Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Office of the
Nursing Services Director

National Clinical Policy and Procedural Guideline

for Nurses and Midwives undertaking

Peripheral Cannulation in Adults

			For local adaptation
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1.0 Introduction

1.1 Policy Statement

It is the policy of the HSE that registered nurses and midwives, within the Health Service Executive (HSE), undertaking peripheral intravenous cannulation must have successfully achieved competence having completed an education programme that is compliant with the HSE Guiding Framework for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives (2010). In addition, nurses and midwives undertaking peripheral intravenous cannulation will do so in accordance with the procedural elements as outlined in this policy.

1.2 Purpose

The purpose of this policy is to:

- Outline the roles and responsibilities of the clinical line manager and the nurse or midwife undertaking the skill of peripheral intravenous cannulation
- Set out procedures based on best evidence, aligned with the national HSE standardised approach, which safeguard the patient and guide the nurse or midwife in the performance of peripheral intravenous cannulation
- Aid in the preparation and support of patients and their families while undergoing peripheral intravenous cannulation procedures

1.3 Scope

This policy applies to all nurses and midwives, who have successfully completed the required education, training and competence assessment to carry out peripheral intravenous cannulation.

1.4 Disclaimer

The information contained within this policy is the most accurate and up to date, at date of approval. The policy contains a procedural guideline for local adaptation and it is the responsibility of the local organisation, to update this, according to best practice.

2.0 Glossary of Terms

Aseptic Technique:

Aseptic technique is implemented during any invasive procedure that bypasses the body's natural defences e.g. the skin or when handling equipment such as peripheral intravenous cannulae. This technique is used to reduce the potential problem of introducing pathogenic micro organisms into the body when the integrity and /or effectiveness of the natural body defences has been reduced.

(Jamieson et al, 1988, Dougherty and Lister, 2009)

Assessor:

An assessor is an identified nurse or midwife, who has undertaken a similar educational and clinical programme and is a competent expert practitioner. It is recommended that nurses and midwives develop their competence within specific disciplines, according to their practice.

Cannula:

A cannula is a short and flexible tube, containing a needle, or introducer, which pierces the peripheral vein, to provide access to the vascular circulation for the administration of intravenous fluids and medications.

Competence:

The ability of the registered nurse or midwife to practice safely and effectively fulfilling his/her professional responsibility within their scope of practice.

(An Bord Altranais, 2000)

Family Centred Care:

A way of caring for patients and their families within health services which ensures that care is planned around the whole family, not just the individual patient and in which all the family members are recognised as care recipients.

(Shields et al., 2006)

Nurse:

A nurse is a person registered in the Live Register of Nurses as provided for in Section 27 of the Nurses Act 1985 and includes a midwife and nursing includes midwifery – Code of Professional Conduct for each Nurse and Midwife.

(An Bord Altranais, 2000)

Parent or Legal Guardian:

The term parent or Legal Guardian is used to describe the parent and or legal guardian of the child who is under 16 years.

(A Practical Guide to Immunisations- HSE, 2008)

Peripheral Intravenous Cannulation:

Peripheral intravenous cannulation is the introduction of a short, flexible hollow plastic tube or cannulae containing a needle (introducer), into a peripheral vein to: provide access to the vascular circulation, for the administration of fluids and medications.

(Dougherty, 2008 and Scales, 2005)

3.0 Roles and Responsibilities

3.1 Role and Responsibility of the Clinical Line Manager

It is the responsibility of the clinical nurse or midwife manager or line manager to ensure that nurses and midwives, who are undertaking peripheral intravenous cannulation fulfil the following criteria. Nurses and midwives must:

- Be registered on the live register of nurses and midwives maintained by An Bord Altranais
- Be employed by the HSE
- Be approved by their Clinical Nurse or Midwife Manager as an appropriate person to expand their practice, to include Peripheral intravenous cannulation
- Be employed in an area where peripheral intravenous cannulation is required to enhance service provision
- Successfully complete an education and training programme in the Management and Administration of Intravenous Medication
- Successfully complete the educational preparation and competence assessment provided by this organisation, that is compliant with or equivalent to that outlined in the HSE Guiding Framework for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives (2010)

3.2 Role and Responsibility of the Nurse and Midwife

It is the responsibility of each registered nurse and midwife to:

- Work within their Scope of Practice -Scope of Practice Framework for Nurses and Midwives, (An Bord Altranais, 2000)
- Comply with this organisation's peripheral intravenous cannulation policy and procedures therein, when undertaking peripheral intravenous cannulation
- Be competent in the skill of peripheral intravenous cannulation and the equipment specific to the procedure
- Be familiar and comply with this organisation's infection prevention and control, health and safety procedures and risk management policies as they apply to peripheral intravenous cannulation
- Develop competence, specific to the needs of the service and patient group

4.0 Procedural Guideline for Peripheral Intravenous Cannulation for Adults

4.1 Indications for the Peripheral Intravenous Cannulation Procedure

The indications for peripheral intravenous cannulation are to:

- Provide intravenous hydration and/or correction of pre-existing dehydration or electrolyte imbalance
- Administer:
  - o intravenous drug therapy
  - o intermittent, continuous or bolus medications
  - o blood components and blood products
  - o an opaque medication and/or a diagnostic reagent to assist with diagnosis
- Facilitate intravenous access as required to enhance patient care
- Provide parenteral nutrition when the central route is unavailable

4.2 Considerations for the Insertion of a Peripheral Intravenous Cannula

- Peripheral intravenous cannulation is an invasive and traumatic procedure and is ordered only when necessary
- The peripheral intravenous cannulation procedure should not be ordered for routine phlebotomy
- A clinical assessment should be undertaken prior to the insertion of a peripheral intravenous cannula
- Peripheral intravenous cannulation should be carried out as close to the time of use to reduce the risk of accidental dislodgement and related complications
- Where peripheral intravenous access is poor and cannulation is difficult, alternative methods of access should be considered and discussed with the appropriate medical team
- Peripheral intravenous cannulation is regarded as a minor surgical procedure and is carried out with a high standard of hand hygiene, site preparation and maintenance
- A peripheral intravenous cannula should not be sited in close proximity to another cannula
- If two cannulae are in close proximity they should be secured with separate dressings

4.3 Preparation for Procedure

4.3.1 Informed Consent

Informed consent should be obtained from the patient or legal guardian prior to the procedure and as per local organisational policy. Informed consent is obtained from the legal guardian or next of kin if the patient does not have the cognitive ability to understand or make an informed decision.

If the patient does not speak English, arrangements should be made to ensure the procedure is understood and the consent is valid. The patient should be given adequate information and explanation.

4.3.2 Topical Anaesthetic Agents

Topical anaesthetic agents such as Ametop Gel, EMLA Cream and Ethyl Chloride Spray produce numbness of the skin and have been proven to reduce the pain experienced during the peripheral intravenous cannulation procedure (Dougherty, 2008). Details of topical anaesthetic agents are:

- **Ametop Gel:** Consists of Amethocaine 4% Gel. Indications: All Adults Application Time: Minimum of 30 minutes prior to procedure. Side Effects: Redness, swelling and itchiness.
- **EMLA Cream** (Eutectic mixture of local anaesthetics). Consists of: Lidocaine and Prilocaine 5% Cream. Indications: All Adults. Application Time: Minimum of one hour prior to procedure. Side Effects: Redness, swelling and itchiness
- **Ethyl Chloride Spray:** Consists of: Ethyl Chloride Spray. Indications: Use if allergic to or if patient has poor tolerance or anxiety relating to other agents or occlusive dressings. Suitable in emergency situations due to it's immediate action. Application Time: Immediate. Side Effects are extremely rare and include: cutaneous sensitisation, pigmentation. Overexposure can lead to headaches, dizziness, vomiting, loss of co-ordination and disorientation.

Topical anaesthetic agents should be applied to a limited number of locations only, as excessive use of agent can be harmful when absorbed (Scales, 2005 and Franurik et al., 2000). Topical anaesthetic agents must be prescribed on an individual basis and be used according to the manufacturer's instructions.

4.4 Vein Selection in Adults

Choosing the correct vein is important. When selecting the appropriate site of vein for venepuncture, it is best practice to begin in the most distal aspect of the vein. This allows for further attempts above the selected vein which will not have been impeded. When cannulating children, the specific advantages and disadvantages of potential venepuncture sites must be considered. These are outlined below:

Veins	Location	Advantages and Disadvantages
The Cephalic and Basilic Vein in the Forearm	**Cephalic Vein –** runs under the skin on the radial side of the forearm **Basilic Vein –** runs up the ulnar side of the forearm	**Advantages** • Easy to locate and routinely chosen for cannulation • It has larger veins, allowing for more rapid infusion • Hand can be freely used **Disadvantage of Basilic Vein** • Situated closest to nerves and arteries and caution should be exercised if chosen
Metacarpel Veins in the Dorsal Venous Network	- on the dorsum of the hand	**Advantages** • Easily visualised and palpated • Splinted by metacarpal bones **Disadvantages** • Difficult to secure • Flow affected by wrist Movement
Median Cubital Vein in the Antecubital Fossa	- situated in the antecubital fossa in the elbow	**Advantages** • Clearly visible • Well supported by subcutaneous tissue (prevents vein rolling under needle) • Deeper and more tolerant to irritant substances **Disadvantages** • Restricted movement • Flexion of the arm can interfere with flow of infusion

4.5 Clinical Assessment

A clinical assessment should be carried out by the nurse or midwife prior to the peripheral intravenous cannulation procedure. A Four Step Approach to the clinical assessment is outlined as follows:

Four Step Approach to Clinical Assessment

Check

- The indication for peripheral intravenous cannulation
- If intravenous medication or fluids could be given by any other route i.e.
  - Is this the last dose of antibiotics?
  - Is the patient on fluids or diet?
- Purpose, duration and rate of the intravenous infusion
- The clinical condition (acute/ chronic/emergency) of the patient
- Type of intravenous fluid or medication to be administered via the vein
- Location and length of the vein
- Condition of the vein (visual and palpation)
- Area is warm prior to cannulation procedure (veins constrict if cold, making the procedure more difficult)
- Allergies to medications, topical anaesthetic agents, dressings or plasters
- For needle phobia
- Previous history of difficult peripheral intravenous cannulation procedures
- For history of blood borne viruses, bleeding disorders or if receiving anticoagulation therapy

Choose

- Most distal aspect of the vein
- Non dominant hand
- Correct location, avoiding arteries and nerves
- Appropriate equipment to undertake procedure
- Appropriate topical anaesthetic agent

Avoid

- Hard, sclerosed, fibrosed, knotty, thrombosed veins or previous cannulation sites
- Areas with increased subcutaneous fat
- Sites with existing intravenous infusions in situ
- Sites that may require peripheral intravenous central catheter (PICC) insertion or arterial monitoring
- Valves in the vein (if visible or palpable)

Do Not Use

- Arm with obvious infection or bruising
- Arm with a fracture
- Arm with an arteriovenous (AV) fistula
- Arm affected by a cerebro vascular accident
- Arm affected by lymphoedema or where axillary lymph node clearance has taken place, for example post mastectomy

4.6 Equipment

The equipment required for the peripheral intravenous cannulation procedure is outlined in each of the peripheral intravenous cannulation procedures in appendix i.

- Peripheral Intravenous Cannulation Procedure Adult – Appendix i

Equipment required should be based on an assessment of the patient and the purpose of the peripheral intravenous cannulation and includes:

Peripheral Intravenous Cannulation - Adult - List Of Equipment	
• A clean & disinfected dressing trolley • *Sterile dressing pack • Sharps container • Disposable non sterile sheet (optional – in case of blood spillage) • **Personal Protective Equipment (e.g 2 pairs of well-fitting non-sterile gloves, protective plastic apron, safety goggles/visor/mask with eye shield) • Skin disinfectant:70% impregnated alcohol Wipes or 2% Chlorhexidine in 70% alcohol when supply available • Topical anaesthetic agent (if prescribed)	• Alcohol hand rub/gel • ***Intravenous cannula (choose size appropriately) • Extension set if appropriate • Clean tourniquet • IV Leur lock Cap/Bung • Ampoule of prescribed Sterile Sodium Chloride (NaCl 0.9%) Flush (5ml-syringe with flush) • Sterile gauze – (to absorb blood spillage) • Sterile, semi-permeable transparent dressing • Sterile plaster/band aid (In case of unsuccessful attempt)
*or equivalent to create a sterile field.	
** As per Standard Precautions the use of a plastic apron and/or face protection should be assessed by each health care worker based on the risk of blood splashing or spraying during the procedure.	
*** Range and type of equipment may vary depending on local organisational policy & the purpose of the cannulation (e.g., an intravenous therapy solution and stand if commencing intravenous therapy).	

4.6.1 Types of Cannulae

Cannulae range in type and size, depending on purpose. The correct size of the cannula will help to prevent damage to the vessel and ensure adequate blood flow. Usually, the smallest size (gauge) for the prescribed therapy is chosen to facilitate better flow and minimise trauma (RCN, 2005 and Scales, 2005). Small veins will not accommodate large volumes or irritant solutions, therefore the purpose of the cannula will determine the appropriate type and size. The nurse and midwife should be familiar with the types of cannulae used in their organisation as outlined in appendix ii.

4.7 The Peripheral Intravenous Cannulation Adults- Procedure

The Peripheral Intravenous Cannulation procedure follows aseptic principles, using a non touch technique. Two attempts ONLY should be made at peripheral intravenous cannulation. If unsuccessful refer to another practitioner. The peripheral intravenous cannulation procedure is outlined in appendix i

4.8 Management of Complications

Specific complications that can arise following the procedure include infiltration, extravasation, venous spasm, phlebitis, thrombophlebitis, haematoma, nerve injury, arterial puncture, embolism and needle stick injury. Children are at greater risk of complications due to the smaller size of their veins and reduced blood flow around the cannula tip (Bravery, 1999). It is critical for the nurse to detect and prevent complications arising and to treat as required. It is especially important for patients who may not be able to verbalise pain. Please see appendix iii for more information on complications.

4.9 Removal of the Peripheral intravenous Cannula

Individual level supervision should be observed according to the patient's cognitive levels and behaviour to prevent accidental removal or dislodgement of the cannula or injury from equipment (Garros et al, 2003). When a peripheral intravenous cannula is no longer in use, it should be removed. Please see appendix iv for Removal of Peripheral Intravenous Cannula.

A peripheral intravenous cannula should be changed every 48-72 hours. (Infection Prevention Society, 2005; Pratt et al., 2007 and RCN, 2005). If there are no signs of infection or if no irritant intravenous solutions are prescribed, the cannula may be kept in place up to 96 hours.

5.0 Documentation

Nursing and midwifery documentation specific to peripheral intravenous cannulation (An Bord Altranais, 2005) should contain the following details:

- Date and time of cannula insertion
- Number of cannulation attempts
- Size of the inserted cannula
- Site of insertion
- Dressing type
- Tolerance of the procedure
- Monitoring of the site
- Date and time of cannula removal
- Management of complications

6.0 Implementation Plan

The Director of Nursing and Midwifery is responsible for the dissemination, implementation and ongoing evaluation and audit of this policy.

7.0 Evaluation and Audit

Evaluation will include a:

- Mechanism for recording, reviewing and acting on adverse peripheral intravenous cannulation incidents.
- System for maintaining practitioner competence.
- Method for identifying further training needs.

Auditing of the insertion, use and maintenance of a peripheral intravenous cannula should be in accordance with the Peripheral Vascular Catheter Care Bundle (HPSC, 2009).

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Appendix i
Peripheral Intravenous Cannulation Procedure - Adult

The peripheral intravenous cannulation procedure follows aseptic principles using a non touch technique.

Aseptic non touch technique should be used when inserting a peripheral venous cannula. This means that the following key parts must only be touched by sterile items:

- All parts of the cannula except the outer protective shield and outer housing section
- Tip of leur lock
- Tips of extension set (if used)
- Tip of syringe
- Shaft and tips of needle used for flush
- Section of gauze that is in contact with cannula
- Side of dressing in contact with cannula

In undertaking the procedure, it is important that only the equipment required is brought to the bedside. This is to ensure that cross-contamination does not occur, increasing the risk to other patients.

Equipment required should be based on an assessment of the patient and the purpose of the peripheral intravenous cannulation and includes:

Peripheral Intravenous Cannulation - Adult - List Of Equipment	
• A clean & disinfected dressing trolley • *Sterile dressing pack • Sharps container • Disposable non sterile sheet (optional-in case of blood spillage) • **Personal Protective Equipment (e.g. 2 pairs of well-fitting non-sterile gloves, protective plastic apron, safety goggles /visor/mask with eye shield) • Skin Disinfectant: 70% impregnated alcohol wipes or 2% Chlorhexidine in 70% alcohol when supply available • Alcohol Hand rub/gel	• ***Intravenous Cannula (Choose size appropriately) • Topical anaesthetic agent (if prescribed) • Clean tourniquet • Extension set if required • –IV Leurlock Cap/Bung • Pre prepared syringe with prescribed Sodium Chloride (NaCl 0.9%) flush or 5ml Syringe with 5ml ampoule of Sterile prescribed Sodium Chloride 0.9% • Sterile gauze – (To absorb blood spillage) • Sterile, semi-permeable transparent dressing • Sterile plaster/band aid (In case of unsuccessful attempt)
* or equivalent to create a sterile field.	
** As per Standard Precautions the use of a plastic apron and/or face protection should be assessed by each Health Care Worker based on the risk of blood splashing or spraying during the procedure.	
***Range and type of equipment may vary depending on local organisational policy & the purpose of the cannulation (e.g., an intravenous therapy solution and stand if commencing intravenous therapy).	

Peripheral Intravenous Cannulation - Adult

Prior to the Peripheral Intravenous Cannulation Procedure

- Confirm indication for the procedure
- Disinfect a clean trolley, using 70% alcohol or equivalent as per local guidelines
- Collect the appropriate equipment, inspect it's integrity and check expiry dates

At the Bedside

- Carry out hand hygiene for a minimum of 15 seconds
- Confirm patient's identification
- Explain the procedure, check for allergies, discuss pain relief
- Obtain informed consent
- Ensure the patient is in a comfortable position
- Apply the tourniquet (5/6cms above the chosen site) and tighten slowly
- Ask the patient to open/close their fist or place arm below heart level to encourage venous filling
- Palpate the site to check for rebound elasticity -press lightly with two fingers and release
- Choose the appropriate vein
- Release the tourniquet, leaving it in position ready to reapply later

Preparation of site and sterile field

- Carry out effective hand hygiene for a minimum of 15 seconds (Alcohol Hand rub/gel or antiseptic hand wash)
- Open the sterile dressing pack, and add the sterile dressing, appropriate cannula for selected vein and other sterile items onto the sterile field using a non touch technique Attach yellow waste bag to trolley
- Draw up NACL 0.9% flush into syringe using needle or straw. Prime extension set if required. Place syringe on the sterile field but avoid touching any sterile items
- Place disposable non sterile sheet (optional) under the patients arm
- Reapply the tourniquet (Do not leave on for longer than two minutes)
- Disinfect the site using Skin Disinfectant (70% impregnated alcohol wipes or 2% Chlorhexidine in 70% alcohol if available)
- Disinfect in a circular motion from insertion site outwards (5-10cms diameter) and place the used alcohol wipes into the waste bag
- Allow to air dry, do not repalpate the site

Cannula Insertion

- Put on gloves (apron and face protection if applicable)
- Use your non dominant hand to achieve skin traction
- Hold cannula between your thumb and index finger
- Position the introducer facing bevel up
- Insert the cannula directly above the vein, through the skin (angle 10-30 degrees)
- Observe for flashback in the cannula chamber, when the introducer punctures the vein
- Decrease the angle between the needle and the skin
- Advance the cannula a further 2mm along the vein

- Withdraw the introducer slightly and advance the cannula fully into vein
- Gently pull the introducer backwards while holding the cannula in position
- Release the tourniquet
- Holding the sterile gauze by one corner and place under the cannula hub (to absorb blood spillage). Ensure only section of gauze that is sterile is in touch with hub
- Apply digital pressure above the cannula tip and remove the introducer and into the sharps bin
- Connect the leurlock cap or primed extension set to the cannula hub
- Flush with Sodium Chloride (NaCL 0.9%) to confirm patency
- Discard the blood contaminated gauze into the yellow waste bag
- Secure and anchor the cannula with a sterile, transparent, semi permeable dressing
- Remove disposable sheet, gloves and disposable eye protection (if applicable) and place in yellow waste bag Carry out effective hand hygiene for a minimum of 15 seconds
- Apply alcohol hand rub/gel, allow to dry

After Care

- Inform the patient of potential complications and advise to report same
- Ensure the patient is in a comfortable position and reassure
- Document the procedure, communicate and inform relevant staff
- Apply gloves and bring trolley with used items to the dirty utility room
    - o Dispose of healthcare risk and non risk waste appropriately
    - o Clean and disinfect the trolley
    - o Clean and disinfect reusable visor if used as per manufacturer's instructions
    - o Remove gloves and apron and carry out appropriate hand hygiene

Appendix ii
Types of Cannulae

Peripheral Intravenous Cannula Types

Equipment required should be based on an assessment of the patient and is as follows:

Cannula Types – Adults		
Yellow/Lime	Purpose: Gauge Size: Flow Rate (Litre per 24Hr): Volumes:	Patients with Frail Veins 24G 1 litre Small
Blue	Purpose: Gauge Size: Flow Rate (Litre per 24 Hr): Volumes:	Patients with Small Veins 22G 1-2 litres Small (maintenance fluids in the elderly)
Pink	Purpose: Gauge Size: Flow Rate (Litre per 24Hr): Volumes:	Intravenous Fluids, Blood Transfusion 20G 2-3 Litres Medium
Green	Purpose: Gauge Size: Flow Rate (Litre per 24Hr): Volumes:	Blood Transfusions and Large Volume Replacement Fluids 18G 2-5 Litres Large
Grey	Purpose: Gauge Size: Flow Rate (Litre per 24 Hr): Volumes:	Theatre Use, Emergency Use, Rapid Fluid Replacement 16G 7-11 Litres Extra Large
Orange/Brown	Purpose: Gauge Size: Flow Rate (Litre per 24Hr): Volumes:	Theatre Use, Emergency Use, Rapid Fluid Replacement 14G 10-16 Litres Maximum Size

Appendix iii
Management of Complications

Potential Complications of Peripheral Intravenous Cannulation

Infiltration	**Infiltration is the inadvertent administration of a non-vesicant (non irritant) solution or medication into surrounding tissue (Wong, 2007).**
Cause	• Peripheral intravenous cannula occlusion or misplacement causing fluid to infiltrate the tissues. When a peripheral intravenous cannula is difficult to flush, trauma to the vessel wall can occur, which weakens the wall and increases the probability of infiltration from leakage
Signs	• Swelling and oedema, pain, loss of mobility or reluctance to move the affected limb • Discolouration and coolness of site adjacent to cannula. It can be measured according to the infiltration scale
Prevention	• Regular monitoring (hourly) of cannula site helps prevent infiltration. Ensure the cannula is secured correctly
Treatment	• Immediately remove the cannula • Apply an appropriate dressing • Administer analgesia as prescribed

Extravasation	**Extravasation is the inadvertent administration of a vesicant (irritant) solution or medication into surrounding tissue (Wong, 2007).**
Cause	• Leakage of vesicant solutions into the tissues. Examples of vesicant solutions are Dextrose 10%, Total Parenteral Nutrition, Calcium, Potassium Chloride (KCL high doses) and chemotherapy
Signs	• Pain • Reluctance to move affected limb • Blistering, burning sensation, ischemia, necrosis and tissue sloughing
Prevention	• Early detection and immediate action is crucial, with at least hourly monitoring of the cannulation site • Ensure the cannula is secured correctly
Treatment	• Immediately remove the cannula and apply an appropriate dressing. • Administer analgesia as prescribed • Consult with medical personnel about specific solutions and their treatment

Venous Spasm	Venous spasm is a sudden involuntary contraction of the vein, resulting in temporary cessation of blood flow in the vein.
Cause	• Venous spasm is caused by fear and anxiety and is usually stimulated by cold infusates, and mechanical or chemical irritation
Signs	• Expressions of pain • Cramping • Numbness above the infusion site
Prevention	• Explain the procedure to reduce fear and anxiety • Give infusions at room temperature (commence infusions slowly)
Treatment	• Gently massage or warm the limb and retry • Slow down the process of cannulation (there is no need to remove the cannula) • Wait for the vein to relax and wait for blood to return into the flash chamber before proceeding • During intravenous therapy, reduce the rate of infusion flow, especially in solutions known to be irritant

Phlebitis	Phlebitis is an acute inflammation of the intima of a vein (Dougherty, 2008).
Cause	• **Mechanical phlebitis:** vein irritation caused by too large a cannula, a fast rate of infusion, excessive bending of the arm or manipulation of the cannula • **Chemical phlebitis:** can be caused by medications or solutions (acid or alkaline). Risk of phlebitis increases with an abnormal pH • **Bacterial/Septic phlebitis:** introduction of an infectious agent at the cannula site; migration of common skin organisms through the cannula
Signs	• Expressions of pain • Loss of mobility or reluctance to move the affected limb • Redness, inflammation, or purulent ooze at the cannula site
Prevention	• Early detection is crucial, with at least one hourly monitoring of the cannulation site. If vesicant solutions are infusing, increase the monitoring of the site
Treatment	• Stop the infusion and remove the cannula • Assess the degree of phlebitis (Phlebitis Score - Jackson, 1998) • Take a swab of the site for culture and sensitivity • Clean and apply a dressing, to the affected area and administer analgesia as prescribed • Report the incident of this complication • Treat as prescribed and document the care given

Thrombophlebitis	Thrombophlebitis is the inflammation of a vein with a thrombus formation.
Cause	• Traumatic cannulation by an unskilled practitioner or multiple attempts • Use of too large a cannula for the size of the vein • Infusion of high pH solution or poor circulation with venous stasis
Signs	• Local redness, hard and torturous feel of the vein, heat, painful to touch or move • Expressions of pain
Prevention	• Early detection is crucial with at least one hourly monitoring of the cannulation site • Appropriate site selection • Appropriate selection of equipment for size of vein • Skilled technique
Treatment	• Discontinue infusion, remove the cannula, and elevate the extremity • Report the incident of this complication as per local organisational policy • Treat as prescribed and document the care

Haematoma	Haematoma is the formation of a painful and hard swelling at the site of the cannula.
Cause	• Infiltration of fluid into the tissue at the site of the cannula, resulting in the formation of a painful and hard swelling • Inappropriate use of a small fragile vein, or too large a needle • Excessive probing to find the vein • Removing the needle prior to releasing the tourniquet • The needle going all the way through the vein • The needle only partially entering the vein, allowing leakage
Signs	• Expressions of pain, loss of mobility or reluctance to move the affected limb • Swelling, discolouration or coolness of the area adjacent to the cannula
Prevention	• Selection of appropriate equipment for the size of the vein • Skilled technique
Treatment	• Release the tourniquet, remove the cannula and apply pressure until haemostasis has been achieved • Elevate the limb and apply a cool compress if necessary, avoiding an ice burn. • Apply a pressure dressing if bleeding is persistent • Explain what has happened and request that staff are informed if the area becomes more painful as the haematoma may be pressing on a nerve • Do not reapply the tourniquet to the affected limb • Request a medical review, if required • Monitor, treat as prescribed and document in the nursing care plan • Report the occurrence of this complication, as per local organisational policy

Nerve Injury	Nerve injury is an inadvertent injury to the nerve.
Cause	• Inappropriate selection of the cannulation site • Poor technique
Signs	• Pain described as an 'electrical shock' or a 'pins and needles' sensation • Loss of mobility or reluctance to move the affected limb
Prevention	• Appropriate clinical assessment • Appropriate site selection • Skilled technique
Treatment	• Release the tourniquet, remove the cannula and apply gentle pressure • Explain and reassure the patient about what has occurred • Advise that any symptoms of altered sensation may persist for a few hours • Arrange a medical review, if required • Monitor, treat as prescribed and document in the nursing care plan • Finally, report the occurrence of this complication, as per local organisational policy

Arterial Puncture	The inadvertent puncture of the artery is another complication associated with cannulation.
Cause	• Inappropriate selection of the cannulation site • Poor technique
Signs	• Presence of bright red blood • Expressions of pain
Prevention	• Appropriate clinical assessment • Appropriate site selection • Skilled technique
Treatment	• Release the tourniquet, removing the cannula immediately and apply pressure until haemostasis has been achieved • Explain and reassure regarding what has happened • Request that a member of staff is informed if bleeding recurs from the puncture site, if pain continues or if there is increasing swelling or bruising • Arrange a medical review • Monitor, treat as prescribed and document in the nursing care plan • Report the occurrence of this complication, as per local organisational policy

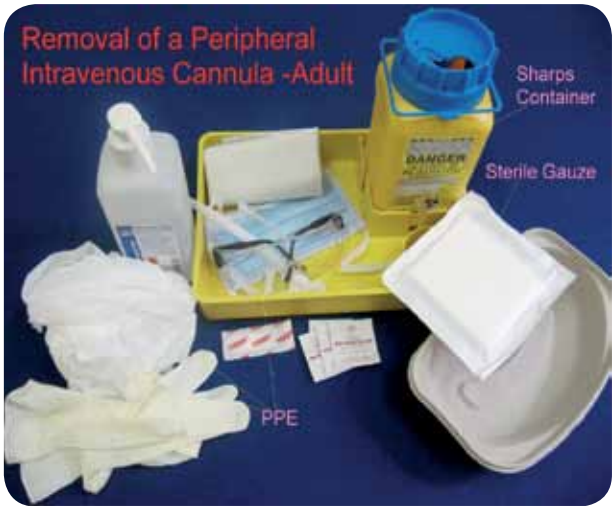
Embolism	An embolism is an air bubble, fat particle or blood clot which travels, causing a blockage in the vein.
Cause	• An embolism occurs when an air bubble, fat particle, or blood clot becomes detached and is carried by the venous flow to the heart and potentially into the pulmonary circulation.
Signs	• Pain • Shortness of breath • Collapse • Shock
Prevention	• Embolism can be prevented by stopping air from entering the system, ensuring that all connections are secure, careful flushing and by securing the cannula adequately
Treatment	• Call for urgent medical attention and treat as prescribed

Needle Stick Injury	A needle stick injury (percutaneous inoculation injury) is an inadvertent puncture of the skin with a potentially contaminated needle.
Cause	• Inadvertent puncture of the skin during the cannulation procedure
Signs	• Pain • Bleeding • A visible puncture of the skin of the nurse or midwife
Prevention	• The application of Infection Prevention & Control and Health and Safety Policy will support safe practice
Treatment	• Encourage the wound to bleed freely (do not suck the wound) • Wash the affected area with liquid soap under running water • Apply a waterproof dressing over the affected area • Report the incident to your line manager • Record the incident accordingly by completing the relevant incident form • Submit the incident form to your risk manager or line manager • For follow-up and advice, contact your Occupational Health Dept and/or the Accident and Emergency Dept as per local organisational policy

Appendix iv
Removal of a Peripheral Intravenous Cannula

List of Equipment

- A clean clinical tray
- Small kidney dish for Healthcare Risk Waste (placed in tray) or use clinical tray with 2 integrated compartments (one to be used for waste)
- Disposable non sterile sheet (optional in case of blood spillage)
- *Personal Protective Equipment (PPE) e.g. 2 pairs of well-fitting non-sterile gloves, protective plastic apron, safety goggles/ visor/mask with eye shield
- Adhesive remover/spray/cleanser
- Sterile gauze
- Sterile waterproof plaster or dressing



* As per Standard Precautions, the use of a plastic apron and/or face protection should be assessed by each Health Care Worker based on the risk of blood splashing or spraying during the procedure

Prior to Procedure

- Confirm indication for removal of peripheral intravenous cannula
- Disinfect a clean clinical tray using 70% alcohol (or equivalent as per local guidelines)
- Collect the appropriate equipment and inspect it's integrity

At the Bedside

- Carry out hand hygiene for a minimum of 15 seconds
- Check patient's identification
- Explain the procedure, check for allergies to dressings and obtain informed consent to remove the cannula
- Open the sterile gauze and sterile dressing using the packaging as a sterile field
- Ensure the patient is in a comfortable position
- Examine the peripheral intravenous cannulation site and surrounding area for signs of infection of infiltration

Preparation

- Stop intravenous infusion if in place
- Apply gloves, (apron and eye protection if required)
- Remove the outer dressing, using adhesive remover if necessary and place in kidney dish or compartment in clinical tray for waste
- Remove the taping from around the cannula and place in kidney dish or compartment in clinical tray for waste

Cannula Removal

- Slowly remove the cannula. With sterile gauze, apply gentle pressure as the cannula tip is removed
- Inspect the cannula length and integrity on removal
- Place cannula into kidney dish or compartment in clinical tray for waste
- Maintain gentle pressure to peripheral intravenous site and hold in place for two to three minutes
- Inspect Peripheral intravenous cannulation site for evidence of infection or inflammation
- Apply sterile gauze dressing or sterile plaster
- Remove gloves and eye protection if applicable and place in the clinical tray
- Carry out effective hand hygiene for a minimum of 15 seconds (Alcohol hand rub/gel)

After Care

- Inform the patient of possible complications and advise to report same
- Ensure the patient is in a comfortable position and reassure
- Document the procedure, communicate and inform relevant staff
- Apply gloves and bring tray with used items to the dirty utility
    - Dispose of healthcare risk and non risk waste appropriately
    - Clean and disinfect the clinical tray and kidney dish if reusable
    - Clean and disinfect reusable eye shield as per manufacturer's instructions if applicable
    - Remove gloves and apron if applicable and carry out appropriate hand hygiene
- Organise for reinsertion of peripheral intravenous cannula if required