Venepuncture & Peripheral Intravenous Cannulation Learning Package

To be used in conjunction with:

- CHHSD-Clin-Infec-412-V1.06/15: Sharp Injuries and Body Fluid Exposure
- Queensland Health Ensuring Correct Patient, Correct Site and Side, Correct Procedure (3Cs)
Statement of Indemnity

Queensland Health does not accept any responsibility for the use of this material outside of the scope for which it has been designed and outlined in the appropriate curriculum document.

Version Control

This is Version 2.1 of the Venepuncture and Peripheral Intravenous Cannulation Resource Package and will remain current until 2019 – or until modification required. The current version will be available for access on the CHHHS Intranet.

Authors

Documents utilized to create this learning package include:
RBWH; Peripheral Intravenous Cannulation Resource Package Version 2.1 with permission from Barbara Hewer (CNC Vascular Access Devices)
Pathology Queensland Specimen Collection Service Venepuncture Self Directed Learning Package for Medical and Nursing Staff.

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Introduction

This learning package covers preparation for Registered Nurses, Midwives and Enrolled Nurses, who are required to obtain competency in peripheral venepuncture and/or peripheral intravenous cannulation (PIVC). Commitment is required to complete the process within 6 months of commencement to ensure standards of practice. Newly appointed nursing staff, employed in the phlebotomy department, with no previous qualifications are required to complete the Venepuncture section and associated assessments.

The aim of this package is to educate health professionals in the theoretical and clinical skills required to perform safe and effective peripheral venepuncture and peripheral intravenous cannulation (PIVC) in accordance with procedures, relevant state and national guidelines and within their own scope of practice. The process of RPL can be applied to acknowledge prior skills and knowledge (See Recognition of Prior Learning section).
Objectives

At the completion of this Resource Package the participant will be able to:

- Outline the environmental safety and legal aspects related to venepuncture and peripheral intravenous cannulation.
- Demonstrate appropriate documentation of peripheral intravenous cannulation (PIVC), care and maintenance practices.
- Discuss and apply the principles of Hand Hygiene and Aseptic Technique to venepuncture and PIVC.
- Describe and locate the position of peripheral veins and correctly identify the appropriate vein for venepuncture and PIVC.
- Identify precautions and contraindications to venepuncture
- Demonstrate safe collection of blood samples.
- Identify the indications and contraindications/restrictions for peripheral intravenous cannulation.
- Correctly complete an assessment of a patient’s cannulation requirements:
  - Assess patient venous access, identify restrictions and determine appropriate cannula and insertion site for relevant therapy/departmental needs.
- Demonstrate appropriate documentation of PIV cannulation, care and maintenance practices.
- Recognise local and systemic complications associated with PIV therapy and initiate strategies to minimise injurious/detrimental patient outcomes.
- Discuss and provide appropriate patient education to support cannula care and maintenance.
- Identify the clinical indications for removal of a peripheral intravenous cannula.

On completion of the practical component the participant will be able to:

- Demonstrate effective PIVC technique.
- Demonstrate effective cannula site inspection, care and maintenance, including dressing and flushing techniques.
There are four (4) sections to this resource package:

- SECTION 1: General Theory with readings
- SECTION 2: Peripheral Venepuncture
- SECTION 3: Peripheral Intravenous Cannulation
- SECTION 4: Appendices (Comprising all assessment tools)

**Assessment**

The assessment component of this learning package comprises successful completion of the relevant theory examination and clinical assessments tools (CAT) as identified throughout the resource package. The completion of this package endorses the venepuncture and cannulation of adults and children 12 years and over. Paediatric venepuncture and cannulation requires further assessment. Contact the Paediatric Nurse Educator for further information.

Additional practice and direct supervision may be required until both confidence and competence is demonstrated.

**Evaluation Method**

**Process Indicator**

1. All patients requiring venepuncture will have their blood collected by health professionals who are trained appropriately and assessed as competent.
2. All patients with a peripheral intravenous access device will be cannulated by health professionals trained, and assessed as competent.

**Outcome Indicator**

3. Timeliness of blood collection and PIVC insertion(s) – response times
4. No delays in treatment – measured by intravenous therapies given on time, no missed doses.
Recognition of Prior Learning (RPL)

In accordance with the QH Recognition of Prior Learning (RPL) Guidelines (2009), Registered Nurses/Midwives applications for RPL are progressed through the Nurse/Midwifery Educators. An assessment of peripheral venepuncture and/or practical cannulation skill by a qualified assessor needs to be undertaken.

**Process of application for RPL – Nurses/Midwives**

1. Provide supporting evidence. The following are examples of supporting evidence which may be included with the submission:
   - Certificate of Achievement
   - Log Book of Practice
   - Facility Based Electronic Database Record of Competency Achievement
   - Course Outline/Training Booklet
   - Document of Attainment

2. Practical Assessment.
   - Completion of relevant CSAT
SECTION 1 – General Theory

1.1. Environmental Safety

Standard precautions should be used for all interactions with patients. Transmission Based Precautions should be used for patients that require them and this should be indicated by the signage in the patient’s area. Gloves must be worn when in contact with blood / body fluids, mucous membranes or non-intact skin of all patients. Protective eyewear or face shields must be worn during procedures that may generate droplets of blood or body fluids. Gowns or aprons must be worn during procedures likely to cause splashes of blood or body fluids.

In the event of sharp injury and/or body fluid exposure, the CHHHS Sharps Injuries and Body Fluid Exposures Procedure is available at: http://qheps.health.qld.gov.au/cairns/docs/pro_sharps_injuries.pdf

- Carry out immediate first aid (i.e. wash affected body part with soap and water or irrigate eyes with normal saline/water for at least 30 seconds)\(^8\).
- Contact infection control during business hours. Out of hours attend the Emergency Department.
- Report the incident to supervisor and complete a Workplace Incident Report.

1.2. Legal Considerations

Peripheral venepuncture and PIVC are invasive procedures requiring consent by the client. Consent can be verbal, written or implied. In order for consent to be valid it must be given:

1. Voluntarily
2. With knowledge of nature/risks/alternatives of proposed procedure/treatment
3. By the client who has capacity to give consent

The consent process may be overridden if the patient is in a life threatening situation and unable to give consent.

A patient has the right to decide what is appropriate for them, taking into account their personal circumstances, beliefs and priorities. This includes the right to accept or to decline the offer of certain healthcare and to change that decision\(^8\).

Prior to the procedure, the health professional must check the following:

- Patient consent has been completed and correct matching of patient with their intended treatment.
- Patient has a current medical order.
- Identify any restrictions to venepuncture or cannulation.
- All required equipment is available, and that you are familiar with the use of equipment according to manufacturer’s guidelines. Use equipment with consideration to expiry date (if applicable).
- Provide patient education

Complications relating to peripheral venepuncture and PIVC are considered adverse events and should be documented in the patient’s medical record and recorded on PRIME.
Reading 1

Access and read the following:
CHHHS Procedure for Informed Consent
Guide to Informed Decision Making in Healthcare

1.3. Hand Hygiene

Hand hygiene should be undertaken as part of the Hand Hygiene Australia ‘5 moments for hand hygiene”. Hand hygiene before performing venepuncture or cannulation insertion is arguably the most important moment to prevent the direct introduction of pathogens into the bloodstream. The use of gloves does not obviate the need for hand hygiene. Patients and their carers also may require education about the importance of hand hygiene. Health professionals should wash their hands with an antiseptic-containing soap solution or use an alcohol-based hand rub:

The procedure for venepuncture and cannulation

1. Before cleansing of general aseptic field e.g. trolley or work surface
2. Before opening packets and preparation of equipment
3. Before donning gloves for procedure
4. After removal of gloves following the procedure
5. At completion of disposal of waste

Reading 2

Good hand hygiene plays an integral component to the safety of our patients. Read the following Queensland Health CHRISP guidelines and 5 moments for hand hygiene
CHHHS Hand Hygiene Procedure
Hand Hygiene Australia 5 moments for hand hygiene

1.4. Aseptic Technique

Aseptic Technique reduces the risk of health care associated infections and has been shown to significantly improve the practices of clinicians performing procedures and reduce the risk of infection. It is required for all invasive procedures. Healthcare Associated Infections are infections acquired in healthcare facilities and occur as a result of healthcare interventions, they are caused by the transfer of pathogens to a patient during a healthcare intervention.
Correct Aseptic Technique prevents contamination and transfer of pathogens from hands, surfaces and equipment to the patient during procedures. This is achieved by:

- Identifying key parts and key sites and protecting them at all times
- Ensuring key parts only come into contact with other key parts and/or key sites.

Key sites include any non-intact skin and insertion or access sites for medical devices connected to the patient e.g. site for venepuncture and cannulation.

Key parts are the sterile components of equipment used during the procedure e.g. cannula, extension set, syringe.

To prevent contamination of the key parts they must be kept sterile by using the following strategies:

- Hand Hygiene as per Moment 2, including prior to equipment set up and preparation of an aseptic field.
- Non touching the key parts
- Ensuring sterile equipment is maintained in its packaging until ready to commence procedure
- Assessing the need for a general aseptic field, or depending upon the extent of the procedure and associated sterile components, whether a critical aseptic field is required.
- Controlling environmental factors such as wind, patient interference, patient curtains etc
- Safe sequencing of the procedure to protect key parts until use.

Reading 3

Access and read the following:

CHHS Aseptic Technique Procedure

1.5. Anatomy and Physiology Overview

Knowledge of the relevant anatomy and physiology is essential when undertaking venepuncture and PIVC. The following section provides a brief overview. For more detailed information, it is recommended that the appropriate section of a contemporary textbook be reviewed.

1.5.1 Veins and Arteries – Differences

ARTERIES

- Three (3) layers.
  1. Tunica Intima/Interna (innermost layer, smooth layer of endothelial cells to maximise blood flow);
  2. Tunica Media (middle layer of muscle, elastic tissue, and nerve fibres. Does not collapse);
  3. Tunica Adventitia/Externa (outer layer, supports vessel, thicker in arteries).
- Strong, elastic-walled vessels which carry blood away from the heart, for distribution to capillary beds.
- Generally lie deep in the tissue, usually well protected by muscle.
- Pulsate as result of the high pressure in the arterial system.
- Occasionally, arteries are located in an unusual place. Naturally occurring, these are known as aberrant arteries.\(^{10}\)
VEINS

- Same three layers as arteries.
  1. Tunica Intima/Interna (Intima forms valves in veins to prevent backflow);
  2. Tunica Media (Not as strong or stiff in veins, surrounded by an elastic membrane, tendency to distend or collapse as pressure rises and falls); and
  3. Tunica Adventitia/Externa (Thinner in veins).
- Return non-oxygenated blood to the heart using passive pressure.
- Generally superficial, easily accessed.
- Do not pulsate.11

1.5.2 The differences between veins and arteries include the following qualities:

<table>
<thead>
<tr>
<th>VEINS</th>
<th>ARTERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contain dark red blood</td>
<td>Contain bright-red blood</td>
</tr>
<tr>
<td>Have a slow blood return</td>
<td>Have a rapid pulsating blood return</td>
</tr>
<tr>
<td>Have a superficial location</td>
<td>Are deeply located, surrounded by muscle</td>
</tr>
<tr>
<td>Contain valves</td>
<td>No valves</td>
</tr>
<tr>
<td>Multiple veins drain an area</td>
<td>A single artery supplies an area</td>
</tr>
</tbody>
</table>
Figure 1: Venous anatomy

Venous Anatomy - Herston Multimedia Unit, RBWH, 2010

Figure 2: The arm and hand veins

Arm and Hand veins - Herston Multimedia Unit, RBWH, 2010
Figure 3 - Variants of Subcutaneous Veins

1. Basilic
2. Antebrachial basilic
3. Basilic hiatus
4. Anterior branch of the medial antebrachial cutaneous nerve
5. Ulnar branch of medical antebrachial cutaneous nerve
6. Cephalic vein
7. Lateral antebrachial cutaneous nerve
8. Median cubital vein
9. Deep median cubital vein
10. Antebrachial cephalic vein
1.6 Condition of the Vein

Palpating a vein is important to determine its condition and viability. Press lightly with one or two fingertips over the vein then release to assess elasticity and rebound filling. The textbook vein should feel round, firm, full and rebounding. Ideally it should not be hard (corded), stringy or knotty on palpation. Finding the textbook vein can be extremely difficult as a patient's co-morbidity worsens. Therefore it is important to identify the most ideal vein for the purposes of the treatment\(^\text{12}\).

Patient assessment is also integral to the decision making because medical history and diagnosis can allude to potential site or vascular problems. If the patient is dehydrated then the veins will feel flat and non-rebounding albeit will be much more difficult to access so consider whether patient might be able to drink a few glasses of water to improve intravascular volume.

Cigarette smoking has a direct effect on the vascular system causing vasoconstriction. To optimise insertion wait at least 30 minutes post last cigarette (if non urgent). Patient anxiety is not to be underestimated as it can cause vasoconstriction or venous spasm and compromise insertion. Uses of relaxation techniques are very effective in venous dilation so time should be taken to implement these strategies\(^\text{13}\).

1.6.1 Vein Selection

When considering which vein to use, consider the following:

- Accessibility of the vein
- Absence on underlying artery of tendon
- Size of the vein – important for venepuncture in determining the volume of blood required and for PIVC in determining cannula size
- Stability of the vein – deeper veins are more stable than surface veins. Veins need to be anchored firmly before puncture.
- Patency – avoid veins that feel hard and fixed as they are likely to be thrombosed and occluded.

To maximise the potential for successful insertion, close visual inspection of the upper and lower arm and hand prior to application of the tourniquet is recommended. Always ask the patient if they have any preference to a particular side as assumption can lead to a dissatisfied patient and unnecessary venepuncture. Simple questions can illicit helpful information that might otherwise not be known.

1.7 Restrictions to Insertion Site

Before accessing a patient's veins the following restrictions to be taken into consideration:

- AV fistula – avoid accessing the arm with fistula
- Mastectomy and axillary clearance – avoid accessing limb on operated side as in the absence of lymph flow the patient is susceptible to infection and thrombosis
- Diabetic Patient – avoid accessing their feet
- Oedematous limbs
- Damaged sclerosed or occluded veins
- Burned, infected or scarred areas should be avoided
- Bruising – do not select sites where obvious bruising has occurred.

1.8 Simple measures to make venepuncture and cannulation easier

- Position the patient’s arm below level of heart to encourage capillary filling or instruct patient to lower limb over the edge of the bed (can also raise head of bed slightly).
- Make sure the patient is warm – wrap arm in warm towel; keep limb under bedclothes or apply warm pack.
- Ask the patient to close their fist (no fist pumping action if taking bloods).
- Provide hot drinks to support dilatation of veins.
- Position the tourniquet within 15cm of the insertion site
  - The tourniquet should be on soft fleshy part of arm (not over bony prominences).
  - Ensure the tourniquet is tight enough.
- Raise the bed to stance height.
- Encourage relaxation techniques for anxious patient.
- Provide calming measures for Trypanophobia (Needle Phobia)\(^\text{14}\).

Avoid tight fist clenching or repetitively opening and closing the fist to prevent pseudohyperkalemia (serum potassium is falsely elevated).

1.9 Relaxation Techniques

Prior to the invasive procedure discuss with the patient their level of anxiety or phobia as panic or vaso-vagal reflex during the invasive procedure may compromise patient and health professional safety. Needle phobia is a defined medical condition which goes far beyond a simple fear of needles and therefore deserves treatment just as any other medical condition\(^\text{14}\). The patient may even suggest that they require an anxiolytic in which it will then require time to take effect. An additional health professional may be able to provide distraction during the procedure. Local intradermal anaesthetic may also be offered however if needle phobia contradicts this then a topical local anaesthetic may be more appropriate (if available). If a topical antiseptic has been applied it must be cleaned off with soap and water prior to venepuncture or cannulation.

Quickly appraise the patient and take note of their body demeanour as this will give an indication of the level of relaxation. An obvious sign of anxiety is the white knuckled grip which indicates muscle tensing. As this is a contributor to insertion failure, it is of value to implement relaxation strategies.

Subsequently, ask the patient to make a conscious attempt to breathe more evenly, slower and slightly deeper throughout the procedure as this provides distraction as well as relaxation. A warm pack can be applied prior to the procedure. However this is only a local measure and the vein may spasm again as soon as the needle penetrates so this strategy can have varying levels of effectiveness.
During the procedure anxiety and catheter related venous spasm can prevent the cannula from advancing along the vein. Relaxing the patient can be the difference between successful and unsuccessful cannulation.

Post insertion; take the time to discuss how these strategies worked for the patient so that they may be effective for future procedures.

1.10 Only two attempts
A practitioner is only allowed two attempts at venepuncture or cannulation. If unsuccessful on the second attempt a more experienced practitioner is to be called to undertake the procedure.

SECTION 2 – PERIPHERAL VENEPUNCTURE
The purpose of venepuncture for blood specimen collection is to enable haematological and/or biochemical analysis. Pathology tests can be ordered via ieMR if at Cairns Hospital or on paper request forms if in the district facilities.

2.1 Specimen Collection via Request Forms
Request form must contain the following legible information
- Client’s full name
- Client’s identification number
- Date of birth
- Sex
- Date of collection
- Laboratory test required
- Name and signature of the Medical Officer/authorised person requesting the test
- Ward/ Unit
- Drug information if applicable
- Fasting status
- Relevant clinical notes

A client identification label is preferred for the request form.

Reading 4
Review the following documents regarding request forms:


On completion of specimen collection the collector must complete the following:
- Time of collection
- Date
• Signature
• Full name
• Any relevant drug doses and time of last dose given
• Fasting status if applicable

2.1.1 Contaminated Pathology Request Forms

Contaminated request forms must be placed in biohazard bags and photocopied. Discard the original contaminated form and use the photocopied form in the normal manner. Make a note on the photocopied request that the original was contaminated\textsuperscript{15}.

2.12 Specimen Collection via ieMR

Please refer to appendix 1.

2.2 Client identification and Consent

Specimens must not be collected until a positive identification of the client has been established and informed consent has been obtained. Misidentification of specimens can result in serious medical and legal consequences.

• Always ask the patient “What is your name?” NOT “Are you Mrs Jones”
• Always ask the patient “What is your date of birth?”
• Always check an inpatients ID band for the patient’s name and UR number.
• Both name and ID checks must be done on all inpatients.
• All details of the patient ID must correspond to the request form\textsuperscript{15}.

2.3 Specimen Identification

All specimens are to be labelled at the client’s bedside immediately after the blood samples have been collected. Labelling specimens before blood collection or at a period of time delay after blood collection may result in adverse incidences.

The client details, which appear on the specimen request form, must match those on the specimen label. Specimens will not be processed if this information is not identical.

Adequate labelling includes:

• Clients full name
• Client’s identification number
• Date of birth
• Sex
• Date and time of collection
• Collectors signature
Any discrepancy between the request form and the labelled tubes will result in specimen rejection by the laboratory and a 'No test' being recorded. This could result in adverse outcomes for the client. A PRIME report should be attended to.

**Label pathology specimens correctly every time!**

*Follow the 'LAB' rule*

<table>
<thead>
<tr>
<th>L</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Look</td>
<td>Ask</td>
<td>Bedside</td>
</tr>
<tr>
<td>at patient’s nameband (check identification details)</td>
<td>patient to recite their full name and date of birth (double check identification details)</td>
<td>labelling (label specimen with identification details before leaving patient’s bedside)</td>
</tr>
</tbody>
</table>

**Check the specimen**

- All specimens must have a minimum of two identifiers:
  1. patient’s full name (surname and given name)
  2. date of birth or medical record (UR) number
- All specimens should have the date, time of collection, and signature of the collector on the specimen.
- Transfusion specimens must have the date, time of collection, and signature of the collector on the specimen.

**Check the request form**

- All specimens must be accompanied by a request form.
- All request forms must have a minimum of three identifiers:
  1. patient’s full name (surname and given name)
  2. date of birth
  3. address or medical record (UR) number or Medicare number.
- All request forms must be signed by the requesting medical officer or authorised delegate.

**Avoid dangerous practices**

- Do not assume you know the patient’s identification details without checking each time.
- Do not assume a sticky label from the patient’s chart is their own.
- Do not take unlabelled specimens away from the patient.
- Do not ‘pre-label’ specimen tubes prior to collecting the specimen.
- Do not label a specimen which you did not personally collect or directly observe being collected.

Mislabelled specimens can cause:
- fatal blood transfusions
- wrong diagnosis and treatment
- painful and embarrassing repeat collections.

2.4 Equipment

Blood collection tubes

Different blood collection tubes are required for different pathology tests. Cairns Hospital are using the tubes on recognition chart 1 and the rural facilities and non ieMR areas are using recognition chart 2. For further information contact the local hospital laboratory. Refer to the chart appropriate for your clinical area:
Figure 5 Blood tube recognition chart 2  
Order of draw
To avoid test result error due to additive carryover samples need to be collected in a particular order

1. Blood Culture Bottles (Green top first and Orange top second)
2. Blue Citrate tube
3. Red Serum tube
4. Green Lithium Heparin tube
5. Pink EDTA tube
6. Mauve EDTA tube
7. Grey Fluoride Oxalate tube


Warning: When using winged collection equipment and a coagulation test is the first tube required, the line will need to be primed with blood to ensure the correct collection volume. Otherwise air will enter the tube resulting in an incorrectly filled coagulation test tubes will be ‘no tested’ by the laboratory as these give inaccurate results.

Blood collection equipment
The evacuated system is the recommended system for blood collection. It is least likely to cause the healthcare worker a needle stick injury and exposure to blood borne viruses.

The current equipment stocked by CHHHS is:
- Vacutainer flashback blood collection needle
- Vacutainer push button collection set
- Varying vacutainer holders and vacutatiner transfer devises

The syringe and needle method should only be used to collect blood from patients with more difficult veins. A transfer device must be used to transfer the blood from the syringe into the tubes to reduce the risk of a needle stick injury.

All methods include the use of the following:
- Gloves
- Tourniquet
- Kidney dish
- Chlorhexidine and alcohol wipes (swab sticks for blood culture collection)
- Laboratory request form/ ieMR order
- Specimen tubes and bottles
- Sharps container and rubbish bag
- cotton ball/gauze and tape, IV pressure pad only if indicated.
- Specimen bag
- Safety glasses
- Other PPE if appropriate

All items can be found on the IV trolley.

An IV pressure pad is a round adhesive with a haemostatic pad. The 3mm thick round pad is highly absorbent and creates a compression effect which results in bleeding stopping quickly. The IV pressure pad should not be used routinely and only be applied if pressure is required to stop bleeding in high risk patients. The pressure pad must be removed after the bleeding has stopped and within 20-30 minutes as the pressure pad can cause pressure injuries if left on for extended periods of time.

2.5 Considerations when Performing Venepuncture

2.5.1 Sites

The most ideal sites for venepuncture are the cubital fossa vessels of the arm, where the median cubital, cephalic and basilica veins lie close to the surface of the skin and are most prominent.

The use of an arm with IVT for the purpose of venepuncture should be avoided. If blood is drawn from a vein above the point of IVT there is the risk of the blood sample being contaminated with IV fluid. Ideally use the other arm however when no other option exists turn off the IVT for a minimum of 3 mins and note the site and details of IVT on the request form\textsuperscript{15}. If a client has a heparin infusion running the IV infusion must be turned off for 10 minutes if an APTT is being collected. Once collection is complete ensure the infusions are recommenced.
2.5.2 Positioning

Patients should not stand or sit on high stools during the procedure due to risks of fainting. A reclining position is preferred.

2.6 Tourniquet

The use of the tourniquet makes the veins more prominent and easier to puncture due to venous filling. The tourniquet should not be left on for greater than a minute as this is not only uncomfortable but also causes haemoconcentration (blood concentration of large molecules i.e.: proteins, cells and coagulation factors). The tourniquet should not be placed over wounds or burnt skin.

Apply the tourniquet immediately before the venepuncture and loosen as soon as blood flow is established. The patient may clench their hand whilst the tourniquet is applied so as the collector can locate the vein, but they must not excessively clench and unclench their hand as this leads to haemoconcentration.

NB: Some blood tests require that a tourniquet not be used, for example ionised calcium levels. There is the potential for detrimental effects of treating incorrect ionised calcium levels due to incorrect collection. Refer to pathology department for collection procedure.

2.7 Venepuncture Procedure

1. Perform hand hygiene
2. Identify patient, explain procedure and gain consent.
3. Review request form and gather appropriate equipment. Prepare equipment utilising aseptic technique.
4. Dons safety glasses.
5. Perform hand hygiene.
6. Apply tourniquet and locate a suitable vein. Release tourniquet.
7. If skin is visibly dirty or topical anaesthetic has been used cleanse site with soap and water and dry.
8. Don gloves.
9. Disinfect skin over intended venepuncture site using a Chlorhexidine and alcohol wipe or swab stick if collecting blood cultures. Allow to dry.
10. Reapply tourniquet above selected site.
11. Grasp the patient’s arm firmly, below the chosen site using your finger to anchor the vein and draw the skin tight.
12. With the bevel up insert the needle into the vein at the angle of approximately 15 degrees.
13. Hold the vacutainer barrel firmly with one hand while the other depresses the tubes in correct order of draw. If using syringe method hold the syringe steady and slowly pull back on the plunger and allow the barrel of the syringe to fill with blood.
14. Release tourniquet when blood starts to flow.
15. After all tubes are collected withdraw needle in one swift movement. If utilizing BD Vacutainer Push Button Blood Collection Set activate the safety device whilst in the vein.
16. Apply cotton ball/gauze dressing or IV pressure pad only if indicated.
17. Instruct patient to keep pressure on site.
18. Dispose of all sharps and contaminated equipment. Sharps must never be recapped. If you have used syringe method dispose of sharp using the needle-notching facility on the sharps container and attach syringe to a blood transfer device and fill tubes. The blood transfer device is the only device to be utilized to fill blood tubes – not a standard needle and syringe.
20. Remove gloves and perform hand hygiene.
21. Label all tubes and fill in request form. Place tubes and form in specimen bag.
22. Perform hand hygiene.
23. Check site to ensure bleeding has stopped and remove tourniquet.
24. Perform hand hygiene.
25. Ensure specimen reaches pathology in a timely manner.

2.7.1 Blood Culture Collection

Blood culture sets comprise of one Aerobic (green top) and one Anaerobic (orange top) fan bottle. Each bottle needs to be inoculated with 10mls of blood (follow graduations on the side of the bottle). Blood culture bottles need to be collected first in the order of draw, aerobic first and anaerobic second.

Additional equipment required to perform blood culture collection is a vacutainer bell adapter and a chlorhexidine and alcohol swab stick.

After step 4 of venepuncture flip off the caps of the blood culture bottles, wipe each with a new chlorhexidine and alcohol wipe; cover the rubber diaphragm with a new chlorhexidine and alcohol wipe for a minimum of 30 seconds. Disinfect the skin over the proposed venepuncture site using firm pressure and a scrubbing motion using the chlorhexidine and alcohol swab stick. Allow 30 seconds to dry. Continue with venepuncture procedure from step 9.

Each bottle must be accurately labelled with name, date and time and site of each collection. If a patient identification sticker is to be used, the sticker is not to be placed over the bar code or the bottom of the bottle.

Blood cultures should never be collected through PIVC even if they have been newly resited due to the increased rate of blood culture contamination at the time of collection. If blood cultures are taken from a CVAD it must be clearly identified (including lumen colour) on the bottles and request form. An additional set of cultures should be taken from a peripheral vein.

2.7.2 Unsuccessful Venepuncture

There are several reasons why you may be unable to obtain a specimen including the following:

- The needle was not inserted deep enough. Push in slightly on the needle holder or syringe.
- The bevel was against the wall of the vein (Figure 7). Slowly rotate the needle holder or syringe and the blood should start to flow.
- The needle was inserted through the vein (Figure 8). Pull back slightly on the needle holder or syringe.
- The vein was not adequately secured which resulted in the vein ‘rolling’ to the side.
• The vacuum was lost from the tube. Remove the tube and replace with another.
• If air bubbles appear in the blood carefully push the needle a little further into the vein.
• The needle is not in the vein. Withdraw the needle slightly still ensuring the needle opening is under the skin, palpate the vein as it may have moved to one side, advance the needle into the vein.
• The needle may be resting on a valve, withdraw the needle slightly.

2.7 Complications of Phlebotomy

As venepuncture is an invasive procedure there are a number of complications that can occur.

2.7.1 Haematomas

A haematoma is caused by blood leaking into the tissues. This can happen in the area around the puncture site if:

- The needle has gone completely though the vein.
- The bevel opening of the needle is only partially in the vein, or
- Insufficient pressure is applied to the site after the puncture.

If a haematoma begins to form, release the tourniquet and remove the needle immediately. Cover the puncture site with an IV pressure pad and apply pressure with the finger. You may need to apply a cold pack or ice to help reduce swelling.

Patients on anticoagulation therapy are at greater risk of haematoma formation and require pressure to be applied for a longer period of time.

2.7.2 Fainting

In some patients venepuncture may evoke an emotional response which can result in the patient fainting. Many people become dizzy and faint at the thought or sight of blood. Always ask patients before undertaking venepuncture if they have experienced syncopal episodes in the past and ensure your patient is lying down. If a patient feels faint remove the needle ensuring sharps are secure. Provide reassurance to your patient and encourage them to breathe deeply and allow the patient to lie down.

If a patient faints, losing consciousness, call for assistance and place them in the recovery position. Ensure their airway is clear and breathing continues until they regain consciousness.

2.8 Clotted Specimens

Specimens may clot for the following reasons:
- The tubes are under or over-filled.
- Failure to adequately mix additives – ensure tubes are inverted correctly especially if the collection has been slow.
- Blood may clot if the collection is difficult and slow. Activation of the clotting cascade can lead to inaccurate results.
- Collection tubes have an expiry date, always check the date before use.

Clotted specimens will require recollection.

2.9 Assessment

- If you are only undertaking your phlebotomy competency please complete part A of the multi-choice exam and hand in to your relevant Nurse Educator for marking, an 80% pass mark is required – see appendix.
- Attend a practical session to perform simulated venepuncture and complete the Clinical Assessment Tool (CAT) – see appendix
- Once you have successfully completed the CAT you are able to practice supervised by a practitioner with at least two years phlebotomy experience until confident and competent in the clinical environment.
SECTION 3 - PERIPHERAL INTRAVENOUS CANNULATION

The health professional should always ensure that a peripheral cannula is the most appropriate vascular access device for the patient’s treatment journey. Queensland Health 3C’s policy indicates it must be the correct procedure therefore if it’s not appropriate for the treatment to be administered peripherally then discuss with the medical team to refer the patient for a Central Venous Access Device (CVAD).

3.1 When would one consider PIVC insertion?

- When clinically indicated.
- Written medical order is available.
- Prescription of intravenous therapy.
- Specialised clinical unit requirements.
- When clinically indicated for replacement.
- If current PIVC has been inserted by QAS or another facility the PIVC is to be replaced upon arrival or within 24 hours.

PIVC insertion is not appropriate in the following situations:

- When patient consent is not obtained.
- When the patient refuses.
- Without inserter competency.
- When cannulation is likely to compromise the patient.

3.2 Reasons for PIVC Insertion

- To administer fluids and electrolytes.
- To transfuse blood and blood products.
- To administer continuous or intermittent medication.
- In an emergency e.g. to stabilise the patient’s condition.
- To maintain a route to administer contrast media or general anaesthesia.
- Clinical indication, e.g. seizure, telemetry.
- Inter hospital transfer (flights).

3.3 Vascular Access Device Selection

Consideration must be given to the purpose of the peripheral device, therefore the cannula and its insertion site must be chosen carefully to maximise patient care outcomes, and minimise potential complications. The choice of cannula is dependent on the following factors:

- Length of dwell time.
- Purpose of therapy.
- Type of therapy.
- Patient's age (in particular vein condition).
**Recommendation** – PIVC are an immediate, but short term solution: If the patient requires a longer term treatment consideration should be given to a Peripherally Inserted Central Catheter (PICC) or other long term device such as midline or Central Venous Access Device (CVAD)\(^\text{17}\). This is a patient focused approach to ensure the patient is not over cannulated and prevent complications in the long term.

### 3.4 Cannula Size does Matter.

The smallest gauge, shortest length catheter/cannula should be chosen when the above considerations have been taken into account to increase haemo-dilution and reduce risk of patient complications.

#### 3.4.1 Are you Gauging Correctly?

Every movement of the cannula causes direct impact to the intima, with inflammatory consequences, therefore keep it as small as possible. A smaller / shorter cannula also allows for better haemodilution therefore less risk chemical phlebitis. Large cannula block the vein, and promote pockets of eddies and stagnation, which are likely to promote clot formation\(^\text{17}\). Peripheral catheters larger than a 20 gauge are more likely to cause phlebitis.

Cannula size should be considered in conjunction with the purpose of the therapy (see 3.2) vein size and vein site availability. As even small cannulae have relatively high flow rates for crystalloids, there is no reason to ‘automatically’ insert a large bore cannulae\(^\text{12}\). See chart below:

**Flow Rates**

<table>
<thead>
<tr>
<th>Gauge</th>
<th>Flow Rate [average ml/minute]</th>
<th>Intended Purpose</th>
</tr>
</thead>
</table>
| 14g Orange | 330 | - Rapid transfusion  
- Resuscitation areas e.g. DEM OT, ICU  
- Life threatening situations  
- Trauma patients  
- Large volume replacement |
| 16g Grey | 215 | - Rapid Transfusion  
- Trauma patients  
- Major surgery  
- Blood products – Large volume transfusions (e.g. GIT bleeds)  
- Intra-partum or post-partum haemorrhage |
| 18g Green | 105 | - Surgical patients  
- Large volume blood products or fluids (e.g. ED, ICU, OT, Birth Suite) |
| 20g Pink | 65 | - All purpose general use (e.g. antibiotics, fluids, medications)  
- Cardiac patients  
- Administration of IV contrast  
- Blood products (including intragram, albumin)  
- Viscous products (e.g. cyclosporine, albumin, IGG)  
- Surgical (i.e. minor, day surgery) |
| 22g Blue | 35 | - All purpose general use (e.g. antibiotics, fluids, medications)  
- Paediatric patients  
- Adults with smaller or compromised veins |
3.5 Selection of site

Areas near joints should be avoided particularly if the impending infusate is a vesicant as it can cause serious and permanent damage. Veins which have had recent use, have been injured or infiltrated, are bruised, red or swollen should be avoided. Choose insertion sites in the forearm to increase dwell time, decrease complications, promote self-care and prevent accidental removal. The vessel should be verified as a vein and not an artery.

3.5.1 The following sites should be avoided:

- Extremities pre or post surgical procedure.
- Joints and areas of flexion.
- Sites located under or adjacent to restraints.
- The limb affected by a mastectomy, axillary clearance, oedema, or blood clot. If patient has had a bilateral mastectomy with nodal clearance the registrar of the treating team is to be contacted regarding suitable access.
- The patient's dominant hand – where possible.
- A site that may interfere with the patient's activities of daily living, if possible
- Near skin lesions e.g., wounds and sores.
- An arm with an arteriovenous fistula – absolute contraindication, except in extreme emergencies.
- Veins of the inner wrist (Volar Aspect) due to risk of structural damage e.g. Potential damage to flexors as vein walls thinner.

3.5.2 Guide to Selecting Correct Vein and Gauge Size

<table>
<thead>
<tr>
<th>Vein</th>
<th>Position</th>
<th>Cannula Size</th>
<th>Specific Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorsal Venous Network of Hand</td>
<td>Most distal veins. Lie on top of hand.</td>
<td>24-22 gauge</td>
<td>Easy to visualise/ palpate but are more liable to block and difficult to stabilise. Allows for successive sites to be proximal. Not ideal for vesicants.</td>
</tr>
<tr>
<td>Cephalic vein</td>
<td>Lies along lateral (thumb) side of arm.</td>
<td>22-14 gauge</td>
<td>Large, easy to stabilise &amp; easily accessible. Good choice for irritating solutions &amp; blood products</td>
</tr>
<tr>
<td>Basilic vein</td>
<td>Large vein. Lies along medial (little finger) side of arm. Palpate easily.</td>
<td>22-16 gauge</td>
<td>Ideal for irritating solutions &amp; blood products – must be well stabilised as vein rolls.</td>
</tr>
<tr>
<td>Median cubital vein</td>
<td>Lies in the antecubital fossa.</td>
<td>22-14 gauge</td>
<td>Reserved for emergency access, blood collection or Peripherally inserted Central Catheters (PICCs).</td>
</tr>
<tr>
<td>Median vein</td>
<td>Extends along underside of arm &amp; empties into basilic or median cubital vein.</td>
<td>24-20 gauge</td>
<td>Medium – large &amp; easy to stabilise. Easily accessible but need to be aware of vein junctions</td>
</tr>
<tr>
<td>Accessory cephalic</td>
<td>Branches off cephalic</td>
<td>22-18 gauge</td>
<td>Large &amp; easy to stabilise – another good</td>
</tr>
<tr>
<td>vein</td>
<td>vein located on top of forearm.</td>
<td>choice for irritating solutions &amp; blood products</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------------------------</td>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Upper cephalic vein</td>
<td>Upper arm, lateral side. Large, and often more stable vein due to depth</td>
<td>22-16 gauge Can be difficult to visualise but can usually be palpated. May require longer length cannula due to depth. Usually reserved for PICC / midline</td>
<td></td>
</tr>
<tr>
<td>Upper basilic vein</td>
<td>Upper arm, medial side. Large, deep vein</td>
<td>22-16 gauge Can be difficult to visualise but can usually be palpated. May require longer length cannula due to depth. Usually reserved for PICC / midline</td>
<td></td>
</tr>
</tbody>
</table>

### 3.6 Vein Selection

*Preference should be given to a vessel that has not been cannulated previously, is easily detected by inspection and palpation, and is patent and healthy.*

As a general rule, distal veins of the hands and arms should be used initially, and subsequent insertions should be proximal to previous sites. The antecubital vein should be reserved for blood sampling and emergency access only. Consideration must be given to the relationship between vein size and cannula size. If for purposes of treatment the patient is required to have a large bore cannula and the veins available are very fine, there is then a poor relationship and alternative access should be sought.

### 3.7 Local versus Systemic Complications

Although cannulae provide necessary venous access, continued use may increase the risk of local and systemic infectious complications and can result in patient morbidity and mortality, as well as increased hospitalisation and healthcare costs. The potential for complications is always present due to the invasiveness of the procedure causing trauma to the vessel wall.

Strict adherence to aseptic technique and the appropriate care of the cannula following insertion are the most important factors to consider in reducing the risk of local or systemic infection. Removal of a cannula as soon as it is no longer required, or when the site is red or painful will also reduce the risk of complications. Follow the Queensland Health, Infection Prevention I-Care program.
3.7.1 **Insertion Complications**
- Failure to release the tourniquet – may potentially lead to circulatory problems, solution which does not flow, and can cause blood to track back into the administration set
- Haematoma - caused by initial stabbing injury
- Nerve, tendon or ligament damage - may cause impaired motor/sensory function area distal to IV site
- Venous spasm
- Phlebitis (symptoms within first 48 hrs associated with insertion)
- Bleeding
- Inadvertent arterial puncture

3.7.2 **Local Complications**
Local complications can result from mechanical problems associated with the infusion system or from trauma to the intima of the vein, and may lead to systemic complications. Regular observation is the best prevention of local complications, such as:
- **Infiltration & Extravasation** - Is the leakage and spread of fluid from the vein into the surrounding tissues.
  - If extravasation is due to crystalloid remove the cannula and elevate the limb.
  - If extravasation is due to a medication refer to pharmacy guideline before removing cannula.
- **Haematoma** – Can occur during procedure and is caused by the puncturing of the opposite vein wall during insertion which causes blood leakage into the surrounding tissues.
  - Release tourniquet immediately
  - Remove the cannula
  - Apply direct pressure
  - Application of icepacks
- **Phlebitis** – is the result of infection or localised mechanical, chemical or bacterial irritation. Signs and symptoms of phlebitis are; pain, tenderness, redness, warmth or tissue swelling at the site. Following the I-Care program will reduce the risk of phlebitis.
  - Remove the cannula
  - If purulent or serous discharge is present collect a swab for MC&S
  - Notify medical officer
  - Resite cannula if required and change administration sets
  - Document
  - Monitor site closely
- Post infusion phlebitis.
- Site infection.
- Thrombosis.
- **Thrombophlebitis** – inflammation of the vein associated with the formation of a thrombus (clot). It can be caused by direct trauma such as the cannula is too large for the vein of that the cannula has moved within the vein. Care as per Phlebitis.
• Arterial puncture – should not occur if the vein is palpated prior to cannulation and no pulse is detected. Ensure cannula is removed and pressure is applied for at least five minutes.
• Venous spasm.
• Local allergenic reaction (dressing or cleansing agent).  

3.7.3 **Systemic Complications**

Although systemic complications are uncommon, they are usually very serious and life-threatening and require immediate interventions. These complications include:

• Speed shock (foreign substance rapidly introduced into circulation).
• Allergic reaction (anaphylaxis).
• Embolism (air, thrombus) rare.
• Catheter Related Blood Stream Infections (CRBSI) – via the introduction of micro organisms at time of insertion or during administration.  

3.8 **Antiseptic Solutions**

Clean visibly dirty skin with soap and water and towel dry prior to applying the antiseptic solution. The antiseptic solution must be allowed to air dry completely prior to PIVC insertion, do not wipe, blot or fan. A contact time of 30 seconds is recommended.

Palpation of the insertion site should not be performed after the application of antiseptic, unless aseptic technique is maintained. If the health professional needs to re-establish the identification of the vein, the site should be re-prepped with the antiseptic solution and allowed to thoroughly dry. For difficult insertions it may be more effective to wear sterile gloves to support ease of palpatation of the cleansed area.  

3.8.1 **Preparations**

A solution containing 2% chlorhexidine gluconate (CHG) in ≥ 70% ethyl or isopropyl alcohol (alcoholic Chlorhexidine swab stick) is recommended for preparation of the insertion site.

3.8.2 **Patient Sensitivity and Allergy**

If the use of CHG is contraindicated, the health professional should use povidone-iodine 10% in 70% ethyl alcohol (ethanol). Povidone-iodine should remain on the skin for at least 2 minutes and until dry before inserting the catheter. If alcohol is contraindicated clinicians should use aqueous povidone-iodine 10%.

Antimicrobial ointment or creams should not be applied under the dressing at the insertion site. The use of topical vasodilators (e.g. glyceryl trinitrate) or anti-inflammatory agents (e.g. cortisone) near the insertion site is also not recommended.

Long or thick hair at the insertion site prevents adherence of PIVC dressings which leads to instability of the cannula and an increased risk of complications. Unclipped hair under PIVC dressings can cause
considerable pain upon dressing removal. Long or thick hair at the insertion site should only be removed (prior to antiseptic application), using clippers rather than blade razor as micro skin cell damage can encourage entry of bacteria\textsuperscript{18}. After hair removal the site should be washed with soap and water and dried thoroughly before proceeding.

3.9 PIVC Procedure

The set-up surface (IV trolley or tray) is considered the \textit{General Aseptic Field} therefore the inserter must clean hands with alcohol hand rub or soap and water then clean set-up area with a disinfectant wipe before gathering & assembling equipment.

\textbf{Risk Assessment:} The inserter should decide between sterile and non- sterile gloves by simply asking themselves the questions: Can I do this procedure without touching key-parts? Will I need to re-palpate the vein after disinfection?

3.9.1 \textit{Equipment needed for Insertion of PIVC}

The following equipment is required to safely perform PIVC:

- Pair of sterile or non-sterile gloves.
- Clean tourniquet.
- Disposable underpad (bluey)
- IV trolley with attached sharps container and alcoholic based hand rub
The insertion site must be visible at all times. If the patient has a tendency to pull at, or attempt to remove the cannula then use a loose non elasticised cover can be used, however visual observation of the insertion site must be completed.

3.9.2 Therapeutic Communication

- Introduce yourself to the patient.
- Facilitate a rapport with the patient (gaining trust helps the patient relax which leads to less trauma inserting the cannula).
- Provide privacy.
- Ensure the patient is comfortable:
  - Preferably the patient should be lying down;
  - Consider workplace health and safety principles when positioning the patient, i.e. position the bed to prevent the health professional needing to bend or twist (muscular skeletal protection);
  - Ensure lighting is adequate.

3.9.3 Venous Distension

- To help dilate the vein prior to application of tourniquet:
  - Allow the patient's arm to hang over the side of the bed.
- To help dilate the vein after application of tourniquet:
  - Have the patient clench and relax their fist a few times (no fist pumping action if taking bloods).
A new cannula must be selected after each attempt; the used cannula is disposed of immediately into the sharps container. A maximum of two (2) insertion attempts is permitted by all health professionals. After two (2) failed attempts the health professional must refer the patient to a more experienced/skilled health professional who has PIVC endorsement unless in an emergency situation. There may be exceptional circumstances whereby the patient is extremely difficult to cannulate and even the most skilled health professional may experience difficulty so clinical judgement must rule whether any further attempts are made or whether to seek alternate intravenous access.

**3.9.4 Procedure**

The following procedure identifies the correct steps to follow for PIVC insertion. Clinical supervision by a clinician with a current Venepuncture and Cannulation Competency and at least two years experience in venepuncture and cannulation, is required until assessment of competency has been achieved. Complete all the required patient checks prior to set-up to ensure there is available access and to minimise wastage of equipment.

**Vein Selection and Set-up**

1. Check the requirement for cannulation and for any predisposing site restrictions (e.g. mastectomy, A-V fistula, injury, open wounds).
2. Verbal patient consent is required prior to insertion, in addition to confirming patient identity both verbally and by checking patient’s identification band. This process must be documented in the patient's record as per *Queensland Health Policy – Ensuring Correct Patient, Correct Site and Side, Correct Procedure (3Cs).*
3. Check if patient has known allergies.
4. Explain the procedure to the patient.
5. Position the patient in a comfortable position that provides optimal access to the intended insertion site (lying down if possible).
6. Perform hand hygiene and then open all equipment packets, protecting key parts.
7. Perform hand hygiene and prepare equipment (priming and attaching key parts as necessary).
8. Don PPE.
9. Secure tourniquet 6-10cms above the intended site (ensure distal pulse is still palpable).
10. Select and palpate an appropriate vein for cannulation:
    - Avoid bony prominences, sclerosed, thrombosed veins;
    - Avoid the ante-cubital fossa if not an emergency situation.
    - Select a vein that can accommodate the selected catheter;
    - Select a vein that if extravasation occurs, produces the least damage;
    - Select the patient’s non-dominant arm if possible.
11. Release tourniquet.
12. Remove hair from insertion site using clippers (not shaved) if necessary to improve the adherence of the dressing. Wash the area with soap and water to clean away loose hair, dry skin.

13. Perform hand hygiene, retighten tourniquet and don gloves.

14. Cleanse the intended site with the chlorhexidine and alcohol swab stick, using a firm circular motion working from the centre outwards. The area of skin to be cleaned should be approximately 10cm x 10cm$^1$.

15. Allow skin preparation to air dry (at least 30 seconds).

N.B. If you need to palpate the vein again repeat steps 13 and 14, or use a sterile glove for palpation after skin disinfection.

**PIVC insertion**

*Insert the cannula as follows:*

1. With non-dominant hand pull skin taut below the site of insertion to stabilise the vein.
2. Puncture the skin at a 10 – 45° angle. Angle will depend on the position depth of vein in the subcutaneous tissue.
3. To increase probability of successful cannulation, enter the vein from above.
4. Confirmation of vessel entry at point of insertion will be immediate and the first flashback of blood is observed in the flashback chamber.

5. Stop and lower catheter parallel to skin to enable advancement without piercing posterior vein wall.
6. Advance the entire catheter and needle unit slightly to ensure cannula tip is in the vein.

7. Using the push-off plate, advance catheter off the needle slightly.
8. Observe second flashback of blood between the needle and catheter to confirm catheter is in the vessel.
9. Continue advancing catheter off the needle and into the vessel.

10. Release tourniquet (unless immediately collecting blood, see 3.9.6).
11. Occlude vein distal to catheter tip to interrupt flow of blood. Stabilize catheter hub to prevent catheter dislodgement.
12. Withdraw needle in a controlled and continuous motion. Passive Safety Shield automatically covers the needle bevel as it exits the catheter hub. Disposal should still be in sharps container.


14. Apply a sterile, transparent, semi-permeable, polyurethane, self-adhesive dressing over the insertion site. The insertion site should be continually visible and the dressing should be of an advanced type that has a border and extra strips for securement and a date tape. **NB:** Effective securement will help prevent infiltration, phlebitis and dislodgement and thereby increase dwell time and reduce repeat cannulations.
15. Flush cannula with 10ml 0.9% Sodium Chloride to expel blood from cannula and confirm cannula placement. Clamp the extension tubing under positive pressure to prevent reflux and clotting.
16. Observe site for signs of bleeding or infiltration.
17. Confirm with patient that cannula is comfortable.
18. Date dressing.
19. Tape must not be placed over the cannula as flow may be impeded. Do not ‘ringbark’ limb with tape as this can create a tourniquet effect.
20. Only apply a non elastic tubular bandage in exceptional circumstances otherwise the insertion site should be left visible.

21. Inappropriate disposal of waste is costly and imparts unnecessary risk to the worker. Dispose of sharps into the sharps container. Place any blood filled or blood soaked equipment into clinical waste. Other waste can be disposed of in the general waste bins.

22. Clean trolley surface/work surface with disinfectant wipe.

23. Remove gloves, perform hand hygiene.

24. Educate patient re care of PIVC.

25. Document in the patient record (see 3.10).

3.9.5 *The taking of blood during cannulation*

The Braun Introcan Safety has the ability to take blood by removing the flash plug and attaching a syringe.

- When preparing your equipment for cannulation, rotate the flash plug to loosen it slightly and allow for ease of removal before attaching syringe.
- Collect blood with 10 or 20ml syringe at step 10.
- Release the tourniquet once blood collected.
- After step 15 of PIVC insertion attach the blood filled syringe to a blood transfer device and ensure you invert the blood tubes adequately.

For further information re Braun Introcan Safety Cannulas visit the following website:


3.10 *Documentation*

Documentation must comply with the medico-legal needs of the patients, the hospital and the health professional performing the clinical skill. PIVC insertion should be documented in the patients record. Documentation should occur in ieMR or on the Cannula Care Record and progress notes, whichever is appropriate to the health service. Documentation should include

1. Date and time of insertion
2. Cannula gauge and length
3. Insertion site
4. Type of preparation used if different to chlorhexidine and alcohol.
5. Name and designation of the health professional who inserted the cannula
6. Number of attempts at cannulation
7. Indicate if local anaesthetic was used
8. Any post insertion instructions/recommendations (if applicable)
9. Consent gained

3.11 Patient Education Chart

Patients should be provided with education on symptoms of phlebitis or infection, and encouraged to alert clinicians to any changes or concerns.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Patient Education cues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why the cannula is required</td>
<td>Treatment purposes</td>
</tr>
<tr>
<td>Explain transient symptoms</td>
<td>Pain on insertion, pain initial 24hrs as invasive procedure, coldness along vein track, anxiety</td>
</tr>
<tr>
<td>that may be experienced</td>
<td></td>
</tr>
<tr>
<td>Potential complications of</td>
<td>Requirement for informed consent as invasive procedure.</td>
</tr>
<tr>
<td>having an intravenous device</td>
<td></td>
</tr>
<tr>
<td>How long the cannula is likely</td>
<td>Potential length of dwell time pertaining to current treatment regime.</td>
</tr>
<tr>
<td>to be insitu.</td>
<td></td>
</tr>
<tr>
<td>How to care for their equipment.</td>
<td>Not to disconnect, pull or kink lines. How to mobilise and protect site in shower whilst attached. Clinical judgment should be used with high 'falls risk' patients or patients who require mobilising as part of rehabilitation, as lines may need to be disconnected.</td>
</tr>
<tr>
<td>To notify the health professional</td>
<td>Pain, swelling, heat, skin colour change (blanching or erythema), induration, fluid leakage or bleeding. If cannula is dislodged or contaminated or if dressing exposed to fluid or no longer intact The health professional must also perform site assessment</td>
</tr>
<tr>
<td>of changes at insertion site</td>
<td></td>
</tr>
<tr>
<td>To notify the health professional</td>
<td>Fever, tachycardia, headache, SOB, sweating, malaise or chest pain.</td>
</tr>
<tr>
<td>of any change in wellbeing</td>
<td></td>
</tr>
<tr>
<td>To notify nurse if cannula has</td>
<td>If patient notices cannula has not been used for at least 24 hrs to flag with nurse in case it is no longer required.</td>
</tr>
<tr>
<td>not been used.</td>
<td></td>
</tr>
<tr>
<td>To remind staff to clean their</td>
<td>Patients should be empowered to assist with prevention of infection.</td>
</tr>
<tr>
<td>hands and disinfect the access port</td>
<td></td>
</tr>
<tr>
<td>prior to administration of fluids/medications.</td>
<td></td>
</tr>
</tbody>
</table>

3.12 Troubleshooting

<table>
<thead>
<tr>
<th>Problems</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missed the Vein</td>
<td>• Catheter was not inserted directly on top of the vein</td>
<td>Redirect stylet if able. Insert IV cannula directly on top of the vein</td>
</tr>
<tr>
<td></td>
<td>• Incorrect body alignment with the</td>
<td>Reposition yourself to ensure accurate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problems</td>
<td>Possible Cause</td>
<td>Corrective Action</td>
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<tr>
<td>----------</td>
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<td>-------------------</td>
</tr>
<tr>
<td>vein caused visual distortion</td>
<td>• Vein moved due to inadequate anchoring</td>
<td>visualisation of the vein - Re-anchor the vein and maintain traction on the skin without flattening vein. Flattening vein will obstruct it from view</td>
</tr>
<tr>
<td>Haematoma with insertion</td>
<td>• Angle too great</td>
<td>Decrease angle of insertion - Decrease force, slow down insertion - Lower the angle after entering the vein.</td>
</tr>
<tr>
<td></td>
<td>• Too much force</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Failure to lower the angle after entering the vein causes trauma to the posterior wall</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fragile veins due to age, medical condition, steroid use, etc</td>
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</tr>
<tr>
<td></td>
<td>• Catheter too large for vein</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Rough separation of cannula from stylet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cannula not in vein on advancement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Thrombocytopaenia</td>
<td></td>
</tr>
<tr>
<td>Catheter/cannula enters the vein (flashback evident) but will not advance</td>
<td>• May not actually be in vein</td>
<td>Confirm primary flash in needle shaft. May need to advance both cannula and stylet a little further - Use breathing relaxation techniques to relax vein. Do not force cannula as this is painful and will also damage the vessel</td>
</tr>
<tr>
<td></td>
<td>• Most common cause is venous spasm causing vasoconstriction</td>
<td>- Ensure proper assessment of vein condition prior to accessing – Remove IV cannula and choose a healthier vein - Remove the stylet. Connect syringe with normal saline, and infuse a small amount of fluid. The fluid may open the valve and free the cannula to float in OR - Pull back the catheter slightly to free from valve and float in as above. The position may be OK as is and not require further advancement (secure well though). - Lower the angle and advance again. This technique should be avoided as re-insertion of stylet can sever the cannula - Use a smaller catheter - Ensure stylet remains under the skin after separation, so that the catheter can be guided into the vein</td>
</tr>
<tr>
<td></td>
<td>• Sclerosed vein</td>
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</tr>
<tr>
<td></td>
<td>• Resistance from a closed valve</td>
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<tr>
<td></td>
<td>• Wrong angle</td>
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<tr>
<td></td>
<td>• Catheter too large for vein</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• During separation, the stylet was pulled back too far</td>
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</tr>
<tr>
<td>Certain that catheter/cannula is in vein but no flashback</td>
<td>• Hypovolaemia causing low BP therefore sluggish flow.</td>
<td>Remove stylet which may encourage flow. Attach syringe and administer small flush to ascertain patency. If vein blows up then remove cannula - A tiny clot or plug of skin can cause blockage which is easily removed by flushing</td>
</tr>
<tr>
<td></td>
<td>• Clotted immediately on vein entry</td>
<td></td>
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</tbody>
</table>

### 3.13 PIVC Review

- PIVC should be reviewed each shift and those that are no longer needed should be removed.
• The insertion site should be visually inspected prior to the administration of IV fluids and/or medications for phlebitis, tenderness, catheter position and infiltration.
• Review of the PIVC should be documented in the patient record each shift.

3.14 Flushing

Utilise a “positive pressure technique” when flushing.

• Flush catheters immediately:
  ▪ After placement.
  ▪ Prior to and after each IV injection.
  ▪ Prior to and after fluid infusion (as an empty fluid container lacks infusion pressure and will allow blood reflux into the catheter lumen from normal venous pressure) or injection.
  ▪ If blood is visible in the cannula or administration set.
  ▪ If a PIVC has no continuous infusion running and has had no medications administered for 8 hours, check the patency by flushing the PIVC

3.15 Replacing of PIVC

Replace every 72-96 hours¹.

• PIVCs should be removed at the first sign of phlebitis (i.e. warmth, tenderness, erythema, palpable venous cord) and when they are no longer required ¹².

• A thorough patient assessment should be undertaken by the health professional to determine if a PIVC is the most appropriate choice of vascular access device for the treatment journey. If not, the patient should be referred for a PICC or other CVAD, as soon as possible.

N.B: PIVCs inserted in emergency situations, when adherence to asepsis cannot be ensured, must be replaced within 24 hours or sooner if the patient's condition is stabilised. When patient has been transferred from another facility with a PIVC insitu should have the device removed by a clinician on arrival. Unless otherwise clinically indicated. There may be emergency situations where access via the original device is necessary; in this case the PIVC should be replaced within 24 hours.

Clinicians should replace all fluid administration tubing and connectors when the PIVC is replaced regardless of when the infusion was initially started.

By having the date of insertion sticker on the PIVC dressing enables clinicians to easily calculate the dwell time.

3.16 Care of IV Therapy

• Clinicians should not intermittently disconnect administration sets used for continuous infusions due to the increased risk of infection through manipulation of the hub and occlusions due to reflux of blood into the catheter tip when the line is disconnected.
Replace dressings when it becomes damp, loosened, no longer occlusive or adherent, soiled or if there is excessive accumulation of fluid under the dressing. Remove the dressing and clean the area with chlorhexidine and alcohol and allow to dry. Apply sterile dressing. Closely monitor PIVC site for signs of infection.

3.17 Replacement of IV Fluids

Clinicians should replace infusions of:

- Standard crystalloid every 24 hours
- Drug infusions e.g. heparin and insulin every 24 hours
- Lipid containing solutions e.g TPN within 24 hours
- Blood components should be infused within 24 hours.  

When an PIVC is resited both the infusion and administration set should be replaced regardless of when the infusion was initially commenced.

3.18 Assessment

- Complete part A & B of the multi-choice exam and hand in to your relevant Nurse Educator for marking, an 80% pass mark is required.
- Organize a time with your educator to undertake clinical assessment in a simulated environment and complete relevant CATs:
- Once you have successfully completed the CAT you are able to practice supervised by a practioner with at least two years phlebotomy and cannulation experience.
Reference List


16. Pathology Queensland (2013). Recommendations for Blood Culture Collection – Adults


Phlebotomy Written Assessment

1. What is the maximum number of attempts the phlebotomist Nurse will make when attempting venipuncture?
   a) One
   b) Two
   c) Four
   d) Three

2. What is the maximum length of time a tourniquet should be placed around the patient’s arm?
   a) Approximately 4 minutes
   b) Until the needle is removed
   c) Until all blood tubes are collected
   d) No more than 1 minute

3. When is the blood specimen tube to be labelled?
   a) When you’re organizing and preparing what tubes you’ll need
   b) Immediately before blood is transported to pathology
   c) At the bedside immediately following collection
   d) When you check the specimen with a colleague

4. Which of the following restrictions should be taken into consideration prior to venipuncture?
   a) AV fistula
   b) Mastectomy and axillary clearance
   c) Oedematous limb
   d) All of the above

5. What is pseudohyperkalemia caused from?
   a) Dehydration
   b) Contamination with IV fluid
   c) Repetitively opening and closing their fist
   d) Taking K+ supplements

6. The septum of the Blood Culture bottles are not sterile and must be disinfected prior to use?
   a) True
   b) False

7. If the application of an IV pressure pad is indicated, when should the pad be removed?
   a) 8 hours
   b) 1 hour
   c) 30 minutes
d) The next day

8. What is the basic order of draw using the evacuated tube system?

a) blood culture, blue citrate, red serum, purple EDTA
b) blue citrate, blood culture, purple EDTA, red serum
c) purple EDTA, blood culture, blue citrate, red serum
d) blood culture, red serum, blue citrate, purple EDTA

9. Which of the following factors result in failure to draw blood during venepuncture?

a) Losing the vacuum in the tube
b) Needle not in vein
c) Inserting the needle through the vein
d) All of the above

10. What is the volume of blood required in each adult blood culture bottle?

a) 10 mL
b) 2-3 mL
c) 5 mL
d) 15 mL

11. Before accessing a patient’s veins identify 5 restrictions to be taken into consideration.

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
/2 marks

12. Identify 2 causes of vasoconstriction.

_____________________________________________________________________________________
_____________________________________________________________________________________
/1 mark
13. Identify the correct blood collection tubes for the following pathology test:

FBC: ________________________________________________________________

INR: __________________________________________________________________

Group & Hold: __________________________________________________________________

Gentamicin level: ____________________________________________________________

/2 marks

14. What do you need to consider regarding patients with IVT insitu before performing venepuncture?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

/2 marks

15. What is the treatment if your patient forms a haematoma as a complication of venepuncture?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

/2 marks

16. Describe the condition of an ideal vein for venepuncture.

________________________________________________________________________
________________________________________________________________________

/1 mark
This completes the Venepuncture Assessment Worksheet.

Minimum requirement: participant must achieve a minimum of 80% (16/20) to proceed to the clinical competency assessment. Once completed, please hand in your assessments to your Nurse Educator for marking and recording prior to proceeding to the simulated competency assessment.

Name: _________________________________________________

Contact Details: _________________________________________

Mark: __________

Nurse Educator: ________________________________________
Cannulation Assessment Worksheet

1. Which is *not* a complication of IV cannulation?
   a) Extravasation
   b) Compartment syndrome
   c) Septicaemia
   d) Phlebitis

2. A Registered Nurse must not cannulate a patient under what age without specific accreditation?
   a) 18
   b) 6
   c) 10
   d) 12

3. Why should you avoid cannulating veins in an arm with an arteriovenous fistula?
   a) pain and discomfort
   b) fistula blood requires special laboratory tubes for collection
   c) risk of loss of life sustaining therapy access
   d) IV fluids cannot be run through high pressure fistulas

4. What size cannula would you choose for intermittent IV Antibiotics?
   a) 24 G
   b) 20 - 22 G
   c) 18 G
   d) 14 – 16 G

5. The ante-cubital fossa can be cannulated
   a) As first preference
   b) Never
   c) Only in emergency situations
   d) As second preference
6. How many insertion attempts is permitted by all health professionals?
   
a) 2
   
b) 1
   
c) Until successful
   
b) 3

7. Which of the following needs to be documented after insertion of PIVC?

1. Insertion Site
2. Number of attempts
3. Date and time of insertion
4. Consent gained
5. Name of person who inserted the PIVC

   a) 1, 2, 3, 5
   b) 1, 2, 4, 5
   c) 1, 3, 4, 5
   d) 1, 2, 3, 4, 5

8. How often should clinicians replace fluid administration tubing and connectors?

   a) Every shift
   b) Never
   c) When the PIVC is replaced
   d) After every bag of blood

9. When should a PIVC be replaced?

   a) Every 72-96 hours
   b) When the insertion site is warm
   c) Within 24 hours of transfer from another facility
   d) All of the above

10. What antiseptic solution should be used if chlorhexidine is contraindicated?

    a) Povidone-iodine
    b) Normal Saline
    c) Alcohol
    d) Soap and water
11. Identify the correct cannula gauge size/s for the following requirements

IV Abs: ____________________________________________________________
Trauma Patients: _____________________________________________________
Large volumes of blood products: _______________________________________
IV contrast: __________________________________________________________

/2 Marks

12. What does the ICARE acronym stand for?

I: ___________________________________________________________________
C: ____________________________
A: __________________________________________________________________
R: _____________________________________________
E: __________________________________________________________________

/2 Marks

13. Identify the correct procedure for addressing phlebitis:

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

/2 Marks

14. What are the key sites and key parts for cannulation?

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

/2 Marks

15. Identify the correct procedure for removal of long or thick hair prior to cannulation:

____________________________________________________________________
____________________________________________________________________

/2 Marks
This completes the Cannulation Assessment Worksheet.

Minimum requirement: participant must achieve a minimum of 80% (16/20) to proceed to the clinical competency assessment. Once completed, please hand in your assessments to your Nurse Educator for marking and recording prior to proceeding to the simulated competency assessment.

Name: _______________________________________________

Contact Details: _________________________________________

Mark: ____________

Nurse Educator: ________________________________________
# Venepuncture

## Clinical Assessment Tool

<table>
<thead>
<tr>
<th>Observed Performance</th>
<th>Observed</th>
<th>Learning Opportunity Identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifies indications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describes risks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discusses the characterisitics of a suitable vein</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confirms pathology request documentation contains three points of patient identification, is correctly completed, signed by medical officer and required tests clearly identified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performs hand hygiene</td>
<td></td>
<td></td>
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<tr>
<td>Provides privacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explains procedure to patient and patient is encouraged to raise questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obtains consent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifies correct patient by asking the patient to state their full name and date of birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confirms identity by checking patient identification band</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undertakes check risk assessment with patient: history of mastectomy, arterio-venous fistula or grafts, coagulopathy, skin infection etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performs hand hygiene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleans work surface/trolley with detergent/disinfectant wipe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collects equipment: vacutainer, vacutainer flashback needle or push-button transfer device (butterfly), tourniquet, unsterile gloves, protective eyewear, alcohol-impregnated swabs, cotton ball swabs, adhesive plaster, waste disposal bag, sharps container, Kidney dish, protective absorbent sheet, required blood collection tube/s.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checks expiry date of blood tube/s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Takes authorised patient identification labels to bed side (unless tubes are to be handwritten). Takes labelling device if utilizing ieMR. <strong>Does not pre label tube/s</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepares environment, e.g. adjusts clients curtains, turns off fan, and creates adequate work space at an appropriate height.</td>
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<tr>
<td>Performs hand hygiene</td>
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<tr>
<td>Ensures patient is placed in reclining position to avoid risk of fainting</td>
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<tr>
<td>Assumes a position that facilitates safe ergonomic practice, (i.e. raises/lowers bed, uses a stool) and aims to be at eye level with patient</td>
<td></td>
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<tr>
<td>Positions patient's arm to enable easy access to vein</td>
<td></td>
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<tr>
<td>Positions and applies tourniquet i.e.10cms above venepuncture site and not so tight as to lose a pulse (no longer than one minute)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selects and palpates an appropriate vein</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleans proposed skin site with friction using an alcohol and chlorhexidine wipe and allows to air dry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Releases tourniquet</td>
<td></td>
<td></td>
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<tr>
<td>Applies warm compress if veins not visible or palpable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discusses rationale for choosing particular vein</td>
<td></td>
<td></td>
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<tr>
<td>Performs hand hygiene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepares equipment. (Ensures key parts remain sterile, for example, needle)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensures correct order of draw (as per Queensland Health (QH) pathology guidelines)</td>
<td></td>
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</tr>
<tr>
<td>Attaches vacutainer to needle or transfer device</td>
<td></td>
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</tr>
<tr>
<td>Places first specimen tube into vacutainer - resting inside but does not puncture the rubber stopper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-applies tourniquet 10cms above insertion site</td>
<td></td>
<td></td>
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<tr>
<td>Performs hand hygiene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dons non-sterile gloves</td>
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<tr>
<td>Anchors the vein below the insertion site with thumb and pulls the skin taut protecting key site</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Inserts** the needle (bevel up) at an appropriate angle (15°)

**Releases** the tourniquet when blood enters flashback chamber

**Secures** barrel or wings to prevent advancement of needle

**Advances** specimen tube into the rubber stopper of the vacutainer (takes care not to advance the needle further into the vein) to allow blood to enter the tube

**Fills** tube/s to the required level or when the vacuum is dispelled

Gently **inverts** all samples several times to ensure adequate mixing of additives (Does not shake)

**Removes** needle or activates retracting device

**Applies** cotton ball swab and plaster to insertion site

**Places** needle / butterfly and transfer device at point of use into sharps container

**Applies** direct pressure to the needle insertion site for at least two minutes to prevent bruising (or patient if able to apply sufficient pressure)

**NB Applies** direct pressure to puncture site for 5 minutes if patient on anticoagulants or steroids

**Advises** patient not to bend arm up during this period as a haematoma may occur

**Removes** gloves and disposes appropriately. **Performs** hand hygiene

Labels blood tube/s at bedside (either authorised labels or legible handwriting)

**Ensures** label contains three points of patient identification

**Signs** the request form

**Places** tube/s in biohazard bag with accompanying signed request form

**Re-checks** the puncture site

**Describes** on-going care with patient and encourage patient to raise questions (ensure on-going care is described on page 3)

**Disposes** all waste including any PPE used

**Performs** hand hygiene

**Sends** samples to pathology in biohazard bag (via Lamson or courier)

**Cleans** trolley with detergent/disinfectant wipes and puts away all used equipment

**Reports** and **documents** outcome of procedure and findings if appropriate

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**Assessment Result** CATs are criterion based assessment tools designed for diagnostic, formative and summative assessment applications. If a CAT is being used for summative assessment of competency it must be administered by a Nurse Educator or experienced assessor (e.g. CN, CNC or NP). The CAT may also be used informally as a self-directed learning tool or peer review tool. Successful CAT completion = 100% of criteria met.

<table>
<thead>
<tr>
<th>Competent</th>
<th>Learning Opportunity Identified</th>
<th>Entered into TrendCare</th>
<th>DATE:</th>
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</table>

Assesse:  
Signature:  
Position:  

Assessor:  
Signature:  
Position:  

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**Plan for further learning**  
Workshops, ongoing education sessions, direct clinical bedside guidance.

**Indications**  
Blood sampling, cross match of blood  
Most common sites for venepuncture are the **antecubital** areas of the arm, where the median **cubital**, **cephalic** and **basilic** veins lie close to the surface of the skin and are most prominent (can be visualised and palpated)
**Risk/Contra-indications**

- Applies direct pressure to puncture site for **5 minutes** if patient on anticoagulants or steroids
- Sample may provide diluted results for patients with IV infusions on the same limb
- Limbs with lymphoedema (post mastectomy) should be avoided
- Patients on anticoagulants are at risk of bleeding and bruising
- Limbs with arterio-venous fistula insitu are to be avoided to maintain integrity of shunt
- Limbs with infected skin / trauma are to be avoided due to risk of infection
- Haematoma and bruising: especially in elderly or immuno-compromised patients with clotting disorders
- Nerve puncture - severe pain, paraesthesia, tingling sensation
- Arterial puncture
- Haemolysis of specimen due to delay in gaining a sample or lengthy application of the tourniquet

**Anatomy or Graphics**

![Site selection for peripheral cannulation of veins](image1)

**Ongoing Care**

Observe for haemorrhage or haematoma post collection especially for patients with clotting deficits and/or on regular anticoagulants

**References**

- Becton and Dickenson product information, 2013.
- CHHHS Phlebotomy and Cannulation Self Directed Learning Package, 2016
- Pathology Queensland, Phlebotomy Venepuncture Training Manual, 2014

**Document Approval/Review History**

<table>
<thead>
<tr>
<th>Version</th>
<th>Document Custodian</th>
<th>Date of Approval</th>
<th>Review Due</th>
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<tbody>
<tr>
<td>1</td>
<td>Nurse Educator Surgical</td>
<td>August 2016</td>
<td>August 2018</td>
</tr>
</tbody>
</table>

Feedback to Nursing Midwifery Education and Research Unit via email
## Observed Performance

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<tr>
<td>Undertakes risk assessment for specific patient factors that may preclude Peripheral Intravenous Cannulation (PIVC) insertion i.e. History of mastectomy, fistula or grafts, coagulopathy, skin infection, limb affected by Stroke</td>
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<tr>
<td>Checks for allergies / sensitivities</td>
<td></td>
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<tr>
<td>Performs hand hygiene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assesses patient venous access, identifies restrictions and determines appropriate vein for cannulation</td>
<td></td>
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<tr>
<td>Determines PIVC size / gauge required based on patient characteristics and anticipated therapy (see indications)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleans work surface/trolley with detergent/disinfectant wipe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collects equipment:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Cannula (size determined by indication)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- IV Extension Set</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 2% Chlorhexidine/70% Alcohol swabstick</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Sterile transparent PIVC dressing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- PosiFlush™ prefilled 0.9% Normal Saline Syringe</td>
<td></td>
<td></td>
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<tr>
<td>- Clean tourniquet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Non-sterile gloves or sterile if re-palpating is anticipated</td>
<td></td>
<td></td>
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<tr>
<td>- Protective eyewear</td>
<td></td>
<td></td>
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<tr>
<td>- Waste disposal bag</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Sharps container</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Protective absorbent sheet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clips (if required)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensures safe ergonomic practices are maintained throughout the procedure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensures patient is positioned (supine to semi-fowlers/ fowlers position) in a bed or chair to maintain patient safety and comfort</td>
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<tr>
<td>Prepares environment, e.g. adjusts clients curtains, turns off fan, and creates adequate work space at an appropriate height.</td>
<td></td>
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<tr>
<td>Performs hand hygiene</td>
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<td></td>
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<tr>
<td>Positions patient’s arm to enable easy access to vein and facilitate patient comfort, removes any patient clothing, identity band, watch and jewellery that may come into contact with the insertion site</td>
<td></td>
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</tr>
<tr>
<td>Applies tourniquet 5 - 15cm above cannulation site and tightens, ensuring tourniquet does not pinch the skin and radial pulse can be palpated</td>
<td></td>
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<tr>
<td>Palpates veins and selects appropriate site (see Indications)</td>
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<tr>
<td>Releases tourniquet</td>
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<td></td>
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<tr>
<td>Clips body hair (approximately 10cm x 10cm) around selected vein if required and cleans site with soap and water if necessary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Places protective absorbent sheet under site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performs hand hygiene</td>
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</tbody>
</table>
**Prepares** equipment maintaining key sites and micro critical fields: PIVC, Extension Set, Swab Stick

**Primes** Extension Set with PosiFlush™ prefilled 0.9% Normal Saline syringe

**Applies** 2% Chlorhexidine impregnated swab stick to proposed IV site in a motion that provides friction (for at least 30 seconds), working outwards, covering an area 10cm x 10cm

Allow to air dry

**Re-applies** tourniquet 5 - 10cm above insertion site

**Performs** hand hygiene

**Dons** non sterile gloves

**Ensures** no further palpation at the insertion site occurs after the application of chlorhexidine. If further palpation at insertion site is required / anticipated either:

- Palpate, then re prep site with Chlorhexidine swab stick and allow to air dry (as above)

Or

- Perform hand hygiene and don sterile gloves before re-palpating

**Picks up** PIVC and remove protective cap

**Anchors** vein below the insertion site with thumb and pulls skin taut

**Inserts** the needle (bevel up) through the skin at 10 - 45 degree angle into vein, observing for flashback of blood in the flash chamber

**Lowers** the needle until it is almost parallel to the skin and advances the needle 1 - 3mm to establish catheter tip in vein

**Stabilises** the flash chamber

**Advances** the catheter slowly off the needle, without contaminating the insertion site, until the cannula hub is flush with the skin

**Releases** tourniquet

**Occlude** vein distal to catheter tip to interrupt flow of blood. Stabilises cannula hub with finger

**Withdraws** the needle to activate the protective cage

**Removes** protective cap from primed IV Extension Set and connects to cannula ensuring key part is not contaminated

**Flushes** IV cannula with 5 mls 0.9% Normal Saline to check cannula patency

**Observe** site for signs of extravasation or leakage

**Clamps** the line with the attached slide clamp and disconnects syringe from IV Extension Set

**Applies** transparent semi-permeable dressing

**Disposes** waste into appropriate receptacles and cleans work surface

**Performs** hand hygiene

**Documents** date and time on cannula dressing

**Discusses** ongoing care with patient and encourages patient to raise questions

**Performs** hand hygiene

**Reports** and **Documents** outcome of procedure and findings

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**Assessment Result**

CATs are criterion based assessment tools designed for diagnostic, formative and summative assessment applications. If a CAT is being used for summative assessment of competency it must be administered by a Nurse Educator or experienced assessor (e.g. CN, CNC or NP). The CAT may also be used informally as a self-directed learning tool or peer review tool. Successful CAT completion = 100% of criteria met.

<table>
<thead>
<tr>
<th>Competent</th>
<th>Learning Opportunity Identified</th>
<th>Date</th>
<th>Entered into database</th>
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**Assessee:**

Signature: __________________________

Position: __________________________

**Assessor:**

Signature: __________________________
### Plan for further learning if learning opportunity identified

<table>
<thead>
<tr>
<th>Indications</th>
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<tbody>
<tr>
<td>- Administer intravenous fluids, electrolytes, blood and blood products</td>
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<tr>
<td>- Administer continuous or intermittent medication</td>
</tr>
<tr>
<td>- Maintain a route to administer diagnostic reagents, contrast media or general anaesthetic</td>
</tr>
<tr>
<td>- Replacement of a peripheral intravenous cannula</td>
</tr>
</tbody>
</table>

### Insertion

It is recommended that clinicians make no more than two attempts at cannulation before seeking assistance from a more experienced clinician, unless it is a medical emergency or no other clinicians are available.

### PIVC Location and Size Guide

**Selection of catheter site:**

- Basilica or cephalic veins on posterior (dorsal) non-dominant forearm, away from areas of flexion are the preferred sites for catheterisation.
- Metacarpal veins on the dorsum of the hand although easiest to visualise are more liable to block and are prone to medication induced vessel damage.
- Antecubital fossa veins are reserved for emergencies only.

**Selection of appropriate size vein for required cannula size:**

- It is recommended that specific characteristics of the patient and anticipated therapy are considered in the selection of PIVC gauge and length. These include: age; condition of veins; degree of cardiovascular stability; medical and surgical interventions.
- Clinicians should use the smallest gauge and shortest length PIVC that will accommodate the prescribed therapy to reduce the risk of phlebitis.
- Size of the target vein should also be considered when selecting PIVC size i.e. large bore catheters required for rapid infusions or resuscitation should only be inserted into a large vein.

### Risk/Contra-indications

**Risks:**

- Thrombophlebitis, infiltration, haematoma, nerve, tendon or ligament damage, infection, extravasation

**Avoid the use of veins in the following sites (where possible):**

- Areas of flexion e.g. antecubital fossa, or bony prominences or patient’s dominant hand
- Areas below previous cannula site
- Bruised or phlebitis areas
- A limb with an arteriovenous fistula or shunt
- An arm on the same side as a previous lymph node dissection, mastectomy or affected by stroke
- An infected limb e.g. with cellulitis
- A limb with a peripherally inserted central cannula (PICC) or implanted venous access device
- Lower limbs

**Contra-indications:**

- Inflammation or infection of insertion site
Anatomy or Graphics

Figure 1: Site selection for Peripheral Intravenous Cannulation of veins

Ongoing Care

Maintaining a PIVC:
- Clinical indications for a PIVC to remain in situ in the absence of intravenous (IV) therapy may include:
  - Unstable chest pain
  - Varices
  - Surgery pending
  - Deteriorating patient
- Inappropriate PIVCs with no clinical indication can cause health care related bacteraemia. The requirements for PIVC should be reviewed each shift and those that are no longer clinically indicated should be removed
- Removal of PIVCs can be nurse initiated if there is no clinical indication documented
- If a PIVC is to remain in situ in the absence of IV therapy the clinical indication must be documented by the treating Medical Officer’s team

Replacing / Removing a PIVC:
- PIVCs are to be replaced every 72-96 hours unless extenuating circumstance criteria is met; i.e.
  - The patient has very poor peripheral access
  - No one else can cannulate the patient
  - The patient still requires peripheral access
  - The cannula is patent
  - There is no sign of phlebitis or infection
- Documentation should be undertaken in the patient’s notes and nursing care plan each shift providing rationale for extenuating circumstances
- PIVC inserted in emergency situations (e.g. by QAS) should be replaced within 24 hours/ on arrival at hospital
- Patients transferring from other health care facilities with a PIVC in situ should have this device removed upon arrival, unless otherwise clinically indicated
- PIVC sites must be reviewed at least once each shift and the PIVC removed by the clinician at the first sign of phlebitis, e.g. pain, warmth, tenderness, erythema, palpable venous cord

**Blood Collection via PIVC:**
- Clinicians can draw blood from a PIVC if necessary, but only if it is in a relatively large vein and only immediately following insertion
- Blood cultures should never be collected through a PIVC due to the increased rate of blood culture contamination at the time of collection

**Safe Ergonomic Practice**
Safe Ergonomic Practice includes positioning self, the patient and equipment to comply with best occupational health and safety practice and to minimise risk to staff and patient with consideration to posture, time and force. When undertaking PIVC insertion consideration must be given to clinician posture relative to height of bed / chair and placement of trolley with equipment in relation to insertion site.

**References**
Australian Government, National Health and Medical Research Council, 2010 *Australian Guidelines for the Prevention and Control of Infection in Healthcare*
Cairns and Hinterland Hospital and Health Service, 2016 Phlebotomy and Peripheral Intravenous Cannulation Learning Package
CHHSD-SPE-Proc-Infec-184-V4-04/16 *Hand Hygiene Procedure*, 2015
CHHSD-Clin-Infec-412-V1.06/15 *Sharp Injuries and Body Fluid Exposure*, 2012

**Document Approval/Review History**

<table>
<thead>
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<th>Version</th>
<th>Document Custodian</th>
<th>Date of Approval</th>
<th>Review Due</th>
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<tr>
<td>1</td>
<td>Nurse Educator Surgical</td>
<td>08/2016</td>
<td>08/2016</td>
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</table>

Feedback to Nursing Midwifery Education and Research Unit via email chhhs_nmeru@health.qld.gov.au

Please ensure you reference the CAT ID no. in the subject line.
Appendix 1 – Specimen Collection Via ieMR

Specimen Collection uses positive patient identification checks and scanning to record collection and print labels in PowerChart. The Specimen Collection window can be launched within a patient’s chart. The Specimen Collection button appears in the ieMR toolbar.

Collecting a specimen

To collect a specimen for a patient:

1. Open the patient chart in the appropriate encounter the specimens were ordered.
2. Click Specimen Collection from the ieMR toolbar.
3. The Collection Details window will open. Confirm the patient’s identity.
4. Scan the patient’s wristband using the barcode scanner OR
5. Click on if a wristband is not available
6. The Collection Details window will open and display a list of orders available for collection in the selected encounter
7. Do not select Not Collected, as this will cancel the order, or Reschedule. Filters can be applied to the Collection Details window to determine what collection details display for a user.
8. Select the required Collection Type radio button.
   - Lab Collect will display only those collection types that are designated to a phlebotomist to collect
   - Nurse Collect will display only those collection types designated for clinician collect
   - Both will display all orders currently due for collection
9. Click on the Show Nurse Collect Indicator checkbox. This will display a Nurse Collect text indicator on the list of collection details against the specimen requiring a nurse collect.
10. Tick the required Specimen Type check boxes.
11. The Save as Default checkbox can be used to apply the filter preferences across all patient records.
12. Click Apply
13. The *Specimen Collection* screen will display reflecting the chosen filters.

14. Hover the mouse over the name of the specimen to view a text box with details of the collection.

15. If you are unable to locate the specimen you are collecting in the *Specimen Collection* window, check the following:
   - You are in the correct patient
   - You are in the encounter the order was generated
   - The filter options in *Specimen Collection* are set to *Collection Type: Both*
   - The order status for the specimen displays as *Ordered (Dispatched)* in the *Orders* section of the patient’s chart. If the order was placed and the *Collected* option was set to *Yes*, you will have to use label reprint to print labels. Refer to the appropriate QRG. If the order status is *Ordered (Scheduled)*, it will not be available in the *Specimen Collection* screen until the designated phlebotomy run. If you need to collect the specimen earlier, the original order must be reordered with the appropriate details. Contact the appropriate clinician if required. If the order status displays as *Ordered (Discontinued)* or *Collected*, contact the relevant clinician.
   - The order is more than 15 days after the *Requested collection date/time*. To collect the specimen, use the label reprint option, refer to the relevant quick reference guide. You will not be able to mark the order as collected.

**Printing the specimen labels from Specimen Collection**

16. To print out specimen labels, click on the **Print** drop down arrow.

17. Select **Print All Labels**. The **Print Labels** window will open. The **Select All** check box will be selected as a default. All specimens will have the corresponding checkbox ticked.

18. To select required specimen labels for printing, deselect the **Select All** check box.

19. Tick the required checkboxes against the individual specimen labels.

20. Select the printer. You can also set a default printer by checking the **Set as default label printer** check box.

21. Click the **Print** button.

22. The label/s will print to the selected printer.

23. Once the specimens are in their containers, initial and time and date the label/s. Affix the appropriate label to the correct collection container. The barcode must be horizontal and straight, and over the existing tube label.

For paediatric or smaller containers, the label may have to be folded. Ensure the barcode remains visible.

24. To communicate if the patient is fasting or if the specimen is urgent, use the appropriate stickers and attach to the lid of the specimen.
25. Use the barcode scanner to scan the labels attached to the specimen containers. The system will confirm that the patient chart and the specimen container label are matched to the correct patient. The specimen order will be displayed with a tick to indicate it has been collected.

26. If a barcode scanner is not available it will be necessary to manually change the collected status from the Specimen Collection window. Hover the mouse over the specimen collected, the line will highlight and the Status menu will be available.

27. Click to the right of the specimen order.

28. A menu will be displayed. Select Collected.

29. A warning message will display if the label was not scanned. Click Yes if you have verified the container and label.

30. Click to certify you have collected the correct samples from the correct patient and labelled each container appropriately. The status of the specimen will automatically change to Ordered (Collected) in PowerChart and will drop off the Specimen Collection window. Marking the samples as Collected will create an entry in AUSLAB for the tests indicated on the label.

31. Click Close to close the Specimen Collection window.

Collecting more or less containers than recommended in the Specimen Collection screen

If you need to collect less containers than suggested in the Specimen Collection screen, print all labels of specimens collected and mark the relevant specimens as collected. Place the spare labels in the bag to be sent to the lab. If you need to collect more containers than suggested in the Specimen Collection screen, print the required number of specimen labels and affix them to the containers. Mark the extra container/s as SPARE and cross out the barcode.

Accidentally marking the wrong order as collected

If you accidentally marked the wrong order as collected in the Specimen Collection screen, and have not clicked yet, hover over the order, click and select Reset.

If you have marked the order as collected and clicked you will need to contact the ordering physician and notify the lab the specimen has not been collected. The ordering clinician will need to locate the original order, right click and select Cancel/Reorder, fill out the appropriate details and sign the order.

Difficult collection or unable to collect

If you want pathology to attempt to perform testing on the specimens you were able to collect, mark or scan these specimens as Collected. Collection notations (difficult bleed, syringe collection etc.) can be noted by writing on the label or on a note placed in the specimen bag.
If the collection order cannot fully be completed at the current time and it has been determined that the collection will be re-attempted at another time, scan the specimens that have been collected, but do not scan the uncollected labels. The specimen should remain the Specimen Collection screen. Do not use the [Not Collected] button as this will cancel the order. No entry for the tests will have been created in AUSLAB and the laboratory will not attempt to perform the tests.

Notify relevant clinicians and complete relevant documentation when unable to collect.
Collecting a Miscellaneous Order

1. If you open up the Collection Details window and the specimen for collection is a Miscellaneous Pathology Test (PMISC), you will need to view the order details before collection. Do not contact the Lab.

2. Close down the Collection Details window.

3. While in the patient’s chart navigate to the Orders section.

4. Locate the Miscellaneous Pathology Test (PMISC) in the Orders screen, right click and select Order Information.

5. In the Details tab it will display the Misc. test name.

6. Return to the Collection Details window to collect the specimen using the appropriate container.