# ST. LUKES GENERAL HOSPITAL CARLOW/KILKENNY

Feidhmeannas Seirbhíse Sláinte
Health Service Executive

Grúpa Ospidéal
Oirthear na hÉireann
Ireland East
HOSPITAL GROUP
UCD DUBLIN

## Guideline for the Care and Management and Safe Removal of Arterial Lines

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# 1 Policy Statement

1.1 St. Luke's General Hospital is committed to ensuring that patients requiring invasive monitoring via an Arterial Line receive safe and optimum care.

# 2 Purpose

2.1 To ensure that all staff working in Critical Care Area (ICU, CCU/HDU), Operating Theatre and the Emergency Department provide a high standard of care for patients who have an invasive arterial Line.

2.2 To provide guidance for the competent management of arterial lines including the setting up and assistance with arterial line insertion, care and maintenance, blood sample collection via the arterial line and removal of the device.

2.3 To ensure that staff are aware of factors that affect the safety and accuracy of arterial monitoring and management of the patient with an arterial line in place.

2.4 To ensure that the opportunity for a Health Care Associated Infection is prevented and that care provided is in accordance with Infection Prevention/Control standards in hand hygiene, aseptic technique and standard precautions.

# 3 Scope

3.1 Only competent anaesthetists/medical practitioners trained and assessed in inserting Arterial Lines can do so.

3.2 All competent nursing staff with the appropriate training, experience and qualifications providing care for patients in the critical care area (ICU, CCU/HDU), Operating Theatre and Emergency Department.

# 4 Legislation/ Other Related Policies

4.1 Nursing and Midwifery Board of Ireland (NMBI) (2021) The Code of Professional Conduct and Ethics for Registered Nurses and Registered Midwives, Dublin: NMBI.

4.2 Nursing and Midwifery Board of Ireland (NMBI) (2015) Scope of Nursing and Midwifery Practice Framework, Dublin: NMBI.

4.3 National Consent Advisory Group (2022) National Consent Policy, Dublin: Health Service Executive.

4.4 St. Luke's Hospital Medication Management Policy (Current).

4.5 St. Luke's Hospital Infection Control Hand Hygiene Policy (current).

4.6 St. Luke's Hospital Infection Control Decontamination Policy (current).

4.7 St. Luke's Hospital Policy for the Safe Use, Handling and Disposal of Sharps and Sharp Containers (current)

4.8 St. Luke's Hospital Patient Identification Policy (current).

4.9 St. Luke's Hospital Aseptic Technique Policy (current)

4.9.1 SLh-POCT-P-007 (2019) Management of GEM Premier 5000 Blood Gas Analyser.

# 5 Glossary of Terms/Definitions/Abbreviations

5.1 Arterial catheter/cannula:

"Is a small cannula inserted into an artery and connected to monitoring tubing to allow for continuous blood pressure monitoring" (NHS 2020). It provides continuous measurement of blood pressure, heart rate and systemic perfusion, mean arterial pressure and pulse pressure variation (Grigsby, 2021).

5.2 Transducer:

"The transducer creates the link between the fluid filled tubing system and the electronic system (Sanchez, 2014*).* The transducer converts pressure from the artery into an electrical signal. This is displayed in a waveform on the monitor with a digital value (Plowright & Sumnall, 2022).

5.3 Flush System:

This is a fluid-filled system which continuously infusing 0.9% Sodium Chloride under a constant pressure 300mmhg. The pressure is greater than the arterial systolic pressure to prevent backflow of blood, deliver a continuous infusion of 3-4 mls/hr to keep the line free of clots (Plowright & Sumnall, 2022).

5.4 Mean Arterial Pressure:

This is the average arterial pressure during a cardiac cycle. It represents the perfusion pressure/driving force of blood flow throughout the cardiovascular system (Crumlett & Johnson, 2010). MAP is a product of Cardiac Output (CO) and systemic vascular resistance (SVR). Tissue perfusion is dependent on the MAP (Berry & McKenzie, 2010).

## Abbreviations

| | |
|---|---|
| **ADON** | Assistant Director of Nursing |
| **CNM** | Clinical Nurse Manager |
| **CRU** | Critical Care Unit |
| **CCU** | Coronary Care Unit |
| **DOACS** | Direct Oral Anti-Coagulants |
| **ED** | Emergency Department |
| **HDU** | High Dependency Unit |
| **ICU** | Intensive Care Unit |
| **I.V** | Intravenous |
| **MAP** | Mean Arterial Pressure |
| **NIBP** | Non-Invasive Blood Pressure |
| **NMBI** | Nursing & Midwifery Board Ireland |
| **NPSA** | National Patient Safety Agency |
| **PPE** | Personal Protective Equipment |
| **SLGH** | St. Luke's General Hospital |
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# 6 Roles and Responsibilities

## 6.1 **Individual Registered Nurse**

6.1.1 Each individual registered nurse has a responsibility to ensure they have the adequate skills and knowledge and are competent to assist the anaesthetist with the insertion of an arterial line.

6.1.2 It is the responsibility of the registered nurse to comply with local and national guidelines when caring for patients with arterial lines guided by evidence-based research. This guideline is available to view on the HSE Document Hub St. Luke's Hospital, Kilkenny.

6.1.3 It is the responsibility of the registered nurse to ensure they work within their Scope of Professional Practice.

6.1.4 It is the responsibility of the registered nurse to sign the signature sheet to indicate that he/she has read understands and agrees to adhere to the guideline.

## 6.2 **Clinical Nurse Manager/Anaesthetist**

6.2.1 The clinical nurse manager must ensure that all nursing staff are informed of this guideline, sign the signature sheet to indicate that he/she has read, understands, and agrees to comply with the guideline. This guideline is available to view on the HSE Document Hub St. Luke's Hospital, Kilkenny.

6.2.2 It is the responsibility of the CNM to ensure staff avail of training sessions when available on the care of invasive lines.

6.2.3 It is the responsibility of the Consultant Anaesthetist/Anaesthetic Registrar to review daily the indication for the arterial line or removal of same.

# 7 Procedure

## 7.1 **Introduction**

7.1.1 The catheter is attached to a fluid filled pressure transducer system incorporating a flush system, which continuously infuses a 0.9% sodium chloride solution under pressure to maintain patency of the catheter.

7.1.2 An attached transducer senses arterial pressure and converts the pressure signal to a wave form on the bedside monitor (Appendix IV & V). The waveform reflects pressure generated by the left ventricle during systole. The monitor also displays numerical pressure values.

7.1.3 Arterial Pressure represents the ejection of blood from the left ventricle in a pulsatile manner generating a pressure wave (upstroke) (Appendix V). The peak of this pressure wave is the systolic pressure. The pressure declines below the aortic pressure, the aortic valve closes producing a small rebound wave (Dicrotic notch). The descending limb represents diastole (downward stroke) (Crumlett & Johnson, 2010).

## 7.2 **Indications for insertion of arterial line**

7.2.1 Arterial lines are inserted when continuous accurate real time blood pressure monitoring is required in patients with fluctuating, unstable blood pressures.

7.2.2 When patients are receiving intravenous vasoactive infusions. The response to such medications requires appropriate titration and continuous monitoring of blood pressure with greater emphasis on the Mean Arterial Pressure (MAP) to safely titrate this medication (Nguyen & Bora, 2022)

*7.2.3* For critically ill patients who require frequent blood sampling and laboratory studies to monitor improvement or deterioration in the patient's condition.

*7.2.4* This form of invasive monitoring should be used for the period of acute illness and removed when not required (Ogle, 2014*).*

## 7.3 **Routes of Cannulation**

7.3.1 An arterial catheter is inserted into the radial, brachial, femoral, or dorsalis pedis artery.

7.3.2 Cannulation of the radial artery is the most common placement of arterial cannulas (Plowright & Sumnall, 2022). The hand has good collateral blood supply via the ulnar artery. The radial artery is near the surface of the skin, it is readily accessible and easily secured (Crumlett & Johnson, 2010).

| Fig 1 Complications of arterial cannulation |
| --- |
| ▪ Vascular thrombosis<br>▪ Distal embolization<br>▪ Proximal embolization; digital ischaemia<br>▪ Local/systemic infection<br>▪ Vascular spasm<br>▪ Skin necrosis of catheter site due to unintentional intra-arterial injection<br>▪ Hypovolaemia secondary to accidental disconnection<br>▪ Cannula fracture/breakage<br>▪ Pseudo-aneurysm formation<br>▪ Median nerve palsy (Bersten et al 2009)<br>▪ Damage to nearby structures |

7.3.3 Catheterisation of the brachial artery is controversial due to the following risks: inadvertent injury to the median nerve, risk of thrombosis and limb ischaemia due to the lack of collateral vessels (Nguyen & Bora, 2022).

7.3.4 Cannulation of the non-dominant hand should be attempted whenever possible.

7.3.5 Ideally the cannula should not be positioned close to any intravenous cannula as this may compromise blood flow around the adjoining structures. T here is also a risk of unintentional administration of medication through the wrong site.

## 7.4 **Pre-procedural considerations**

7.4.1 If the patient is alert and of full capacity the intended procedure is explained to them. Valid consent (implied or verbal) is obtained in adherence with the *National Consent Policy* (*2022)*.

7.4.2 Prior to insertion assess the patient's coagulation status (PT, INR & APTT) and platelet count. Observe if the patient is prescribed oral anticoagulants or antiplatelet medications e.g., Warfarin, NOAC/DOACS-Apixaban, Rivaroxaban, Dabigatran, Clopidogrel.

7.4.3 Position the patient in bed as comfortable as possible with the area exposed. If the radial artery is, used position the palm of hand facing upwards, with a rolled towel/bag of fluid to assist with dorsiflexion of the wrist. This brings the artery to the surface increasing accessibility (Crumlett & Johnson, 2010). Avoid hyper-extending it.

7.4.4 If the radial artery is used, the circulation of the hand must be assessed: temperature, capillary refill, and the colour of the hand (RCN 2010). Although not fully reliable, the Allen's test (Appendix III) should be completed prior to radial arterial cannulation to establish whether there is adequate blood supply to the hand.

7.4.5 If the patient's identification bracelet is removed for the procedure, apply a new identification bracelet to the other wrist before removing it. All ICU patients always have two identification bracelets.

## 7.5 **Equipment Required**

- Pressure infuser cuff
- 500ml sterile 0.9% sodium chloride (No other solution)
- Transducer (Edwards Life Sciences pressure transducer pack)
- Transducer Cable (All monitors have new cables compatible to the Edwards Lifesciences Transducer set)
- Dressing Trolley (Disinfected as per local guidelines)
- Sharps disposal container
- Pre-packed Arterial line sterile set (Appendix I)
- Non-sterile sheet/drape
- Extra sterile gauze if required.
- Sterile gloves
- Appropriate PPE (non-sterile gloves, gown, goggles/visor)
- 2% Lignocaine injection 5ml
- 2.0 Mersilk suture
- 2% Chlorohexidine with 70% isopropyl alcohol solution applicator or Povidine-iodine in alcohol solution if Chlorohexidine sensitive
- Arterial device warning label.
- Hand aid arterial wrist support (if radial artery insertion) (Appendix I)
- Transparent occlusive dressing (e.g., IV 3000)
- I.V. Stand

**Note:** the medical practitioner may request an alternate suture material or local anaesthetic.

- Arterial line equipment. Pre-packed Arterial line sterile sets are available in ICU/CCU/ED. This contains the necessary components required for arterial line insertion (Appendix I).

- Approved cleaning solution: Chlora-prep with tint combined applicators (Chlorhexidine Gluconate 20mg/ml/Isopropyl Alcohol 0.70ml/ml (Appendix I)

- Lidocaine 1% or 2 % local anaesthetic. This minimises pain during the procedure and reduces vasospasm. T he medication name, dose and date are checked with anaesthetist administering the medication and inserting the line.

## 7.6 **Preparation of the flush set and transducer system**

7.6.1 Perform hand hygiene as per infection control hand hygiene policy.

7.6.2 500ml bag of 0.9% sodium chloride (ensure it is in-date and double checked with your nursing colleague). This should be labelled with date and time and signed by the nurse. **No other intravenous infusion fluid should be used**. 500ml pre-prepared bags 0.9% sodium chloride bags with 500units of heparin are not routinely used. If requested, this must be prescribed by the anaesthetist in the patient's prescription chart and the indication in the patient's notes. Patients with or at risk of Heparin Induced Thrombocytopenia (HITTS) should not have heparin in the flush solution (Crumlett & Johnson, 2010).

*7.6.3* Insert the transducer administration set into the 500ml bag of Sodium Chloride 0.9% and hang on an I.V administration stand. Ensure that all connections are tight and secure. These are loose initially when packaged to facilitate sterilisation and if left loose can cause back flow of blood and inaccurate readings (Fehily*, 2017).*

*7.6.4* Prime the line ensuring that all parts are primed with fluid. Ensure that the flush system is free of air bubbles after priming as air can lead to dampening of the system (Sanchez, 2014*)* and inaccuracy of monitoring.

7.6.5 Place the 500ml 0.9% sodium chloride bag with the primed transducer set into the pressure bag inflate to 300mmhg. This ensures the pressure is higher than in the artery preventing backflow. Prime again once inflated to ensure the set is free of air. An automatic flush of 3mls/hr is delivered to maintain patency of the arterial cannula (Plowright & Sumnall, 2022*).*

7.6.6 This flush system is changed every 72 hours. The bag is changed every 24 hours and no later than 72 hours to minimise infection risks (Pratt et al, 2007, Sanchez, 2014*).* The infusion set and fluid is labelled separately with the date, time, and both staff signatures.

## 7.7 **Insertion, transducing and zeroing of arterial line**

7.7.1 Once the insertion site is confirmed by the anaesthetist/medical practitioner, position the patient in bed as comfortable as possible with the area of insertion exposed.

7.7.2 If the artery of choice is the radial artery position the palm of hand facing upwards. A rolled towel may be used to dorsiflex the wrist without hyper-extending it.

7.7.3 Place a suitable non-sterile sheet to place under the patients' hand for blood spillage.

7.7.4 The anaesthetist/medical practitioner inserting the arterial cannula performs hand hygiene and applies appropriate PPE.

7.7.5 The site is cleaned with 2% Chlorohexidine with 70% isopropyl solution and allowed to dry for 30 seconds.

7.7.6 The anaesthetist administers the local anaesthetic. Advise the patient of a non-sustained stinging sensation. Allow sufficient time for the local anaesthetic to take effect as per manufacturer's instructions.

7.7.7 The arterial line is inserted by the anaesthetist/medical practitioner using strict aseptic technique. The arterial line must be sutured in place to prevent dislodgement.

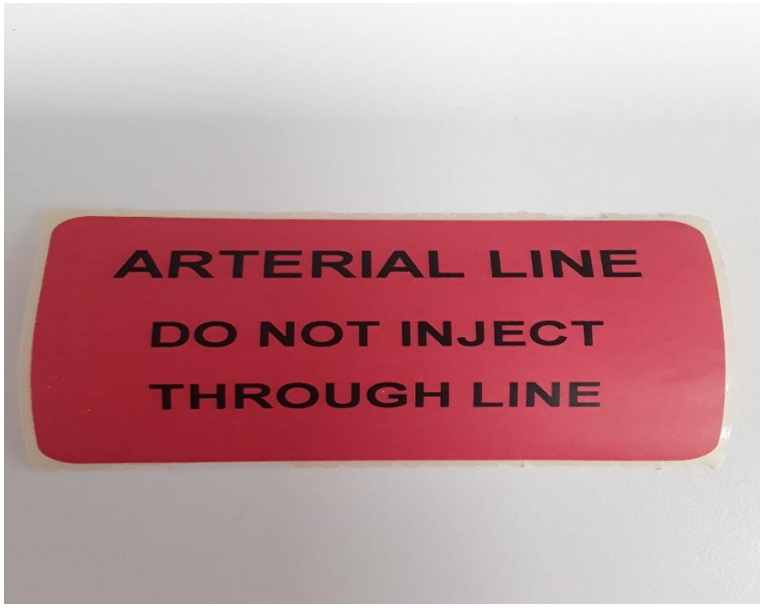
7.7.8 Once sutured. Apply the transparent dressing (I.V 3000) over the catheter and the insertion site. The cannulated site should be visible to allow for inspection and close monitoring for signs of inflammation or infection, arterial thrombosis, haematoma, arterial perforation, and to avoid catheter kinking or accidental dislodgement of the arterial line.

7.7.9 The flush line is then connected to the arterial cannula using the Aseptic Non-Touch Technique (ANTT). The Transducer set is denoted by the red stripe on the tubing which is used for arterial lines only.

7.7.10 Apply the hand splint to further secure after insertion.



7.7.11 Label the line clearly as **Arterial** to ensure it is not mistaken for venous access.




*7.7.12* Attach the transducer to the (P1) Arterial cable. All monitors in Critical Care, Theatre and ED are fitted with a universal cable compatible with the Edwards Life Sciences Transducer sets. (The transducer cables are also compatible with the portable monitors used for intra/inter hospital transfers (*Appendix II).*

*7.7.13* Level and zero the Arterial Line. Levelling negates hydrostatic pressures on the transducing system and zeroing eliminates the effects of atmospheric pressure on the haemodynamic values (Morgan, 2020). Ensure a pressure waveform is identified with corresponding blood pressure recordings (*Appendix IV).*

*7.7.14* Dispose of the clinical waste as per local policy. Perform hand hygiene.

7.7.15 The anaesthetist/medical practitioner who inserted the arterial cannula must document the procedure in the patient's healthcare notes.

7.7.16 The nurse documents the procedure in the Nursing flow chart. The care bundle/plan *(Appendix VI)* is completed each shift detailing date of the insertion, date of dressing change (every 7 days), transducer change (every 72 hours), flush bag change (every 24 hours).

## 7.8 **On-going Monitoring and Management**

7.8.1 The arterial line can remain in situ for up to 7 days, or longer in special situations as deemed necessary by the clinician, unless signs of infection are evident, not working efficiently, unexplained pyrexia or if the arterial line is no longer required.

7.8.2 For radial and brachial arterial lines, keep the arm in extended position for accuracy and patency of the line.

7.8.3 Arterial sites must be always clearly visible. e.g., on top of the sheets. Regularly observe the limb distal to the insertion site for warmth, sensation, colour, and pulses. Check the cannulation site for signs of infection (redness, swelling, pain or oozing) and document in the Arterial Care Bundle.

7.8.4 Monitor the access site and limb distal to the catheter for complications haematoma, thrombus, arterial spasm. Tingling, paraesthesia, capillary refill > 3 secs, or a cool pale limb may indicate a neurovascular injury. If suspected notify the Intensivist/Anaesthetist or Primary Consultant immediately. Other potential complications include air embolus, ischaemia, or accidental disconnection.

7.8.5 The dressing should be left undisturbed on the arterial line for 7 days. Replace every 7 days or if there is a problem with kinking of the line, leaking around the site, if it becomes damp, loosened or soiled. This should be performed aseptically to minimise infection. Visually inspect the hand splint. Ensure that the aid is clean. Wash the patient's hand and always keep dry.

7.8.6 Monitor the flush system at least 4 hourly. Maintain pressure level at 300mmHg to deliver a continual flow of approximately 1-3ml per hour for adults preventing occlusion (Crumlett & Johnson, 2022).

7.8.7 Level the transducer and zero the line at the beginning of each shift and document in the Care Bundle and Nursing documentation.

7.8.8 Ensure the transducer is positioned correctly at the mid axillary line level with the 4$^{th}$ intercostal space (Appendix II). If the transducer is positioned too low, it can deliver a falsely elevated pressure. Positioned too high can give a false low pressure (Fehilly, 2017).

7.8.10 Alarms provide immediate notification of changes in the patient's haemodynamic status or in accidental disconnection. Alarms parameters should be checked at the beginning of each shift and reassessed throughout the 12 hours. Appropriate limits should be set for each patient and the degree of fluctuation (Morgan, 2020). A change in blood pressure can represent changes clinically in the patient. Always respond to an alarm. **Alarms should never be silenced/Turned Off.**

7.8.11 Observe and assess the quality of the monitor trace. Perform a dynamic response test (fast flush square wave testing) each shift, when zeroing the line or when the accuracy of the tracing is undetermined to assess the level of dampening in the system. The zero point must be visible on the monitor screen: **optimisation of the trace must not be implemented**.

7.8.12 Record the pressure measurements on the ICU observation chart or the INEWS chart.

7.8.13 Record BP (systolic/diastolic & MAP (Mean Arterial Pressure) hourly or more frequently if the patient is clinically unstable/on vasoactive medication. A MAP of greater than 60mmhg is required for coronary artery perfusion higher for the brain and kidneys (Urden et al, 2018). The Intensivist/Primary Team will establish MAP parameters individual to each patient to assist with accurate titration of vasoactive medication.

7.8.14 If non-invasive blood pressure is checked for comparison, this should be performed on the opposite arm. Cuff BP measurements are less accurate in hypotensive patients. Repeated inflation can lead to false readings and therefore not a true reflection of the patient's condition (Morgan, 2020).

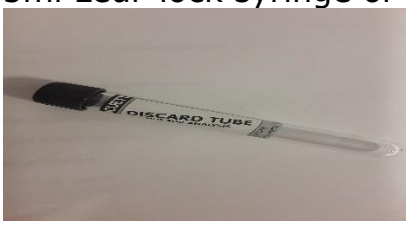
7.8.15 **DO NOT ADMINISTER ANY MEDICATION OR OTHER SUBSTANCES VIA AN ARTERIAL LINE (NPSA, 2008)** The only purpose of an arterial line is for continuous accurate real time blood pressure monitoring and blood sampling.

**Please note: The patient with an Arterial line must have continuous monitoring. Under no circumstances should monitoring be paused, stopped or disconnected during an inter-hospital transfer of the patient (to a different room space/Radiology Dept etc).**

## 7.9 **Taking blood samples from the Arterial line**

7.9.1 Equipment

- Dressing Trolley (disinfected as per local policy)
- Sterile dressing pack
- Disinfected clinical tray or single use receiver
- Sharps disposal container
- Appropriate PPE (non-sterile gloves, Gown/apron, and goggles/visor)
- Alcohol hand rub
- 2% Chlorhexidine in 70% alcohol (Clinell wipes).
- Sterile vacutainer.
- 5ml Leur-lock syringe or blood discard tube




- Required blood sampling tubes/Blood Culture Bottles/ Pre-heparinized arterial blood gas syringe
- 5x5 sterile gauze
- Sterile Leur-lock Cap (red bung)

7.9.2 Ensure that the fluid used in the pressure bag to transduce the arterial line is 0.9% sodium chloride only. No other fluids are used ever except for 500ml 0.9% saline with 500units of heparin. If required, this must be prescribed by the anaesthetist. These are prefilled bags available in the Critical Care. Check the prescription corresponds with the contents of the fluid bag and expiry date with a second colleague.

7.9.3 Accurate patient identification is fundamental for patient safety. It is the responsibility of the healthcare professional to positively identify the patient before performing the procedure as per as per hospital identification policy. Check the patient's name, date of birth and hospital number against the patient's identification bracelet.

7.9.4 Explain and discuss the procedure with the patient. Obtain valid consent in all cases, except on occasions when the patient is unable to consent, for example, the sedated or unconscious patient.

7.9.5 Perform hand hygiene using the 5 moments of hand hygiene.

7.9.6 Open the dressing pack onto the top of the disinfected trolley if taking blood cultures. Prepare your equipment onto the sterile field using the ANTT. Set aside non-sterile blood bottles in order of draw.

7.9.7 Decontaminate your hands and apply appropriate PPE.

7.9.8 Check the 3-way tap is closed to the port before removing the red bung. This avoids backflow of blood from the artery.



***Three-way tap: closed to port***

7.9.9 Remove the cap from three-way tap and clean the exposed port with 2% Chlorhexidine in 70% alcohol wipe and allow to dry for 15-30 seconds. Allow to dry.

7.9.10 Attach the vacutainer to the port.

7.9.11 Turn the 3-way tap to artery and port so that flow is from the artery stopping the flush fluid from contaminating the blood samples.



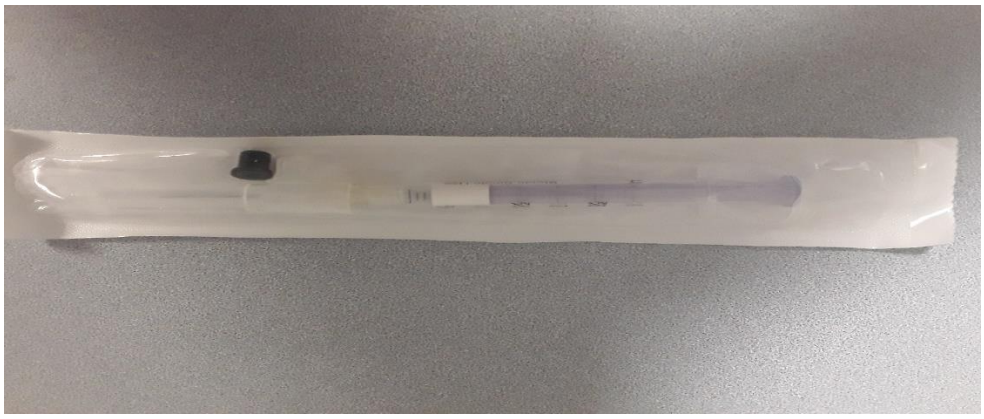
***Three-way tap: turned to artery and port.***

7.9.12 Attach the discard bottle (below) to the Vacutainer and allow to fill to the marked line. Alternatively, attach a 5ml Leur-lock syringe to the port and slowly withdraw the correct volume of blood. If this method is used, before the removing syringe, turn the 3-way tap diagonally to close off both the artery and the flush to avoid blood spillage/backflow from the artery. 3mls of blood is appropriate from a peripheral artery and 5ml is appropriate from a femoral artery. Discard this sample in your sharp's disposal container.



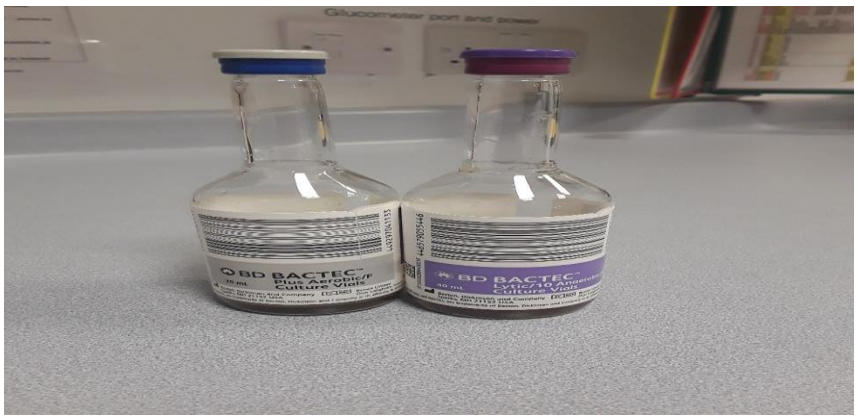
***Three-way tap: turned diagonally to close off flush, artery and port.***

7.9.13 Attach the blood sample tubes in appropriate order filling to marked line. Attach the ABG syringe to retrieve sample and slowly withdraw 0.6-1ml of blood as recommended.



7.9.14 When samples have been taken turn the 3-way tap diagonally to close off both the artery, flush and port. Remove the vacutainer and dispose in the sharp's disposal container.

7.9.15 If taking blood cultures, this is a sterile procedure. Therefore, prepare your decontaminated trolley with a sterile dressing pack. Perform the five moments of hand hygiene. Prepare the necessary equipment. Apply sterile gloves. Follow the above procedure. There is no need to discard the first 3-5mls. Attach the blood culture bottles to the vacutainer blue top (aerobic) first then the maroon top (anaerobic) and fill to the required level.





***Three-way tap: turned diagonally to close off flush, artery and port.***

7.9.16 Apply a sterile 5x5 gauze under the port. Turn 3-way tap onto 'open to port' position; to close off artery and flush the port. Apply a new 2% Chlorhexidine in 70% alcohol s wipe to the port, flush by squeezing the actuator (see manufacturer's instructions). This reduces the risk of infection, micro emboli, and thrombus.



***Three-way tap: turned to flush and port.***

7.9.17 Turn 3-way tap to 'open to artery' position and flush the cannula towards the artery, by gently squeezing the actuator. As the cannula is flushed, observe the hand and fingers for signs of blanching, discolouration, or complaints of pain from the patient, which is indicative of early signs of embolism.



***Three-way tap: closed to port.***

7.9.18 Clean the port with a 2% Chlorhexidine in 70% alcohol wipe and allow to dry.

7.9.19 Apply new sterile Leur lock (red bung) to the port and check it is secure.

7.9.20 Check the pressure infuser cuff is inflated to 300mmhg to prevent backflow and the arterial waveform is visualised on screen.

7.9.21 If sample spillage occurs the decontamination process must follow requirements of Infection Control Policy for Acute Hospitals – section on Management / Decontamination of spills of Blood/High Risk Body Fluids and Other Body Fluids.

7.9.22 Label the blood samples and forms at the patient's bedside ensuring labels correlate with patient identification band. Place samples in Laboratory transport bag along with appropriate blood request forms.

7.9.23 Dispose of the equipment safely as per St. Luke's General Hospital Waste Policy (HSE/S/SE most up to date).

7.9.24 Remove gloves and other PPE and dispose appropriately. Perform hand hygiene.

7.9.25 The ABG sample should be analysed immediately using the blood gas analyser at point of care, ensure safe transport and disposal of syringe. Please refer to the SLGH Laboratory (2019) Management of GEM Premier 500 Blood Gas Analyser SLH-POCT-P-011 and SLGH Laboratory (2019) Operation and Management of Rapid Point 500 Blood Gas Analyser.

7.9.26 Dispose of the clinical tray after each use or decontaminate as per the Decontamination Policy for Non-Invasive Medical Devices and Fixtures & Fittings (HSE/S/SE).

7.9.27 The ABG result is interpreted and documented on the flow sheet/ medical notes. Communicate the arterial analysis findings to the primary team/Anaesthetists.

Adapted from the Royal Marsden (2020)

## 7.10 **Removal of the Arterial Line**

### 7.10.1 Rational:

The arterial line should be removed if:

- The arterial line is no longer required for close blood pressure monitoring and /or frequent blood sampling.
- If there are any signs of infection, phlebitis or no longer functioning well (dampening/failure to aspirate or flush).
- When the patient has signs of sepsis requiring replacement of all invasive lines.

### 7.10.2 Equipment

- Dressing trolley (disinfect as per local guideline)
- Sterile dressing pack
- Appropriate P.P.E
- 2 pairs non-sterile gloves
- 2% Chlorohexidine with 70% isopropyl alcohol solution or Povidine-iodine in alcohol solution if Chlorohexidine sensitive
- Stitch cutter.
- Sharps disposal container.
- Sterile 5 x 5 gauze.
- Adhesive tape
- Sterile transparent occlusive dressing

## Procedure for removal of Arterial Line

| | Action | Rationale |
|---|---|---|
| 7.10.3 | Review the patient's chart and reason for arterial line removal. Verify the medical practitioner has documented the orders for arterial line removal. | |
| 7.10.4 | Check the patient's recent coagulation results and platelet count. | Consideration should be given to patient's recent coagulation results (e.g., INR, PT, PTT, platelets) prior to removal as increased time may be needed for haemostasis to occur. Discuss any concerns with medical practitioner. |
| 7.10.5 | Prior to removal of the arterial line, notify the other members of the nursing staff that you are intending to remove the arterial line. | Notify other members of the team that you will be unavailable to assist them until the procedure is completed. |
| 7.10.6 | Identify the patient. Check patient's name, date of birth and hospital number against the patient's identification bracelet. | To provide positive identification of patients during all stages of clinical treatment, minimising related medical errors and patient harm.<br><br>SLGH Patient Identification Policy (most up to date) |
| 7.10.7 | If the patient is alert/semi-alert, explain and discuss the procedure with the patient. | To ensure that the patient understands the procedure. Valid consent is obtained. |
| 7.10.8 | Place the patient in a comfortable position with the arterial line easily accessible. | Reduces fatigue, as the limb will be stationary for some time. |
| 7.10.9 | Perform the 5 moments of hand hygiene. | To reduce risk of cross infection. |

| | Action | Rationale |
|---|---|---|
| 7.10.10 | Prepare the sterile field. Open the sterile dressing pack. This is an aseptic procedure. | To reduce the risk of cross infection. |
| 7.10.11 | Suspend or turn the ABP alarm off | |
| 7.10.12 | Turn off the flush set. Clamp the arterial line closest to the patient (red clamp included on insertion) | To prevent spillage when removing catheter. |
| 7.10.13 | Deflate the pressure bag once line is double clamped. | Pressure is no longer required. |
| 7.10.14 | Perform the 5 moments of hand hygiene | |
| 7.10.15 | Apply appropriate PPE. | |
| 7.10.16 | Expose the arterial site; loosen the anchoring dressing/tape. Remove all dressings. | To facilitate removal of cannula. If purulent discharge around the catheter, take specimen as if wound swab. |
| 7.10.17 | Clean the site using the approved skin cleanser and allow to dry. | |
| 7.10.18 | Remove the sutures using the suture remover. Dispose of sharp in sharps disposal container. | Note the number of sutures (usually 2) |
| 7.10.19 | While applying firm pressure to the insertion site with a sterile gauze swab, gently remove the arterial catheter. | If the catheter is suspected of causing an infection, the tip should be collected for testing.<br><br>Post removal, cut the last 2-3cm of arterial catheter with a sterile scissors and place this distal portion in a sterile specimen container.<br><br>If the patient is febrile or if septicaemia is suspected, collect blood cultures from another site. |

| | Action | Rationale |
|---|---|---|
| 7.10.20 | Continue to apply steady digital pressure for a minimum of 5 minutes to prevent bleeding and haematoma formation. If an arterial femoral line is removed press firmly for 10 minutes or until haemostasis is achieved. | It will take 5 to 15 minutes for haemostasis to be achieved |
| 7.10.21 | Once there is no sign of bleeding through the gauze after 5 minutes or more then apply a transparent dressing (IV 3000) and secure. | |
| 7.10.22 | Remove PPE,<br>Discard waste in clinical waste. Perform hand hygiene. | As per local guidelines. |
| 7.10.23 | Ensure the insertion site is always visible. Closely observe the site every 10 minutes for the first hour. Notify the Intensivist/ Anaesthetist /Primary Consultant or Registrar if any of these complications occurs. | Monitor for signs of haematoma or bleeding.<br>Observe the hand and fingers for discolouration, pain, and swelling. |
| 7.10.24 | Avoid checking NIBP on this arm for 12-24 hours to prevent haematoma formation. | |
| 7.10.25 | Document the date and time of removal and peripheral circulation status distal to the access site in the nursing notes and Care bundle | |

## 7.11 **Trouble Shooting**

| Problem | Possible Causes | Solution/Management |
|---|---|---|
| **Difficulty with zeroing**<br>▪ Does not reach 0 waveform<br>▪ Does not reach baseline<br>▪ Zeroing but not getting the number display on the monitor | Not connected properly.<br>Line not primed appropriately through the transducer.<br>Faulty transducer or pressure cable.<br>Number display not set up/selected on the monitor for ABP.<br>System is not open to air | Check all equipment and connections between the patient and monitor.<br>Ensure all roller clamps are open.<br>Check system for air bubbles and blood clots.<br>Recalibrate.<br>Replace transducer, cable and/or module<br>Replace arterial line (last resource). |
| **Unable to aspirate cannula** | Kinked or blocked line and/or cannula. | Check line for kinks.<br>Apply traction to cannula.<br>Gently try to flush.<br>Replace arterial line. |
| **Falsely high or low readings**<br><br>Dampened wave (Over or under dampened) | Incorrect placement or transducer, either too high or too low in relation to the patient's phlebostatic axis.<br><br>Uncalibrated system.<br>Kinked or blocked cannula. | Perform square waveform check.<br>Check position of transducer.<br>Re-zero.<br>Re position patient's arm.<br><br>Apply back slab to maintain extension on entry point.<br>Remove kink.<br>Unclamp rolled clamp(s) in line<br>Remove air bubbles/ blood clots.<br>Check adequate amount of fluid in the flush bag.<br>Ensure pressure bag is inflated to 300mmHg.<br>Re dress if necessary. |
| **Haemorrhage** | Disconnection. | **To prevent:**<br>Always keep limb visible.<br>Ensure alarm is on so that any accidental disconnection can be dealt with quickly.<br>Ensure that arm is immobile with arm board.<br>Ensure all connections are tight.<br><br>**If haemorrhage:**<br>Apply pressure to limb.<br>Assess leak.<br>If haemorrhage persists notify Medical practitioner. |

| | | |
|---|---|---|
| **Infection** | Presence of pathogen in the arterial line/site. | **To prevent:**<br>Assess area regularly for any signs of infection document.<br>Avoid interrupting circuit as much as possible.<br>Use universal precautions when dealing with arterial line.<br>Change dressing when necessary to keep dry and clean.<br><br>**If infection:**<br>Remove arterial line.<br>If tip is sent for culture, it should be accompanied by blood culture |
| **Blockage/Clotting/Air emboli** | Kinked line.<br>Disconnection or loose connection.<br>Not enough pressure on the pressure bag.<br>Insufficient fluid in the 0.9% Sodium Chloride on the pressure bag.<br>Line not flushed when there is the presence of blood in the line.<br>Line not primed properly. | **To prevent:**<br>Keep pressure bag inflated to ensure a pressure of 300mmHg (3-5ml/h).<br>Ensure all connections are secure.<br>Always maintain line and blood collection port free of blood.<br>Use fast flush device to clear line to prevent clot formation.<br><br>***Never*** flush a clot or air embolism into the patient.<br><br>**If clot/air embolism:**<br>Attempt to aspirate blood/air to remove clot. |
| **Interruption to peripheral circulation** | Distal ischaemia.<br>Arterial thrombosis embolism.<br>Dressing too tight. | **To prevent:**<br>Regularly check distal vascular observations and document.<br>Keep dressing and board straps not too tight.<br><br>**Management:**<br>Notify Anaesthetist/Primary Team immediately.<br>Consider removing line. |

# 8 Implementation Plan

8.1 This guideline will be available to view on the HSE Document Hub St. Luke's Hospital, Kilkenny. https://dochub.healthservice.ie/st-lukes-hospital-kilkenny

8.2 This guideline will be disseminated to the Clinical Director, all Hospital Consultants, Director of Nursing, Senior Nurse Management Team, Clinical Nurse Manager III Critical Care, Clinical Nurse Manager III Acute Care, Clinical Nurse Manager III Theatre. This guideline is applicable to nursing and medical staff who care for patients with invasive lines (Arterial) in the Critical Care environment, Theatre, or Emergency Department.

8.3 It is the responsibility of all relevant Consultants and the Clinical Nurse Managers in each department/unit to ensure that all staff who are competent in the use and care of arterial lines have access to this guideline.

8.4 It is the responsibility of each individual practitioner to ensure their practice is supported by current best practice guidelines *(NMBI, 2014).*

# 9 Evaluation and Audit

9.1 This guideline content will be reviewed and evaluated every 3 years after implementation.

9.2 The CNM II/Shift leaders to ensure compliance in accordance with quality and safe practice will audit compliance and effectiveness of the care bundles on invasive lines in Critical Care every month.

# 10 Revision History

| Date | Review Number | Section Number | Change/s |
|---|---|---|---|
| 2019 | | | New document |
| 2022 | 1 | | • New Arterial Line Stickers to be applied at the 3-way blood aspiration port.<br>• Addition of the Arterial Line Care Plan and bundle. |

# 11 References/Bibliography


- Berry, W. McKenzie, C. (2010) Use of Inotropes in Critical Care. Clinical Pharmacist. (2):395-396.

- Crumlett, H. Johnson, A. (2010) cited in ACCN Procedure Manual for Critical Care. 6TH Edition. Elsevier: St. Louis.

- Doughtery, L. and Lister, S. (2008) The Royal Marsden Hospital Manual of Clinical Procedures. 7th Edition. West Sussex: Wiley-Blackwell Publishing.

- Eden-Hamilton. F. Arterial Line Management-Salisbury NHS Foundation Trust [online] Available at : http://www.icis.salisbury.nhs.uk/ClinicalManagement/IntensiveCare/Pages/ArterialLines Accessed 19th June 2019.

- Fehilly, Y. (2017) Guideline for Arterial Lines. Galway: Saolta University Health Group.

- Grigsby, S. (2021) Caring for patients receiving vasopressors and inotropes in the ICU-Vigilant monitoring will maximize outcomes. American Nurse Journal 16(2):5-10.

- Intensive Care Hotline. Arterial Line Insertion [online]. Available at: https://intensivecarehotline.com/arterial-line-insertion Accessed 3rd June 2019.

- Kaur, A. Caring for a patient with an arterial line. Available at: http://journals.1ww.com/nursing/fulltext/2006/04000/Caring_for_a_patient_with_an_arterial_line Accessed 19th June 2019 Accessed 19th June 2019.

- Morgan, B (2020) Standard of Care: Arterial Line Monitoring. Critical Care Trauma Centre. Available at: Ihsc.on.ca/critical-care-trauma-centre/standard-of-care-arterial-line-monitoring. Accessed July 10th, 2022.

- National Consent Advisory Group (2022) National Consent Policy. Dublin: Health Service Executive.

- National Patient Safety Agency (2008) Rapid Response Report. Problems with infusions and sampling from arterial lines. UK: NHS.

- Nguyen, Y. Bora, V. (2022) Arterial Pressure Monitoring. NCBI Bookshelf. Available at; http://www.ncbi.nlm.gov/books/NBK556127/#_NBK556127_pubdet

- Ogle, C. (2014). Arterial Lines [online]. Available at: www.gosh.nhs.uk/health-professionals/clinical-guidelines/arterial-lines. Accessed 19th June 2019.

- Plowright, C., Sumnall, R., (2022) Essential Critical Care Skills 3: Arterial Line Care. Nursing Times [online] 118(1) 24-26 Available at: www.nursingtimes.net. Accessed July 10th, 2022.

- Pratt, RJ. Pellowe. CM., Wilson, JA., Loveday, HP., Jones, SR., McDougall. C. and Wilcox, MH. (2007) National evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. Journal hospital Infection 65 (1): S1-64.

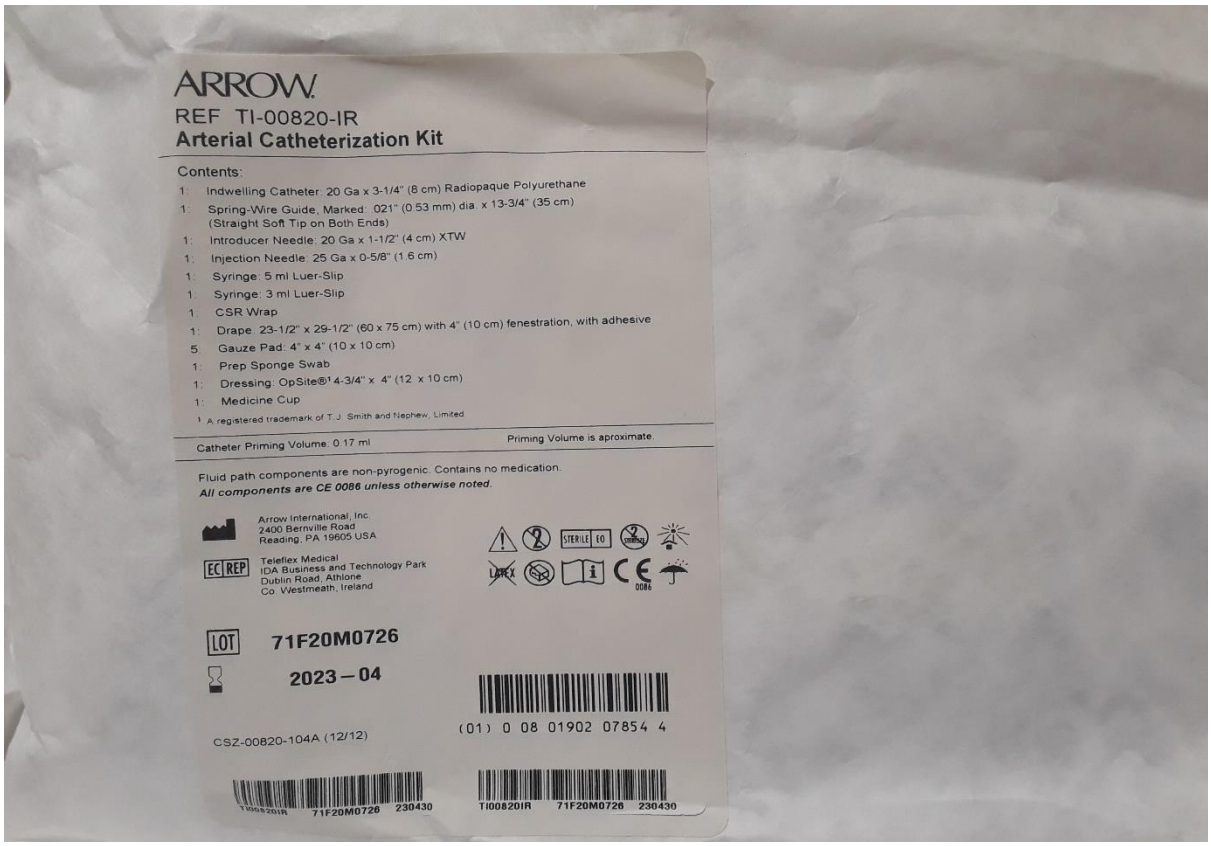
- Lister, S. Hofland, J. Grafton, H (2020) The Royal Marsden Manual of Clinical Nursing Procedures. 10th Edition. NHS: Wiley Blackwell.

- Sanchez, P. (2014) Arterial lines monitoring and management. Liverpool Hospital: Southwestern Sydney Local Health District.

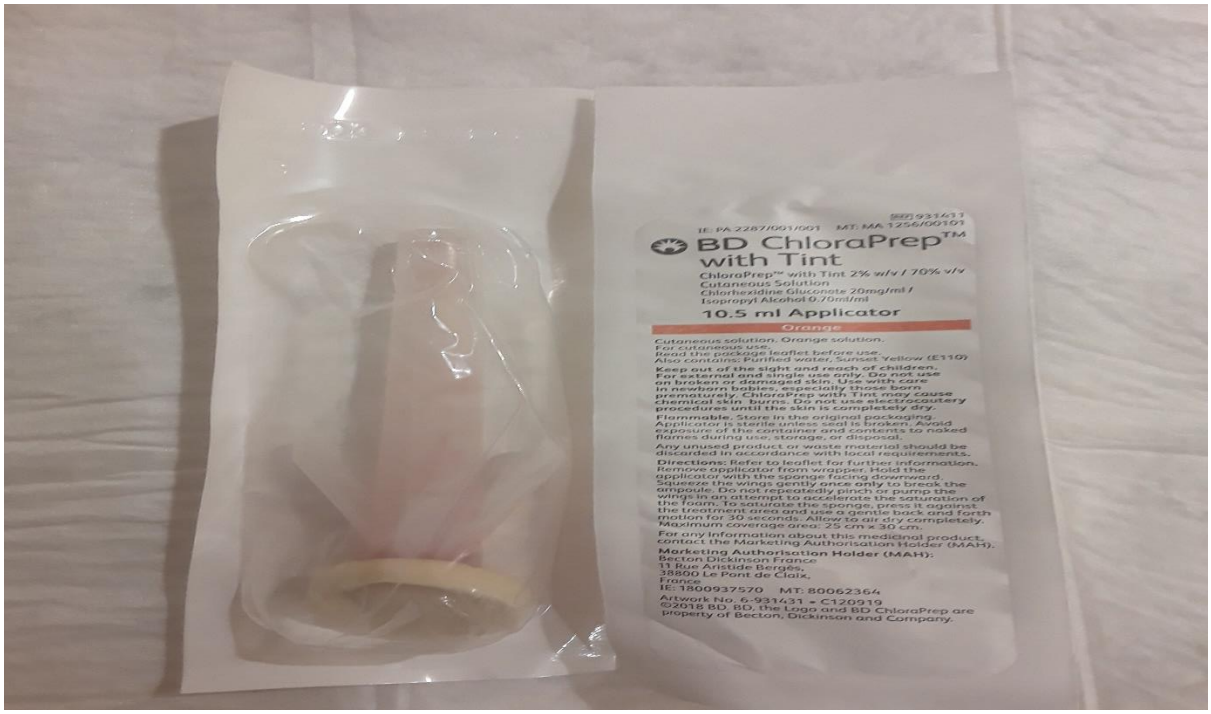
- Urden, L. and Stacey, K. and Lough, M. (2018) Critical Care Nursing. Diagnosis and Management. 8th Edition. Missouri: Elsevier Inc.

- Woodrow, P. (2012) Intensive Care Nursing. A framework for Practice. 3rd Edition. London: Routledge.

# 12 Appendix I Arterial Line Kit



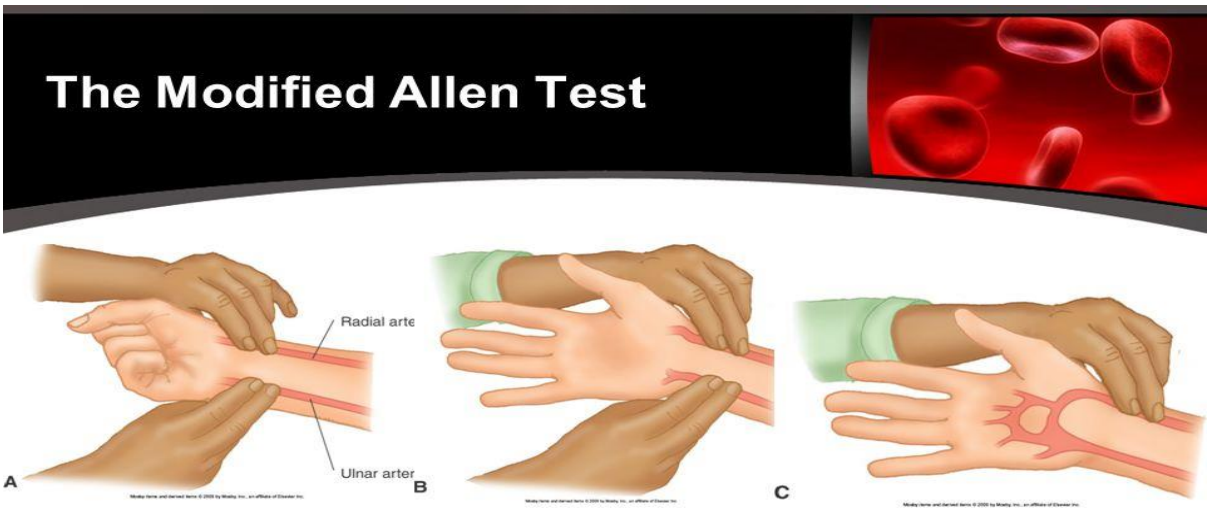




IE: PA 2287/001/001 MT: MA 1256/00101
BD ChloraPrep™ with Tint
ChloraPrep™ with Tint 2% w/v / 70% v/v
Cutaneous Solution
Chlorhexidine Gluconate 20mg/ml /
Isopropyl Alcohol 70ml/ml
10.5 ml Applicator
Orange
Cutaneous solution. Orange solution.
For cutaneous use.
Read the package leaflet before use.
Also contains: Purified water, Sunset Yellow (E110)
Keep out of the sight and reach of children.
For external and single use only. Do not use on broken or damaged skin. Use with care in newborn babies, especially those born prematurely. ChloraPrep with Tint may cause chemical skin burns. Do not use in electrocautery procedures until the skin is completely dry.
Flammable. Store in the original packaging.
Applicator is sterile unless seal is broken. Avoid exposure of the container and contents to naked flames during use, storage, or disposal.
Any unused product or waste material should be discarded in accordance with local requirements.
Directions: Refer to leaflet for further information.
Remove applicator from wrapper. Hold the applicator with the sponge facing downward. Squeeze the wings gently once only to break the ampoule. Do not repeatedly pinch or pump the wings in an attempt to accelerate the saturation of the foam. To saturate the sponge, press it against the treatment area and use a gentle back and forth motion for 30 seconds. Allow to air dry completely.
Maximum coverage area: 25 cm x 30 cm.
For any information about this medicinal product, contact the Marketing Authorisation Holder (MAH).
Marketing Authorisation Holder (MAH):
Becton Dickinson France
11 Rue Aristide Berges,
38800 Le Pont de Claix,
France
IE: 1800937570 MT: 80062364
Artwork No. 6-931431 • C120919
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# 13 Appendix II Transducer set



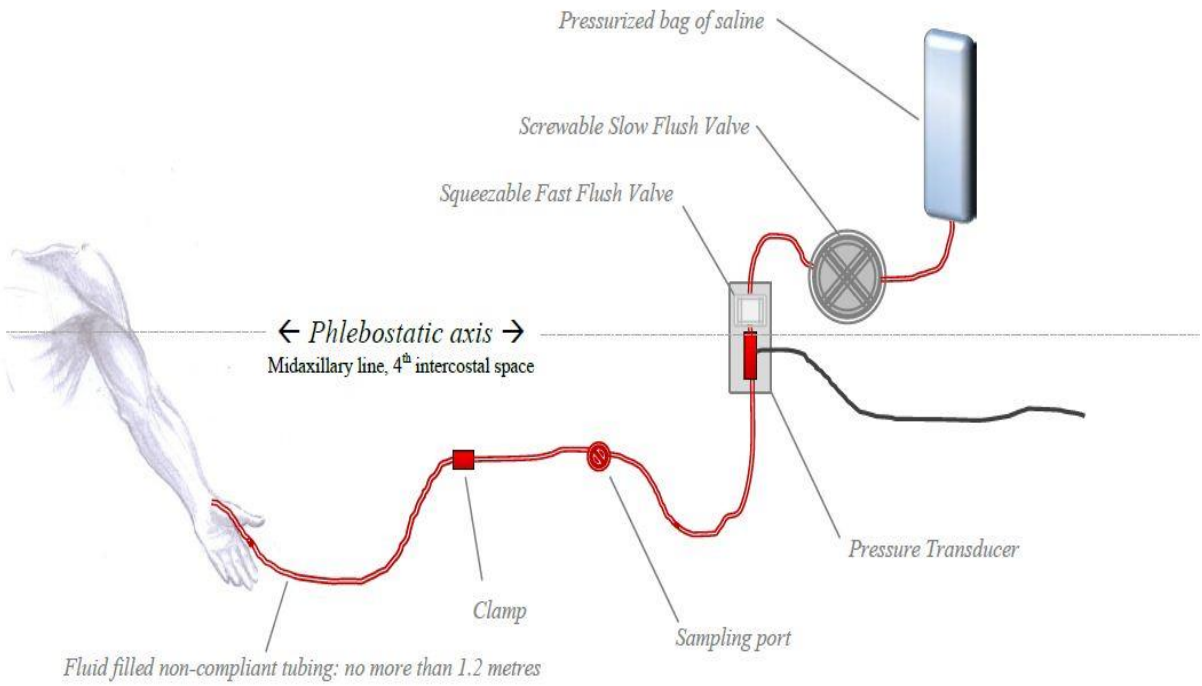
# 14 Appendix III Modified Allen's Test / Allen's Test




The modified Allen test. **A,** The hand is clenched into a tight fist and pressure is applied to the radial and ulnar arteries. **B,** The hand is opened (but not fully extended); the palm and fingers are blanched. **C,** Removal of pressure on the ulnar artery should result in flushing of the entire hand.

- Perform hand hygiene (WHO 2009; HSE 2015; HSE SE 2015).
- Instruct the patient to clench his or her fist until blanching of the distal skin occurs.
- Release your pressure over the ulnar artery and assess skin colour and refill – approximately 5 seconds after the release of the artery, the extended hand should blush owing to capillary refilling.
- Determine whether the Allen test is positive or negative.
- **Positive Modified Allen test:** If the hand blushes within 5-10 seconds, it indicates that the ulnar artery has good flow. This normal flushing of the hand is a positive test
- **Negative Modified Allen Test:** If the hand does not flush within 5-10 seconds, it indicates that the ulnar circulation is inadequate or non-existent. In this situation the radial artery supplying the hand should not be punctured.
- If the test is negative perform the test on the other arm.
- If both tests are negative, the sampling should be abandoned, and the justification re-evaluated in case an alternative site may be chosen and the procedure carried out by the medical team.

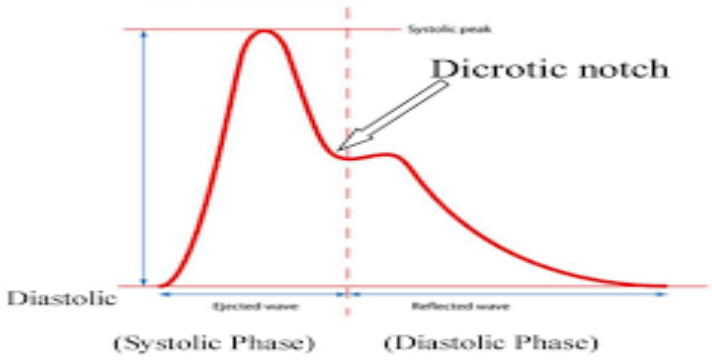
# 15 Appendix IV Transducing/Zeroing Arterial Line



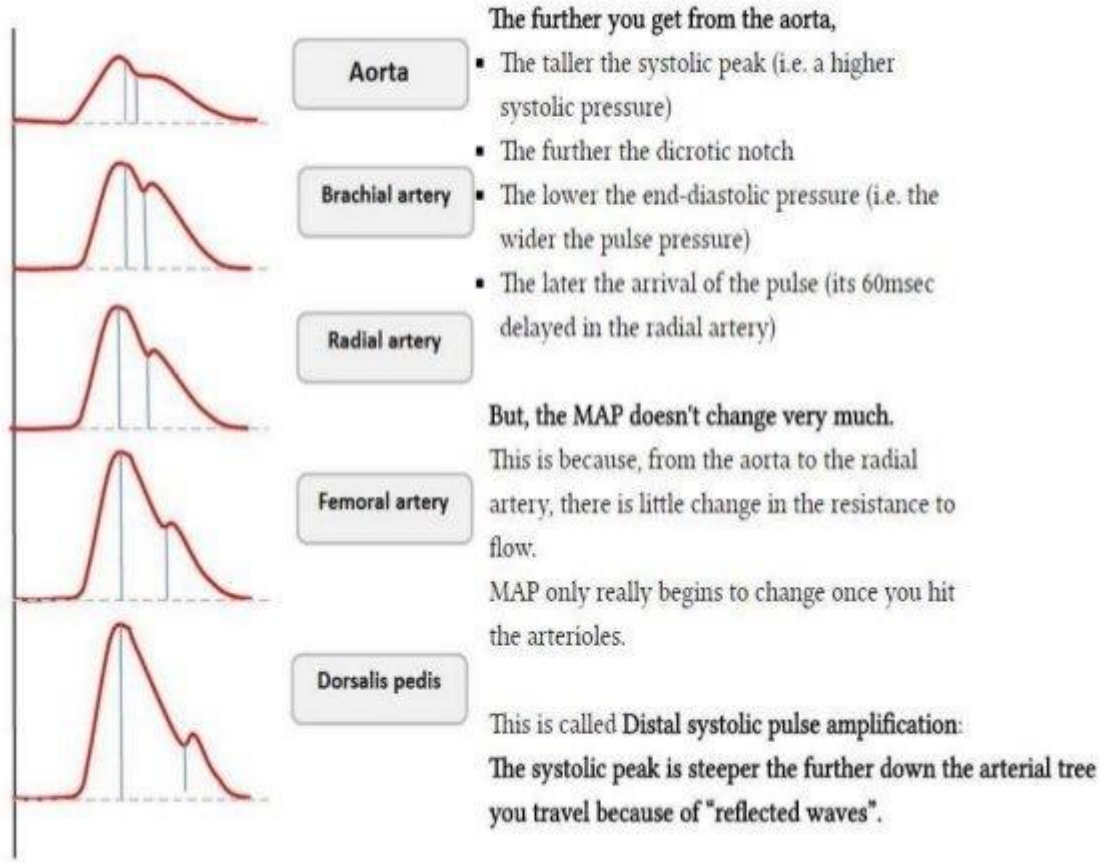

## STEPS FOR ZEROING AND LEVELING:

- Position patient on their back
- Patient may be positioned with the head of the bed elevated between 0-60°
- Flush the system
- Level transducer to phlebostatic axis (may mark this with an x on patient)
- Turn stop-cock on transducer so that it is off to the patient.
- Remove cap
- Press zero on the module
- Ensure that zero appears on screen replace cap and turn stop-cock so that it is open to monitoring and patient.

# 16 Appendix V Arterial Waveform




Normal Arterial Waveform. (*Aci.health.nsw.gov.au)*




Source: John, M. Oropelo, S.M. Pastores, V.K. [online] Available@: http://accessanaesthesiology.mhmedical.com/content Accessed 29th August 2019.

# 17 Appendix VI Arterial Line Care Plan and Bundle

Feidhmeannas Seirbhíse Sláinte
Health Service Executive

## Nursing Care Plan

St. Luke's General Hospital, Kilkenny

Patient Name:
Date of Birth:
Address:
Hospital No:

| KEY ISSUE NO: | ARTERIAL LINE CARE BUNDLE | |
|---|---|---|

**Problem Identification:** Arterial Line inserted into major arterial vessel.
Risk of Bleeding/accidental Disconnection.
Risk of Infection.

**Reason for insertion:** Continuous accurate real time blood pressure monitoring
Observe responses to patients receiving vasoactive infusions.
For frequent blood sampling to monitor improvement or deterioration in the patient's condition (Level 2/Level 3 patients)

**Goal:** 1. Safe management of the device. 2. Prevent complications .3. Prevent infection.

| Date/ Time | **Plan** *Follow SLGH Policy FOR THE MANAGEMENT AND CARE OF ARTERIAL LINES.* | Signature | Resolved/Discontinued Sign, Date & Time |
|---|---|---|---|
| | **Arterial line** ☐<br>**Date & Time Insertion:** **Insertion Site:** | | |
| | **Management of an Arterial Line post Insertion**<br>• Check the site for bleeding/oozing/haematoma formation.<br>• Leave the dressing intact for 24 hrs (if possible). Monitor and observe that the line is secured safely, ensuring sutures are in place.<br>• Ensure you can visualise the limb with the arterial line. If placed in radial artery use the appropriate splint to immobilise and maintaining position, optimising the waveform.<br>• Label the line as Arterial. **(NO MEDICATIONS ARE GIVEN VIA THE ARTERIAL LINE)**<br>• Attach to the P1 catheter with pressure of 300mmhg to ensure continuous flow of 3mls/hr and observe for waveform on the monitor.<br>• Ensure the transducer is at appropriate level (4th intercostal space, Mid Axillary) before transducing.<br>• Open to atmospheric pressure and zero the line. Once zeroed turn stopcock, ensure a waveform and monitoring values demonstrate your BP and MAP.<br>• Monitor and record observations in NEWS and escalate appropriately. | | |
| | • **Educate the patient** about the importance of the arterial line discouraging any manipulation of the line due to its position in an artery. | | |
| | **Inspection/Assessment (Always use sterile gloves)**<br>• Ensure hand hygiene is performed according to Hand Hygiene policy.<br>• Ensure aseptic technique is maintained when performing a change of dressing.<br>• Observe site for signs of infection/inflammation. Report any abnormalities to the medical team/Anaesthetic team immediately.<br>• Clear transparent dressing should be changed aseptically at least every 7 days-if dressing changed more frequently, document rationale for same in nursing notes.<br>• Do not use dressings that are not transparent where the site cannot be visualised.<br>• Ensure appropriate cleansing solution is used when cleaning the site Chlora-prep with tint combined applicator. Dispose of material in appropriate sharps disposal clinical waste post dressing change.<br>• Observe limb distal to the catheter: note the colour (blanching of the fingers/thumb), temperature, and capillary refill of the limb. Note any tingling or paraesthesia of the limb **if** the patient can voice this to you. This can indicate a neurovascular injury.<br>• **Document** inspection of the site at least once per shift and more frequently if indicated on the reverse of this care plan in the Arterial care bundle & any additional information in the nursing notes. | | |
| | **Review the ongoing clinical indication** for the Arterial line daily with multidisciplinary team. If there is no clinical indication, the patient's condition improves, or the patient is confused and at risk of disconnection or removal. The line should be removed. | | |
| | **Important Points/Actions in relation to Arterial Lines**<br>• ***This line is for monitoring and retrieval of blood to assess the patient's clinical deterioration or improvement. NO MEDICATIONS OR FLUIDS ARE TO BE ADMINISTERED VIA THIS LINE***<br>• Ensure the transducer set is tightly secure with an appropriate waveform and numerical monitoring value. Maintain pressure at 300mmhg to ensure flow rate of 3mls/hr.<br>• Ensure your alarm parameters are adjusted appropriately and not silenced. Establish parameters with anaesthetic team/primary team.<br>• If there is a problem with blood withdrawal/waveform refer to the troubleshooting section of the SLGH guideline.<br>• Always check your arterial line before and after you reposition your patient to ensure no accidental disconnection, kinking of lines during the move.<br>• Risks assess appropriately and use correct PPE when performing change of dressing or retrieval of blood samples adhering to the correct hand hygiene technique before and after the procedure. | | |

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

# Arterial Line Nursing Care Plan

St. Luke's General Hospital Kilkenny

Attach addressograph here
Patient Name:
Date of Birth:
Address:
Hospital No:

## Record of Daily Care Plan Review

| Date | Reviewed | Updated | Signature | Date | Reviewed | Updated | Signature |
|---|---|---|---|---|---|---|---|
| | ☐ | ☐ | | | ☐ | ☐ | |
| | ☐ | ☐ | | | ☐ | ☐ | |
| | ☐ | ☐ | | | ☐ | ☐ | |
| | ☐ | ☐ | | | ☐ | ☐ | |
| | ☐ | ☐ | | | ☐ | ☐ | |
| | ☐ | ☐ | | | ☐ | ☐ | |
| | ☐ | ☐ | | | ☐ | ☐ | |

| Date | Time | Plan | Signature | Resolved/Discontinued Sign, Date & Time |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## Arterial Line Care Bundle

Note: √ YES, X NO. Please keep this care bundle at the patient's bedside **Note: Minimum twice daily documentation (once each shift minimum) for Arterial Line Care Bundle**

| Bundle Criteria | Date | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| The clinical need for line use has been reviewed and recorded today | AM | | | | | | | | | | | | | | | |
| | PM | | | | | | | | | | | | | | | |
| The dressing is intact and was changed within the past 7 days. Aseptic technique when performing dressing change. IV 3000 most appropriate dressing to be used on Arterial Line site. | AM | | | | | | | | | | | | | | | |
| | PM | | | | | | | | | | | | | | | |
| The flush system is changed every 72 hours (document date and time) | AM | | | | | | | | | | | | | | | |
| | PM | | | | | | | | | | | | | | | |
| Change the flush bag every 24 hours (document date, time and signature) **NB 0.9% Normal Saline only solution to be used** | AM | | | | | | | | | | | | | | | |
| | PM | | | | | | | | | | | | | | | |
| When taking bloods ensure ANTT used. Line must be flushed post procedure ensuring Arterial waveform is displayed on the monitor. Use only approved **Red Bung once retrieval of bloods completed** | AM | | | | | | | | | | | | | | | |
| | PM | | | | | | | | | | | | | | | |

NPD/Critical Care 2020 V (1)

# 18 Appendix VII PPPG Development Group Membership

**Signature:** _____ **Date:** 17/1/23
**Ms Lorraine Lawlor**
**Clinical Skills Facilitator Critical Care**

**Signature:** _____ **Date:** 17/01/23.
**Ms. Margaret Wallace**
**CNM3 Critical Care Unit**

# 19 Appendix VIII Peer Review of Policy, Procedure, Protocol or Guideline

**Reviewer:** The purpose of this statement is to ensure that a Policy, Procedure, Protocol or Guideline (PPPG) proposed for implementation is circulated to a peer review (internal or external). You are asked to sign this form to confirm to the committee developing this Policy or Procedure or Protocol or Guideline that you have reviewed and agree the content and approve the following Policy, Procedure, Protocol or Guideline for use within the organisation:

**Guideline for the Care and Management and Safe Removal of Arterial Lines**

I acknowledge the following:

- I have been provided with a copy of the Policy, Procedure, Protocol or Guideline described above.
- I have read the Policy, Procedure, Protocol or Guideline document and agree the content
- I approve the Policy Procedure, Protocol or Guideline for implementation

**Signature:** Helen Molloy **Date:** 08/02/2023

**Ms. Helen Molloy**
**Nurse Practice Development**

# 20 Appendix IX Key Stakeholders Review of Policy, Procedure Protocol or Guideline

**Reviewer:** The purpose of this statement is to ensure that a Policy, Procedure, Protocol or Guideline (PPPG) proposed for implementation is circulated to Managers of Employees who have a stake in the PPPG. You are asked to sign this form to confirm to the committee developing this Policy or Procedure or Protocol or Guideline that you have reviewed and agreed the content and approve of the following Policy, Procedure, Protocol or Guideline for use within the organisation

**Guideline for the Care and Management and Safe Removal of Arterial Lines**

I acknowledge the following:

- I have been provided with a copy of the Policy, Procedure, Protocol or Guideline described above.
- I have read the Policy, Procedure, Protocol or Guideline document and agree the content
- I approve the Policy Procedure, Protocol or Guideline for implementation

**Signature:** _____ **Date:** 24/1/23
**Ms. Helen Butler**
**Director of Nursing**

**Signature:** _____ **Date:** 24.1.23
**Professor Garry Courtney**
**Clinical Director**

**Signature:** _____ **Date:** 23/01/2023
**Ms. Lisa Zimmerman**
**Consultant Anaesthetist**

**Signature:** _____ **Date:** 23/01/2023
**Mr. Niall Kavanagh**
**Consultant Anaesthetist**

# 21 Appendix X Signature Sheets

I have read, understand and agree to adhere to the attached Policy, Procedure, Protocol or Guideline.

| Print Name | Signature | Area of Work | Date |
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## Signature Sheets

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