



# ADULT PERIPHERAL CANNULATION

RESOURCE BOOKLET

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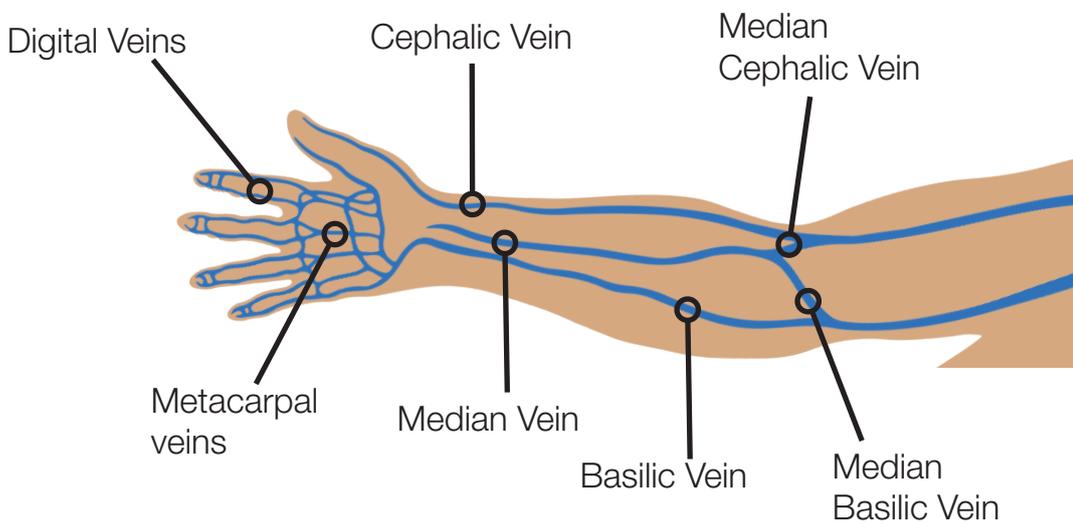
## Cannulation Indications

- Administer drugs
- Administer fluids
- Administer blood/blood products
- Occasional parenteral nutrition (PN)
- Emergency access for deteriorating patients

Cannulae should not be sited- 'just in case' – ensure it is appropriate and required imminently e.g. IV drugs or fluids are prescribed or emergency drugs/fluids are required in case of deteriorating patient. Before cannulation the drug or fluid prescription must be checked against the patient name band and the patient must verbally confirm their; name, DoB, and first line of their address. Informed verbal consent must then be gained and a vein assessment made.

## Selecting a Site for Cannulation

In order to correctly identify a vein against an artery for insertion, careful palpation and identification must be made.



Selection criteria for choosing suitable veins:

- Use distal metacarpal veins first. Any subsequent cannulation should be made proximal to the healed previous site to avoid complications
- Use veins that feel soft and resilient
- Use large veins where possible
- Use straight veins (avoid valves)
- Use veins on patient's non-dominant limb
- Use large veins with a good blood flow for high flow rate infusions, or for infusing irritant drugs

## Blood Vessels

### Tunica Adventitia (outer layer)

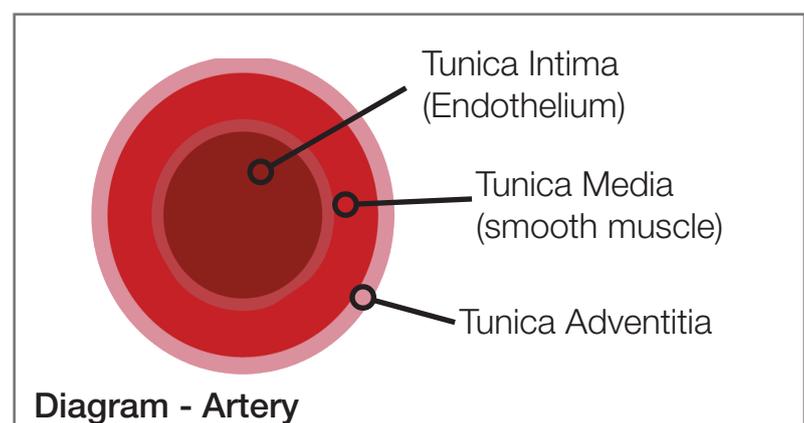
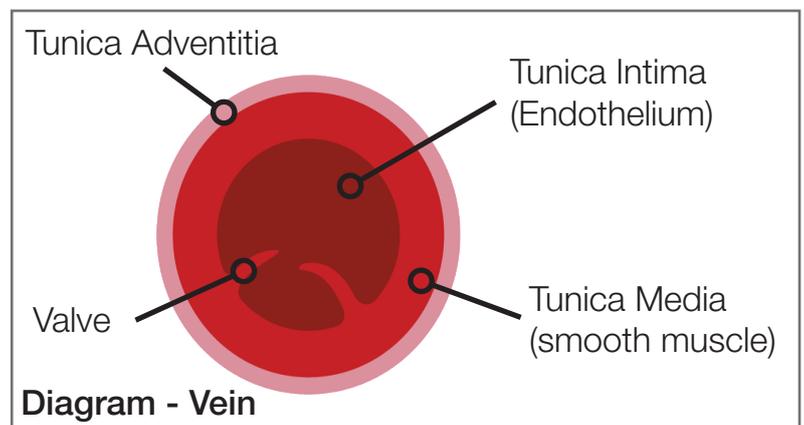
Fibrous layer of connective tissue, collagen and nerve fibres which surrounds and supports the vessel

### Tunica Media (middle layer)

Muscle layer containing elastic tissue and smooth muscle fibres

### Tunica Intima (inner layer)

Thin layer of endothelium, which facilitates blood flow and prevents adherence of blood cells to the vessel wall. Trauma to the endothelium encourages platelet adherence and thrombus formation



# Improving Venous Access

Avoid veins that are:

- Hard and sclerosed
- Damaged from previous cannulation
- Small, visible but impalpable
- Close to existing wounds injuries / infection
- In any area where a fistula is present or planned to be as a permanent site for renal dialysis access - risk of cellulitis
- Too short to accomodate cannula length - risk of transfixation/phlebitis
- Lower limb and foot veins- as increased risk of venous thromboembolism due to restriction of blood flow and reduced patient mobility
- Close to a joint, for example the antecubital fossa/cephalic - cannula failure
- Close to arteries or arterial lines - risk of arterial puncture
- Above previous insertion sites that are not healed - risk of infection
- In areas of bruising / haematoma - risk of infection

Vein identification and access will be improved with the following:

- **Tourniquet**- application promotes venous distension. It should be applied 8-10 cms above the intended insertion site and be tight enough to impede venous return, but not tight enough to occlude arterial flow. Allow time for the veins to fill and it should not be left on for longer than a minute before puncture as it may interfere with blood results and may lead to bruising. Maximum tourniquet time is two minutes. Use once only use Trust approved disposable tourniquet which will be discussed further in the training session
- **Warmth**- will dilate veins and improve visibility- heat pads may be an option
- **Gravity**- will help to pool blood to increase visibility and volume
- **Stroke the vein**- to help with dilation- don't tap the vein as may be painful and result in a haematoma
- **Viewing aids**- e.g. ultrasound

# Peripheral Vein Assessment Tool

Grade	Vein Quality	Definition of Vein Quality	Insertion Management
1	<b>Excellent</b> Suitable < 6 months Intermittent Therapy up to 10 days	<b>4-5 palpable or visible veins</b> suitable for cannulation	Cannula may be inserted by trained authorised health care practitioner
2	<b>Good</b> Suitable < 4 months Intermittent Therapy up to 10 days	<b>2-3 palpable or visible veins</b> suitable for cannulation	Cannula may be inserted by trained authorised health care practitioner
3	<b>Fair</b> Suitable for 4-6 weeks Intermittent Therapy up to 10 days	<b>1-2 palpable or visible veins</b> suitable for cannulation (Veins may be small, scarred or difficult to find and require heat pads, infrared viewer or ultrasound to aid vasodilation)	Cannula may be inserted by trained authorised health care practitioner with the assistance of viewing aids only
4	<b>Poor</b> One off cannulation	<b>Veins not palpable or visible</b> (requires ultrasound or infrared viewer assistance)	Cannula may be inserted by expert trained authorised health care practitioner with the assistance of viewing aids only
5	<b>None</b> Unidentifiable <b>not</b> suitable for cannulation	<b>No veins palpable or visible</b> to naked eye or viewing aids	Not for peripheral cannula. Refer to an expert practitioner for access advice

# Cannulation Insertion Preparation

There are many factors that contribute to a successful insertion and care outcome and can be divided into three areas:

1. During the preparation of the patient and equipment prior to cannulation
2. During the cannula insertion procedure
3. Post insertion access and care

Preparation of the patient and equipment prior to cannulation

## Choosing a Vein

Site	Advantages	Disadvantages
Digital	<ul style="list-style-type: none"> <li>• Use as last resort</li> </ul>	<ul style="list-style-type: none"> <li>• Not primary site choices as these are very small veins Can only accommodate a 22- or 24- gauge cannula NB- Highly skilled practitioners in cannulation only will use this site</li> </ul>
Dorsal Metacarpal (Hand)	<ul style="list-style-type: none"> <li>• Commonly chosen site</li> <li>• Bones of hand provide natural splint</li> <li>• Easily visualised, palpated and allow for repeat cannulation</li> <li>• Can re-site above previous sites</li> </ul>	<ul style="list-style-type: none"> <li>• Contraindicated in the elderly as skin turgor and subcutaneous tissue are diminished</li> <li>• Close proximity to delicate structures, that compromise dexterity of hand</li> <li>• Extravasation will result in serious consequences</li> <li>• More painful</li> </ul>
Cephalic vein (wrist site)	<ul style="list-style-type: none"> <li>• Easily visualised and palpated and its size and position make it a good choice</li> <li>• Joint provides natural splint</li> </ul>	<ul style="list-style-type: none"> <li>• Take care to site above the wrist joint to prevent mechanical phlebitis &amp; discomfort</li> <li>• Close to radial nerve &amp; crosses brachial artery- take care to avoid</li> </ul>
Basilic (Medial aspect of forearm)	<ul style="list-style-type: none"> <li>• Prominent-</li> <li>• Find vein by flexing the elbow &amp; bending the arm prior to palpation</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to observe &amp; has more valves making it difficult to advance cannula</li> <li>• Difficult to stabilise during &amp; post insertion as not well supported by subcutaneous tissue</li> <li>• Important to reduce risk of extravasation</li> <li>• Crosses median nerve &amp; brachial artery- take care not to accidentally puncture</li> <li>• Haematomas form easily on removal of devices</li> </ul>
Cephalic Basilic Median cubital (Antecubital- fossa )	<p>These veins are:</p> <ul style="list-style-type: none"> <li>• Large, superficially located, easily visualised and palpated and well supported by underlying tissues</li> <li>• Allow for rapid infusion &amp; infusate dilution- causing reduced drug irritation</li> </ul>	<ul style="list-style-type: none"> <li>• Should not be considered as a first choice as joint flexion may lead to mechanical phlebitis</li> <li>• If the median cephalic vein is used, take care to avoid the brachial artery and radial nerve</li> <li>• Damage to area can result in loss of structure &amp; function in the joint</li> <li>• Difficult to identify early extravasation – due to deep veins. This is why this site is avoided in chemotherapy</li> </ul>

# Choosing a cannula

Choose the smallest size cannula possible

- to minimise patient discomfort
- to allow better flow around the cannula (**figure 1**)
- a large cannula can occlude a small vein (**figure 2**) or can lead to damage of the intima e.g. chemical phlebitis (**figure 3**)

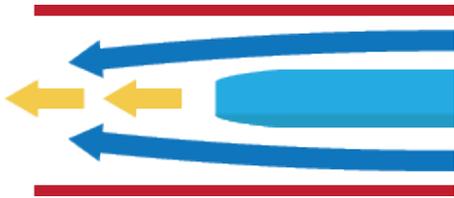


Figure 1

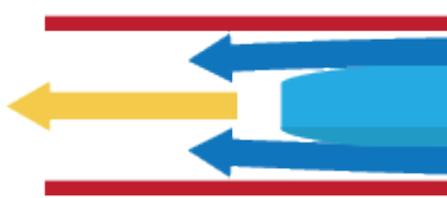


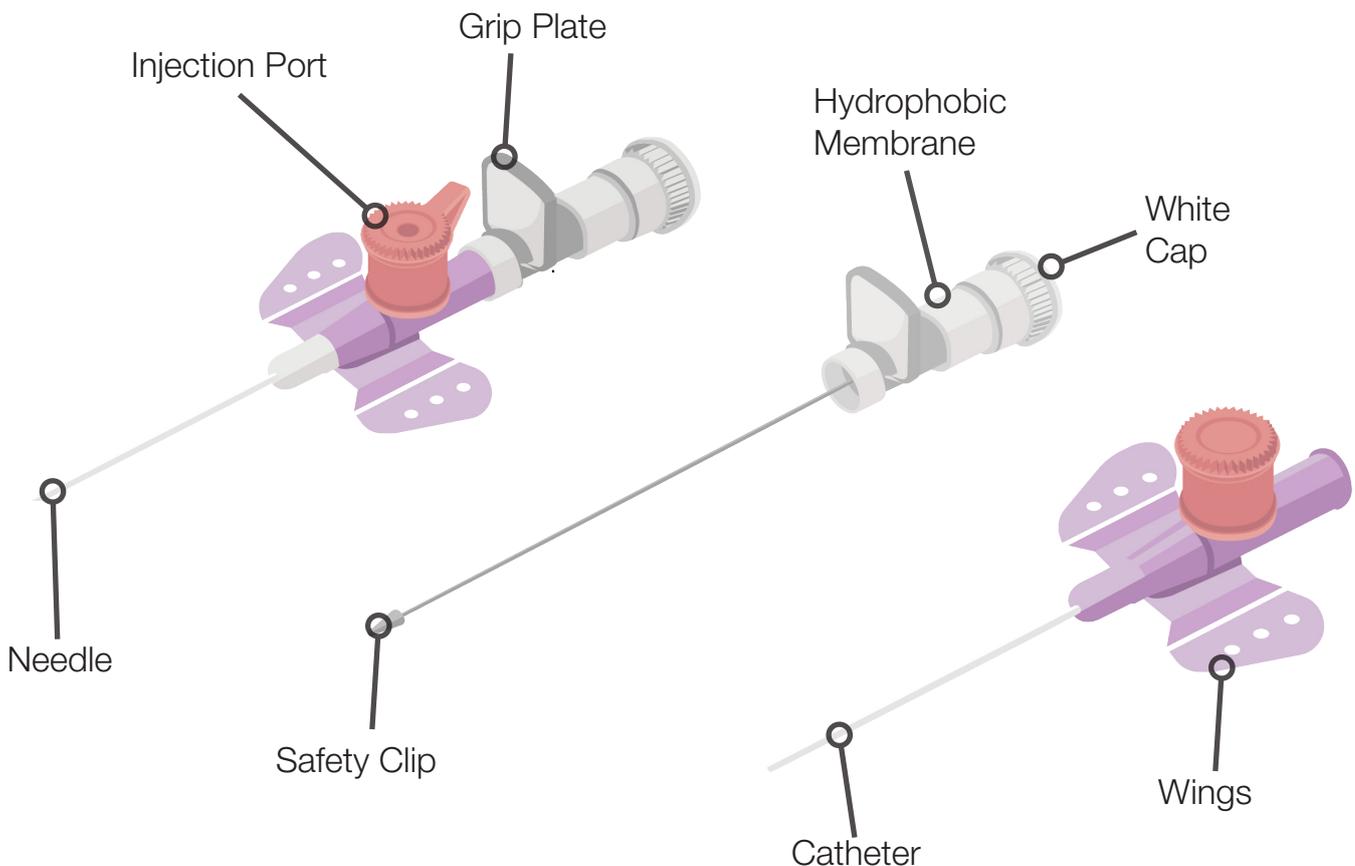
Figure 2



Figure 3

## Parts of a Cannula

This type of ported cannula is widely used in the Trust. Other cannulae may be used and flow rates will vary.



Cannulae sizes range from 14G- largest, to 24g smallest. The following page will show the suitable site, infusion and possible flow rate achievable with each size cannula. Familiarise yourself with the sizes and suitability of each cannula in your clinical area.

# Cannula Selection Guide

## 14G

### CRYSTALLOID GRAVITY FLOW RATE

343 ml/min - 345 ml/min

#### GENERAL USE

- For rapid transfusion of whole blood, blood components or viscous fluids
- Often used in theatres or emergency interventions

#### SUITABLE ANATOMICAL LOCATION FOR INSERTION

- Antecubital fossa
- Median cephalic (radial side)
- Median basilic (ulnar side)
- Median cubital (in front of elbow joint)

## 16G

### CRYSTALLOID GRAVITY FLOW RATE

196 ml/min - 210 ml/min

#### GENERAL USE

- For rapid transfusion of blood components or viscous fluids
- Often used in theatres or emergency interventions

#### SUITABLE ANATOMICAL LOCATION FOR INSERTION

- Antecubital fossa
- Median cephalic (radial side)
- Median basilic (ulnar side)
- Median cubital (in front of elbow joint)

## 18G

### CRYSTALLOID GRAVITY FLOW RATE

96 ml/min - 100 ml/min

#### GENERAL USE

- For infusing blood components quickly
- Parental nutrition
- Stem cell harvesting and cell separation
- Large volumes of fluids

#### SUITABLE ANATOMICAL LOCATION FOR INSERTION

- Median cubital (radial aspect of forearm)
- Median basilic (ulnar aspect of forearm)
- Median antebrachial

## 20G

### CRYSTALLOID GRAVITY FLOW RATE

60 ml/min - 61 ml/min

#### GENERAL USE

- For routine infusion therapies and infusing blood components or large volumes of fluid
- Patients on long term medication
- Patients receiving up to 2-3 litres of fluid per day

#### SUITABLE ANATOMICAL LOCATION FOR INSERTION

- Accessory cephalic (branches off cephalic vein along the ulna bone)
- Basilic (ulnar aspect of the lower arm along ulna bone)
- Cephalic (radial aspect of lower arm along radius bone of forearm)
- Metacarpal (on dorsum of hand)

## 22G

### CRYSTALLOID GRAVITY FLOW RATE

35 ml/min - 36 ml/min

#### GENERAL USE

- Appropriate for most infusion therapies
- Standard for paediatrics
- For infusing blood components quickly

#### SUITABLE ANATOMICAL LOCATION FOR INSERTION

- Used in adults, adolescents, children, infants and geriatric patients
- Commonly used in the acute and chronic care setting
- May be more difficult to pierce through

## 24G

### CRYSTALLOID GRAVITY FLOW RATE

22 ml/min

#### GENERAL USE

- For elderly, paediatric and neonatal patients
- Oncology patients undergoing chemotherapy
- Medications, short term infusions
- Patients with fragile veins

#### SUITABLE ANATOMICAL LOCATION FOR INSERTION

- Digital veins (along lateral-distal portion of fingers)
- Accessory cephalic (branches off cephalic vein along the ulna bone)
- Cephalic (radial aspect of lower arm along radius bone of forearm)
- Metacarpal (on dorsum of hand)

# Procedure for Insertion of a Peripheral Intravenous Cannula-Standard ANTT Approach (Two Handed Technique)

## Protect Key Parts and Key Sites throughout the procedure

### Equipment:

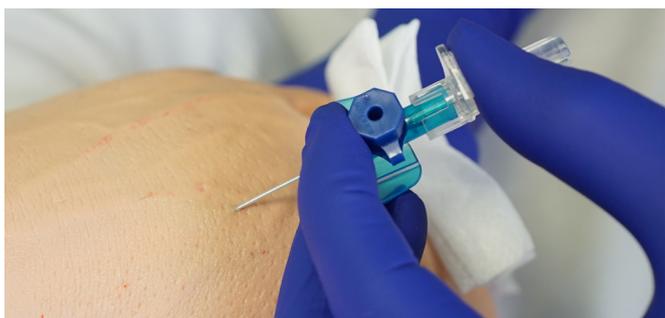
- Plastic procedure tray / sharps container
- Universal wipes to clean tray
- Non- sterile gloves (Nitrile) and disposable apron
- Sterile safety cannulae x2 (correct size)
- Chlorhexidine 2% and alcohol 70% wipe to clean patient's skin and NFAD if becomes contaminated
- Disposable tourniquet/sterile semi permeable polyurethane dressing
- Sterile/hypoallergenic tape and sterile gauze (for failed attempt)
- Needle free access device (NFAD) single or double lumen extension- indicated for all drug/fluid administration (unless exceptions)
- Sodium Chloride 0.9% pre-filled syringe
- Separate rubbish if available/required
- Cannula insertion and ongoing care record/other relevant documentation

1. Wash hands using 6 stage (Ayliffe procedure)
2. Ask patient to confirm identification verbally and gain verbal informed consent. Note: if insertion site is hairy, trim area with sterile scissors- do not shave as this causes micro-abrasions.
3. Position arm e.g. on pillow and use methods to raise the vein e.g. tourniquet if required
4. Assess/identify for suitable veins and check if needle phobic- may need to lay down
5. Complete vessel health preservation (VHP) assessment
6. Assess if; Surgical ANTT Approach, local anaesthetic or blood samples are required. For blood sampling; collect after insertion only, following ANTT principles, before patency check or drug/fluids administration and in the correct order of draw
7. Equipment Preparation Zone: wash hands, clean the plastic tray and allow to air dry
8. Gather all appropriate cannula equipment, checking for expiry dates and integrity and place in the tray

9. Patient Zone: clean hands with gel/ foam, put on apron and gloves and apply disposable tourniquet 8-10 cms above the intended insertion site and re-identify the suitable vein



10. Clean the skin over the selected vein using a 2% chlorhexidine and alcohol 70% wipe for 30 seconds using a circular motion moving outwards up to a 10 cms area. Allow to air dry (about 30 seconds). If the site is re-palpated, re-clean it using another wipe and allow to air dry. Consider if surgical ANTT approach is required
11. NB: Consider tourniquet time if blood samples are required post insertion. If need to reduce tourniquet time- may choose not to use tourniquet if veins are easily visible during; identification, cleaning or drying time
12. While the site dries, inspect the cannula device and fold down the wings of the cannula. **Do not remove the needle (stylet) from the cannula**
13. Stabilise the vein by applying manual traction on the skin below or beside the intended insertion site with the least dominant hand
14. With the dominant hand- insert the cannula with the needle bevel uppermost, directly over the vein at an angle of approximately 15-20 degrees



15. Observe for presence of blood in the flashback chamber- this indicates that the needle is in the vein lumen
16. Lower the cannula slightly by decreasing the angle between the cannula and the skin, and advance the cannula a few millimetres and stop

17. With one hand hold the coloured part of the cannula still and with the other hand, withdraw the clear plastic thumb guard back a few mms- secondary flashback will be seen in the cannula shaft- this indicates that the cannula shaft is within the vein lumen



18. With one hand hold the clear plastic thumb guard and with the other hand slowly advance the cannula off the needle and fully into the vein. There should be a gap between the cannula end and the cannula thumb guard of about 4-5 mms
19. Release the disposable tourniquet. Apply digital pressure at the distal end of the cannula and slowly remove the safety needle, taking care not to allow the needle to splatter blood on the edge of the cannula on removal. The arm may be raised to help prevent bleeding



20. Dispose of the safety needle immediately into sharps container
21. Attach the primed needle free access device to the cannula unless exceptions to NFAD requirement
22. If the cannula is placed satisfactorily, apply either only the secure strips, check patency and then apply the full dressing or apply both and check patency
23. Confirm cannula patency by flushing the cannula with 5-10mls of 0.9% Sodium Chloride using a pulsatile technique through the needle free access device. Remember to end with positive pressure by clamping the NFAD near the patient end and then removing the syringe and discarding into the sharps container
24. If NFAD not used, check patency through cannula end
25. Do not use the port on a ported cannula to flush as this exerts unacceptable pressure onto the lining of the vein and is an infection risk. Ports should be reserved for emergency access only

26. Ask the patient if they feel any pain and observe for swelling or leakage. If any complications, take appropriate action to resolve e.g. remove dressing and check site or if cannula has failed remove and re-site
27. Complete date/time on paper strip and apply to corner of dressing (for easier removal)  
Secure NFAD



28. Educate the patient about caring for the device
29. Decontamination zone: Dispose of all equipment appropriately as per Infection Control guidelines/waste stream
30. Remove PPE and gel/foam hands
31. Clean plastic tray and allow to air dry
32. Complete Peripheral Venous Cannula (PVC) Insertion and Ongoing Care Record document or other approved document
33. Monitor and follow up any potential complications with appropriate care/actions as indicated on Visual Inspection Phlebitis (VIP) Score tool and Re-Evaluation of Cannula Access Tool

**Remember in the event of a splash or sharps injury, take actions in accordance with policy.**

# Potential Problems During the Procedure

Problem	Possible Causes	Signs and Symptoms	Prevention/Intervention
1. Miss the vein on insertion of cannula	<ul style="list-style-type: none"> <li>• Poor vein choice</li> <li>• Poor positioning of patient/practitioner</li> <li>• Poor concentration</li> <li>• Inadequate palpation/ Inadequate vein stabilization</li> <li>• Vein not penetrated properly due to incorrect insertion angle</li> <li>• Vein collapse</li> </ul>	<ul style="list-style-type: none"> <li>• No flashback observed in cannula</li> <li>• Pain at site</li> <li>• Cannula not sited correctly or advanced fully</li> <li>• Possible evidence of haematoma if vein wall has been punctured</li> <li>• Unable to flush cannula or flush infiltrates into surrounding tissues</li> </ul>	<ul style="list-style-type: none"> <li>• Good preparation of practitioner/patient</li> <li>• Ensure position &amp; lighting are sufficient</li> <li>• Improve technique in vein: identification, palpation of veins and insertion of cannula including good vein stabilisation technique</li> <li>• Check the patient for pain</li> <li>• If pain is experienced by the patient- remove the cannula</li> <li>• If cannula is misaligned, may be able to slightly withdraw the cannula without removing the needle in order to correctly realign the cannula</li> <li>• Seek assistance from a more experienced practitioner as required</li> </ul>
2. Blood flow stops after initial flashback	<ul style="list-style-type: none"> <li>• Bevel of cannula needle is against the vein valve</li> <li>• Venospasm</li> <li>• Cannula needle penetrates the posterior wall of the vein</li> <li>• Possible vein collapse</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of further flashback in cannula</li> <li>• Unable to advance cannula into vein due to valve location</li> <li>• Potential pain</li> <li>• Possible evidence of haematoma if vein wall has been punctured</li> </ul>	<ul style="list-style-type: none"> <li>• Locate valves prior to insertion &amp; avoid valves by inserting cannula just above and before a valve</li> <li>• Insert cannula at correct angle to prevent penetration of the vein posterior wall</li> <li>• Level off (lower) the cannula once inserted to prevent puncture</li> <li>• Do not remove the needle (stylet)</li> <li>• Release &amp; then tighten the tourniquet</li> <li>• Gently stroke the vein above the cannula to relieve venous spasm</li> <li>• Withdraw the cannula to move the needle bevel away from the valve</li> <li>• If the vein wall is penetrated-remove the cannula</li> </ul>

Problem	Possible Causes	Signs and Symptoms	Prevention/Intervention
3. Failed cannulation	<ul style="list-style-type: none"> <li>• Inappropriate vein selection, e.g. wrong site or poor skin condition such as, bruising, phlebitis</li> <li>• Inappropriate sized cannula</li> <li>• Vein weakness/collapse</li> <li>• Poor lighting</li> <li>• Not stabilising the vein on insertion</li> <li>• Inadequate fixing with cannula dressing</li> </ul>	<ul style="list-style-type: none"> <li>• Unable to penetrate skin &amp; or vein</li> <li>• Missed vein on attempted insertion</li> <li>• No flash back observed</li> <li>• Unable to advance cannula</li> <li>• Unable to flush or flush infiltrates into surrounding tissues</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate venous palpation &amp; selection</li> <li>• Correct cannula size</li> <li>• Observe for flashback in the chamber</li> <li>• Ensure lighting is sufficient</li> <li>• Ensure vein is stabilized during insertion</li> <li>• Ensure flush is easily injected and with no pain or signs of infiltration. Note: with small gauge cannulae or hypotensive patients, blood flow may be slow or minimal</li> <li>• Ensure all of cannula is inserted up to the hub</li> <li>• Ensure correct dressing according to Trust policy &amp; is applied in the correct way to keep the cannula secure</li> </ul>
4. Accidental arterial cannulation	<ul style="list-style-type: none"> <li>• Poor selection of site and didn't identify pulse on palpation</li> <li>• Aberrant or changed anatomy and physiology due to scarring. NB: an artery may be located superficially or in an unusual position</li> </ul>	<ul style="list-style-type: none"> <li>• Increased pain on cannulation</li> <li>• Bright red pulsating blood observed</li> <li>• Haematoma formation</li> <li>• Pulsing of blood may be observed in cannula lumen or administration set</li> </ul>	<ul style="list-style-type: none"> <li>• Be familiar with anatomy and physiology</li> <li>• Be able to identify between artery &amp; vein</li> <li>• Remove cannula &amp; discard needle safely</li> <li>• Apply pressure to site, elevate arm above the heart, reassure patient &amp; get help if required Note: medications inadvertently injected into an artery may cause necrosis</li> </ul>

Problem	Possible Causes	Signs and Symptoms	Prevention/Intervention
5. Ecchymosis (bruising) Infiltration of blood into the tissues	<ul style="list-style-type: none"> <li>• Poor technique</li> <li>• Patients who are prone to bruising, e.g. patients on long term anticoagulation or steroid therapy will be more susceptible to bruising</li> <li>• May occur when multiple entries are made into a vein, or when attempts are made on veins that are difficult to visualise or palpate</li> <li>• Failure to remove the tourniquet promptly or prior to needle removal</li> </ul>	<ul style="list-style-type: none"> <li>• Pain/discomfort at insertion</li> <li>• Observe the site &amp; surrounding tissues for swelling during insertion</li> <li>• Discoloration or swelling may be immediate or slow</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure correct technique is employed</li> <li>• If Ecchymosis is seen during the procedure, the cannula must be removed and light pressure applied to the site</li> <li>• If pressure is too heavy, fragile veins in the area may also rupture and increase bleeding, apply a dry sterile dressing to the site</li> </ul>
6. Difficulty advancing the cannula over the needle	<ul style="list-style-type: none"> <li>• Pulling the needle back partly or fully from the cannula before advancement, thus the cannula tubing is not rigid enough to be advanced NB: if this occurs, under no circumstances must the needle be re-inserted</li> <li>• Valve is present causing obstruction</li> </ul>	<ul style="list-style-type: none"> <li>• Cannula is no longer rigid &amp; is not advancing within the vein</li> <li>• Needle is protruding out of the cannula device along its length</li> <li>• Unable to pass cannula through the vein valve</li> <li>• Skin over the vein wrinkles up if the vein is not well stabilised &amp; will make it difficult to advance cannula</li> </ul>	<ul style="list-style-type: none"> <li>• Check cannula parts are checked prior to use</li> <li>• Adequate assessment of veins to ensure valves are avoided and cannula is checked prior to use</li> <li>• On levelling off or lowering of cannula- ensure it is inserted sufficiently prior to cannula advancement over the needle</li> <li>• Ensure tourniquet remains tight until insertion is fully completed</li> <li>• Use correct technique for advancement</li> </ul>

Problem	Possible Causes	Signs and Symptoms	Prevention/Intervention
7. Difficulty flushing the cannula once successfully inserted	<ul style="list-style-type: none"> <li>• Cannula tip is up against a valve</li> <li>• Cannula has pierced the posterior vein wall</li> <li>• Cannula tip is resting on the vein wall</li> <li>• There is an occlusion</li> </ul>	<ul style="list-style-type: none"> <li>• Unable to flush or flush infiltrates into surrounding tissues</li> <li>• Pain on attempt to flush</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid areas along the vein where there may be valves</li> <li>• Ensure careful insertion to prevent puncturing the vein posterior wall</li> <li>• Remove and re-site cannula</li> </ul>

# Potential Problems Following the Procedure

Problem	Possible Causes	Signs and Symptoms	Prevention/Intervention
1. Haematoma	<ul style="list-style-type: none"> <li>As for Ecchymosis</li> </ul>	<ul style="list-style-type: none"> <li>As for Ecchymosis</li> </ul>	<ul style="list-style-type: none"> <li>If haematoma is observed during cannulation procedure: remove the cannula, apply pressure and raise the limb if possible until bleeding ceases</li> <li>Apply a dry, sterile dressing to the site</li> </ul>
2. Cannula occlusion	<ul style="list-style-type: none"> <li>Cannula may occlude if correct and appropriate flushing is not carried out, leading to particulate or clot formation in the cannula lumen</li> </ul>	<ul style="list-style-type: none"> <li>Inability to maintain infusion flow rates</li> <li>Resistance when flushing the cannula</li> <li>Pain</li> </ul>	<ul style="list-style-type: none"> <li>Do not attempt to flush occlusion to clear it as this may force particulate matter / clot to enter the blood stream</li> <li>Cannula should be removed and integrity of the cannula examined</li> <li>Apply a dry, sterile dressing to the site</li> <li>A new cannula must be inserted if therapy is to continue</li> <li>Document all actions/omissions &amp; complete VIP score and Re-Evaluation tool assessment</li> </ul>
3. Infiltration- (Tissuing with non vesicant drugs)	<ul style="list-style-type: none"> <li>Cannula displacement- allows fluid to enter surrounding tissues</li> <li>Inadequate securing of cannula allowing cannula migration</li> <li>Excessive manipulation of IV line</li> <li>Vein weakness or collapse, i.e. in elderly patients</li> </ul>	<ul style="list-style-type: none"> <li>Pain &amp; inflammation at entry site</li> <li>Phlebitis</li> <li>Cool, oedematous peripheries</li> <li>Finger stiffness</li> </ul>	<ul style="list-style-type: none"> <li>Discontinue drug/infusion</li> <li>Provide analgesia</li> <li>Elevate limb for comfort</li> <li>Monitor vital signs/NEWS2/pain score</li> <li>Document &amp; monitor using Trust VIP score</li> <li>Flushing, before, between and after drug administration will reduce this risk</li> <li>Correct dilution of bolus/infusion will reduce this risk</li> <li>Most infiltrations occur in the hand or forearm monitoring of neurological status &amp; function is essential</li> </ul>

Problem	Possible Causes	Signs and Symptoms	Prevention/Intervention
4. Extravasation -(Infiltration with vesicant drug). Vesicant-medication which can potentially cause blistering, tissue sloughing or necrosis	<ul style="list-style-type: none"> <li>• Cannula or fluid displacement- allowing vesicant fluid to enter surrounding tissues</li> <li>• Vein weakness- i.e. in elderly patients</li> <li>• Inadequate securing of cannula</li> <li>• Incorrect dilution of drug bolus/infusion</li> </ul>	<ul style="list-style-type: none"> <li>• Burning/stinging pain at insertion site</li> <li>• Blanching</li> <li>• Sluggish flow rate or IV counter alarming</li> <li>• Resistance felt on bolus injection</li> <li>• Absence of blood backflow</li> <li>• Oedema at insertion site</li> <li>• Oedema affecting the entire limb</li> </ul>	<ul style="list-style-type: none"> <li>• Discontinue infusion</li> <li>• Keep cannula in situ to aspirate residual drug through cannula if possible - then remove</li> <li>• Inform Dr to review ASAP</li> <li>• Provide analgesia</li> <li>• Elevate limb for comfort</li> <li>• Monitor vital signs/NEWS2/pain score</li> <li>• Do not re-site cannula in the same limb</li> <li>• Document &amp; monitor using VIP score and vein re-evaluation assessment</li> <li>• Flushing before, in between and after administration of drugs will reduce this risk</li> <li>• Good securing of cannula will reduce this risk</li> <li>• Monitoring of neurological status &amp; function is essential</li> </ul>
5. Phlebitis (mechanical, chemical or septic) the inflammation of the tunica intima of the vein. These may result in thrombophlebitis, the formation of a clot in the vein at cannula site	<ul style="list-style-type: none"> <li>• Poor aseptic technique and poor skin cleansing on insertion</li> <li>• Contamination of equipment</li> <li>• Inadequate securing of cannula</li> <li>• Failure to keep site clean, i.e. soiled cannula dressings</li> <li>• Failure to change IV equipment as per policy</li> </ul>	<ul style="list-style-type: none"> <li>• Pain, redness, swelling, heat at cannula site; “tracking” may be visible</li> <li>• Pain on injection of drugs or the inability to infuse drugs or fluid through cannula</li> </ul>	<ul style="list-style-type: none"> <li>• Phlebitis must be documented using a uniform standard scale for measuring degrees of phlebitis</li> <li>• The Trust uses the visual infusion phlebitis (VIP) score which advises if intervention is required. VIP score of 2- indicates that the cannula must be removed and re-sited if treatment is ongoing</li> <li>• Severe phlebitis (3) may require antibiotic treatment</li> <li>• Other interventions as No.6</li> </ul>

Problem	Possible Causes	Signs and Symptoms	Prevention/Intervention
6. Infection of cannulation site	<ul style="list-style-type: none"> <li>• See Phlebitis</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> <li>• Swelling at site</li> <li>• Purulent discharge</li> <li>• Pyrexia</li> </ul>	<ul style="list-style-type: none"> <li>• Discontinue bolus/infusion</li> <li>• Inform Dr</li> <li>• Assess VIP score and document</li> <li>• Remove cannula- check if cannula tip to be sent to microbiology</li> <li>• Monitor vital signs/NEWS2/pain score</li> <li>• Send blood cultures</li> <li>• Re-site cannula if required</li> <li>• Document as per Trust care plan</li> </ul>
7. Systemic Infection Septicaemia – the presence of micro - organisms or their byproducts in the blood stream	<ul style="list-style-type: none"> <li>• Poor or absent aseptic insertion technique</li> <li>• Contamination of equipment</li> <li>• Failure to change IV equipment as per policy</li> <li>• Flushing of blocked lines</li> <li>• Other causes as above</li> </ul>	<ul style="list-style-type: none"> <li>• Chills</li> <li>• Pyrexia</li> <li>• Rigors</li> <li>• Tachypnoea or bradypnea</li> <li>• Tachycardia</li> <li>• Variable BP</li> <li>• Unexplained deterioration</li> <li>• Focal sign of infection</li> </ul>	<ul style="list-style-type: none"> <li>• Discontinue any bolus/infusion</li> <li>• Monitor vital signs/NEWS2 &amp; pain scoring</li> <li>• Inform Dr for review ASAP</li> <li>• Assess VIP score and document</li> <li>• Remove cannula- check if cannula tip to be sent to Microbiology</li> <li>• Send blood cultures</li> <li>• Re-site cannula for antibiotic treatment</li> <li>• Document as per Trust care plan</li> </ul>

# Post Cannula Insertion Access and Care

## Peripheral Cannulation Documentation

This is an integral part of the cannulation procedure which includes ensuring the documentation covers insertion through to removal. It must be initiated by whoever sites the cannula.

The minimum documentation requirements are:

Cannula size/gauge, batch number, site, date and time, number of attempts, name and designation of practitioner inserting cannula and date of removal.

Nursing staff will monitor and document cannula status, including twice daily Visual Infusion Phlebitis (VIP) score and Re-evaluation assessment. It is important that the patient is informed about how to care for and when to contact staff if any complications arise. How to assess and complete the documentation and action any findings appropriately will be discussed within training.



Name: \_\_\_\_\_  
 Date of Birth: DD / MM / YYYY  
 MRN Number: \_\_\_\_\_  
 NHS Number: \_\_\_\_\_  
(OR AFFIX HOSPITAL LABEL HERE)

### Inpatient Peripheral Venous Cannula (PVC) Insertion and Ongoing Care Record

If PVC inserted outside of GHNHSFT or documentation not started in GHNHSFT – complete all relevant sections on this form on admission.  
 For patients who have been assessed that IV therapy is needed and that a PVC is the right line decision.

**Step 1. Complete vessel health assessment.**  
 Where viewing aids are indicated refer to: Senior nurse, ACRT, Dr or anaesthetist-trained in their use

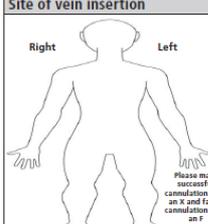
Grade	Vein quality	Definition of vein quality	Insertion management	Please tick
1	<b>EXCELLENT</b> Suitable < 6 months Intermittent Therapy up to 10 days	4-5 palpable or visible veins suitable for cannulation	Cannula may be inserted by trained authorised health care practitioner	<input type="checkbox"/>
2	<b>GOOD</b> Suitable < 4 months. Intermittent Therapy up to 10 days	2-3 palpable or visible veins suitable for cannulation	Cannula may be inserted by trained authorised health care practitioner	<input type="checkbox"/>
3	<b>FAIR</b> Suitable for 4-6 weeks Intermittent Therapy up to 10 days	1-2 palpable or visible veins suitable for cannulation. (Veins may be small, scarred or difficult to find and require methods to improve vasodilation or viewing aids e.g. ultrasound or infrared viewers)	Cannula may be inserted by trained authorised health care practitioner with the assistance with vasodilation methods and viewing aids only.	<input type="checkbox"/>
4	<b>POOR</b> One off cannulation	Veins not palpable or visible. (Requires ultrasound or infrared viewer assistance)	Cannula may be inserted by expert trained authorised health care practitioner with the assistance of viewing aids only	<input type="checkbox"/>
5	<b>NONE</b> Unidentifiable Not suitable for cannulation	No veins palpable or visible to naked eye or viewing aids	Not for peripheral cannula. Refer to expert practitioner for access advice.	<input type="checkbox"/>

**Step 2. Complete documentation for successful cannulation**

**Reason for insertion**

IV fluids <input type="checkbox"/>	IV antibiotics <input type="checkbox"/>	IV drugs <input type="checkbox"/>	Blood <input type="checkbox"/>
Chemotherapy <input type="checkbox"/>	Surgery <input type="checkbox"/>	Other <input type="checkbox"/>	State: _____

**Site of vein insertion**



**Cannula insertion details**

Skin prep  Local anaesthetic: Topical Yes  N/A  Infiltrated Yes  N/A

Needle free access device (NFAD)  
 Single  Double  N/A

Sterile semi-permeable dressing  Please state type: \_\_\_\_\_

Successful patency flush

Gauge: \_\_\_\_\_ Lot No: \_\_\_\_\_

Inserted by: Signature \_\_\_\_\_ Designation \_\_\_\_\_  
 Print name \_\_\_\_\_

Date DD / MM / YYYY \_\_\_\_\_ Time 00 : 00

**Patient information**

Peripheral Intravenous (IV) Cannula Insertion patient information leaflet given to patient (GHP10935\_04\_16)

Verbal advice given on cannula care  N/A  (state reason) \_\_\_\_\_

**Insertion difficulties**

State which attempt cannulation was successful: 1  2  or more

No of attempts 1  2  or more  before referral Patient referred to: Senior nurse  Acute Care Response Team (ACRT)  Senior Doctor  Anaesthetist  Viewing aids used  Please state: \_\_\_\_\_

**Step 3. Please complete ongoing assessment overleaf**

**Step 4. Cannula removal**

Removed by	Print name	Designation	Date/Time cannula was removed
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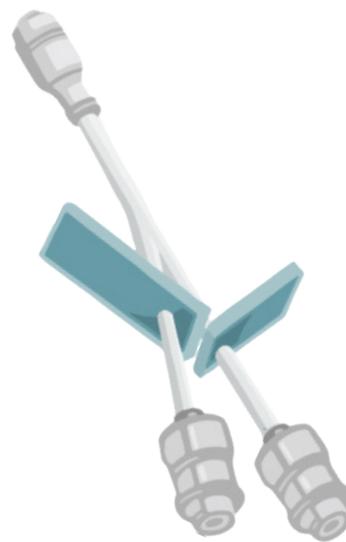
# Ongoing Care

- A transparent, adhesive, semi permeable dressing must be used to secure the cannula unless an allergy is known or suspected. Dressing must be intact at all times
- Replace dressing if soiled/loose. Do not secure with additional tape
- Additional security e.g. confused patients may require a tubular bandage ('Tubifast') to be applied. NB: this must be removed for each access to observe the cannula site against the VIP Score and re-applied as necessary
- 2% Chlorhexidine/70% alcohol swabs must be used to cleanse NFAD prior to drug administration
- Clean thoroughly for 30 seconds and allow to air dry for about 30 seconds

## Needle Free Access Device (NFAD) Guidance:



Single Lumen Extension Set



Double Lumen Extension Set  
(if multiple accesses indicated)

- Minimises needle stick injuries
- Enables remote accessing to reduce incidence of IV access associated blood stream infections
- Minimises mechanical phlebitis and preserves IV access devices
- Compatible with IV drug / fluid administration equipment, though Luer syringes require  $\frac{1}{4}$  to  $\frac{1}{2}$  turn to 'lock' and open fluid pathway for bolus drug administration

## When a (NFAD) is NOT indicated?

- Day case surgery and short procedures, for which cannulation is only required for a few hours and not expected to extend > 24 hours. If the cannula needs to remain in situ, a NFAD must be attached
- A NFAD can be removed / not sited in situations where lifesaving drugs or rapid fluid replacement is required, if that placement would cause delay or infusion speed is compromised
- Different cannula e.g. brands with an integrated NFAD

# Re-Evaluation of Vascular Access Device (VAD) Tool

The Vascular Access Device (VAD) Tool shown below allows for a full assessment of the VAD and guidance for removal.

If the VAD tool scores any No's then the cannula must be removed and a Vessel Health Preservation Assessment made if a peripheral cannula is still required. The VIP assessment must also be made and scored twice daily on the Peripheral Venous Cannula (PVC) Insertion and Ongoing Care Record and any appropriate actions documented.

<b>Does the current Vascular Access Device (VAD) still provide the optimum solution to the patient's needs?</b>		
<b>Remove the cannula and revisit if required if Yes to any of the following:</b>		
<b>Insertion site score VIP score more than 2</b>	Yes	No
<b>Device Infected:</b>		
<b>Suspected</b>	Yes	No
<b>Proven</b>	Yes	No
<b>Occlusion</b>	Yes	No
<b>Thrombosis</b>	Yes	No
<b>Leakage</b>	Yes	No
<b>Dislodgement</b>	Yes	No

Diagram: Vascular Access Device (VAD) Tool

# Removal of a Peripheral Intravenous Cannula Standard ANTT Approach

This is included as part of registered practitioners' cannulation training, but removal may be delegated to non-registered practitioners' who will not insert or care for a cannula but will achieve a competency in cannula removal.

The VIP score and Re-Evaluation of Access Device tool will provide guidance on when to remove a patient's cannula.

## Equipment:

- Plastic procedure tray / sharps container
- Universal wipes to clean tray
- Non-sterile gloves (Nitrile) and disposable apron
- Clear hypoallergenic tape and sterile gauze
- Relevant documentation
- PVC Insertion and ongoing care record

1. Prepare patient: confirm identification and gain informed consent
2. Wash hands and position arm on e.g. pillow
3. Equipment Preparation Zone: wash hands and clean plastic tray and allow to air dry
4. Gather appropriate equipment, checking for expiry dates/integrity and place in the clean tray
5. Patient Zone: Clean hands with gel/foam and put on apron and gloves
6. Loosen the dressing by lifting the date/time strip corner and then gently pull the clear part of the dressing away from you close to the patients' skin. The adhesive bonds will break easier this way and cause the least damage to the patient's skin. The secure strips should also hold in place while the woven part of the dressing is loosened and removed. Remove the secure strips and then gently remove the cannula



7. Ensure cannula integrity. If there is any doubt that the entire device has **not** been removed, retain the device, and obtain urgent medical advice. If infection is suspected- check if cannula tip needs to be sent to microbiology.

8. Decontamination zone: Dispose of the cannula in a sharps container
9. Dispose of all equipment appropriately and apply sterile gauze to the site to stop bleeding
10. Once bleeding has stopped, apply new gauze and tape
11. Ensure the patient is able to call for help if required e.g. fresh bleeding from site
12. Clean hands with gel/foam and clean the plastic tray and allow to air dry
13. Wash hands and complete documentation

## Summary

This pre-course material should prepare you for your training session and is a useful resource for future reference.

If you have any queries concerning this skill after the attendance at the training session, please do not hesitate to contact us.

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