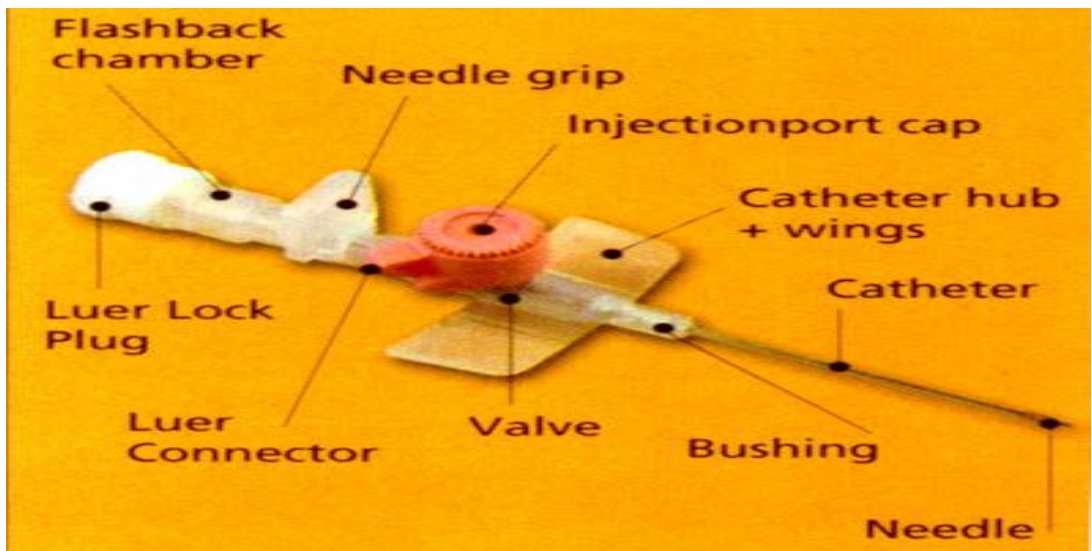


# Intravenous (IV) Cannulation

Intravenous (IV) cannulation is a technique in which a cannula is placed inside a vein to provide venous access. Venous access allows sampling of blood as well as administration of fluids, medications, parenteral nutrition, chemotherapy, and blood products.

## Cannulae

- Parts of a cannula:



• **Types of cannulae:**

Colour	Gauge	Estimates flow rate (ml/min)	Uses
Yellow	24	20	Paediatrics, neonates
Blue	22	36	<ul style="list-style-type: none"> <li>• Paediatrics, elderly, chemotherapy patients</li> <li>• Suitable for slow speed infusions</li> </ul>
Pink	20	60	<ul style="list-style-type: none"> <li>• The Most commonly used cannula</li> <li>• Suitable for IV analgesia and non-emergent blood transfusions</li> </ul>
Green	18	125	Used in trauma, surgery, blood transfusions and administration of dyes in contrast studies
Grey	16	180	Trauma patients rapid transfusion of whole blood or blood components
Orange	14	240	Trauma patients ,rapid Large volume replacement

**Sites for intravenous cannulation**

• **Veins of the fore arms:** (*figure A - below*)

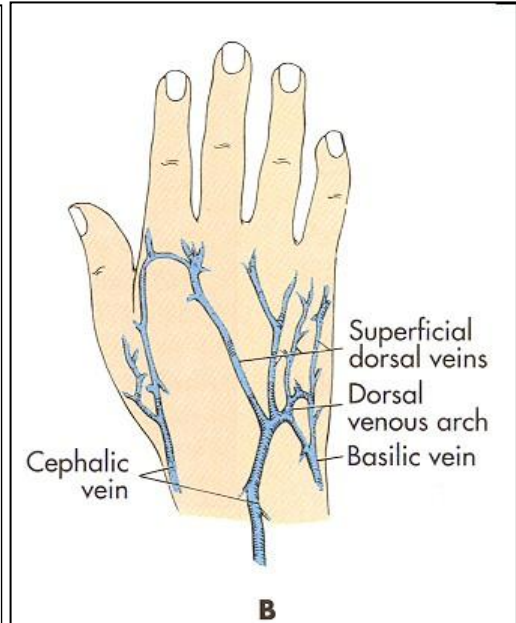
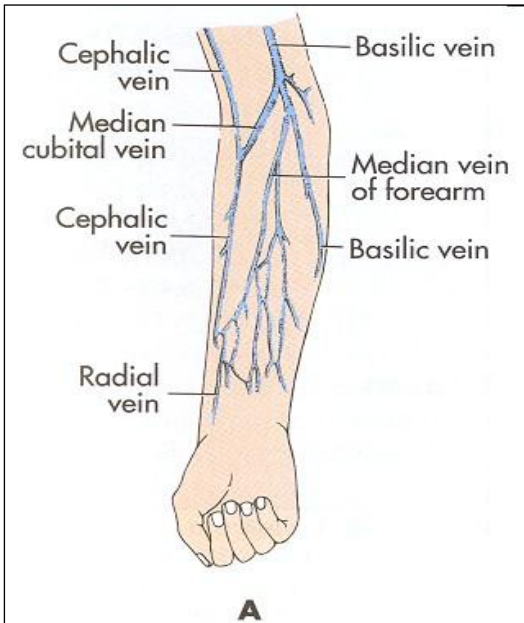
- Basilic vein
- Cephalic vein
- Median cubital vein

• **Veins of the hands:** (*figure B - below*)

- Metacarpal veins
- Dorsal venous arch

• **General rules in selecting an IV site:**

- Start in the most distal area before going proximally
- Use the upper extremities rather than the lower extremities
- Avoid areas of flexion
- Use the largest , longest ,straightest palpable vein



## Indications for IV cannulation

- Repeated blood sampling
- Administration of drugs
- Administration of intravenous fluids
- Administration of blood and blood products
- Administration of intravenous nutritional support

## Contraindications to IV cannulation

- Injured, infected, swelled or burned extremity
- Extremity that have an arteriovenous fistula
- The arm on the side of a mastectomy

## Complications of IV cannulation

Complication	Causes	Sigs& symptoms	Intervention
<p><b>Haematoma</b> (localised collection of extravasated blood, usually clotted in an organ or tissue)</p>	<ul style="list-style-type: none"> <li>• Blood leaking out of the vein into the tissue due to puncture or trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Swelling, tenderness and discoloration</li> </ul>	<ul style="list-style-type: none"> <li>• Apply appropriate pressure bandage, monitor the site</li> </ul> <p><b>Prevention:</b></p> <ul style="list-style-type: none"> <li>• Proper device insertion</li> <li>• Pressure over site on removal of cannula</li> </ul>
<p><b>Phlebitis</b> (Inflammation of the vein)</p>	<ul style="list-style-type: none"> <li>• Poor aseptic technique</li> <li>• High osmolarity I.V. infusions or drugs</li> <li>• Trauma to the vein during insertion/incorrect cannula gauge</li> <li>• Prolonged use of the same site</li> </ul>	<ul style="list-style-type: none"> <li>• Tenderness, redness, heat and oedema</li> <li>• Advanced-induration, palpable venous cord</li> </ul>	<ul style="list-style-type: none"> <li>• Remove cannula</li> <li>• Apply warm compression</li> <li>• Observe for signs of infection</li> <li>• If phlebitis is advanced antibiotics may be required</li> </ul>
<p><b>Thrombophlebitis</b> (Formation of a thrombus and inflammation in the vein, usually occurs after phlebitis)</p>	<ul style="list-style-type: none"> <li>• Injury to the vein</li> <li>• Infection</li> <li>• Chemical irritation</li> <li>• Prolonged use of the same vein</li> </ul>	<ul style="list-style-type: none"> <li>• Tenderness/redness</li> <li>• Heat/oedema</li> <li>• Cordlike appearance of the vein</li> <li>• Slowing of the IV infusion</li> </ul>	<ul style="list-style-type: none"> <li>• Remove cannula</li> <li>• Observe for signs of infection</li> <li>• Change cannula frequently (48-72hrs)</li> </ul>
<p><b>Infection</b> (Pathogen in the surrounding tissue of the I.V. site)</p>	<ul style="list-style-type: none"> <li>• Lack of asepsis</li> <li>• Prolonged use of the same site</li> </ul>	<ul style="list-style-type: none"> <li>• Tenderness and swelling</li> <li>• Erythema/purulent drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Remove cannula</li> <li>• Antibiotics may be required</li> <li>• Documentation</li> </ul>

<p><b>Venous spasm</b> (Spasm of the vein wall)</p>	<ul style="list-style-type: none"> <li>• Patient anxiety</li> <li>• Cold I.V fluids</li> <li>• Drug irritation</li> <li>• Trauma to the vein during cannula insertion</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> <li>• Slowing of the I.V infusion</li> <li>• Blanching at the insertion site</li> <li>• Vein difficult to palpate</li> </ul>	<ul style="list-style-type: none"> <li>• Apply warm compress</li> <li>• Slow the infusion rate</li> <li>• Reassure the patient</li> </ul>
<p><b>Occlusion</b> (Slowing or cessation of fluid infusion due to: • Fibrin formation in or around the tip of the cannula • Mechanical occlusion (kink of the cannula)</p>	<ul style="list-style-type: none"> <li>• Cannula not flushed</li> <li>• Kinking of the cannula</li> <li>• Back flow or interrupted flow</li> </ul>	<ul style="list-style-type: none"> <li>• I.V not running</li> <li>• Blood in the line</li> <li>• Discomfort</li> </ul>	<ul style="list-style-type: none"> <li>• Check for kinks in cannula</li> <li>• Raise IV higher</li> <li>• Remove cannula</li> </ul>
<p><b>Extravasation</b> (The infiltration of a drug from an I.V line into the surrounding tissue)</p>	<ul style="list-style-type: none"> <li>• Catheter erodes through the vessel wall at a second point,</li> <li>• Increased venous pressure causes leakage around the venepuncture site</li> <li>• When a needle pulls out of the vein.</li> <li>• Vesicant drugs/solutions may cause severe tissue injury</li> </ul>	<ul style="list-style-type: none"> <li>• Oedema and changes in the site's appearance</li> <li>• Coolness of the skin.</li> <li>• Slowing of infusion</li> <li>• Pain or a feeling of tightness around the site.</li> <li>• Possible consequences include necrotic ulcers, infection, disfigurement, and loss of function.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove cannula</li> <li>• Elevate affected arm</li> <li>• Apply ice pack (early) or warm compress (late)</li> </ul>

## The procedure

- Introduce yourself
- Wash hands
- Check patient details (*name / ID*)
- **Explain procedure:**
  - “I need to insert a small plastic tube into your vein using a needle“
  - “This will allow us to give you fluids and medications intravenously“
  - “It will be a little uncomfortable, but it hopefully won’t be too painful“
- **Gain consent:**
  - “Are you ok for me to go ahead? “

## Gather equipments

- Pair of non-sterile (clean) gloves
- Intravenous cannula of appropriate size –*the standard size is 20g (pink)*
- Cannula dressing
- Tourniquet
- 0.9% saline to flush with a 5mL or 10mL syringe
- Cotton gauze with tape
- Alcohol swab
- Sharps bin (*not pictured*)



## Position the patient

- Position the patient in lying or sitting position
- Make sure that there is adequate light and that the room is warm enough to encourage vasodilation
- If possible use the patient's non-dominant arm
- Adequately expose the arm, removing any tight clothing
- Place a pillow under the patient's arm to stabilise it

## Palpate a vein

- Apply a tourniquet 10 cm above the injection site – *tourniquet should not be left on for more than 2-3 minutes* and avoid nipping the patient's skin
- **Palpate a vein:**
  - Go for a vein you can feel
  - It should ideally be straight
  - Tapping the vein & asking the patient to pump their fist can make it easier to see & feel veins – *if not consider applying a warm towel/pack*
  - Avoid areas where two veins are joining (*valves present*)

## Inserting the cannula

- Wear a pair of clean gloves
- Clean the area 3 times with different alcohol swabs in an outward circular motion. Let it air dry and do not touch this area again
- **Prepare the cannula:**

- Open wings
- Check top cap is working
- Slightly withdraw & replace needle – *this will make it glide easier*
- Unscrew the cap at the back of the cannula & place it upright in a tray
- Remove the cannula sheath
- Ensure needle's bevel is pointing upwards
- Secure the vein with your non-dominant hand from below
- Warn the patient of a sharp scratch
- Insert cannula at an angle of 30–45 degrees
- Observe flashback of blood in the flashback chamber
- Reduce the angle and advance the needle a further 1-2mm after flashback to ensure it's in the veins lumen
- Withdraw the needle slightly so that it's sharp point is inside of the plastic tubing
- Advance cannula fully into vein – *the needle still inside the tubing will stop the plastic from kinking*
- Release the tourniquet – *this will reduce bleeding*
- Place some gauze directly underneath the cannula – *this will prevent blood dripping*
- Apply pressure over the vein from above – *this should occlude the vein & reduce bleeding*
- Remove the needle
- Dispose of the needle into a sharps bin
- Replace cap onto the cannula



## Securing the cannula

- Put some tape on the cannula wings to secure it before flushing



## Flushing the cannula

- **Set up the flush:**
  - Open 5-10ml syringe
  - Get 10ml bottle of saline 0.9%
  - Confirm type of fluid & date of expiry
  - Withdraw fluid from saline bottle into syringe
  - Remove any air bubbles within the syringe
- **Remove the top cap from the cannula port & insert syringe**
- **Inject the saline into the cannula:**
  - It should go in smoothly with little resistance
  - Watch for signs of swelling around the site – *stop immediately if you see this!*
  - If the patient complains of pain you should also stop

immediately!

- **Close the cannula port**
- **Apply the transparent dressing to the cannula site**



### To complete the procedure...

- Ensure the patient is comfortable and answer any questions
- Thank the patient
- Wash hands
- Dispose waste material according to infection control standards
- **Document the following:**
  - Patient details (*name / ID*)
  - Date & time of cannulation
  - Reason for cannulation
  - Type of cannula used – (*e.g. 20 gauge*)
  - Site of insertion-vein and arm/hand

- Your name and role

Checklist	D	ND
Appropriate introduction (state your name & role)		
Confirm patient's name and ID		
Explain the procedure and reason for carrying it out		
Obtain consent		
Wash hands and prepare materials for cannulation:		
<ul style="list-style-type: none"> <li>• Pair of non-sterile (clean) gloves</li> <li>• Intravenous cannula of appropriate size</li> <li>• Cannula dressing</li> <li>• Tourniquet</li> <li>• 0.9% saline to flush with a 5mL or 10mL syringe</li> <li>• Cotton gauze with tape</li> <li>• Alcohol swab</li> <li>• Sharps bin</li> </ul>		
Wear a pair of clean gloves		
Position the patient		
Apply the tourniquet 10 cm above the injection site		
Select an appropriate vein by visualising and palpating		
Clean the area in a circular motion 3 times with different alcohol swabs. Let it air dry and do <b>not</b> touch this area again		
Inspect the cannula for any defects		
Secure the vein with your non-dominant hand from below		
Warn the patient just before insertion that there will be a sharp scratch		
Insert the cannula at an angle of approximately 30-45 degrees and observe for "flashback" of blood in the flashback chamber		
Reduce the angle of the needle and advance the needle and cannula a further 2–3 mm to ensure the tip is in the vein		
Withdraw the needle at the same time advance the cannula in to the vein		

Release the tourniquet		
Remove the needle while pressing above the injection site to prevent backflow of blood		
Appropriately dispose the needle in the sharps bin		
Put the cap on the cannula		
Secure the cannula with tape and flush the cannula with 0.9% saline		
Apply the cannula dressing as appropriate		
Ensure the patient is comfortable and answer any questions		
Thank the patient		
Dispose waste material according to infection control standards		
Remove gloves and wash hands		
Document the procedure		



• **Geeky medics:**

How to Perform Cannulation - OSCE Guide

<https://youtu.be/h8DIRtqgh8c>

• **OSCE PASS:**

IV Cannulation Procedure - OSCE Exam Demonstration

<https://youtu.be/0csywpTvHFM>