) *(Date)*

Step by step procedural guide

Step	Action	Rational
1	Confirm patient ID, explain what the procedure entails and obtain verbal consent from the patient.	Legal consent and ensure the patient understands. Refer to trust policy.
2	Gather the equipment (Lancet, capillary tube, alcohol skin wipe, cotton wool, tape, vasodilator cream required into a clean receiver Wash hands in accordance with trust policy	Safe preparation and to prevent cross infection.
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4	Apply examination Gloves. Apply vasodilation cream liberally, cover with cotton wool and medical tape and leave for 10 minutes.	Improve blood flow to capillary bed to reduce likelihood of haemolysis and contamination with tissue fluid.
5	Place gauze or tissue on the patient's shoulder.	To protect clothing from blood spillage.
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8	Wearing examination gloves support the back of the ear with sterile gauze or cotton wool.	To support the earlobe and prevent movement on insertion of lancet.
9	Applying firm pressure, pierce the earlobe as near to the tip of the pinna as possible, using the lancet.	To obtain optimal blood flow.
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12	Mix blood collected in the tube with anticoagulant by gentle rolling of the tube between thumb and finger.	To maintain anaerobic conditions and prevent clotting.
13	Following sampling, wipe the patient's ear with a gauze swab or cotton wool and ask the patient to gently apply pressure. Leave puncture site covered with cotton wool and medical tape until no evidence of further bleeding.	To ensure site has stopped bleeding.

14	Dispose of sharps immediately, wash hands and clean equipment.	To comply with trust health and safety and infection control policies.
15	Test immediately using the appropriate blood gas analyser. Only staff with appropriate training should use the blood gas analysers.	To ensure the equipment is used appropriately and safely.
16	**The blood gas results should be immediately highlighted to and interpreted by an appropriate clinician.**	To ensure blood gas result acted upon in a timely way.
17	Document results in notes and include that it is an arterialised capillary blood sample, the oxygen flow rate or room air, on/off ventilator, with any action needed and sign, along with date and time. Printout of blood gas results should be secured in the patients notes.	To comply with trust policy and ensure clear action if needed. Fi02 and ventilation status will allow better interpretation of results.
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LEICESTER CLINICAL procedure ASSESSMENT TOOL

Category and component competence
1.0 Communication and working with the patient and/or representative
1.1 Introduces self to patient and/or their family **1.2 Shares information about the procedure appropriately** **1.3 Listens attentively** **1.4 Answers questions honestly** **1.5 Checks patient's understanding** **1.6 Obtains valid and continuing consent** **1.7 Works with the patient to maintain co-operation** **1.8 Use of communication skills** **1.9 Performs procedure in a compassionate and patient-centred manner**
2.0 Safety
2.1 Checks patient's identity correctly **2.2 Checks/completes request and/or documentation correctly** **2.3 Labels samples/printouts correctly** **2.4 Applies procedure-specific safety measures correctly** **2.5 Is aware of limitations of personal competence and role, and acts appropriately** **2.6 Maximises own and others' safety** **2.7 Offers appropriate post-procedure care to the patient**
3.0 Infection Prevention and Control
3.1 Washes and/or decontaminates hands **3.2 Prepares patient's skin appropriately** **3.3 Uses anti-infection barriers as required** **3.4 Displays appropriate practice of aseptic technique** **3.5 Disposes of waste appropriately** **3.6 Optimises infection prevention within environmental limitations**
4.0 Procedural Competence
4.1 Assesses the patient appropriately **4.2 Appropriately assesses the indications for and contra-indications to the proposed procedure** **4.3 Plans the procedure with respect to patient factors** **4.4 Prepares the patient appropriately** **4.5 Selects and checks equipment, disposables, and consumables** **4.6 Performs procedure fluently** **4.7 Displays familiarity with equipment** **4.8 Displays knowledge of the procedure** **4.9 Uses assistance appropriately** **4.10 Handles samples/ensures quality control of outputs correctly** **4.11 Deals appropriately and sensitively with the evolving situation** **4.12 Demonstrates respect for tissue**
5.0 Team working
5.1 Displays understanding and respect for the roles of team members **5.2 Communicates effectively with the team** **5.3 Leaves clinical area clean and tidy** **5.4 Documents procedure correctly**

Supervised practice recording form

Practice	Date	LCAT Score	Comments	Assessor's Name and Signature
Baseline LCAT				
Practice 1		Not Applicable		
Practice 2		Not Applicable		
Practice 3		Not Applicable		
Final LCAT				

LCAT Assessors Recording Form: Baseline LCAT

Nurse Name	Date	Nurse Signature	
Competence Category	**Positive Features**	**Weakness / Omissions**	**Score**
Communication and working with the patient			
Safety			
Infection Control			
Procedural Competence			

Team working			
Particular Strengths/weakness			Total Score
Specific strategies for Improvement			

Assessors Name……**Assessors Signature**……**Date**…….

LCAT Assessors Recording Form: Final LCAT

Nurse Name	Date	Nurse Signature	
Competence Category	Positive Features	Weakness / Omissions	Score
Communication and working with the patient			
Safety			
Infection Control			
Procedural Competence			

Team working			
Particular Strengths/weakness			Total Score
Specific strategies for Improvement			

Assessors Name……**Assessors Signature**……**Date**……..

Entered on HELM ☐

Final Signature Section

This must be completed within 6 months of the training date.

This section to be completed BY ALL candidates

"I confirm that I have read, understand and shall practice the skill as per the relevant UHL policy(s) / guideline(s) for this skill. I will keep up to date with this practice and if I feel out of date and/or unable to practice this skill I will discuss with my line manager."

_____ _____

(Candidate signature) *(Date)*

_____

(Please print your name)

This section to be completed by final LCAT assessor

"I confirm that …… (Candidate Name) has demonstrated an understanding of the theoretical component of …….. (Clinical Skill).

I have seen their practice record and confirm that they have achieved a minimum score of 10 in their final practical LCAT assessment equating to competent practice.

I confirm that I have attended the LCAT Trainers course and my eUHL record states "attended, competent and completed supervised practice" in relation to the relevant Clinical Skill."

_____ _____

(Final LCAT Assessor Signature) *(Date)*

_____

(Please print your name)

Final Signature Section

This section to be completed by your manager

"I confirm that …… (Candidate Name) has demonstrated an understanding of the theoretical component of ……..… (Clinical Skill).

I have seen their practice record and confirm that they have achieved a minimum score of 10 in their final practical LCAT assessment equating to competent practice.

I also confirm that the final LCAT assessment has been completed by a trained LCAT Assessor who has a valid in date eUHL record stating "attended, competent and completed supervised practice" in relation to the relevant Clinical Skill."

_____

Manager Signature *Date* _____

_____

Please print your name

Please return to the Clinical Skills Unit

This section to be completed by an authorised Clinical Skills Unit signatory

"I confirm that …….... (Candidate name) has attended a practical workshop and that this booklet has been signed by the three individuals above.

The candidate's skills passport has been updated to display "attended, competent and completed supervised practice".

_____ _____

(Signature) *(Date)*

_____