Venous Cannulation
Developed by L. Williams & K. Atchison

Venepuncture is a technical skill. Skills can only be perfected and maintained by ongoing practice. Knowledge of techniques and good nursing practice will reduce the potential risk to the patient. Getting the cannula in the vein is not the only goal - getting it in with the least risk is.

**Pre-requisites**
- Discuss with your manager and educator - is this right for you right now?
- Read through the training handout
- Work through the "Interactive learning module – produced by BD Medical - Medical Surgical Systems"
- Read the resource articles
- Complete the Self Test
- Book in for a practice and training session with your Venous Cannulation Link nurse
- Develop expertise by performing cannulation supported by your Link nurse or a credentialed peer
- Be signed off as competent, using the competency assessment tool

**Determine what the IV is to be used for -**

Length of time the IV access will be needed helps to determine both the vein site and type of device required.

Type of fluid/medication determines the size needle or cannula required.

**Selecting the appropriate device**

**Over the Needle Cannula**
Over the needle cannula, where the needle is removed, leaving only a flexible cannula in the vein is used for fluid administration over more than a few hours. The over needle cannulae in the hospital are BD Insyte Autoguard and BD venflon.

**Size**
When determining size, consider the fluid type expected to be used over the next 72 hours. This may prevent an additional venepuncture. Always use the smallest needle/cannula that you can to reduce the risk of phlebitis

**GUIDELINES**

<table>
<thead>
<tr>
<th>TRAUMA/ HAEMORRHAGE/ UNSTABLE ADULT</th>
<th>ROUTINE ADULT</th>
<th>CHILD/ INFANT</th>
</tr>
</thead>
</table>
| • 14g 18g for Trauma patients and those under going major surgery  
• 18g for surgical patients and for blood administration (Although blood can be given through smaller catheters, it flows better through a larger lumen). | • 20g 22g for medical patients (But use a larger catheter in a larger vein to infuse a caustic or viscous solution) | • 22g 24g for infants, children and adults with extremely small veins |
**Selecting the Vein**

When selecting an appropriate vein consider the following -

**Patient’s Diagnosis/History**
- Are there any conditions that prevent the use of an extremity – e.g. oedema, surgery, mastectomy, infection, avoid shunt sites
- What fluids, medications may be required later.

**Patient Comfort**
- Try to use non-dominant arm.
- Consider how each site may restrict the patient.
- Ask the patient where they prefer, if a routine cannulation.
- Choose self splinting options first i.e. back of hand rather than AC joint.

**Type of IV Fluid/Medication to be infused**
- Viscous fluids require larger veins.
- Large volumes require larger cannula and larger veins.

**Expected Duration of IV Therapy**
- Long term therapy will require multiple venepunctures. Start distally to save more proximal sites for later use.

**Criteria for Vein Selection**
- Twice the diameter of needle/cannula to be used.
- Straight for the length of cannula.
- No lumps, hardened area.
- Not over a joint.
- As distal as possible.

**AVOID**
- Veins below a previous IV site (for 72 hours).
- Veins below a phlebitis area.
- Areas of skin inflammation, bruising.
- Joints.
- Arms affected by mastectomy, arteriovenous shunt.
- Anterior aspect of forearm.
**VEIN OPTIONS**

1. Metacarpal (hand) veins are the easiest to cannulate. Be sure the catheter tip doesn’t rest in a flexion area. For example, don’t insert a catheter at the bend of the wrist. For small, short hand veins, use 3/4 to 1 inch (1.88 to 2.5 cm) catheters.

2. The cephalic vein in the forearm is a very comfortable site, but often is very deep. If long term IV therapy is needed, use after the hand veins.

3. The basilica vein (anterior, medial arm) is a large, strong vein and a comfortable site. But it’s difficult to find on short, heavier arms.

4. Keep the catheter tip away from the antecubital fossa: Patient movement can inhibit the IV flow in that area and you’ll want to save the site for blood draws.

5. The cephalic vein in the mid to upper arm is the ideal site when lower veins have been used. The vein is easier to locate in thin patients.

6. Use these medial and lateral bifurcation sites for blood draws, in acute trauma, or if no other veins are available.

7. Anterior aspect of forearm should be avoided in routine adult cannulation.

8. If needing to re cannulate leave old cannula in until new cannula is resited to avoid bleeding from site.

9. Cannulation of legs and feet carry increased risk. This is not considered a nursing procedure.

Please note many nerve roots passing down the anterior surface of the forearm (the palm side) making it painful to insert IV cannula in this area in adults.

**Preparing for Venepuncture**

- Enlist patient’s co-operation and obtain consent.
  * Informed, relaxed patients make venepuncture easier.
  * Utilise treatment room and play therapists with children for invasive procedures
- Consider use of EMLS / Ametop. Use prior to any cannulation any cannulation attempt with children
- Collect equipment -
  * Gloves
  * Tourniquet
  * Skin cleaning swab Chlorhexidine 1% + Alcohol 70% or 70% Isopropyl Alcohol (NB. 70% Isopropyl Alcohol is the recommended skin cleansing solution for infants under 2 month of age)
  * Protective bed cover
  * IV cannula (x 2)
  * Extension set (primed with 0.9% sodium chloride)
  * Sterile transparent dressing (Tegaderm IV)
  * 10ml syringe
  * 0.9% sodium chloride
- **Prepare Cannula**
  Rotate the Cannula through 360° taking care not to move cannula up the needle. This may increase risk by shearing the cannula.
  Consider applying EMLA or AMETOP cream as a topical anaesthetic 40 minutes before insertion.
### Cannulation (See also Appendix B)

#### 1 Preparation
- Arrange equipment in handy position keep sharps bin close by
- Wash hands and wrists thoroughly or use alcohol hand gel and don gloves.
- Prepare extension set by priming the line and leaving syringe and remaining 0.9% sodium chloride attached - take care to keep equipment sterile
- Place protective bed cover in place.

Use universal precautions and aseptic technique through-out procedure.

#### 2 Cleanse Skin
- 2% chlorhexidine + 70% alcohol swab and allow to dry for 45 seconds
- Or
- 70% Isopropyl alcohol and allow to dry for 30 seconds

#### 3 Apply Tourniquet
- Apply 10 - 15 cm above intended insertion site. Apply snugly to trap venous blood, without occluding the pulse. **Do not leave the tourniquet on for longer that 1 minute.**
- Lift secured tourniquet, using other hand to pull skin above. When the tourniquet is lowered the skin and veins below will be taut at insertion site. This helps prevent veins rolling.

#### 4 Immobilise the Vein
Immobilise by stretching the skin downward about 5 cm below the intended insertion site.

#### 5 Insert
- over the needle cannula at 15-30° angle with bevel up. As soon as flash back of blood observed, lower the angle to skin level.
- With the **ONC** (Over needle cannula)- advance 2-3 mm into vein. Then hold needle **steady**, while advancing the cannula off the needle, the desired distance into the vein.

#### 6 Remove tourniquet

#### 7 Activate Safety button – ensure needle is safely sheathed

#### 8 Attach smart site extension set (already ready primed with 0.9%sodium chloride) and flush with 0.9% sodium chloride to ensure line is in vein and patent – patient should only experience a cool sensation if painful the cannulation has been unsuccessful

#### 9 Dress with IV tegaderm, secure line with tape, date and time. (see Appendix B)

#### DON'Ts
- Don’t pull needle out of cannula - push cannula off of the needle - place one finger at the end of cannula and another over the nib to stabilize it - activate safety device
- Don’t slide cannula back onto needle once advanced off the needle
- Don’t put non-sterile tape under sterile, impermeable dressing

#### 10 Documentation
IV insertion should be documented in patient record, including date, time, site and patient response.

Additionally the insertion date and time should be recorded on the IV site dressing.
## Complications

### Haematoma

<table>
<thead>
<tr>
<th>Potential Causes</th>
<th>Nursing Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourniquet incorrectly applied</td>
<td>Apply tourniquet 10-15cm above site. Release prior to running fluid.</td>
</tr>
<tr>
<td>Puncturing back of vein</td>
<td>Enter vein 15-30°. Immediately lower angle when flashback noted.</td>
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### Phlebitis

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<tbody>
<tr>
<td>Needle/cannula size inappropriate</td>
<td>Use large cannula/needle for caustic medication.</td>
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<tr>
<td></td>
<td>Choose vein twice the diameter of cannula/needle.</td>
</tr>
<tr>
<td>Site not changed regularly</td>
<td>Peripheral IV sites should be changed every 72-96 hours. DO NOT wait for redness to appear, by then it is too late.</td>
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### Infection

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<thead>
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<tbody>
<tr>
<td>Contamination during insertion</td>
<td>Use aseptic technique for all IV manipulation.</td>
</tr>
<tr>
<td>Site dressing not changed regularly</td>
<td>Change site and dressing Q 96 hours. Observe site 8 hourly, change dressing as needed. Change IV site at first sign of redness, inflammation.</td>
</tr>
</tbody>
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### Extravasation “Tissuing”

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<tr>
<td>Needle/Cannula dislodged from vein</td>
<td>Don't place over a joint. Stabilise cannula well. Observe regularly for oedema, coolness, tenderness.</td>
</tr>
<tr>
<td>Vein doesn't seal around cannula/ needle</td>
<td>Enter vein at 15-30° angle to reduce cutting of vein wall fibres.</td>
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### Catheter Embolism

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<thead>
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<tr>
<td>Reintroducing needle into catheter (ONC)</td>
<td>DO rotate the cannula through 360° before insertion.</td>
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<tr>
<td></td>
<td>NEVER re-introduce needle into cannula or pull cannula down over needle.</td>
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REFERENCES


Appendix A


BD Angiocath™ Autoguard™
Shielded IV Catheters

POINTS TO PRACTICE

PREPARATION
- Make sure all items are accessible throughout the procedure
- Prepare site according to your facility’s policy and procedure

VENIPUNCTURE
- Approach vein slowly at a low angle
- Observe early flashback along the catheter (20, 22 and 24 gauge only)
  In larger gauge sizes, observe flashback behind white button

ADVANCEMENT
- Upon flashback visualization, lower catheter almost parallel to the skin
- Advance entire unit slightly before threading catheter
- Thread catheter into vein while maintaining skin traction

NEEDLE REMOVAL
Before Pressing the Button
- Release tourniquet
- Apply digital pressure beyond the catheter tip
- Gently stabilize catheter hub
- Press the white button

SECUREMENT
- Secure catheter and apply sterile dressing according to your facility’s policy and procedure

CAUTION REMINDERS
- Do Not withdraw needle from catheter hub before pressing the white button
- Needle should be Retracted Prior to Disposal in a puncture-resistant, leak-proof sharps container
- Never Reinsert Needle into the catheter as this could shear the catheter
- Do Not Use Scissors at or near the insertion site.

Refer to package insert for complete instructions for use.
TIPS FOR SUCCESS

INSERTION SUCCESS
- Slow down the speed of insertion
- Use less force to penetrate the skin
- Lower the initial insertion angle keeping the elbow low
- After flash, lower the angle and advance slightly

SEEING THE FLASH
- Trust your instinct and take a pause
- Be aware of patient factors such as small veins, small patient, blood pressure, condition of vein, dehydration, etc., that may impact flash

THREADING WITH EASE
- After flash, lower the angle and advance slightly, before threading catheter off the needle
- Avoid the push-pull technique when advancing
- Maintain traction on the skin

RETRACTING THE NEEDLE
- Make sure to place digital pressure beyond the tip of the catheter
- Make sure needle is not being inadvertently bent while attempting to activate the button

MINIMIZING THE BLOOD
- Release tourniquet before pressing the button
- Place digital pressure beyond the catheter tip
- Have IV connector or tubing close by and ready

AVOID EARLY ACTIVATION
- Be aware of where your fingers are
- Remove needle cover in a straight, outward motion
Appendix B

See Also http://solutions.3m.com

Applying 3M™ Tegaderm™ IV Transparent Film Dressings with Border

Application:

1. Open package and remove sterile dressing.
2. Remove the center panel and place on sterile field. The tape strips will remain attached to this piece (Figure A).
3. Peel the liner from the dressing, exposing the adhesive surface (Figure B).
4a. When using Tegaderm™ IV transparent dressing #1633: Position the dressing so the notch fits snugly around the cannula port and under the hub (Figure C). The reinforced tabs of the dressing will help to secure the cannula. The tabs can be overlapped slightly to provide additional stabilization and cushioning under the catheter hub.
4b. When using Tegaderm™ IV transparent dressing #1635: Position the transparent portion of the dressing so that it is centered over the insertion site, while holding the notched portion off the skin (Figure C).
5. Overlap the tabs under the catheter to form a tight seal around the catheter or lumens (Figure D).
6. Slowly remove the frame while smoothing down the dressing edges (Figure E). Seal the edges of the notch and smooth the dressing from the center toward edges using firm pressure to enhance adhesion.
7. Record information on the documentation label, then place the label on or near the dressing (Figure F).

The sterile tape strips can be used:
• Under the catheter wings or hub — to protect the skin
• Over the catheter wings or hub — to enhance catheter stability
• To secure IV tubing or to stabilize catheter lumens