Peripheral Intravenous Cannulation & Venepuncture Resource Package

To be used in conjunction with Guidelines in:

- CHRISP—I-Care Program
- RBWH 05450/Proc: Peripheral Intravenous Cannulation, Venepuncture and Infusions – Adult and Paediatric
- CHRISP Hand Hygiene Guidelines
- CHRISP Hand Hygiene Guideline
- RBWH 81003/Proc: Standard Precautions
- RBWH 80502/Proc: Patient Identification and Procedure Matching
- RBWH 74100/Proc: Documentation in the Patient Record
- Australian Commission on Safety and Quality in Health Care (ACSQHC) - National Safety and Quality Health Services (NSQHS) Standards
- Queensland Health Guide to Informed Decision-making in Healthcare
- Pathology Queensland Homepage
- RBWH 21605/Proc: Blood Collection (Adult)
- RBWH 21609/Proc: Blood Cultures Collection (Adult)

Completion of this package, if relevant to the context of practice, attracts twelve (12) Continuing Professional Development (CPD) hours of learning.

CPD hours can contribute to the nurse / midwife CPD requirements as per the Nursing and Midwifery Board of Australia Continuing Professional Development.

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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 1 of the ‘Peripheral Intravenous Cannulation and Venepuncture Resource Package’ and will remain current until 2018 or earlier when modifications required. The current version will be available for access on the Intranet and identified hyperlinked address as required. For example

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Overview of the resource

This Peripheral Intravenous Cannulation (Adults and Paediatrics) and Venepuncture Resource Package has been developed for Registered Nurses, Midwives, Medical Officers, Radiographers and Nuclear Medicine Technologists who are required to obtain competency in peripheral intravenous cannulation and/or venepuncture. Commitment is required to complete the process within a reasonable timeframe of commencement to ensure standards of practice.

The aim of this package is to educate health professionals in the theoretical and clinical skills required to perform safe and effective peripheral intravenous cannulation in adults and/or paediatrics and venepuncture in accordance with MNHHS policy, organisation procedures, relevant state and national guidelines and within their own scope of practice. Abstinence of practice for a period of time will require the health professional to refresh their skills and knowledge and be reassessed.

If applicable to the organisation the process of RPL can be applied to acknowledge prior skills and knowledge (See Recognition of Prior Learning section).

Only health professionals who have completed an education program in PIVC and venepuncture and who have been assessed in this skill may insert cannula or collect venous blood specimens, including blood cultures. Venepuncture, except for in specialised areas (e.g. Oncology, Emergency Department and Coronary Care, Cardiac Investigations Unit, Intensive Care), is only expected to be performed outside of phlebotomy hours (after hours) unless there are mitigating circumstances.

How to use the resource package

Prior to commencement of this Resource Package, it is recommended that the health professional liaise with the line manager to discuss if the demand for the skills set of peripheral intravenous cannulation and/or venepuncture in the service/unit is required. If there is minimal opportunity to practice these skills and maintain continued competency, there is limited value in completing this Resource Package.

There are six (6) sections to this resource package of which sections 1-3 are compulsory then choose sections 4-6 as options. Only complete section 5 if Paediatric Intravenous Cannulation is identified as necessary within the defined role. The sections are as follows:

- Section 1 - Legislation and Safety
- Section 2 – General Theory
- Section 3 – Theory for Practice
- Section 4 – Peripheral Intravenous Cannulation
- Section 5 - Paediatrics
- Section 6 - Venepuncture
- Peripheral Intravenous Cannulation and Venepuncture Theory Examinations, Assessments and Practice Logbook
Completion of a specialist Neonatal Intravenous Cannulation Resource Package and associated assessments is required for cannulation in Neonatology.

**Assessment**

Assessment of this resource package will be demonstrated through successful completion of specific activities utilising the resources provided or identified throughout the Resource Package, or others available from your Hospital Health Service/Facility.

- A PIVC/Venepuncture Trainer will be available to review and discuss the responses of all activities listed in the Resource Package and will assist to determine the level of knowledge of the specific issues addressed.
- The PIVC/Venepuncture Theory Examinations comprise multiple choice and short answer questions to assess theoretical knowledge.
- All practice and assessment elements must be supervised and conducted by a PIVC/Venepuncture Trainer.
- Competency/Skills Based Assessment Sheet attached to the package (found in *Peripheral Intravenous Cannulation and Venepuncture Theory Examinations, Assessments and Practice Logbook*) comprises successful completion of the *Peripheral Intravenous Cannulation – Theory Examination* and *Venepuncture – Theory Examination*. Clinical Practice Learning Activities and Clinical Skills Assessments as identified throughout the resource package.
- Ongoing competence consists of self-reflection and self-assessment measured against the national standards. A record of insertions is recommended for inclusion in the Performance and Development Plan (PDP).
- Recognition of Prior Learning (RPL) can be granted for applicants who can provide evidence of prior learning (Refer to Recognition of Prior Learning [RPL] section of this Resource Package). Radiographers and Nuclear Medicine Technologists are requested to discuss RPL with their line manager.

**Pre-requisite Requirements**

To facilitate acquisition of necessary skills and knowledge, the nominated participant is required to complete Pre-requisite Requirements (as listed below) **prior to REGISTRATION to the PIVC/Venepuncture workshop**: If workshop option is not available within facility/service then the following options are available for progression:

**Option 1:** negotiate attendance and participation in a scheduled PIVC/Venepuncture Workshop held at RBWH

**Option 2:** participate in work unit training and bedside teaching facilitated by a trained PIVC TTT
• workshop content is the minimum endorsed standard and therefore must be addressed in work unit training and bedside teaching

Pre-requisite requirements for completion prior to PIVC/Venepuncture Workshop (to meet Minimum Standards Model)

• 100% pass grade in the Peripheral Intravenous Cannulation - Theory Examination and/or Venepuncture - Theory Examination and/ or Paediatric Cannulation– Theory Examination
• Discuss all Readings applicable to each section with PIVC/Venepuncture Trainer.
• Complete required Clinical Practice Learning Activities
  ▪ PIVC - Clinical Practice Learning Activities 1-4 inclusive
  ▪ Venepuncture - Clinical Practice Learning Activities 5-9 inclusive
  ▪ PIVC/Venepuncture – All Clinical Practice Learning Activities

The trainee participant is required to negotiate time with the PIVC/Venepuncture Trainer for discussion and marking of relevant Theory Examination/s and Clinical Practice Learning Activities of the PIVC Resource Package.

Following discussion and marking, the nominated participant is required to provide signed evidence of successful pre-requisite completion to the Service Line Nurse/Midwifery Educator prior to registration to PIVC/Venepuncture Workshop:

N.B. Failure to complete the pre-requisite requirements will result in cancellation of current registration for the nominated PIVC and/or Venepuncture Workshop(s).

Post Workshop Practical Assessment Requirements
Following successful completion of the pre-requisite assessments and attendance at the PIVC/Venepuncture Workshop, the nominated participant is required to complete the following:
Peripheral Intravenous Cannulation and Venepuncture Theory Examinations, Assessments and Practice Logbook:

• Optional: Observe a minimum of 1 cannula insertion or venepuncture performed by a PIVC/Venepuncture Trainer – Record of Observation, Practice and Supervised PIVC Insertions

Peripheral Intravenous Cannulation (PIVC)

• Essential: Perform and record numerous supervised peripheral cannulations – Record of Practice of Supervised Practice - PIVC Insertions, until the required standard of independent (*unassisted) practice is able to be met. A PIVC/Venepuncture Trainer must sign to endorse evidence of practice.
• PIVC Assessment: Be assessed in Peripheral Intravenous Cannulation (PIVC) (including aseptic non touch technique) by a PIVC Trainer using the ‘Clinical Skills Assessment Tool – Peripheral Intravenous Cannulation (PIVC). The required standard is that of independently ‘Achieved’ on all skill sets.
• Personal Record: Maintain practice and an ongoing record of PIVC insertions – Ongoing Record of Peripheral Intravenous Cannulation.
Venepuncture

- **Essential**: Perform and record numerous supervised venepunctures - *Record of Practice of Supervised Practice - Venepunctures*, until the required standard of independent (*unassisted*) practice is able to be met. A PIVC/Venepuncture Trainer must sign to endorse evidence of practice.

- **Venepuncture Assessment**: Be assessed in Venepuncture (including aseptic non touch technique) by a Trainer using the ‘Clinical Skills Assessment Tool – Venepuncture’. The required standard is that of independently ‘Achieved’ on all skill sets

- **Personal Record**: Maintain practice and an ongoing record of Venepuncture procedures performed – *Ongoing Record of Venepuncture*.

*Unassisted Practice Definition: The health professional must demonstrate independence in all skill sets. Additional practice and direct supervision may be required until both confidence and competence is demonstrated.*

**Evaluation Methodology**

**Process Indicator**

1. All patients who require a peripheral intravenous access device will be cannulated by health professionals trained, and assessed as competent in insertion.

2. All patients who require blood sampling will be venepunctured by health professionals trained, and assessed as competent.

**Outcome Indicator**

3. Timeliness of insertion(s) or venepuncture – response times

4. No delays in treatment – measured by intravenous therapies given on time, no missed doses or collection of blood samples performed in a timely manner to facilitate ongoing patient care.

5. Reduced procedure related complications

**Recognition of Prior Learning (RPL)**

In accordance with the Queensland Health (QH) Recognition of Prior Learning (RPL) Guidelines (2009)¹², Registered Nurses’/Midwives’ applications for RPL are progressed through the Service Line Nurse/Midwifery Educators and an assessment of practical cannulation or venepuncture skill by a PIVC/Venepuncture Trainer. RNs/Midwives requesting RPL should complete the RBWH Recognition of Prior Learning (RPL) Applicant Workbook (2009)¹² and submit with relevant supporting evidence.

*NB: Recognition of Prior Learning (RPL) is not applicable for novices in PIVC or Venepuncture.*
**Process of application for RPL – Nurses/Midwives**

1. Complete RPL Applicant Workbook

2. 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

3. Evidence of practice of Aseptic Non-Touch Technique

**NB:** All RPL applications for PIVC and Venepuncture competency status will require the health professional to complete a challenge test ¹² using either the ‘Clinical Skills Assessment Tool – Peripheral Intravenous (PIVC)’ or ‘Clinical Skills Assessment Tool – Venepuncture’ under the direct supervision of a PIVC/Venepuncture Trainer or Super-User
Flow Chart of Requirements for: Training to Certification Completion
Peripheral Intravenous Cannulation and Venepuncture

Peripheral Intravenous and Venepuncture Flow Chart

Complete pre-requisite requirements prior to booking for the PIVC and/or Venepuncture workshop

Submit completed learning activities and multiple choice tests to Trainer or educator for marking. 100% pass mark

Attend Peripheral and/or Venepuncture workshop
Simulated practical cannulation/venepuncture and Aseptic Non Touch Technique set-up

Perform supervised practical training on patient in relevant clinical area
Direct supervision is required until both confidence and independent practice is demonstrated

Complete practical assessment
Competency is assessed through completion of all clinical skill sets
All sections on the Peripheral Intravenous Cannulation and/or Venepuncture Competency assessment Record must be completed, signed and dated by a nominated Trainer

Training Records
Send record of competency to relevant line manager and or educator and training unit (if applicable, certificate is sent to credentialed participant)

Ongoing Competence
Maintain ongoing record of cannulations and/or venepunctures
Required Resources to complete the package

Recommended resources to complete package

- Access to Queensland Health Electronic Publishing Service (QHEPS)\textsuperscript{13} and to relevant home site (see below).

\begin{itemize}
  \item RBWH: \textit{RBWH Procedures and Guidelines - Homepage}\textsuperscript{14}
  \item TPCH: \textit{The Prince Charles Hospital Procedures Home Page}\textsuperscript{15}
  \item Caboolture and Kilcoy Hospitals: \textit{Procedural Documents Portal}\textsuperscript{16}
  \item Redcliffe Hospital: \textit{Procedural Documents Portal}\textsuperscript{16}
  \item Community, Indigenous and Sub-Acute Services: \textit{CISS services}\textsuperscript{17}
\end{itemize}

- Practical demonstrations via workshop which will cover equipment, technique, collection tubes, infection control, hand hygiene and competency assessments
- Peripheral Intravenous Cannulation/Venepuncture Trainer or Super-User (as per Minimum Standards Model) or for supervision of practice and assessment.
- Recommended readings
- Access to:
  - Centre for Healthcare Related Infection Surveillance and Prevention (CHRISP) and Tuberculosis Control Guidelines intranet site\textsuperscript{18}

Minimum Standards (Model)

The \textit{Minimum Standards Model} has been developed to facilitate high standards of practice for those who are training in Peripheral Intravenous Cannulation and/or venepuncture through supervision and assessment by an \textit{endorsed or nominated} PIVC/Venepuncture Train-the-Trainer.

\textit{Base Knowledge}: All Health Professionals whose day to day business is interventions with peripheral intravenous devices must have base knowledge around the management of these devices to prevent complications. Health professionals undertaking peripheral intravenous cannulation training should ensure their knowledge is up-to-date and practice is current. If applicable the Health professional may be required to complete \textit{Care and Maintenance of Intravenous Therapy Resource Package} before commencement of level two (this is mandatory for all RBWH staff).

Health professionals should complete the relevant theoretical components, including readings, and gain a 100% pass grade in the \textit{Peripheral Intravenous Cannulation - Theory Examination} and/or \textit{Venepuncture – Theory Examination} and/or \textit{Paediatric Cannulation– Theory Examination} before attending the PIVC/Venepuncture Workshop/relevant professional stream training and attempting the Clinical Practice Learning Activities. All Clinical Practice Learning Activities must be supervised by an \textit{endorsed} or \textit{nominated} PIVC/Venepuncture Trainer (see below).
PIVC/Venepuncture Trainer: Is a Registered Nurse, Midwife, Medical Officer, Radiographer or Nuclear Medicine Technologist who has:

- has been identified as having proven ability and advanced skill in cannulation and is a current preceptor therefore is **nominated** within the organisation as a **PIVC Trainer** **OR**

- Is a current preceptor or completed cert IV (or equivalent) and attended a formal PIVC Train-the-Trainer (TTT) workshop to attain recognition as an **endorsed PIVC Trainer**

Super User: Health Professional with advanced knowledge and skill who is involved with collaborations regarding resource development, may provide education and training and supports decision making and trouble shooting.
Objectives

Training will provide the skills and knowledge required for routine peripheral intravenous cannulation and blood collection – excluding complex blood collection techniques.

At the completion of this package the participant will be able to:

- Outline the environmental safety and legal aspects related to PIVC and venepuncture.
- Explain the Insertion Bundle approach to the insertion of peripheral intravenous (IV) cannulae and blood taking.
- Discuss and apply the principles of Hand Hygiene and Aseptic Non Touch Technique (ANTT) to PIVC and venepuncture.
- Describe and locate the position of peripheral veins and correctly identify the appropriate cannula gauge for each vein.
- Describe and locate the position of peripheral veins that can be used for venepuncture and identify restrictions that may contraindicate their use.
- Identified which veins to avoid in PIVC and preserve for venepuncture.
- Correctly identify the appropriate safety equipment for the degree of difficulty of venous access.
- Demonstrate effective PIVC and/or venepuncture technique.

Peripheral Intravenous Cannulation (PIVC)

- Correctly complete an assessment of a patient’s cannulation requirements.
- Identifies the indications and contraindications/restrictions for peripheral intravenous cannulation.
- Recognises local and systemic complications associated with a peripheral IV therapy and initiate strategies to minimise injurious/detrimental patient outcomes.
- Demonstrate correct selection and use of equipment and effective insertion technique.
- Demonstrate effective cannula site inspection, care and maintenance, including dressing and flushing techniques.
- Discuss and provide appropriate patient education to support cannula care and maintenance.
- Demonstrate appropriate documentation of PIVC, care and maintenance practices.

Venepuncture

- Describe process for correct pathology request form completion.
- Identify patient identification process and correct matching with labelling of pathology tubes.
- Correctly identify the appropriate venepuncture safety equipment for the degree of difficulty of venous access.
- Recognise local complications associated with venepuncture and initiate strategies to minimise injurious/detrimental patient outcomes.
- Demonstrate the appropriate documentation of venepuncture.
Section 1- and Legislation Safety

1.1. Environmental Safety

Blood and body fluid precautions should be consistently used during cannulation/venepuncture procedures for all patients. Protective eyewear or face shields and gowns or aprons must be worn during procedures that may generate droplets of blood or body fluids\(^5\).

In the event of body fluid exposure 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)\(^{19}\).

- After hours report to Emergency Department
- Report the incident to the supervisor.
- Follow organisational requirements if Needle Stick injury sustained.
- Follow infection prevention and control policies and occupational exposure to blood and body fluid procedures.

According to the NSQHS standards a risk management approach is taken when implementing procedures for:

- safe handling and disposal of sharps
- prevention and management of occupational exposure to blood and body substances\(^8\)

Blood taking and cannulation equipment must provide staff with protection from potential needle stick injury and prevent unnecessary exposure to blood. Blood should be drawn directly into the pathology tube with use of a transfer device. Cannulae with a blood control mechanism provide staff with protection from unnecessary blood exposure therefore syringes should not be attached for purposes of blood draw as it negates this feature.

_N.B. RBWH has a procedure in place that disallows blood taking from cannulae at all times except in an emergency._

- After use, all sharps (including safety sharps) are to be placed in a puncture resistant sharps container at point of generation.
- Use portable sharps container if fixed sharps bin not present in immediate vicinity.

_Needle and syringe must not be used for venepuncture as it poses a risk of damage to the patient's vein, high risk of needle stick injury and blood exposure to the healthcare worker and risk of haemolysis of the blood sample._
1.2. Legal Considerations
As PIVC and venepuncture are invasive procedures, the health professional performing this procedure is legally responsible for obtaining verbal consent prior to commencement. Consent should be documented in the Patient Record.

**Reading 1: Queensland Health Policy Statement: Informed Consent for Invasive Procedures**
Access and read the following Queensland Guidelines: *Informed Consent for Invasive Procedures* – to familiarise yourself with the consent process.


No more than two (2) attempts at cannulation or venepuncture are to be made by one individual, except under exceptional circumstances. If in doubt about the viability of a vein, consult a more experienced clinician. Prior to the procedure the health professional must:

- Verify clinical need, e.g. current intravenous therapy prescription or medical order documented in patient clinical record.
- Confirm patient has a *Pathology Queensland* form (see: Figure 8: Blood Specimen Request Form), completed correctly and signed by the medical officer.
- Obtain patient consent to cannula insertion or venepuncture.
- Confirm correct patient identity and correctly match to the intended procedure, prior to commencement in accordance with the procedure ACSQHS mandatory standards.
- Demonstrate ability to provide patient/carer/alternate healthcare decision-maker education on the procedure, risks associated, purpose, and possible restriction to movement.

1.3 Patient Safety Considerations
For patient safety outcomes the following must also be considered:

- Department of Medical Imaging instruction on contrast media.
- Appropriate intravenous access device for purpose of treatment, e.g. vesicant, hyperosmolar and parenteral nutrition orders require administration via a central venous access device (CVAD).
- Restrictions to insertion site.
- Required equipment is available, and the inserter is familiar with the use of equipment according to manufacturer's guidelines. Use equipment with consideration to expiry date (if applicable).
- Inserter must be able to demonstrate the ability to provide patient education: - (see Table 1 below).
<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 that may be experienced</td>
<td>Pain on insertion, pain initial 24hrs as invasive procedure, coldness along vein track, anxiety</td>
</tr>
<tr>
<td>• Potential complications of having an intravenous device</td>
<td>Requirement for informed consent as invasive procedure.</td>
</tr>
<tr>
<td>• How long the cannula is likely to be insitu.</td>
<td>Potential length of dwell time pertaining to current treatment regime.</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. Disconnected lines should be discarded immediately and reconnection will require newly prepared lines using ANTT.</td>
</tr>
<tr>
<td>• To notify the health professional of changes at insertion site</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>• To notify the health professional of any change in wellbeing</td>
<td>Fever, tachycardia, headache, SOB, sweating, malaise or chest pain.</td>
</tr>
<tr>
<td>• To notify nurse if cannula has not been used.</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>
</tbody>
</table>
Section 2 – General Theory

2.1 Anatomy and Physiology Overview

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

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.

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.

Table 2: The differences between Veins and Arteries

<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>

22
Figure 1: Venous Anatomy

Image by Clinical Multimedia RBWH (2011)

2.1.1 Veins of Arm, Hand and Foot in Adults

Figure 2: Arm and Hand Veins

Image by Clinical Multimedia RBWH (2011)
Figure 3: Foot / leg Veins

Images by Skills Development Centre RBWH (2015)
Section 3 – Theory for Practice

3.1 Hand Hygiene

Hand hygiene should be undertaken as part of the Hand Hygiene Australia ‘5 moments for hand hygiene’ 3 4. Aseptic Non Touch Technique (ANTT) 23 recommends that the World Health Organisation (WHO) 5 moments for hand hygiene program is followed. 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 alcohol-based waterless cleanser:

**The hand hygiene moments for cannulation and venepuncture are as follows:**

- **Moment 1:** before touching patient at initial assessment
- **Moment 2:** before cleansing of general aseptic field, e.g. tray or work surface before opening packets and preparation of equipment, before donning gloves for procedure
- **Moment 3:** After completion and disposal of waste. This also combines moments four and five.

**Reading 2: Hand Hygiene Guidelines**

Good hand hygiene plays an integral component to the safety of our patients.

Read the following guidelines:

- QH CHRISP Hand Hygiene Information 3
- QH CHRISP Hand Hygiene Guideline 4
- Hand Hygiene Australia 5 moments for hand hygiene 24

3.2 Aseptic Non-Touch Technique (ANTT)

Aseptic Non Touch Technique (ANTT) protects patients during invasive clinical procedures by employing infection prevention and control measures that minimise the presence and transfer of pathogenic organisms. ANTT provides standardised principles and safeguards for clinical staff - to understand and undertake safe aseptic technique during a wide range of clinical procedures and to define, control and monitor standards of aseptic technique 23.

ANTT uses Aseptic Fields to promote asepsis during procedures by providing basic protection from the environment. It is a designated work space that contains and protects the procedure equipment from direct and indirect environmental contact-contamination with microorganisms. These are either general or critical fields. For the purposes of cannulation or venepuncture a general aseptic field and micro critical aseptic fields should be used. Micro critical aseptic fields that can be used are sterile caps or in the inside of sterile packaging to protect the key parts 23.
ANTT protects Key-Parts (parts that come into contact with Key-Sites, any liquid infusion or any other Key-Part connected to a patient via a medical device) and Key-Sites (where the cannula/needle is to be inserted) during the procedure to prevent transmission of pathogens into the patient thereby reducing the risk of catheter related blood stream infection (CRBSI). Key-Parts and Key-Sites are protected by non-touch technique therefore if contaminated should either be disposed of, or disinfected again (if reusable). The sterile components used in cannulation or venepuncture are Key-Parts and remain that way until touched23.

The non-Key-Parts can be *touched with confidence* so the user must be able to identify those parts to enable safe handling of equipment and avoid contamination.

**Example:** *When picking up a syringe it is held by the barrel (the non-Key-Part) to avoid touching the tip and therefore prevents contamination of an Active-Key-Part.*

*Key-Parts are the critical Parts of the procedure equipment that come into contact with the Key-Sites (in cannulation/venepuncture the puncture site), any infusion fluid, or with any other active Key-Parts connected to the patient* 23.

Key-Parts may be rendered *inactive* when no longer required or temporarily not in use 23. A common example of this is the vascular access needleless connector(s) which are attached to the cannula (or extension of the cannula) which become inactive when not in use as it is not practical to maintain them as aseptic. Key parts that are inactive must be rendered aseptic prior to re-use or accessing by effective cleaning and disinfection. Therefore the vascular access needleless connector(s) must be cleaned and disinfected before being accessed.

At completion of blood taking all equipment is disposed of so there are no Key-Parts requiring maintenance however the insertion site, i.e. Key-Site should be monitored for complications for at least 24 hrs.

### 3.1.1 Risk Assessment

Whilst the principles and tenets of ANTT are consistent for all invasive procedures or management of indwelling medical devices, the ANTT technique will change according to risk assessment. Risk assessment includes assessment of technical difficulty, length of procedure, the size of Key-Sites, number of Key-Parts that require protection and staff competence23 25 26.

In order to be efficient as well as safe, the ANTT Practice Framework23 defines what type of aseptic technique and precautions are required for both simple and complex procedures, and how to decide between the two approaches.
3.1.2 Standard ANTT

Standard ANTT is the technique of choice when procedures:

- Involve minimal Key-Parts and small Key-Sites.
- Contain Key-Parts that can easily be protected by caps, covers or packaging (Micro Critical Aseptic Fields).
- Are not significantly invasive.
- Are technically uncomplicated and/or short in duration (approximately < 20 minutes).\(^2^3\)\(^2^5\)\(^2^6\).

In Standard ANTT the main aseptic field is termed a General Aseptic Field. It does not have to be managed as a key part and is used to promote rather than ensure asepsis. Non sterile gloves are usually worn for Standard ANTT procedures, unless it is assessed necessary to touch (direct/indirect) a Key Part/Site or the staff member’s experience/competence in the task would indicate that sterile gloves should be worn. Whilst venepuncture is considered less risk than other invasive procedures because no device remains within the vessel, touching of the Key-Site after skin cleansing would require the collector to wear sterile gloves. This might occur if the patient’s veins cannot be visualised and touch is required.

3.1.3 Surgical ANTT

Surgical ANTT is demanded when procedures:

- Involve large and/or numerous Key-Parts.
- Are significantly invasive, e.g. large/open Key Site or central venous system access.
- Are technically complex.
- Require extended procedure time (approximately > 20 minutes).\(^2^3\)\(^2^5\)\(^2^6\).

Surgical ANTT utilise a Critical Aseptic Field that must be managed as a key part, i.e. the main aseptic field must only come into contact with sterilised equipment. Additionally, Surgical ANTT usually involves the wearing of surgical gown/barrier precautions and sterile gloves.

Activity 1: Aseptic Non Touch Technique (ANTT)

From your understanding of ANTT and risk assessment, identify whether PIV Cannulation should be performed with Standard ANTT or Surgical ANTT and explain your rationale.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

PIVC Trainer’s Name: __________________________ Signature: __________________________

Date: _________________
3.3 Skin Preparation
Skin preparation is essential to prevent the introduction of skin flora into the blood stream (at needle insertion) and to avoid contamination of blood culture specimens. If the skin is visibly dirty the patient should wash the area with soap and water before commencement of the procedure.

Skin must be prepared with an antiseptic and as recommended by the Center for Disease Control (CDC) guidelines should contain ≥ 70% alcohol and > 0.5% Chlorhexidine Gluconate (CHG). Phlebotomy and investigatory procedures incur brief needle dwell time therefore a 70% Isopropyl alcohol swab (unless contraindicated) is usually sufficient for skin preparation unless antimicrobial antiseptic is indicated.

If blood cultures are to be obtained, extra care is required to prevent the blood sample from being contaminated by skin bacteria. Skin preparation must be 2% Chlorhexidine Gluconate with ≥ 70% alcohol (unless contraindicated).

As peripheral cannulation is an invasive procedure the requirement for skin preparation within the MNHHS is a large swab or swab stick containing 2% Chlorhexidine Gluconate with ≥ 70% alcohol, unless contraindicated. A stick is preferred over a swab as it enables the inserter to cleanse without inadvertently touching the intended insertion site. If the patient is allergic then cleanse the skin with alcoholic povidone iodine. Using multiple swabs is not recommended as it removes the skin’s natural barrier protection and increases infection risk.

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. It is more efficient to assess the patient’s veins at the outset, determine degree of difficulty of insertion and then risk assess to ascertain if it may be more effective to wear sterile gloves to enable palpating of the cleansed area thereby maintaining ANTT. To support asepsis, care should be exercised to only touch the prepped area to avoid contamination of gloves. The antiseptic must be allowed to air dry completely prior to inserting the catheter; do not wipe, blot or fan.

Reading 3: Skin Preparation
A working knowledge of the CHRISP Skin Preparation: Insertion Site is required. Please review this section within the Insertion and Management of Peripheral Intravascular Catheters Guideline.

It is not advisable to use isopropyl alcohol to cleanse the venepuncture site when obtaining a specimen for a blood alcohol test. This may have potential legal implications associated with use of alcohol based cleaners that could theoretically impact analysis. An alternative skin preparation would be povidone iodine.
3.3.1 Patient Sensitivity and Allergy
If the use of CHG is contraindicated, the health professional may use an alternative (see 3.3 Skin Preparation).

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.

Hair at the insertion site should be removed (prior to antiseptic application), only using clippers rather than blade razor as micro skin cell damage can encourage entry of bacteria.

3.4 Local Anaesthetic
Local anaesthetic (i.e. intradermal or topical) can be offered for adults and should be given if requested (unless contraindicated), before insertion of any size of intravenous catheter. If there is no standing order associated with the procedure then a medical order will be required for the nurse, radiographer or technician to be able to administer. Intradermal lignocaine can cause some discomfort (i.e. stinging, needlestick injury) therefore consider patient preference as another less invasive option such as topical EMLA may be preferred.

3.4.1 Lignocaine Hydrochloride
Action: Lignocaine is a local anaesthetic of the amide type and an anti-arrhythmic drug.

Mechanism: Lignocaine stabilises all potentially excitable membranes and prevents initiation and transmission of nerve impulses. This produces the local anaesthetic effect. Onset of action is rapid/immediate and blockage may last from 1 to 1½ hours.

Contraindications: Known hypersensitivity to local anaesthetics of the amide type.

Dose: Lignocaine 1% (0.02 – 0.03 mLs) intradermally (a bleb just under the skin).

The RBWH has a Standing order to enable non-medical staff to administer intradermal lignocaine for the purpose of PIVC.

3.4.2 Administering Intradermal Local Anaesthetic
- Draw up local anaesthetic in an insulin syringe (Lignocaine 1%).
- Apply an alcoholic chlorhexidine solution to the injection site and allow drying.
- With the bevel of the needle uppermost and keeping the syringe horizontal to the skin surface, insert the needle into the skin. You should be able to see the outline of the needle vaguely through the skin.
• Draw back on the syringe to ensure that a blood vessel has not been entered. If no blood is returned, slowly inject the local anaesthetic into the intradermal layer (0.02 – 0.03 mLs usually sufficient). A tense white wheal should appear. In elderly patients or patients with frail skin the wheal does not always appear.
• Proceed with PIVC.

3.4.3 Topical Anaesthetic
EMLA™ (‘Eutetic Mixture of Local Anaesthetics’ - Lignocaine with Prilocaine), should be applied 60 minutes prior to cannulation to be effective\(^3\) therefore consideration must be given to implications of treatment delay. EMLA™ may cause transient local peripheral vasoconstriction or vasodilatation, observed as transient paleness or redness, at the treated area\(^3^1\). Consider that vasoconstriction could compromise the insertion particularly if the patient already has difficult access.

\textit{EMLA™ cream can leave a lipid residue that may create a nidus for microbial growth; therefore the residue of the topical anaesthesia should be removed with a soap and water scrub, prior to skin disinfection}^3\).

\textit{Lignocaine with Adrenaline is an absolute contraindication.}

3.5 Dressing
3.5.1 PIVC Site
A sterile transparent, semi-permeable, self-adhesive IV dressing must be placed over the insertion site (as per manufacturer recommendations) and be dated. 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. Simple transparent dressings should be preserved for day procedure only.
A gauze dressing can be used if the above is contraindicated, (e.g. allergy) or if the patient is diaphoretic and a polyurethane type would be impractical however will require changing every 24-48hrs. Replace with an approved transparent IV dressing as soon as clinically appropriate to do so.

3.5.2 Venepuncture Site
Post blood collection(s) apply a gauze ball and tape, or alternatively an adhesive IV haemostatic pad. And provide the patient with instructions on when to remove.
3.6 Documentation

Documentation must comply with the medico-legal needs of the patient, the hospital and the health professional performing the clinical skill. Each inserter/collector must document individually in the patient’s clinical record (even if it was a failed attempt). Documentation must include, but is not limited to:

1. Insertion/collection site (must stipulate vein, side, upper or lower)
2. Skin antiseptic used
3. Name and designation of the health professional who inserted the cannula

4. Number of attempts
5. Indicate if local anaesthetic was used
6. Consent gained
7. Any post insertion/venepuncture instructions/recommendations (if applicable)
8. Date and time of insertion (PIVC)
9. Cannula gauge (PIVC only)
10. Anything untoward or unexpected complications (such as bleeding, nerve impingement, not enough blood collected etc.).

3.7 Patient Identification

Specimens must not be collected until a positive identification of the patient has been established (and the patient has verbally consented as previously discussed). This is to ensure that the correct results appear for the correct patient. Remember - the procedure of venepuncture is an invasive procedure, therefore consent by the patient or alternate healthcare decision maker must be obtained prior to performing this procedure.

To ensure proper informed consent, signs and symptoms of possible venepuncture associated complications and the importance of reporting these should be discussed. For example: swelling, pain, burning, bleeding or redness at the needle site.
Section 4 – 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. 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 the cannula is dependent on the following factors:

- length of well time
- purpose of therapy
- type of therapy
- patient’s age (in particular vein condition)\textsuperscript{32}.

PIVC are an immediate, but short term solution to IV therapy treatment. If the patient is likely to require a longer term treatment consideration should be given to an alternative medium to long term device such as midline or Central Venous Access Device (CVAD)\textsuperscript{33}. This is a patient focused approach to ensure the patient is not over cannulated and therefor prevent complications in the long term.

Queensland Health Guide to Informed Decision-making in Healthcare\textsuperscript{9} 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).

**Reading 4: Peripheral Intravenous Access and Infusion, Management of (Adult) procedure**

A working knowledge of the RBWH Procedure on Peripheral Intravenous Cannulation, Venepuncture and Infusions - Adult and Paediatrics\textsuperscript{2} is required to complete this section. The procedure can be accessed through the QHEPS Procedure and Guidelines Home Page.

**Consider PIVC insertion when:**

- written medical order is available
- prescription of intravenous therapy
- specialised clinical unit requirements
- clinically indicated for replacement\textsuperscript{5}.

**PIVC insertion is not appropriate in the following situations:**

- when patient consent is not obtained
- when the patient refuses
- when there is no written medical order
- without inserter competency
- when cannulation is likely to compromise the patient\textsuperscript{2}.
4.1 PIVC Insertion Bundle

Care bundles are a group of straight forward healthcare interventions based on evidence which provide structure, standardisation and encourage full compliance and when performed collectively and reliably, have been proven to improve patient outcomes\textsuperscript{34}. To prevent blood stream infections related to vascular access devices the Insertion Bundle is to be used for insertion of all peripheral intravenous cannula. The following are the simple concept points for the PIVC Insertion Bundle.

1. Hand Hygiene (3.1 Hand Hygiene)
2. ANTT (3.2 Aseptic Non-Touch Technique (ANTT))
3. Skin Preparation (3.3 Skin Preparation)
4. Dressing (3.5 Dressing)
5. Documentation (3.6 Documentation)

4.2 Purpose for PIVC Insertion

- to administer fluids and electrolytes
- to transfuse blood and blood products
- to administer continuous or intermittent medication
- for parenteral nutrition (PN) of low osmolarity given over short duration (\textit{N.B. this is not Total Parenteral Nutrition which is administered via Central Venous Access Device})
- 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)\textsuperscript{2}

4.3 Cannula Size Does Matter!

Always take into the account the intended treatment e.g. frequency, length, pH/osmolality and the patient’s condition and vasculature before deciding on the appropriate size cannula, pending that a short term cannula is acceptable.

Every movement of the cannula causes direct impact to the intima, therefore a cannula too small or too large (in size) can create inflammatory consequences. 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\textsuperscript{35}.

\textit{The smallest gauge and shortest length (cannula) in relation to vein size should be taken into account to increase haemo-dilution, reduce risk of dislodgement and other patient complications.}
### Table 3: Guide to Selecting 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>Good sites to begin cannulation, easy to visualise/palpate. 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 and easily accessible. Good choice for irritating solutions and 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 and 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>Short term cannula access only – reserved for emergency access, radiological procedures, bloodletting or Peripherally inserted Central Catheters (PICCs).</td>
</tr>
<tr>
<td>Median vein</td>
<td>Extends along underside of arm and empties into basilic or median cubital vein.</td>
<td>24-20 gauge</td>
<td>Medium – large and easy to stabilise. Easily accessible but need to be aware of vein junctions</td>
</tr>
<tr>
<td>Accessory cephalic vein</td>
<td>Branches off cephalic vein located on top of forearm.</td>
<td>22-18 gauge</td>
<td>Large and easy to stabilise – another good choice for irritating solutions and blood products</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</td>
<td>Can be difficult to visualise but can usually be palpated. May require longer length cannula due to depth. Usually reserved for PICC /midline</td>
</tr>
<tr>
<td>Upper basilic vein</td>
<td>Upper arm, medial side. Large, deep vein</td>
<td>22-16 gauge</td>
<td>Can be difficult to visualise but can usually be palpated. May require longer length cannula due to depth. Usually reserved for PICC /midline²²</td>
</tr>
</tbody>
</table>
### Table 4: General Guide to Cannula Flow Rates

<table>
<thead>
<tr>
<th>Cannula Gauge</th>
<th>Cannula Length (mm)</th>
<th>Flow rate (mL/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>19</td>
<td>1200</td>
</tr>
<tr>
<td>22</td>
<td>25</td>
<td>2220</td>
</tr>
<tr>
<td>20</td>
<td>25</td>
<td>3780</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
<td>3660</td>
</tr>
<tr>
<td>20</td>
<td>48</td>
<td>3240</td>
</tr>
<tr>
<td>18</td>
<td>30</td>
<td>5700</td>
</tr>
<tr>
<td>18</td>
<td>48</td>
<td>5220</td>
</tr>
<tr>
<td>16</td>
<td>30</td>
<td>11580</td>
</tr>
<tr>
<td>16</td>
<td>45</td>
<td>11100</td>
</tr>
</tbody>
</table>

### 4.4 Vein and Site 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 forearm 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 (see 4.4 Cannula Size Does Matter!). 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.

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. The vessel should be verified as a vein and not an artery. See also section 4.6 Chronic Kidney Disease (CKD) Patients for specifics site selection related to renal patients.

**Observe the following guidelines for vein selection when cannulating:**

- Use distal veins first – Select a site where the vein is long, straight and accessible
- Choose a vein away from areas of flexion.
- Consider the type of infusion fluid or medication (see 4.2 Purpose for PIVC Insertion)
- Palpate veins to determine their condition.
- Always choose soft, full, unobstructed veins when available.
Site Restrictions:

- An arm with an arteriovenous fistula or vascular graft – **absolute contraindication** and antecubital fossa, except in emergencies.
- Extremities pending or have recently undergone surgical procedure.
- Joints, bony prominences 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.
- Affected limb following a cerebral vascular accident or neurological trauma
- The patient’s dominant hand – where possible
- A site that may interfere with the patient’s activities of daily living, if possible
- Avoid areas with signs of oedema, skin inflammation, disease, breakdown or infection
- Veins of the inner wrist (Volar Aspect) due to risk of structural damage, e.g. potential damage to flexors as vein walls are thinner
- Veins which are sclerosed, fibrosed or thrombosed
- Vein that has a haematoma (bruising)
- Veins which have undergone multiple previous punctures
- Below a recent PIVC site (unless absolutely certain it is a different vein pathway)
- Veins in close proximity to arterial lines
- Veins in the lower extremities (unless none else available)

A PIVC inserted into the lower limbs causes a greater risk of thrombophlebitis and thrombosis than the upper limbs however there may be no alternative. Subsequently a written medical order must clearly state the cannula is to be placed into the lower limb before this area can be accessed.
Activity 2: Peripheral Access Restrictions

a) Outline three (3) patient restrictions to peripheral access that might be common within your clinical area

b) State the clinical requirements that will need to be considered for patients with these restrictions to peripheral access.

PIVC Trainer's Name: __________________________ Signature: __________________________

Date: ____________________________________
4.5 Chronic Kidney Disease (CKD) Patients

Patients with kidney disease may require vascular dialysis access. Preservation of blood vessels in the arms should occur early on in people with renal impairment.

Once a patient has a functioning Arteriovenous Fistula (AVF) it is crucial to take steps to protect the AVF from potential damage. Please note that AVF are not limited to renal patients, a number of gastroenterology patients also require AVF for long term parenteral nutrition.

The preferred permanent vascular access for a CKD patient who may need future haemodialysis is a native AVF\textsuperscript{36}. This form of access has the advantages of superior patency, lower patient morbidity and lower hospitalisation costs compared to the Arteriovenous Graft (AVG) or haemodialysis catheter\textsuperscript{37} \textsuperscript{38} \textsuperscript{39}. It is for these reasons that patients and healthcare professionals should be educated on preservation of the patient’s peripheral and central veins to prevent damage or impair venous circulation which are known to jeopardise future fistula construction or function.

Phlebitis, venous sclerosis, stenosis and thrombosis are the main injurious effects that can occur if caution is not taken. Frequent venepuncture and unsystematic use of peripheral intravenous lines, such as PICCs or central venous catheters, are identified factors that can cause this damage\textsuperscript{40}.

4.5.1 Peripheral Cannulation in the CKD

No peripheral vein in a CKD patient should be considered expendable for peripheral cannulation, since the cephalic and basilic veins of each arm are pivotal in AVF creation. However, the dorsal hand veins, preferably in the dominant arm first then the non-dominant arm should be utilised. The cephalic, antecubital veins and upper arm veins should not be used for intravenous access\textsuperscript{37}. Deviations from these guidelines may be at the discretion of the treating team and must be documented in the Patient Record. If the patient has no viable hand veins then contact the Vascular or Renal team for advice.
Activity 3: Peripheral Access for the CKD Patient

a) State the rationale for not selecting the cephalic, antecubital or upper arm veins.

b) Discuss the course of action if a renal patient has no viable veins in the area of permitted cannulation.

4.6 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 and the cannula size that will be required\(^3\).

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. The size of the cannula is also important because it will be technically difficult to insert a 14g, 16g or even 18g in a dehydrated patient therefore the inserter should not consider this. It would make more sense to insert a 22g and rehydrate the patient then insert a larger gauge, if required.

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\textsuperscript{41}.

\textbf{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 resiting. Simple questions can illicit helpful information that might otherwise not be known.}

4.6.1 \textbf{Simple Measures to make 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 tighten 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)\textsuperscript{41}.

4.7 \textbf{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\textsuperscript{41}. 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 intra-dermal anaesthetic may also be offered however if needle phobia contradicts this then a topical local anaesthetic may be more appropriate (if available).

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 for example a token warm drink can relax the patient and dilate the veins.

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\(^\text{41}\).

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

### 4.8 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. In fact evidence suggests that phlebitis is more likely to occur within the first 48 hours of insertion therefore replacing a functional catheter may predispose the patient to more risk\(^\text{42}\).

#### 4.8.1 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\(^\text{32 42}\).

#### 4.8.2 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
- haematoma or ecchymosis
- phlebitis (mechanical, chemical, bacterial)
- postinfusion phlebitis
- site infection
- mechanical failure
- thrombosis
- thrombophlebitis (can lead to septicaemia)
- venous spasm
- local allergenic reaction (dressing or cleansing agent)\textsuperscript{32 42}.

4.8.3 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\textsuperscript{32 42}.

4.9 PIVC Procedure

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

**Risk Assessment:** The inserter should decide between sterile and non-sterile gloves by simply asking themselves the question: Can I do this procedure without touching key-parts?

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 competence. 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 after the first, or whether to seek alternate intravenous access.

**Attaching a short extension set to the catheter reduces complications associated with catheter movement (mechanical phlebitis).**
4.9.1 Equipment needed for Insertion of PIVC

The following equipment is required to safely perform PIVC. The shaded equipment are identified as Active Key-Parts and should remain non-touch throughout the procedure:

- safety cannula (of correct gauge for the purpose of treatment)
- drawing up needle
- leur- lock Syringe (10cc)
- extension add-on
- IV Needleless Connector
- sterile transparent IV peripheral dressing
- swab stick impregnated with 2% Chlorhexidine gluconate and 70% ethanol (or alternative if known allergy)
- sterile 0.9 % Sodium Chloride (10ml)

- safety goggles
- plastic apron
- pair of sterile or non-sterile gloves
- insulin syringe with needle and local anaesthetic (optional)
- reliable tourniquet.

\[\text{The insertion site must be visible at all times} \,^2 \text{. If the patient has a tendency to pull at, or attempt to remove the cannula then use a loose non elasticised cover, however observation of the insertion site must be increased.}\]

4.9.2 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.
4.9.3 Venous Distension
To help dilate the vein prior to application of tourniquet see 5.9.2 Techniques to maximise venous access:

To help dilate the vein after application of tourniquet have the patient clench and relax their fist a few times².

Activity 4: Patient Assessment and PIV Cannulation

Scenario
The Medical Officer has requested insertion of peripheral cannula for commencement of Vancomycin. Patient history is long standing recurrent hospital admissions for asthma and needle phobia.

Discuss the following:
   a) patient assessment
   b) selection of vein
   c) selection of cannula gauge
   d) strategies to ensure successful insertion.

PIVC Trainer’s Name  Signature:  
_________________________  ___________________________
Date:  
_________________________

4.9.4 Cannulation Procedure
The following procedure identifies the correct steps to follow for PIVC insertion. Clinical supervision by a PIVC/Venepuncture Trainer 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 Using ANTT

1. Check the medical order 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.
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.
7. Perform hand hygiene and prepare equipment (priming and attaching Key-Parts as necessary).
8. Don protective eyewear and apron.
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
    - 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.
11. Release tourniquet.
12. Perform hand hygiene, retighten tourniquet and don gloves.
13. Cleanse the intended site (in a circular motion from proximal to distal for 30 seconds) with cutaneous antiseptic: as per 3.3 Skin Preparation and Allow skin preparation to dry.
15. Release the stylet/cannula tip adhesive by holding the hub of the cannula and rotating the safety chamber 360° until it returns back to its original slotted position.

Figure 4: Finger Grip on BD Insyte Autoguard BC ® Cannula
(Becton Dickson™ and Company, 2012)
**Insert the cannula as follows:**

16. Hold cannula by designated finger grip (as above) using dominant hand. Push-Off tab and white (activation) button should be in alignment facing upwards.

17. With non-dominant hand pull skin taut below the site of insertion to stabilise the vein.

18. Puncture the skin at a 10 – 30° angle. Angle will depend on the position depth of vein in the subcutaneous tissue however angles above or below the recommended will be more painful.

19. To increase probability of successful cannulation, enter the vein directly from above.

20. Confirmation of vessel entry will be evident with blood immediately visible in the stylet with 24-20g and in the flash-chamber behind the white button with 18-14g.

21. Stop and lower angle to enable advancement without piercing posterior vein wall.

22. Advance the stylet and cannula a few millimetres to establish the cannula tip in the vein.

23. Use index finger of dominant hand to advance cannula using Push-Off tab.
   - Do not push-off from the end of the hub as this can cause entry of bacteria into the bloodstream.

24. A secondary confirmation of vessel placement will occur with blood appearing in the flash chamber behind the white button with 24-20g and with 18-14g will flow up the cannula on advancement.

For blood control cannula there is no need to perform vessel compression whilst connecting add-ons as the cannula has blood control technology reducing risk of blood exposure (see Figure 6 below). If using non-blood control cannula then vessel compression will be required prior to removing the stylet and maintained until a leur-lok connection is attached.

Release tourniquet (unless immediately collecting blood).

25. Place a finger lightly on the hub over the Push-Off tab to stabilise the cannula. Do not touch the end of the cannula hub as this is an Active Key-Part (see picture below).

26. Press activation button with dominant hand finger to retract the stylet into the needle shield safety chamber. The sharp is now completely encapsulated protecting inserter from needlestick injury. Disposal should still be in sharps container.

*Note:* Blood control. No need to compress vessel.

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**Figure 5: Blood Control on BD Insyte Autoguard BC ® Cannula**

(Becton Dickson™ and Company, 2012)
27. Attach administration extension set.
28. Flush cannula with 10ml 0.9% Sodium Chloride to clear blood and confirm cannula placement. Observe site for signs of haematoma or infiltration.
29. Clamp under positive pressure to prevent blood reflux and clotting.
30. Apply sterile dressing as per 3.5 Dressing

**NB:** Effective preparation and securement will help prevent premature dislodgement, infiltration/extravasation, phlebitis, infection and thereby increase dwell time and reduce repeat cannulations.

31. Confirm with patient that cannula is comfortable.
32. Date dressing.
33. Tape must not be placed over the cannula which will obscure insertion site and may impede flow. Do not ‘ringbark’ limb with tape as this can create a tourniquet effect.
34. Only apply a non-elasticised tubular bandage in exceptional circumstances otherwise the insertion site should be left visible.
35. Inappropriate disposal of waste is costly and imparts unnecessary risk to the worker. Dispose of sharps into the sharps container. Place biological disposable waste into yellow rubbish bin. Other waste can be disposed of in the green rubbish bins\(^2\)\(^43\).
36. Document in the patient record\(^7\) as per 3.6 Documentation

**Table 5: Troubleshooting PIV Cannulation**

<table>
<thead>
<tr>
<th>Problems</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missed the Vein</td>
<td>• Cannula 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 therefore wrong direction</td>
<td>- Reposition yourself to ensure accurate visualisation of the vein</td>
</tr>
<tr>
<td></td>
<td>• Vein moved due to inadequate anchoring</td>
<td>- Re-anchor the vein and maintain traction on the skin without flattening vein.</td>
</tr>
<tr>
<td></td>
<td>• Incorrect angle of insertion</td>
<td>- Local anaesthetic should be given as intradermal <strong>not</strong> subdermal(^43).</td>
</tr>
<tr>
<td></td>
<td>• Collection of local anaesthetic</td>
<td>- Practice and become a palpation expert</td>
</tr>
<tr>
<td></td>
<td>• Mistaken identity</td>
<td>- Use of ultra sound or infra-red light to exactly locate vein</td>
</tr>
<tr>
<td>Haematoma with insertion</td>
<td>• Angle too great</td>
<td>- Decrease angle of insertion</td>
</tr>
<tr>
<td></td>
<td>• Too much force</td>
<td>- Decrease force, slow down insertion</td>
</tr>
<tr>
<td></td>
<td>• Failure to lower the angle on vein entry causing trauma to the posterior vessel wall</td>
<td>- Lower the angle after entering the vein.</td>
</tr>
<tr>
<td></td>
<td>• Fragile veins due to age, medical condition,</td>
<td>- Choose the best possible vein with a good blood volume. Tourniquet too tight.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Use a smaller catheter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Improve technique (use a smoother</td>
</tr>
<tr>
<td>Problems</td>
<td>Possible Cause</td>
<td>Corrective Action</td>
</tr>
<tr>
<td>----------</td>
<td>---------------</td>
<td>-------------------</td>
</tr>
</tbody>
</table>
| medications & lifestyle | Cannula too large for vein | separation)  
- Ensure both cannula and stylet in vein before separation  
- Spontaneous bleed caused by low platelets. Apply pressure[^43]. |
| Rough separation of cannula from stylet | Cannula not in vein on advancement | |
| Thrombocytopenia | Evidence of separation)  
- Ensure both cannula and stylet in vein before separation  
- Spontaneous bleed caused by low platelets. Apply pressure[^43]. |
| • May not actually be in vein | Venous spasm causing vasoconstriction | |
| • Sclerosed vein | • Resistance from a valve | |
| • Wrong angle | • Catheter too large for vein | |
| • During separation, the stylet was pulled back too far | - Stylet may be in vein but cannula which is shorter, may not be. 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  
- 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[^43]. |
| No flashback | Hypovolaemia causing low BP therefore sluggish flow. | |
| • Clotted immediately on vein entry | Removal of stylet may encourage flow. Attach syringe and administer flush to ascertain patency. Remove cannula if swelling occurs.  
- A tiny clot or plug of skin can cause blockage which is easily removed by flushing[^43]. |
4.10 Flushing
Utilise a “pulsatile positive pressure technique” when flushing.

- Flush catheters immediately:
  - after placement
  - 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
  - or at a minimum every 8 hours².

4.11 Replacement of PIVC
The dwell time for a PIVC is ≤ 72 hours unless there are extenuating circumstances¹⁹. Such circumstances may include:

- The PIVC is likely to be needed for another 24 hours or less
- Replacement of PIVC is likely to be difficult and judged to be a greater risk than retention
- Patient refuses to have routine replacement of cannula.

If the PIVC is to be retained beyond 72 hours, there must be no symptoms or signs of inflammation or other site complication and a written directive and rationale must be clearly documented daily in the patient’s clinical record.

PIVC inserted without full aseptic procedure (e.g. Emergency department, during resuscitation) or whereby asepsis could not be determined (e.g. another hospital, Ambulance, or no documentation of insertion) are to be removed within 24 hours if the patient’s clinical condition allows. A new PIVC is to be sited if ongoing IV access is indicated.

The decision to remove or replace before 72 hours should be based on assessment of the patient’s condition and access site, the following should be observed:

- skin and vein integrity, e.g. infiltrated, extravasated, infection, tracking, induration, erythema
- sign of phlebitis, thrombophlebitis (i.e. warmth, tenderness, erythema, palpable venous cord
- integrity and patency of VAD e.g. clotted, leaking, dislodged, contaminated
- dressing and stabilisation, e.g. loose, moist, soiled
- patient reports discomfort or pain³².

Review the need for ongoing IV access/therapy. PIVCs should be removed when they are no longer required ².

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.

**IV dressing must be dated at time of insertion. Securing strips accompany the more advanced IV polyurethane dressing, the date strip being indicated by the picture of a little stick figure.**
Section 5- Paediatric Intravenous Cannulation

5.1 Introduction

This section is relevant to healthcare workers who require undertaking the accreditation process for Paediatric Intravenous Cannulation where it is identified as necessary within their defined role.

Peripheral intravenous access in infants and children is technically challenging as their veins are small and located deep within the subcutaneous tissue\(^4^4\). It is also one of the most feared procedures so ensure that the procedure is justified and in this exception combine with blood sampling if needed\(^4^6\). Preparing the child in an age appropriate approach for a painful invasive procedure can be challenging and time consuming. Discuss the procedure with the consenting parents/guardian however inclusion of the child in the decision making is also very important. Whilst it can go wrong even for the most adept cannulator the old adage “try, try, try again” is not acceptable therefore after two attempts ask for help.

5.2 Distraction Therapy

Painful procedures, particularly those involving needles can be very traumatic for children and their families therefore use of cognitive psychological techniques to allay anxiety, fear and behavioral distress is now proven to be effective\(^4^5\). Specialty healthcare workers such as Play and Music Therapists or even those who fulfill the role of Medical Clown, affectionately known as Clown Doctor are employed for distraction techniques as it is a proven strategy for preventing long-term negative emotional and psychological sequelae\(^4^5\).

In an environment where children present infrequently it is feasible that these services are unavailable but nonetheless there is a moral obligation for healthcare workers to be aware of, and use some distraction techniques\(^4^5\). The following is a list of some strategies that can be implemented in any environment but with a little creative ingenuity there are many more options.

5.2.1 Distraction aids

Visual

- Play videos- especially colourful moving or music sing-along
- Picture cards/ books
- Apply stickers to the child’s arm (ask parents/ guardians first)
- Place stickers on the healthcare workers apron to make it child friendly
- Pictures on the walls/ ceiling of the procedure room
- Hanging mobiles
- Use play preparation such as dolls, parents or healthcare worker to demonstrate procedure steps\(^4^6\)
Sound

- Use of musical mobiles or toys
- Play music- sing along with the child
- Guitar playing volunteer to sing age appropriate children’s songs

Play Therapy

- Nominate a department ‘Clown Doctor’, requires a special kind of silliness and oversized medical equipment.
- Have character costumes available for the assisting staff.
- Play games with shapes and letters
- Engage the child playing with unopened equipment before and after the procedure. Make up counting games with the equipment so the child becomes familiar, and it’s fun.
- Engage the child in making a simple toy e.g. stick figure made from cotton balls and spatula’s (draw a face). These could be added to a department mobile
- Make up your own department games / toys

**The inserter should not dress in-character; the child may learn to relate their favourite character to pain and fear. An alternate staff and/ or family member should perform the role.**

5.3 Pain Management

Any procedure that concerns the insertion of a needle has been shown to be very frightening and distressing for children and therefore even a minor invasive procedure such as peripheral intravenous cannulation can invoke significant pain. There are other comfort measures (including distraction) that can alleviate pain.

**Always use proper securement to prevent dislodgment and unnecessary reinsertion, even a sick child can be active. See Splinting**

Infants <6 Months

- Oral sucrose 2 minutes prior and throughout, with non-nutritive sucking e.g. pacifier provides calming effect
- Parent/ guardian may hold the infant and employ multisensory stimulation

Older Infants and Children

- Use of topical anaesthetic creams (unless contraindicated).
  - Ametop™ is effective in 30-45 minutes (mims)
  - Emla™ is effective in 60 minutes (mims)
  - allow time for topical anaesthetic to be effective
5.3.1 Cold and Vibration

The application of external cold and vibration stimulation have been shown to be effective in relieving pain and anxiety in children during peripheral intravenous cannulation\textsuperscript{47}. For example use of an battery operated Buzzy\textsuperscript{TM} with incorporated ice pack wings applied 30-60 seconds before the procedure and continued until the end of the procedure is a simple and cost effective pain relief method\textsuperscript{47}.

*Figure 6: Example of Cold and Vibration Buzzy\textsuperscript{TM}*

5.4 Setting

Whenever possible perform the procedure away from the bedside (e.g. in treatment room) as the child’s bed should be the safe place\textsuperscript{46}. In departments where imaging procedures occur insert the cannula in a different room to where the machinery is located. Have the equipment ready before the child enters the room. Ensure adequate lighting but infants eyes should be protected from bright light\textsuperscript{53}. Provide a neutral thermal environment and prevent cold stress\textsuperscript{53}. There will need to be at least one other staff member to assist so ensure help is at hand ready to go.

5.5 Insertion Sites

Prior to cannulation ask the parents/ guardians which is the non-dominant hand. It is important to avoid the dominant hand in a child as coordination is less developed and if the child cannot use this hand it can be very unsettling. Ask the parents/ guardians if the child has had previous peripheral devices as the may suggest successful site identification or warn of previous skin/ vein or patient reaction\textsuperscript{52}. In children and infants the hand, forearm, feet and scalp veins are the most common PIVC sites although predominantly the dorsum of the nondominant hand or long saphenous is preferred\textsuperscript{46 48}.

Also avoid:

- the thumb sucking hand (if applicable)
- foot in an ambulant child
- antecubital fossa (as a child who cannot bend their arm will become frustrated)
- if a splint is required consider where this may be most appropriate (e.g. avoid joint so child doesn't get frustrated and can move).
With application of a tourniquet look carefully and remember that in paediatric patients the best vein may not necessarily be palpable. Scalp veins should only be cannulated by more experienced medical officers. A tourniquet is not required for an infant as use of the Trigger method is usually sufficient to achieve the same effect. It is a good idea to identify two potential cannulation sites at the initial assessment to allow quick transition to the second site if the first attempt fails. Paediatric veins can be difficult to visualise and palpate therefore another method that may be useful to assist with visualisation is transillumination.

5.5.1 Trigger Method
The Trigger technique is a suggested method for very young children to obstructive venous flow as well as stabilise the vein and arm, aptly named because the action is similar to pulling a trigger of a gun. The nondominant hand is used to secure the extremity in an optimal position at the same time stabilising the extremity and skin structures and the index finger is used to obstruct venous flow (hence pulling a trigger). Older children will require other Therapeutic Holding techniques to be negotiated with the child and parents/guardians.

Figure 7: Trigger Technique to Stabilise Vein

5.5.2 Trans-illumination
Vascular access in children can be challenging and there is no way to ensure success. The longer it takes the more stressed the child is likely to become. One method that is not fully utilised is transillumination, use of a background light held against the opposing side to illuminate the vessels. To avoid skin burns only COLD lights (fibre-optic) should be in contact with the skin. In older children the light may not illuminate the vessels from the opposing side so other vein finders which illuminate from above may be useful however these are decidedly more expensive.

5.6 Therapeutic Holding
It may be necessary for the child to be held gently but firmly to manage the painful procedure quickly and effectively or maintain the child’s safety and prevent injury. Holding is distinguished from restraint by the degree of force required and the intention, and should be age appropriate.
Parenteral/guardian presence and involvement should be encouraged whereby *hug holds* in supporting the child is preferable but parents/guardians should not be made to feel guilty if they do not wish to be present during the procedure\(^50\).

The healthcare worker should make an agreement beforehand with the parents/guardians and child about what method is to be used\(^50\), document this in the clinical record. Young children are incredibly skilled at getting rid of things they don’t like so *splinting* or immobilization of the arm may be required, this is also a form of therapeutic holding\(^51\). Explain to the child beforehand what securement technique will be used. In all but the youngest child seek permission before proceeding\(^50\).

A child may not be happy to lie still on a procedure bed so offer options such as the child sitting on a parent’s/guardians lap (hug holding for reassurance). For a very small child it may be easier and more ergonomically comfortable for the inserter if the parent is sitting on the procedure bed rather than a low chair. If the child if very wriggly and the parent cannot contain movement consider wrapping the child in some sort of bundling device\(^52\), blanket or comforting swaddling with just the required limb exposed for cannulation\(^53\).

**Reading 6: Therapeutic Holding**
Read and review the Royal College of Nursing, *Restrictive Physical Intervention and Therapeutic Holding for Children and Young People*.

**5.7 Insertion Bundle**
The use of care bundles has been proven to reduce the risk of complication\(^34\) so the same adult principles of the *Insertion Bundle* concept must also be applied to paediatrics.

**Reading 7: Insertion Bundle**
Read and review all aspects of the generic *PIVC Insertion Bundle* and apply the same principles to paediatric cannulation.

- **3.1 Hand Hygiene**
- **3.2 Aseptic Non-Touch Technique (ANTT)**
- **3.3 Skin Preparation**
  - 70% Alcohol for procedure
  - Use > 0.5% Chlorhexidine™ preparation with alcohol. Use with caution in infants aged <2 months as there is no recommendations for safety\(^27\).
- **3.5 Dressing**
  - Use a paediatric size dressing.
- **3.6 Documentation**
5.8 Inserting the Cannula

When all the necessary steps of preparation have been implemented have the assistant stabilise the limb, holding above and below (the intended site) but allow easy access for the inserter. The parent/guardian (if present) should be providing comfort only.

If applying a tourniquet slide a finger under the engaged clip and pulled straight up (to the sky) and pull only tight enough that the finger can slide out easily. The aim is to avoid pinching skin and compressing the artery and have easy access to release the tourniquet.

- Disinfect skin thoroughly, swab for at least 30 seconds. **Allow to air dry.**
- Do not re-palpate cleansed skin unless wearing sterile gloves.
- Stabilise the vein below the insertion site (or apply Trigger technique), pull the skin taut.
- Hold cannula correctly to be able to visualise flashback.
- Insert assuredly and smoothly at recommended 10-15° angle. If lower angle is required keep in mind it is more painful.
- A primary flashback of blood should be observed, this may be slow with a 24g in a very small vein. This may be accompanied by a giving way sensation.
- Lower the cannula to rest on the skin
- Advance both needle and cannula slowly for about 1-2mm (to ensure both needle and cannula are in the vein).
- Go slowly
- Advance the entire cannula off the needle into the vein.
- Release the tourniquet (if no bloods required) and deploy the needle (activating passive or mechanical safety).
- Secure the cannula immediately by holding it at the hub or asking the assistant to place dressing tape across.
- Bloods are taken at this stage if required (release tourniquet post blood taking if applicable)
- Attach extension and flush the cannula gently to confirm placement.

Equipment is prepared prior to the child entering the procedure room to reduce fear and anxiety. See **Equipment needed for Insertion of PIVC.** Only use 24-22g in infants and children.
• In younger children use the chevron taping technique e.g. inverted cross-over straps
• Place another tape over the top then apply the IV transparent dressing.
• A small piece of cotton ball or gauze may be placed under the cannula hub to prevent pressure injury.
• Further securement such as splinting is likely; always ensure the site is visible.
• In very young children the other hand may require bandaging to prevent removal of cannula.

5.8.1 Splinting
• The splint should be of the correct size for the child's arm
• Strap so the joint is immobilised
• Apply cotton wool wadding to the length of tape that will be in contact with the skin (for painless removal). Tape should only be sticky at points of contact with the splint.
• Avoid tapes being too tight
• Ensure the thumb is free

5.9 Resite
The peripheral intravenous cannula should remain in situ until there is no clinical indication for use. Such as:
• Treatment completed/ ceased
• Alternate replacement device
• Indication for resite such as complication
• Parents/ guardians no longer consent to treatment
Section 6 - Venepuncture

Only health care workers who have completed an education program in venepuncture and who have been assessed in this skill may collect venous blood specimens, including blood cultures. Venepuncture, except for in specialised areas (e.g. Oncology, Emergency Department and Coronary Care, Cardiac Investigations Unit, Intensive Care), is only expected to be performed outside of phlebotomy hours (after hours) unless there are mitigating circumstances.

The venepuncture procedure requires both knowledge and skill to perform safely and correctly. Poor knowledge in collection technique, equipment and methodology of blood draw can result in unnecessary and erroneous collection which is a risk to the patient and a cost to the hospitals.

Reasons for Blood Specimen Collection

- Establish, confirm or exclude a diagnosis
- Monitor a therapy or medication level(s) for dosing or possible toxicity
- Screen for or detect a disease
- Stage a disease
- As a prognostic indicator
- Provide baseline prior to treatment\(^{54}\).

6.1 Venepuncture Bundle Principals

A bundle is a straightforward set of evidence-based practices (see 4.1 PIVC Insertion Bundle for more in-depth information) that deliver best possible care for patients undergoing certain procedures, in particular invasive procedures\(^{55}\). Venepuncture is an invasive procedure so to prevent patient complication health professionals must adhere to the bundle concepts.

1. ANTT (3.1 Aseptic Non-Touch Technique [ANTT])
2. Hand Hygiene (3.2 Hand Hygiene)
3. Skin Preparation (3.3 Skin Preparation)
4. Dressing (3.5 Dressing)
5. Documentation (3.6 Documentation)

6.2 Site Selection

Venepuncture means the collection of blood from a vein\(^{56}\). The best sites for venepuncture are the superficial veins of the upper limb primarily the veins of the ante cubital fossa (ACF)\(^{57}\). The safest vein of choice in the ACF is the median cubital (see Figure 7) as it has less tendency to roll and circumvents the brachial nerve and artery\(^{58}\) however other veins of the ACF may be used if necessary. If suitable veins cannot be located then use hand or wrist veins (avoid the volar aspect). If the veins are thrombosed or have a haematomas from previous cannulation or venepuncture then another site must be used. Obtaining blood from other than the arm can be done but requires medical authorisation.

It is important for the clinician have a working knowledge of anatomy and physiology when undertaking venepuncture. See the section 2.1 Anatomy and Physiology for a more detailed account of structures. Assess the patient’s vasculature prior to commencement to ascertain
difficulty of access (see: 4.7 Condition of the Vein) and avoid sites of restriction (see: 4.4 Vein and Site Selection – Site Restrictions) Veins can be difficult to see and palpate due to age, obesity, hydration level, disease, co morbidity or medication/drug usage therefore strategies may need to be employed to assist.

6.2.1 Upper versus Lower extremities
Always use veins in the upper extremities before using lower extremity sites. Veins of the lower extremities are only used at the discretion of the Medical Officer. The ideal veins for venepuncture in adults are those in the antecubital fossa (see Figure 7).

Veins of the legs, feet and ankles are generally used only in exceptional circumstances, as “needling” may compromise circulation. If necessary, the dorsum of the foot and saphenous vein of the ankle are sites of choice. For more detailed view of vasculature for venepuncture see 2.1.2 Veins of Arm, Hand and Foot in Adults and 2.1.3 Veins of Arm and Foot in Paediatrics.

Figure 9: AnteCubital Fossa Vasculature

Retrieved at http://www.royalmarsdenmanual.com
Activity 5: Site Selection

Read the comprehensive list of sites to avoid in PIVC section 4.4 Vein and Site Selection – Site Restrictions. List four (4) restrictions that would apply to venepuncture.

a) Explain why venepuncture should not occur in the arm in which blood is being transfused.

b) 

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

PIVC Trainer’s Name: ___________________________  Signature: ___________________________

Date: ___________________________
6.3 Patient Identification

Wrong blood in tube (WBIT) errors where the blood in the tube is not that of the patient identified on label may lead to fatal outcomes such as death from an ABO incompatible blood transfusion.

Specimens must not be collected until a positive identification of the patient has been established. National Standard 5- Patient Identification and Procedure Matching requires that at least three (3) approved patient identifiers are required:

- Full Name
- Date of Birth
- UR number or address

Always compare the identity on pathology request forms with the patient (verbally and by comparison to ID band) and ensure specimens are labelled at the bedside immediately after collection. The laboratory will reject blood specimens if the identity of the patient on the request form is illegible, absent, incomplete or different to that on the specimen.

**Remember** - the procedure of venepuncture is an invasive procedure, therefore consent by the patient or alternate healthcare decision maker must be obtained prior to performing this procedure (see: 1.2 Legal Considerations). To facilitate valid informed consent the patient must be informed of risks and complications associated with venepuncture, e.g. swelling, pain, burning, numbness, tingling and bleeding or redness at the needle site.

6.4 Request Forms

The pathology request form must be completed by a medical officer (MO) or nurse practitioner who must ensure correct patient details. The collector should not proceed if any of the following details are omitted. The essential elements of the requisition form are:

**Patient details and demographics:**

- UR number
- Surname and given name
- Date of birth
- Sex
- Consultant/requesting medical officer/nurse practitioner
- Surname and first name initials (printed in block letters)
- Signature of the MO requesting the test(s)
- Hospital and ward/unit or clinic
- Relevant clinical history - including drugs (last dose)

To ensure accuracy of detail on pathology request form a patient identification label is preferred.
If the patient requires a Group and Hold (GPH) test this may be requested on either the Pathology Request or Transfusion Request forms, however if the patient requires transfusion then the Transfusion Request form must be completed to enable allocation of blood. The collector must take absolute care in checking patient details when sampling for GPH to ensure the patient does not receive incompatible blood products.

If more than one collection of blood cultures is required then a separate form must accompany each set even if being drawn consecutively. The removable scanner code on the culture bottles should be applied to the pathology form which will accompany the samples.

The collector must ensure the pathology request form has all required information before commencing venepuncture. The collector must certify the pathology request form to confirm blood was collected from the correct patient. This must include:

**Collection information:**
- Date and time of collection
- Print legible surname and initials
- Signature of collector (to certify)

*Reading 5: Pathology Request Forms*
Read and review the How to Fill out a Pathology Request Form for Faster Results

*Reading 6: Blood Collection Procedure*
Access and read the following RBWH 21605/Proc: Blood Collection (Adult) procedure

*Activity 6: Specimen Request Form*
Complete reading above then answer the following questions.

List at least five essential information elements which must be provided on the pathology request form and provide a rationale for each element.
6.5 Specimen Identification

All specimens are to be labelled at the patient’s bedside **immediately after** the blood samples have been collected. Ensure that all the required documentation and specimen labelling is complete before commencing a blood collect on another patient. Under no circumstances are specimen tubes to be pre labelled, doing so increases the risk of a WBIT event occurring. The details, which appear on the pathology request form, must match those on the specimen label.

Specimen labelling must include:-

1. Patient’s full name
2. Patient’s identification number
3. Patient’s date of birth
4. Date of collection and time of collection
5. Ward/Unit
6. Collector’s signature

If there is a request for transfusion then it is preferred that specimens are handwritten however patient labels will be accepted if the collector’s signature, date and time of collection is written on the label. If there are any identified errors, discrepancy or omission then this will result in a ‘no test’ and redraw will be required.

*Reading 7: No Tests*

Access and read the following [Acceptance and Rejection of Specimens: Pathology Queensland](#)

*If using patient ID pathology stickers, collector’s signature, date and time of specimen collection and ward or unit must also be completed on the label. Ask patient to check their sticker details (if able) to ensure accuracy.*
Reading 8: Collection for Transfusion Request

Access and read the following MNHHS Blood and Blood Product Transfusion Procedure

Activity 7: Specimen Collection for Transfusion Request

Complete reading above then answer following questions.

For a pre transfusion specimen collection, list five (5) important responsibilities of the Collector in regards specimen labelling and patient identification that would minimise potential for error.

PIVC Trainer’s Name: __________________________ Signature: __________________________

Date: __________________________

6.6 Blood Cultures

Collection of blood cultures from peripheral veins prior to antibiotics gives the greatest sensitivity and positive predictive value\(^6\). Collection of blood cultures through venous catheters has a low predictive value and specificity both at time of insertion, and later therefore collection from venous catheters should be avoided. If multiple sets of blood cultures are required it is recommended to draw from each arm to rule out contamination of the sample. Skin preparation prior to blood culture collect must be Chlorhexidine 2% with alcohol 70% (unless contraindicated) to reduce risk of skin contaminant. The culture bottle tops are not sterile (under the flip off cap) so this must be cleaned thoroughly with a 70% alcohol swab.

A Blood Culture set comprises of two (2) Fan™ (fastidious antibiotic neutralisations)\(^*\) bottles collected at the same time - one Aerobic (green) and one Anaerobic (orange). Cultures is best
collected using equipment which provides a direct fill to the aerobe / anaerobe bottles to prevent risk of contamination. To assist with large volume blood collection it is recommended to use a venepuncture butterfly (preferably needle safety) but remember to fill the aerobic (green top) culture bottle first as the butterfly extension is primed with air and will compromise the anaerobe bottle (orange top). A good motto to remember order of fill is ‘Green for Go’.

Cultures should be the first draw of blood Table 1: Order of Pathology Tube Fill. To give the greatest sensitivity and positive predictive value collect 10mL of blood per aerobic/anaerobic bottle e.g. 20 mL totals. Two separate peripheral blood collects provide a sensitivity of approximately 90% and three sets 98%. Three sets are recommended for investigations if bacterial endocarditis is suspected.

When collecting blood for cultures ensure patient ID labels are not placed over the bar-code labels on culture bottles. The removable bar code label must be placed horizontally on the patients request form to ensure correct pairing. If the label is torn, covered or cannot be removed the barcode number must be clearly written on the request form. If taking more than one set of cultures then a separate request form for each set is required. If drawing cultures from a central line simultaneously then ensure the device type is written on the form so pathology can differentiate from peripheral because catheters are a highly contaminant source. For this reason peripheral draws (if accessible) should be given preference (over catheter draw) to enable true diagnostics, even for the immunocompromised febrile patient.

To ensure blood cultures are collected and processed without error click on hyperlink and read the RBWH procedure [05450/ Proc: Peripheral Intravenous Cannulation, Venepuncture and Infusions- Adult and Paediatrics] and [http://cassapps1.health.qld.gov.au/testlistpq/default.aspx]
Activity 8: Collecting Blood Cultures

Complete reading above then answer following questions.

List precautions required when drawing culture blood samples to ensure reliability testing.

PIVC Trainer’s Name ___________________________ Signature: ___________________________

Date: ___________________________

6.6 Pathology Collection Tubes
The tubes used for phlebotomy are either additive or non-additive. Non-additive tubes may contain silicone to assist clot formation, +/- inert barrier gel. Check that the tubes are not expired or damaged.

The tubes are designed to fill with a predetermined volume of blood by vacuum these are called Evacuated Collection Tubes. The rubber stoppers (tube tops) are colour coded according to the additive that the tube contains. Various sizes are available.

Blood should NEVER be poured from one tube to another since the tubes can have different additives or coatings.

The rubber stoppers should NEVER be removed or pierced with a needle to fill the tube.

Blood samples for certain tests must meet special requirements. Some tests require whole blood whilst others require components such as plasma, serum or cells therefore correct collection tube is important.
• **SERUM**: Consists of plasma minus fibrinogen. Serum is obtained by drawing blood in a non-additive tube and allowing it to coagulate.

• **PLASMA**: Consists of stable components of blood minus the cells. Is obtained by using an anticoagulant to prevent the blood from clotting.

• **WHOLE BLOOD**: Used for some tests e.g. Full blood count.

To ensure blood are tubed correctly read and review the *Pathology Queensland Specimen Collection - Blood Tube Recognition Charts*.

There are some tests that **must** have correct blood sample (fill) volume to ratio of additive to ensure accuracy of testing. If multiple tubes are required or patient is difficult to bleed ascertain which tubes can be under filled and those which require correct fill.

**These tests will not be processed if blood collection tube is not filled to correct level**

- ESR
- Citrate tubes (coagulation studies)

### 6.7 Order of Draw

Blood collection tubes must be drawn in a specific order (see [Table 1: Order of Pathology Tube Fill](#)) to avoid cross-contamination of additives between tubes. To find out information on tests available and correct tubes for collection go to *Pathology Queensland: Test List*. See table below for correct order of fill/draw.

Blood should be drawn using closed system e.g. directly from vein to specimen tube.

Always use safety equipment with transfer device. This promotes staff safety and integrity and reliability of blood sample e.g. prevents blood haemolysis and erroneous results.

<table>
<thead>
<tr>
<th>Table 6: Recommended Order of Blood Draw</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture Bottles (Fan ® Set)- always collect culture bloods first. Fill green aerobic first, orange anaerobic second</td>
</tr>
<tr>
<td>Blue Citrate Tube- must have correct fill volume for test accuracy</td>
</tr>
<tr>
<td>Red Serum Tube</td>
</tr>
<tr>
<td>Green Lithium Heparin Tube</td>
</tr>
<tr>
<td>Purple EDTA Tube- ESR must have correct fill volume</td>
</tr>
<tr>
<td>Grey Fluoride Oxalate Tube</td>
</tr>
</tbody>
</table>
Activity 9: Pathology Tubes and Collection

You have been asked to collect patient blood specimens for blood culture, Chem 20, INR and full blood count.

List the tubes in the correct order of draw (fill) and describe the type of tube and the colour.

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

PIVC Trainer’s Name: ___________________________ Signature: ___________________________

Date: ___________________________

6.8 Special Considerations

To ensure optimum collection, reduce error and reduce costly ‘no tests’ the collector must have knowledge on the following specialty collections considerations.

6.8.1 Temperature Control for Specimen

Delays in transporting specimens may result in specimen degradation or may reduce the biological representative nature of the specimen. Blood culture specimens are to be transported to the Laboratory as soon as possible. Some investigations require the specimen to be maintained at a certain temperature to maintain the biological values of the specimen.

Specimens to be kept on ice:

- Arterial Blood gases – (Only Registered Nurses who have undergone approved training can take arterial blood)
- Aldosterone

To maintain at 37°C

- Cold agglutins
- Cryoglobulins
- PTH peptide
6.8.2 Dietary restrictions to Patient
The patient should have been advised of any dietary restrictions prior to blood collection. It is important for the collector to know restrictions and check that the patient has followed specific instructions (e.g. fasting time). If the collector fails to check with the patient and the patient has not followed dietary restrictions then blood results may not be a true reflection. It should be noted on the pathology form if the patient has not followed dietary restrictions. If the collector is unsure of special requirements then check on (link) http://cassapps1.health.qld.gov.au/testlistpq/default.aspx or phone pathology.

- Fasting lipids  Fasting 8-12 hours pre collection
- Glucose tolerance tests  Fasting 8-12 hours pre collection
- Carotene  Check test manual
- Some endocrine tests  Check test manual

6.8.3 Minimum Volumes
The blood collector should know acceptable minimum volumes (to draw) for testing as it may not be possible or practical to collect full volumes. Smaller minimal volumes may be acceptable for some tests if the patient is

- Difficult to bleed
- Having frequent blood draws
- A paediatric

Check with pathology if unsure.

6.8.4 Plasma Drug levels
Confirm with Pathology required time frames for drug assays e.g. pre and post administration time frames.

6.8.5 Oedema
Avoid oedematous areas when selecting a site for venepuncture. Not only will the veins be hard to palpate but the specimen may be contaminated with fluids.

6.8.6 Bariatric
Be careful when collecting blood from obese patients as excessive probing of the site in search of the vein may result in rupture of the red blood cells, an increased concentration of intracellular contents or the release of tissue clotting factors.

6.8.7 Infusion Therapy
Drawing blood from a patients arm with an intravenous infusion running has the potential risk for erroneous and misleading laboratory test results. Use the opposite arm whenever possible. If the ipsilateral arm has to be used it is recommended to draw blood below the IV (while it is infusing) or after the intravenous fluids have been stopped for two minutes.
If there is no choice but to use vein above a peripheral intravenous cannula turn the IV therapy off and clamp line (if appropriate and safe to do so) for 2 minutes prior to collection. Make a note on the pathology request that blood was drawn from above infusion site but pump turned “off”. The cannula must be flushed afterwards to ensure patency before restarting pump.

6.8.8 **Damaged, Sclerosed or Occluded Veins**
Damaged, sclerosed or occluded veins feel hard when palpated and should be avoided.

6.9 Preparation for Venepuncture
Proper positioning is important to both the collector and the patient not only for safety but a successful blood collection or venepuncture. Patients should **NEVER** stand or sit on high stools during the procedure due to risk of vaso-vagal and fainting. If the patient has a history of vaso-vagal and/or fainting then position the patient in semi-prone or prone position for venepuncture. The limb should also be positions to enable easy access for the collector and prevent unnecessary muscular skeletal injury.

- Confirm order for venepuncture for blood sample
- Wash hands
- Introduce yourself to the patient
- Confirm correct patient identification and obtain patient’s consent
- Explain the procedure and the purpose of the venepuncture to the patient/parent/carer/legal guardian
- Check for allergies (especially to preparation solution and adhesive tapes)

6.9.1 Tourniquet Application
The use of a tourniquet makes the veins more prominent and easier to puncture due to venous filling. The radial pulse should be palpable to ensure arterial flow is not occluded. Place a tourniquet above the intended venepuncture site. The tourniquet should not be left on for greater than one minute as this causes haemoconcentration (blood concentration of large molecules i.e. proteins, cells and coagulation factors), that can lead to inaccurate laboratory test results.

A tourniquet left on too long can cause falsified blood collection due to haemoconcentration e.g. blood concentration of large molecules such as proteins, cells and coagulation factors.

Some blood samples must be drawn without use of a tourniquet as it may compromise accuracy of test results e.g. serum calcium

6.9.2 Techniques to maximise venous access:
- Application of warmth to the site or near the site to assist venous distension
- Lowering of extremity over the side of the bed/chair to allow vein fill capacity
- Gently tapping or massaging of the vein
- Fist clench (avoid instruction of vigorous clench/unclench as test results can be compromised such as false hyperkalaemia)
- Tourniquet on too long can cause vein to flatten (release, allow blood flow then retighten)

6.10 Standard Equipment – Adult Collection
- Standard safety blood taking equipment.
- Tourniquet
- Skin antiseptic (as previously discussed)
- Gauze/gauze balls +/- tape
- Optional Pressure band aid
- Specimen Tubes
- Gloves
- Safety glasses
- Sharps disposal container
- Mask (if required)
- Plastic gown

Do not use needle and syringe or non-safety equipment for blood taking as risk of needle stick injury and blood exposure to the healthcare worker. Environmental Safety

- Perform hand hygiene
- Clean standard set-up field surface (RBWH use green tray)
- Gather necessary equipment and put on set-up field
- Moment 1 hand hygiene
- Don plastic apron
- Make positive patient identification.
- Gain consent, explain procedure and reassure patient.
- Check requisition form for details.
- Assess patient and undertake risk assessment.
- Position patient’s arm in comfortable position.
- Apply tourniquet to upper arm. Palpate vein(s)- suitable vein should feel elastic, full & rebounding
- When a suitable vein has been located release the tourniquet and assemble remaining equipment
- Moment 2 hand hygiene
• Open equipment maintaining ANTT and make any necessary equipment preparations
• Don protective eyewear
• Tighten tourniquet
• Moment 2 hand hygiene
• Don gloves (if using sterile gloves don after skin preparation)
• Cleanse insertion site with appropriate skin preparation and allow to air dry
• Anchor the vein by pulling skin taught with thumb. Ensure thumb is at least 3cm from insertion site.
• If wearing sterile gloves the cleansed site may be re-palpated before venepuncture
• Insert the needle (bevel up) at appropriate angle depending on vein depth (usually 15-degree) following vein pathway.
• Hold needle steady in vein and push the tube onto vacutainer®.
• Blood will automatically fill vacuum tube, if not troubleshoot cause.
• Loosen tourniquet as blood enters the first vacuum tube
• Change tube as necessary using correct order of draw

Whilst each consecutive tube is filling, use free hand to gently invert previously filled tube(s), 8-10 times to mix additives with blood. Do not shake

• After collecting the required specimens release the tourniquet fully and withdraw the needle, placing pressure pad over the site and applying pressure after the needle is removed. Tape pad or ask patient to continue applying pressure. Do not flex the patient's arm to apply pressure as this may cause haematoma formation.
• Dispose of sharps correctly.
• Label all tubes correctly (see 3.6 Specimen Identification for correct labelling)
• Check site to ensure bleeding has stopped.

Direct pressure must be applied to venepuncture site for minimum five (5) minutes if patient is on anticoagulant therapy and/or steroids.

• Place blood tubes in Biohazard Pathology Bag and send to Pathology.
• Document venepuncture in progress notes.
• Ensure patient has suffered no adverse effects.

Do not pierce the blood tube cap or forcibly inject the blood into the tube with a needle. This may cause damage to the blood cells, result in falsely abnormal results and necessitate repeated venepuncture for the patient.

A blood transfer device must be used to prevent damage to blood cells and risk of needle stick injury to healthcare worker.
6.11 Complications of Venepuncture

6.11.1 Fainting/Syncope
Always ask patients prior to venepuncture if they have experienced syncopal episodes to blood collection. Occasionally patients suffer a vaso-vagal which can lead to fainting so it is safe practice to always ask the patients history of possible syncopal reactions during blood collection. If a patient has a history of fainting during venepuncture, ensure they are positioned appropriately in the semi- prone or prone when venepuncture is performed.

6.11.2 Haematoma
Swelling around the puncture site usually indicates that blood is leaking into the tissues, causing a haematoma. This may be due to accidentally inserting the needle right through the vein, by not enough pressure being applied to the site following venepuncture, if the bevel of the needle is only partially within the vein or if an arterial tap has been performed. If a haematoma begins to form, remove the tourniquet and remove the needle from the vein and apply firm pressure to the site.

6.11.3 Petechiae
Small red spots on the patient’s skin indicate that minute amounts of blood have escaped into the epithelium. This often occurs in patients with coagulopathy and care should be taken following venepuncture to ensure that bleeding has stopped. Do not pull tourniquet up too tight or alternatively secure over patient's clothing sleeve.

6.11.4 Infection
The risk of infection is present whenever the skin is broken. Cellulitis and phlebitis are rare complications of venepuncture however inflammatory conditions which are bacterial in nature can lead to blood stream infection. Sepsis is more likely to occur in patients who have a compromised immune system. This includes the elderly, patients with immune system disorders and those taking drugs to suppress the immune system. Properly cleaning the site prior to pricking the skin greatly reduces the risk of infection-related complications.

6.11.5 Haemoconcentration
An increase in the proportion of red blood cells relative to the plasma, brought about by a decrease in the volume of plasma or an increase in the concentration of red blood cells in the circulating blood.

Factors contributing to haemoconcentration include
- Vigorous massaging or probing of the venepuncture site
- Sclerosed or occluded veins
- Tourniquet application too tight and or too long (> 2 minutes)
- Vigorous repetitive fist clenching
- Severe loss of water from the body.
6.11.6 Haemolysis
Haemolysis occurs when red blood cells are ruptured and haemoglobin is released into the serum, this may impact on findings related to the specimen\(^6\). Although haemolysis can result from physiological abnormalities it is most commonly as a result of poor technique such as:

1. Inserting the blood into the specimen container under pressure (e.g. incorrect blood collection equipment)
2. Shaking or mixing the specimen tubes too vigorously
3. Tourniquet application too long (> 2 minutes)
4. Drawing blood via a peripheral intravenous cannula
5. Delay in tubing bloods (due to incorrect equipment usage)

6.11.7 Collapsed Veins
The most common cause of a collapsed vein is:

- Use of needle and syringe whereby the collector pulls back on syringe plunger too vigorously.
- When smaller veins are accessed for blood draw.
- The posterior vein wall is pierced during insertion

5.12 Trouble Shooting

Table 7: Slow or Inadequate Blood Collection

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Prevention</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood tube not centred correctly on vacutainer® needle therefore rubber stopper (diaphragm) is not completely punctured.</td>
<td></td>
<td>Remove the tube and replace with another.</td>
</tr>
<tr>
<td>Collapsed vein</td>
<td>Might be patient condition, tourniquet on too long.</td>
<td></td>
</tr>
<tr>
<td>Needle opening against side of vessel wall</td>
<td>Watch angle of insertion and insert with bevel face up.</td>
<td>Slowly rotate the needle holder and the blood should flow.</td>
</tr>
<tr>
<td>Patient condition</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 8: Failure to Draw Blood

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Prevention</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not inserting the needle deep enough</td>
<td>Vein palpation and knowledge of anatomy</td>
<td>Ascertain vein position and progress needle until flashback observed. May need to reposition needle if vein is missed.</td>
</tr>
<tr>
<td>Inserting needle all the way through the posterior vein wall.</td>
<td>Ensure able to palpate vein - don't go in &quot;blind&quot;.</td>
<td>Withdraw slightly and observe for flashback. If haematoma forms desist and attempt elsewhere.</td>
</tr>
<tr>
<td>Holding bevel against vein wall</td>
<td>Assess vein depth and enter at correct angle.</td>
<td>Reposition slightly. Care to avoid opposite vessel wall puncture</td>
</tr>
<tr>
<td>Losing vacuum in tube</td>
<td>Hold tube firmly don’t allow it to unintentionally slip off. Hold needle steady to prevent inadvertent removal from vein.</td>
<td>Replace with new tube. Check needle is still in vein.</td>
</tr>
<tr>
<td>Difficult draw-no visible or palpable vein</td>
<td>Become an expert in palpation as there will be veins there but fingers may not be proficiently sensitised.</td>
<td>Use correct equipment. Ask assistance from a more experienced colleague or phlebotomist.</td>
</tr>
<tr>
<td>Collapsed vein</td>
<td>Might be patient condition, tourniquet on too long or inadvertent vessel wall puncture.</td>
<td>Thorough assessment of vascular access and be aware of strategies for fragile friable veins</td>
</tr>
</tbody>
</table>
Figure 10: Pathology Request Form

How to fill out a Pathology Request Form for faster results

Help us to help you — ALL fields in RED are mandatory for Requesting Doctor to complete

Doctor: Please complete ALL relevant areas in the red section

- Ward is essential for data entry and reduces time-consuming phone calls to locate patients
- All tests need to be written legibly to ensure the correct test is performed without time-consuming confirmation calls
- Clinical notes provide an important insight into patient's condition and are essential for diagnosis
- The Consultant and Requesting Doctor's signature are essential
- If results are to be phoned, provide pager or telephone number
- Indicate extra copies with Doctor's name and address or fax number

Private patients MUST sign the request form for billing purposes.

Collector's name and signature along with time and date of collection.

Collector to complete all the collection details.
Peripheral Intravenous Cannulation (PIVC) & Venepuncture
Theory Examinations, Assessments & Practice Logbook

Name: ____________________________________________________________

Work Unit: __________________________________________________________________
Peripheral Intravenous Cannulation – Theory Examination

Name: ______________________ Work Unit: ______________________

Complete theory examination and submit to Trainer for marking. All health professionals are required to achieve 100% pass grade prior to commencing clinical component.

Please tick the most correct response

1) On which sites should cannulation be avoided?
   a) Veins below a previous IV infiltration
   b) Sclerosed or thrombosed veins
   c) Veins in an arm with an intravenous shunt
   d) Veins in the antecubital fossa
   e) All of the above

   □

1 Mark

2) What factors must be considered when selecting cannula site?
   a) Purpose of and duration of the IV therapy
   b) Type of fluid to be administered
   c) Location of the insertion site
   d) Condition of the chosen vein
   e) All of the above

   □

1 Mark

3) How many attempts may a health professional make when attempting to insert an IV cannula?
   a) 1 attempt
   b) 2 attempts
   c) 4 attempts
   d) 3 attempts
   e) Try until you are successful

   □

1 Mark

4) In which circumstances must an IV Cannula be changed within 24hrs?
   a) When sited in the antecubital fossa
   b) When inserted in an emergent situation
   c) When the patient complains of pain at the site
   d) If the site is red and inflamed
   e) a and b

   □

1 Mark
5) Inserting a cannula in the antecubital fossa (ACF) is generally common practice for patients requiring CT because of the high pressure per square inch and mLs per second delivery rate requirement. What other circumstance(s) are acceptable for an ACF insertion?

a) In an emergency situation
b) Anytime
c) For very short term use
d) When there is no other viable veins, but reason must be documented and monitoring increased
e) a & d

6) What are three main differences between veins and arteries?

a) Veins lie deep, return non-oxygenated blood to the heart and contain bright red blood
b) Veins do not pulsate, Tunica Media is not as strong or stiff and are generally superficial
c) Arteries pulsate, are generally superficial and Tunica Intima/Interna forms valves
d) Arteries are strong and carry blood away from the heart, generally lie deep and do not pulsate
e) Arteries contain bright red blood, pulsate and Tunica Intima/Interna forms valves

7) On which part of the arm should peripheral cannulation be most frequently attempted?

a) Lateral
b) Proximal
c) Medial
d) Distal
e) c & d

8) What is the best method of extravasation prevention?

a) Use of large gauge cannula
b) Regular observation
c) Splinting the arm
d) Replacing the cannula every 72hrs
e) All of the above
9) Who has legal authorisation to order an initial PIVC?
   a) All Healthcare workers □
   b) All Registered Nurses □
   c) All Medical Officers □
   d) All Registered Nurses who are certified in cannulation □
   e) b, c & d □

10) The patient who is extremely anxious can provide difficulty for the inserter in advancing the cannula along the vein. What is the most logical cause?
   a) Occlusion by vasospasm □
   b) Caught by valve □
   c) Patient is so tense the taut muscle compresses the vein □
   d) Anxiety causes the patient to move around a lot □
   e) Cannula overshot the vein □

11) When inserting a peripheral cannula which of the following should not be a consideration
   a) The angle of insertion □
   b) That proximal location should take priority over distal □
   c) Patient’s preference for a specific arm or site □
   d) Previous cannulation insertion sites □
   e) c & d □

12) What is the ideal dressing for a peripheral cannula site if the patient is diaphoretic?
   a) Gauze, changed daily □
   b) Semi-permeable, transparent, self-adhesive Dressing □
   c) Advanced transparent polyurethane dressing □
   d) Simple transparent self-adhesive dressing □
   e) Gauze and bandage □

13) Your patient is on a continuous infusion containing potassium chloride and the patient complains of pain at the insertion site. What is your best course of action?
   a) Stop the infusion, remove cannula and insert a new one □
   b) Slow infusion down □
   c) Check the site by both palpation and visual assessment and if no other symptoms carry on but increase frequency of site monitoring □
   d) Apply a heat pack just above the insertion site to improve haemodilution which may prevent further complication □
   e) c & d □
14) Which of the following signs and symptoms would indicate accidental arterial cannulation?
   a) Bright red blood present in the hub of the cannula
   b) Patient complains of pain
   c) Pulsating bright red blood flowing back into the cannula hub and the patient reports pain at the insertion site
   d) Nil flashback visible
   e) b & d

15) You have to cannulate a renal patient whom is at the pre-planning stage for construction of a native Arteriovenous Fistula. Which vein/s is the preferred first option?
   a) Dorsal veins of the non-dominant arm
   b) Dorsal veins of the dominant arm
   c) The upper cephalic or basilica
   d) The distal veins of either arm
   e) Median Cubital Vein

16) What describes the concept of Aseptic Non-Touch Technique for cannulation?
   a) Maintain a sterile set-up field
   b) Hand hygiene at the correct moments of the procedure
   c) Avoid touching the insertion site after cleansing unless wearing sterile gloves
   d) Protection by non-touch of Active Key-Parts during the aseptic Procedure
   e) b, c & d

17) What steps should be taken to prevent haematoma formation when inserting a cannula?
   a) Tight application of tourniquet to prevent blood leakage
   b) Correct angle of insertion and avoid early cannula separation
   c) Release the tourniquet as soon as flashback is visualised
   d) Cannulate at low angle (8-10°) to prevent piercing back wall of vessel
   e) Improve cannulation insertion technique

18) Inserter practices are very important in preventing vascular access device associated complications. What best describes the practice that all inserters must adhere to?
   a) Hand hygiene, asepsis, skin preparation, IV dressing and documentation all performed correctly and collectively
   b) Ascertaining patient history to previous vascular device problems and allergies
   c) Good inserter technique
   d) Assessment of the patients vein and selecting the correct site
   e) Correct device selection
19) Taking blood from an IV cannula either at time of insertion or later is unacceptable. What is the best reason(s) for this?

a) Premature cannula failure therefore potential delay to treatment
b) Increased risk of catheter related thrombophlebitis
c) Haemolysis of blood sample therefore inaccurate results and increased risk of blood stream infection to the patient
d) Risk of air embolism
e) a & c

1 Mark

20) Good hand hygiene and skin antisepsis are arguably the best preventative measures for healthcare associated blood stream infection prior to an invasive procedure. Which best describes the ideal skin preparation prior to cannulation?

a) 70% isopropyl alcohol, cleansing an area the size of the dressing
b) Chlorhexidine Gluconate 2% in alcohol 70%, cleansing thoroughly and allowing to air dry
c) Chlorhexidine Acetate 0.1%, cleansing a large area thoroughly for at least 30 seconds and allowing to air dry
d) Chlorhexidine Gluconate 2% in alcohol 70%, cleansing thoroughly and vigorously for at least 30 seconds, beyond the size of the dressing and allowing to air dry
e) Povidone Iodine, cleansing thoroughly and vigorously for at least 30 seconds and allowing to air dry

1 Mark

Comments:

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Mark:........../20

Participant Signature: _________________________________ Date: __________________
Assessor Name: _________________________________ Date: __________________
Assessor Signature _______________________________ Position __________________________
Venepuncture – Theory Examination

Complete theory examination and submit to Trainer for marking. All health professionals are required to achieve 100% pass grade prior to commencing clinical component.

Please tick the most correct response

1) Site selection is one of the Bundle principles, what best describes the safest vein choice for venepuncture?
   a) The median cubital as there is less risk of damaging the brachial nerve  
   b) Hand vein as they are easy to stabilise and less likely to get a haematoma  
   c) Wrist vein as they are more prominent therefore easy to see  
   d) The dorsum of the foot as it reserves other veins for cannulation  
   e) All of the above  
      1 Mark

2) The pathology form requests specimens for blood culture, APTT, full blood count and electrolytes (chem 20) what would be the correct order of fill to avoid cross contamination between tubes?
   a) EDTA, Serum, Citrate, Blood Culture  
   b) Serum, EDTA, Citrate, Blood Culture  
   c) Blood Culture, Citrate, Serum, EDTA  
   d) Blood Culture, Serum, EDTA, Citrate  
   e) Order does not matter as long as tubes are filled correctly  
      1 Mark

3) If a transfusion request specimen results in a No Test and a redraw is required, this is because…
   a) The specimens were haemolysed on arrival the pathology  
   b) There were identified errors, discrepancies or omissions  
   c) The tube was incorrectly filled  
   d) The collectors signatures did not match  
   e) The form was not dated  
      1 Mark

4) Which of the following factors can result in failure to draw blood during venepuncture?
   a) Collapsed vein  
   b) Entering vein at incorrect angle  
   c) Losing the vacuum in the collection tube  
   d) Inadvertent vessel wall puncture  
   e) All of the above  
      1 Mark
5) Haemolysis occurs when red blood cells are damaged, this can be caused by?
   a) Shaking pathology tubes vigorously to mix specimen
   b) Tourniquet application too long
   c) Delay in tubing blood
   d) Drawing blood via a peripheral intravenous cannula
   e) All of the above

   1 Mark

6) The use of a tourniquet assists with venous distension during venepuncture how long can the tourniquet be applied before it is required to be released?
   a) Until arm discomfort occurs. Approximately four (4) minutes
   b) Until the patient requests removal
   c) Until the venepuncture is complete
   d) No more than one (1) minute
   e) No more than two (2) minutes

   1 Mark

7) Haemoconcentration is an increase in the proportion of red blood cells relative to the plasma. Which factor(s) may contribute?
   a) Overly anxious and tense patient
   b) Vigorous repetitive fist clenching
   c) Blood disease
   d) Thrombocytopenia
   e) Prolonged aspiration of blood from sclerosed or scarred veins

   1 Mark

8) Haematoma formation is the most common complication of venepuncture. If a haematoma forms during blood collection what action(s) should be taken?
   a) Immediately release tourniquet and remove needle
   b) Apply firm pressure over the site with a clean swab for 2 minutes
   c) Recheck bleeding has stopped
   d) Reassure patient
   e) All of the above

   1 Mark
9) What special considerations should be met when a patient has a continuous IV Infusion running and you need to take a blood sample for APTT level?

a) Try to avoid the arm in which the IV is running
b) An alternative would be to use a vein below the IV site
c) Consideration of lower limb if no alternative to avoid diluted sample
d) Ensure patency of peripheral cannula if IV infusion is turned off for collection
e) All of the above

10) Which of the following site(s) are unsuitable to use for venepuncture?

a) Arm(s) with lymphoedema
b) An arm with an arterio-venous fistula (AVF) formation
c) Feet in paediatric patients
d) Hands in paediatric patients
e) Both a) and b)

Comments:

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Mark:........../10

Participant Signature: _____________________________ Date: ________________
Assessor Name: _________________________________ Date: ________________
Assessor Signature _____________________________ Position ____________________________
Paediatric Cannulation– Theory Examination

Name: ___________________________ Work Unit: ___________________________

Complete theory examination and submit to Trainer for marking. All health professionals are required to achieve 100% pass grade prior to commencing clinical component.

Please tick the most correct response

1) Correct site selection is one of the best practice principles all inserters should be aware of, what are the best veins of choice in children?
   a) The median cubital as there is less risk of damaging the brachial nerve ☐
   b) Dorsum of the non-dominant hand and saphenous veins ☐
   c) Wrist veins as they are more prominent in children ☐
   d) The dorsal venous arch ☐
   e) Dorsum of the dominant hand ☐
   1 Mark

2) If a child is wriggling and screaming, you can assume they have not consented to their procedure. Restraining a child means forcefully holding them against their will. What best describes the method of therapeutic holding?
   a) Holding the child still with their permission, to manage a painful procedure quickly and effectively. ☐
   b) Asking an assistant to hold the limb still ☐
   c) Sitting the child on the parents lap for comfort ☐
   d) Asking a parent/guardian if they can assist with a hug hold ☐
   e) Both A and D ☐
   1 Mark

3) Intravenous Cannulation is one of the most painful procedures a child can experience. What best describes some strategies that can be implemented to reduce the fear and anxiety?
   a) Have equipment ready before child enters procedure room ☐
   b) Distraction therapy ☐
   c) Use of topical local anaesthetic ☐
   d) Cold and vibration commence 1 minute prior and continued through procedure ☐
   e) All the above ☐
   1 Mark
4) Certain sites should be considered ‘restricted’ in a paediatric patient. Identify which site(s) would be considered restricted.
   a) Foot in ambulant child
   b) Hand veins
   c) Head veins
   d) Antecubital fossa
   e) Both A and D

5) What strategies can the inserter employ to prevent the child removing the cannula
   a) Avoid the cubital fossa as this will frustrate the child who cannot bend their arm
   b) Use the chevron technique in securing the IV cannula, apply the correct IV dressing and appropriately apply a splint
   c) Avoid the thumb sucking hand
   d) Cannulate the dominant hand so the child cannot pull it out
   e) Apply a crepe bandage firmly and completely enclose the fingers

Comments:
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Mark:………./5

Participant Signature: ____________________________ Date: ________________
Assessor Name: ________________________________ Date: ________________
Assessor Signature _____________________________ Position __________________
Appendix 1: Record of Observation, Practice and Supervised PIVC Insertions.

Pre-assessment criteria:

- Optional if prior skill is recognised:
  
  Observe one (1) actual cannula insertion performed by a PIVC Trainer or Super User

Activity 10: PIVC Observation, Set-up and Vein Selection

a) Contact a PIVC Trainer and arrange to observe and record a minimum of one (1) peripheral intravenous cannulation insertions
   
   * – Record of Supervised Practice

b) Request if you can set up for the procedure to practice ANTT
   
   b) Assess the patient’s veins. Request the PIVC Trainer to assist you to feel the vein.

PIVC Trainer’s Name __________________________ Signature: __________________________

Date: __________________________

Perform and record all supervised Peripheral intravenous Cannulations attempts, until an unassisted standard (see definition below) is reached. There is no minimum number to be performed it is the PIVC Trainer or Super User who will determine on an individual basis when the trainee is proficient enough to perform the final assessment.

* Unassisted Practice Definition: The health professional must demonstrate independence in all skill sets using ‘Clinical Skills Competency – Peripheral Intravenous Cannulation Assessment Tool’ as a guide.
Activity 11: PIVC Observation, Set-up and Vein Selection

a) Demonstrate and record successful/unsuccesful peripheral intravenous cannulation insertions under the direct supervision of an endorsed PIVC Trainer using the Record of Supervised Practice.

- The ‘minimum’ level of competence required to perform cannula insertions is ‘unassisted’ practice e.g. independence and no prompting required.
- The PIVC Trainer determines when the trainee is at the required level of skill to undertake final assessment.

PIVC Trainer’s Name: ___________________________ Signature: ___________________________

Date: ___________________________
## Record of Supervised Practice – Peripheral Intravenous Cannulation (PIVC)

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**Final Assessment:** The health professional is assessed using the **Clinical Skills Competency – Peripheral Intravenous Cannulation**. The PIVC Trainer or Super User will assess performance and mark each skill set with 'Achieved' or 'Not Achieved'. Each element must be marked as 'Achieved' for successful completion of this assessment.

*Final assessment* result of ‘Not Achieved’ will require the health professional to perform (and record) a minimum of another two (2) supervised practices until independence is demonstrated prior to attempting another formal assessment. In the event of ‘Not Achieved’ the supervisor must complete the [Request for further evidence](#) form.

Should the health professional be unsuccessfully at final assessment on the second attempt then they are to complete four (4) supervised practices again. If there is non-completion after the third attempt and the health professional wishes to continue then a Performance and Development plan should be commenced.

**Activity 12: PIVC Final Assessment**

a) The health professional is assessed using the **Clinical Skills Assessment Tool – Peripheral Intravenous Cannulation (PIVC)**.

A formal assessment is required to gain competence and this can only be performed after completing enough supervised insertions to demonstrate the level of independence. Assessment should not be undertaken if the trainee still seeks guidance and requires prompting from the PIVC Trainer.

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Date: __________________
Clinical Skills Assessment Tool – Peripheral Intravenous Cannulation (PIVC)

The health professional will demonstrate: The ability to correctly assess the patient needs and perform the clinical skills in the insertion and management of PIVC in a safe manner.

Assessor to ensure that the following are complete prior to clinical assessment:

<table>
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<th>Resource Package</th>
<th>Supervised Practice</th>
<th>Independent practice assessment</th>
<th>Knowledge evident</th>
<th>RPL</th>
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PERFORMANCE CRITERIA: Assessment to be undertaken only when standard of independent practice is achieved

Successful achievement of the ‘Peripheral Intravenous Cannulation Clinical Skills Competency’ will reflect the following standards for professional practice:

- 05450/Proc: Peripheral Intravenous Cannulation, Venepuncture and Infusions - Adults and Paediatrics
- 81003/Proc: Standard Precautions.
- 80502/Proc: Patient Identification.

Identifies the indications and contraindications/restrictions for peripheral intravenous cannulation.

Performs correct hand hygiene technique for procedure

Demonstrates evidence of legislative requirements:
- Confirms request/ clinical need for PIV access (i.e. medication/fluid order or documented request).
- Displays correct patient identification and procedure matching process.
- Identifies relevant clinical information and patient allergies (e.g. latex, dressing, tape, cleansing agent).
- Obtains informed consent from patient/guardian
- Provides explanation of procedure to patient/family/carer.

Performs assessment of patient cannulation requirements:
- Demonstrates knowledge of appropriate cannula and insertion site selection relevant to the IV therapy/ departmental/ patient needs or procedure
- Assesses patient venous access, identifies restrictions and determines appropriate vein for cannulation

Paediatric
- Discusses procedure with the child and parents/guardians to gain consent
- Gains agreement on therapeutic holding

Environmental Management, Personal and Patient Protection
- Workspace clear of irrelevant items
- Selects appropriate aseptic field and cleaned/ disinfected before use
- Positions patient to decrease risk contamination and provide easy access to vein
- Bed height adjusted for OH &S
- Checks equipment for integrity and expiry dates prior to use
- Dons personal protective equipment (gloves, apron/gown, protective eye wear)
- Gloves selected in accordance with risk assessment (i.e. Non-sterile verse sterile)

Key-Part/Key-Site Management and Non Touch Technique
- Protects Key-Parts from contamination during preparation of equipment
- Protects Key-Parts and Key-Site throughout procedure
- Key-Site is disinfected using correct product and technique and is allowed to air dry

Demonstrates insertion technique:
- Correct tourniquet application and vein distention techniques
- Prepares cannula correctly (loosens tip adhesive if applicable).
- Adequately secures vein. Anchors well below Key-Site to avoid contamination
- Inserts cannula at correct angle/direction in relation to vein position/depth
### PERFORMANCE CRITERIA: Assessment to be undertaken only when standard of independent practice is achieved

<table>
<thead>
<tr>
<th>Achieved</th>
<th>Not Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Utilises correct strategies to ensure safe cannula advancement</td>
<td></td>
</tr>
<tr>
<td>• Releases tourniquet before activating needle safety</td>
<td></td>
</tr>
<tr>
<td>• Activates button to retract stylet into safety barrel (whilst stylet still in vein)</td>
<td></td>
</tr>
</tbody>
</table>

#### Demonstrates management of cannula:

<table>
<thead>
<tr>
<th>Achieved</th>
<th>Not Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Confirms correct cannula placement by flushing</td>
<td></td>
</tr>
<tr>
<td>• Demonstrates pulsatile technique and clamps under positive pressure.</td>
<td></td>
</tr>
<tr>
<td>• Observes site for bleeding or infiltration.</td>
<td></td>
</tr>
<tr>
<td>• Confirms with patient that cannula is comfortable.</td>
<td></td>
</tr>
<tr>
<td>• According to risk assessment applies appropriate sterile IV dressing over the insertion site and secures cannula and extension set with securement tape strips (ensuring insertion site remains visible).</td>
<td></td>
</tr>
<tr>
<td>• Labels dressing with date of insertion.</td>
<td></td>
</tr>
</tbody>
</table>

**Paediatrics**

<table>
<thead>
<tr>
<th>Achieved</th>
<th>Not Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Appropriately secures with splint (if applicable), thumb is free</td>
<td></td>
</tr>
<tr>
<td>• Minimises tape adherence to skin by dabbing cotton wool along the length of tape leaving ends with adhesive</td>
<td></td>
</tr>
</tbody>
</table>

#### Disposes of all waste in line with infection control procedures.

#### Provides education to patient for ongoing care of cannula.

#### Accurately documents details of clinical management provided in Patient Record.

<table>
<thead>
<tr>
<th>Name of Assessee &amp; Signature:</th>
<th>Date:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name of Assessor &amp; Signature:</th>
<th>Date:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Please Circle:</th>
<th>Competent:</th>
<th>YES / NO</th>
</tr>
</thead>
</table>

**If not competent complete next section**

### Request for further evidence PIVC

**N.B.** Complete this section when further evidence is required to meet expected standards.

*If not competent,* please detail what further evidence is required:

<table>
<thead>
<tr>
<th>Assessee’s Signature:</th>
<th>Date:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Assessor’s Signature:</th>
<th>Title:</th>
<th>Date:</th>
</tr>
</thead>
</table>

On completion, participants present this assessment sheet to their line manager for recording of training. All training for nurses/midwives is documented on the Mandatory Training Register (MTR) as evidence of professional development. A certificate of achievement will be generated.
## Complete Peripheral Intravenous Cannulation Competency Record

<table>
<thead>
<tr>
<th>Participant's Name:</th>
<th>Work Unit:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Components of Competency</th>
<th>Date/s of Assessment</th>
<th>Name of Assessor</th>
<th>Assessor Signature</th>
<th>Position of Assessor</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Clinical Practice Learning Activities in Resource Package completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIVC Theoretical Examination (100%) achieved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attended Peripheral Intravenous Cannulation Workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical Skills Competency - Peripheral Intravenous Cannulation completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Participant’s signature:**

**Date:**

*To receive a PIVC certificate of Achievement email a copy of the Complete Peripheral Intravenous Cannulation Competency Record* to VASE-RBWH@health.qld.gov.au.
## Appendix 2: Record of Practice and Supervised Venepunctures

### Activity 13: Supervised Venepunctures

a) Demonstrate and record successful/unsuccessful venepunctures under the direct supervision of an endorsed Venepuncture Trainer using the **Record of Supervised Practice Venepuncture**

- The ‘minimum’ level of competence required to perform venepuncture is ‘unassisted’ practice e.g. independence and no prompting required.
- The Venepuncture Trainer determines when the trainee is at the required level of skill to undertake final assessment.

### Record of Supervised Practice – Venepuncture

<table>
<thead>
<tr>
<th>Participant’s Name:</th>
<th>Work Unit:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Venepuncture Trainer:</th>
<th>Comments regarding the insertion:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Venepuncture Trainer’s signature:**

**Participant’s signature:**

---

<table>
<thead>
<tr>
<th>Participant’s Name:</th>
<th>Work Unit:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tbody>
<tr>
<td></td>
<td></td>
</tr>
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</table>

**Venepuncture Trainer’s signature:**

**Participant’s signature:**
<table>
<thead>
<tr>
<th>Participant's Name:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Unit:</td>
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<td></td>
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<tr>
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<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Work Unit:</td>
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<tr>
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<td>---------------------</td>
</tr>
<tr>
<td>Work Unit:</td>
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<td></td>
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<tr>
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<td>Name of Venepuncture Trainer:</td>
<td>Comments regarding the insertion:</td>
</tr>
<tr>
<td>Venepuncture Trainer’s signature:</td>
<td></td>
</tr>
<tr>
<td>Participant’s signature:</td>
<td></td>
</tr>
</tbody>
</table>
**Final Assessment:** The health professional is assessed using the **CLINICAL SKILLS COMPETENCY - VENEPUNCTURE**. The Venepuncture Trainer or Super User will assess performance and mark each skill set with ‘Achieved’ or ‘Not Achieved’. Each element must be marked as ‘Achieved’ for successful completion of this assessment.

*Final assessment result of ‘Not Achieved’ will require the health professional to perform (and record) a minimum of another two (2) supervised practices until independence is demonstrated prior to attempting another formal assessment. In the event of ‘Not Achieved’ The supervisor must complete the Request for further evidence form.*

Should the health professional be unsuccessfully at final assessment on the second attempt then they are to complete four (4) supervised practices again. If there is non-completion after the third attempt and the health professional wishes to continue then a Performance and Development plan should be commenced.

**Activity 14: Venepuncture Final Assessment**

a) The health professional is assessed using the ‘Clinical Skills Competency – Clinical Skills Assessment Tool - Venepuncture’

A formal assessment is required to gain competence and this can only be performed after completing enough supervised insertions to demonstrate the level of independence. Assessment should not be undertaken if the trainee still seeks guidance and requires prompting from the Venepuncture Trainer.

PIVC Trainer’s Name: ___________________________  Signature: ___________________________

Date: ___________________________

[Signature and date section]
Clinical Skills Assessment Tool – Venepuncture

The health professional will demonstrate: The ability to correctly assess the patient needs and perform the clinical skills in the insertion and management of PIVC in a safe manner.

Assessor to ensure that the following are complete prior to clinical assessment:

- Resource Package
- PIVC Workshop
- Supervised Practice
- Independent practice assessment
- Knowledge evident
- RPL

PERFORMANCE CRITERIA: Assessment to be undertaken only when standard of independent practice is achieved

<table>
<thead>
<tr>
<th>Achieved</th>
<th>Not Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrates application of and ability to apply standards that reflect accountabilities for professional practice as relevant to the profession:</td>
<td></td>
</tr>
<tr>
<td>Refers to:</td>
<td></td>
</tr>
<tr>
<td>• RBWH 21605/Proc: Blood Collection</td>
<td></td>
</tr>
<tr>
<td>• QH-GDL-321-1-1:2012 Hand Hygiene Guideline.</td>
<td></td>
</tr>
<tr>
<td>• 81003/Proc: Standard Precautions.</td>
<td></td>
</tr>
<tr>
<td>• 80502/Proc: Patient Identification</td>
<td></td>
</tr>
<tr>
<td>Identifies the indications and contraindications/restrictions for venepuncture</td>
<td></td>
</tr>
<tr>
<td>Performs correct hand hygiene technique for procedure</td>
<td></td>
</tr>
<tr>
<td>Demonstrates evidence of legislative requirements:</td>
<td></td>
</tr>
<tr>
<td>• Confirms pathology request and test requirements</td>
<td></td>
</tr>
<tr>
<td>• Displays correct patient identification and procedure matching process.</td>
<td></td>
</tr>
<tr>
<td>• Identifies relevant clinical information and patient allergies status</td>
<td></td>
</tr>
<tr>
<td>• Explains procedure and obtains informed consent from patient</td>
<td></td>
</tr>
<tr>
<td>• Identifies only one patient to be bled at a time</td>
<td></td>
</tr>
<tr>
<td>• Identifies specimen tubes not to be pre-labelled</td>
<td></td>
</tr>
<tr>
<td>Performs assessment of patient requirements</td>
<td></td>
</tr>
<tr>
<td>• Checks for special collection requirements e.g. fasting/dietary requirements/specific collection times (drug levels)</td>
<td></td>
</tr>
<tr>
<td>• Checks for special transport requirements e.g. temperature control/protection from light</td>
<td></td>
</tr>
<tr>
<td>• Identifies resources to seek information e.g. QLD Pathology</td>
<td></td>
</tr>
<tr>
<td>• Identifies requirement for one Request form per FAN® culture set</td>
<td></td>
</tr>
<tr>
<td>Correctly identifies the patient checking and specimen labelling requirements</td>
<td></td>
</tr>
<tr>
<td>• Patient is positively identified at time of collection using 3 forms of identification (family name, given name(s), DOB, hospital identification number and/or address</td>
<td></td>
</tr>
<tr>
<td>• 3 identifiers checked against the patients ID band and the Pathology Request form</td>
<td></td>
</tr>
<tr>
<td>• Identifies handwritten specimens preferred for transfusion samples</td>
<td></td>
</tr>
<tr>
<td>• Demonstrates use of labels on specimens require time and date of collection and collectors signature/initials</td>
<td></td>
</tr>
<tr>
<td>• Identifies that collectors signature on Request form must match that of signature on specimen for transfusion request otherwise re-bleed will be required.</td>
<td></td>
</tr>
<tr>
<td>• Identifies that any errors, discrepancy or omissions identified by the Pathology Provider will result in request for re-bleed</td>
<td></td>
</tr>
<tr>
<td>Selects appropriate equipment</td>
<td></td>
</tr>
<tr>
<td>• Gathers correct collection tube(s) for requested test(s)</td>
<td></td>
</tr>
<tr>
<td>• Demonstrates knowledge of appropriate safety venepuncture equipment pertaining to volume of blood being collected</td>
<td></td>
</tr>
<tr>
<td>Describes correctly the process for blood culture collection to avoid contamination</td>
<td></td>
</tr>
<tr>
<td>• Identifies requirement for CHG 2% w 70% alcohol skin preparation (unless contraindicated) specific to culture collection</td>
<td></td>
</tr>
<tr>
<td>• Culture bottles top are cleaned with a 70% alcohol swab</td>
<td></td>
</tr>
<tr>
<td>• Alcohol swab remains on top until ready for use to prevent re-contamination</td>
<td></td>
</tr>
<tr>
<td>• Identifies first blood draw for culture</td>
<td></td>
</tr>
<tr>
<td>• Fill aerobic (green) bottle first due to air in collection equipment</td>
<td></td>
</tr>
<tr>
<td>• Identifies 2 x separate peripheral collects for optimal sensitivities</td>
<td></td>
</tr>
<tr>
<td>• 10 mL per bottle for optimal sensitivities</td>
<td></td>
</tr>
</tbody>
</table>
**PERFORMANCE CRITERIA:** Assessment to be undertaken only when standard of independent practice is achieved

<table>
<thead>
<tr>
<th>Environmental Management, Personal and Patient Protection</th>
<th>Achieved</th>
<th>Not Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Workspace clear of irrelevant items</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Selects appropriate aseptic field and cleaned/ disinfected before use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Positions patient to decrease risk contamination and provide easy access to vein</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bed height adjusted for OH &amp;S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Checks equipment for integrity and expiry dates prior to use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Dons personal protective equipment (gloves, apron/gown, protective eye wear)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Gloves selected in accordance with risk assessment (i.e. Non-sterile verse sterile)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key-Part/Key-Site Management and Non Touch Technique</th>
<th>Achieved</th>
<th>Not Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Prepares aseptic field without contamination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Protects Key-Parts from contamination during preparation of equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Protects Key-Parts and Key-Site throughout procedure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key-Site is disinfected using technique and is allowed to air dry</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Demonstrates Collection technique</th>
<th>Achieved</th>
<th>Not Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Correct tourniquet application and vein distention techniques</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Demonstrates safe and effective needling of vein</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Demonstrates safe and effective use of equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Loosens tourniquet as first tube commences fill</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Demonstrates Correct Procedure</th>
<th>Achieved</th>
<th>Not Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Identifies discard collection tube (if no blood cultures)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Identifies the correct order of collect for each tube</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Fills each tube correctly according to individual requirement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Labels and signs tubes immediately post collection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Completes patient verification section of Group &amp; Hold form (if applicable)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Places removable culture bottle scan bar sticker on corresponding Request form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Places all tubes in specimen bag(s) with form(s) and sends off</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disposes of all waste in line with infection control policy</th>
<th>Achieved</th>
<th>Not Achieved</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Provides education to patient for ongoing care</th>
<th>Achieved</th>
<th>Not Achieved</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Accurately documents details of clinical management provided in patient's medical records</th>
<th>Achieved</th>
<th>Not Achieved</th>
</tr>
</thead>
</table>

**Please Circle:** Competent: YES / NO

**If not competent complete next section**

**Request for further evidence PIVC**

**N.B. Complete this section when further evidence is required to meet expected standards.**

If not competent, please detail what further evidence is required:

---

**Name of Assessee & Signature:**

**Name of Assessor & Signature:**

**Assessee's Signature:**  
**Assessor's Signature:**

On completion, participants present this assessment sheet to their line manager for recording of training.

All training for nurses/midwives is documented on the Mandatory Training Register (MTR) as evidence of professional development. A certificate of achievement will be generated.
## Complete Venepuncture Competency Record

<table>
<thead>
<tr>
<th>Participant's Name</th>
<th>Clinical Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Components of Competency</th>
<th>Date of Completion</th>
<th>Name of Assessor</th>
<th>Assessor Signature</th>
<th>Position of Assessor</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Clinical Practice Learning Activities in Resource Package completed</td>
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<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Clinical Skills Competency – Venepuncture completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Participant's signature: ______________ Date: ______________

*To receive a Venepuncture certificate of Achievement email a copy of the [Complete Venepuncture Competency Record](mailto:VASE-RBWH@health.qld.gov.au).*
## Ongoing Record of Venepuncture

Ongoing competence is self-assessed. To provide documentation as evidence of ongoing competency for inclusion in Performance and Development Plan (PDP), a record is recommended.

**Name:……………………………………………..Service/Unit: …………………………………

<table>
<thead>
<tr>
<th>Date…………………………………</th>
<th>Patient Ur No……………………………………</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of patient needs</td>
<td>Brief details of cannulation performed</td>
</tr>
<tr>
<td>Date…………………………………</td>
<td>Patient Ur No……………………………………</td>
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<td>Assessment of patient needs</td>
<td>Brief details of cannulation performed</td>
</tr>
</tbody>
</table>

Photocopy additional pages as required
Peripheral Intravenous Cannulation and Venepuncture Final Assessment Record

Name of Participant: ___________________________ Position: ______________

Work unit: ___________________________ Service Line: ____________

Participant Signature: ___________________________ Date: ______________

This assessment sheet when signed is documentation of completion of this package which attracts twelve (12) Continuing Professional Development (CPD) hours of learning.

<table>
<thead>
<tr>
<th>Components of Competency</th>
<th>Date/s of completion</th>
<th>Name of Assessor</th>
<th>Position of Assessor</th>
<th>Assessor Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>All learning activities and checklists</td>
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<tr>
<td>Peripheral Intravenous Cannulation (PIVC)</td>
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<tr>
<td>PIVC Theory Examination</td>
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<tr>
<td>PIVC Record of Supervised Practice</td>
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<tr>
<td>PIVC Clinical Skills Assessment</td>
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<tr>
<td>Venepuncture</td>
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<tr>
<td>Venepuncture Theory Examination</td>
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<tr>
<td>Venepuncture Clinical Skills Assessment</td>
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</tbody>
</table>

Has the participant’s responses met expected standards for all components? Yes ☐ No ☐

If no, please detail what further evidence is required:

To be completed when further evidence is provided to meet expected standards.

Participant’s Signature: ___________________________ Date: ___________________________

Assessor’s Signature: ___________________________ Date: ___________________________

On completion of the above, please present this assessment sheet to the Nurse/Midwifery Educator for recording as evidence of training and to your line manager for insertion to your PDP file.
References


14 Royal Brisbane and Women’s Hospital (RBWH). (n.d.). RBWH Procedures and Guidelines Intranet


53 Auckland District Health Board. IV Cannulation. Retrieved at: Newborn Services Clinical Guideline


60 Pathology Queensland. Recommendations for Blood Cultured Collections- Adults. Document number 26423V7

