Peripheral Intravenous Cannula (PIVC) Insertion and Post Insertion Care in Adult Patients

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                      Clinical/ Patient Services - Nursing and Midwifery
Summary  This guideline outlines the principles for the safe insertion, management and removal of PIVCs in adult patients in NSW Health facilities. The guideline aims to minimise complications from the insertion and management of PIVCs.

Author Branch  Clinical Excellence Commission
Branch contact  Clinical Excellence Commission 92695586

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GUIDELINE FOR PERIPHERAL INTRAVENOUS CANNULA (PIVC) INSERTION AND POST INSERTION CARE IN ADULT PATIENTS

PURPOSE
The purpose of this Guideline is to provide the standard for insertion, management and removal of peripheral intravenous cannulae (PIVC) in patients who are 16 years of age and older.

KEY PRINCIPLES
All clinical staff who insert a PIVC or care for a patient with a PIVC in situ should follow this Guideline.

Facilities should support clinicians to ensure adherence with this Guideline.

Aseptic technique should be used during each PIVC insertion and access to reduce the risk of local or systemic infection.

Every PIVC insertion should be documented at the time of insertion or as soon as possible afterwards.

USE OF THE GUIDELINE

Chief Executives and delegated officers
- Promote safe practices for insertion and post insertion care of PIVCs across their Health District/Service
- Ensure that appropriate resources are available for implementation of this Guideline.

Clinical Staff Inserting PIVC Devices
- Are trained and assessed to insert PIVC in accordance with this guideline
- Adhere to this guideline for every insertion of a PIVC
- Ensure PIVC insertion is documented in the patient’s health record.

Clinical Staff Caring for, Managing and Removing PIVC Devices:
- Are trained and assessed in the care of a PIVC device in accordance with this guideline
- Adhere to this guideline for post insertion care of a PIVC device
- Assess daily the ongoing need for a PIVC device.

REVISION HISTORY

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<th>Approved by</th>
<th>Amendment notes</th>
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<tr>
<td>December 2013</td>
<td>Deputy Director General Governance Workforce &amp; Corporate</td>
<td>New Guideline</td>
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<td>(GL2013_013)</td>
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ATTACHMENTS

1. Guideline for PIVC Insertion and Post Insertion Care in Adult Patients

ASSOCIATED DOCUMENTS

NSW Health *Infection Control Policy* (PD2007_036)

NSW Health *Infection Control Policy: Prevention & Management of Multi-Resistant Organisms (MRO)* (PD 2007_084)

NSW Health *Recognition and Management of Patients who are Clinically Deteriorating* (PD2011_077)

NSW Health *Hand Hygiene Policy* (PD2010_058)

NSW Health *Central Venous Access Device Insertion and Post Insertion Care* (PD2011_060)

NSW Health *User applied labelling of Injectable Medicines, Fluids and Lines* (PD2012_007)
GUIDELINE

GL2013_013

Issue date: December-2013

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1 BACKGROUND

1.1 Introduction

Peripheral intravenous cannula (PIVC) insertion is an invasive procedure that has the potential for serious immediate or delayed complications.

This Guideline is relevant to all clinicians who insert or manage PIVCs in patients who are 16 years of age and older.

1.2 Purpose

This Guideline outlines the principles for the safe insertion, management and removal of PIVCs in adult patients in NSW Health facilities. Facilities should follow this Guideline, regardless of the clinical setting. The guideline aims to minimise complications from the insertion and management of PIVCs.

Other options should be considered before deciding to insert a PIVC, such as oral medication, nasogastric tube feeding, or central intravenous line.

In some emergency situations, it may not be possible to fully comply with this Guideline. PIVCs inserted in such situations should be replaced as soon as practical within 24 hours.

1.3 Key definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Alcohol-based hand rub (ABHR)</td>
<td>An alcohol-containing preparation designed for application to the hands in order to reduce the number of viable micro-organisms with maximum efficacy and speed¹</td>
</tr>
<tr>
<td>Antiseptics</td>
<td>Antimicrobial substances that are applied to the skin to reduce the number of micro-organisms. Examples include topical alcohols, chlorhexidine, triclosan and iodine²</td>
</tr>
<tr>
<td>Aseptic technique</td>
<td>An aseptic technique aims to prevent microorganisms on hands, surfaces and equipment from being introduced to susceptible sites³</td>
</tr>
<tr>
<td>Attempt</td>
<td>Each effort at placing a PIVC at one site</td>
</tr>
<tr>
<td>Attending Medical Officer (AMO)</td>
<td>The medical officer primarily responsible for the clinical care of the patient/client for the episode of care. The AMO is responsible for ensuring that adequate standards of medical documentation are maintained for each patient/client under their care⁴</td>
</tr>
<tr>
<td>Bloodstream infections (BSIs)</td>
<td>The presence of live pathogen(s) in the blood, causing an infection³</td>
</tr>
<tr>
<td>Clinician</td>
<td>For the purpose of this Guideline a clinician is defined as a medical practitioner, registered nurse or midwife, endorsed enrolled nurse, assistant in nursing, qualified paramedic, radiographer, anaesthetic technician, pathology collector or student in any of those fields.</td>
</tr>
<tr>
<td>Competent/Trained</td>
<td>For the purpose of the guideline, a competent clinician is one who has completed a training program in the insertion of PIVCs or who is in, or has completed, a specialist medical training program</td>
</tr>
<tr>
<td><strong>Decontaminate</strong></td>
<td>Use of physical or chemical means to remove, inactivate, or destroy pathogens on a surface or item so that they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.</td>
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<tr>
<td>------------------</td>
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<tr>
<td><strong>Escalation</strong></td>
<td>An inexperienced clinician who fails to cannulate a vein after two attempts should escalate the procedure to an experienced clinician.</td>
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<tr>
<td><strong>Experienced clinician</strong></td>
<td>A clinician who has completed a training program in the insertion of PIVCs or who is in, or has completed, a specialist medical training program and has inserted a considerable number of PIVCs. Experienced clinicians are not necessarily more senior clinicians; they may be colleagues such as a Registered Nurse/Midwife or a Junior Resident Medical Officer.</td>
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<td><strong>Healthcare associated infection (HAI)</strong></td>
<td>Infection acquired in a healthcare facility or an infection that occurs as a result of a healthcare intervention and which may manifest after the patient is discharged from the healthcare facility.</td>
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<tr>
<td><strong>Healthcare facility</strong></td>
<td>For the purpose of this Guideline, a healthcare facility is any facility or service that delivers healthcare services. Healthcare facilities include hospitals, multi-purpose services, aged care facilities, emergency services, ambulatory care services, Aboriginal Medical Services, community health services, ambulance stations and community based health services such as needle and syringe programs.</td>
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<tr>
<td><strong>IIMS</strong></td>
<td>Incident Information Management System.</td>
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<tr>
<td><strong>Inexperienced clinician</strong></td>
<td>A clinician who has completed a training program but is still gaining clinical experience and confidence in the insertion of PIVCs.</td>
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<tr>
<td><strong>Peripheral Intravenous Cannula (PIVC)</strong></td>
<td>For the purpose of this Guideline a device that is designed to be inserted into and remain within a peripheral vein (excludes peripherally inserted central line catheters).</td>
</tr>
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<td><strong>Personal Protective Equipment (PPE)</strong></td>
<td>Refers to a variety of protective barriers used alone, or in combination, to protect mucous membranes, skin, and clothing from contact with recognised and unrecognised sources of infectious agents in healthcare settings.</td>
</tr>
</tbody>
</table>
| **Public health organisation** | For the purpose of this Guideline a public health organisation is:  
- Local Health District/Network  
- Ambulance Service  
- Statutory health corporation that provides inpatient services  
- Affiliated health organisation in respect of its recognised establishments that provide inpatient services. |
| **Safety engineered device** | An invasive device that has been designed with built-in safety features that reduce the risk of injury. Examples include devices such as syringes with guards, sliding sheaths, shielded, blunting or retracting needles, blunt suture needles and surgical blades with protective covers. |
| **Should** | Indicates a recommended action that should be followed unless there are sound reasons for taking a different course of action. |
| **Staff** | For the purpose of this Guideline, staff refers to any person working in any capacity within NSW Health, including contractors, students and volunteers. |
2 REQUIREMENT FOR A PERIPHERAL INTRAVENOUS CANNULA

2.1 PIVC insertion requirement

Only competent/trained clinicians or clinicians under direct supervision of an experienced clinician should insert a PIVC.

2.2 Other factors to consider

2.2.1 Consult the relevant Medical Officer before insertion to ensure that
- A PIVC is required
- Alternatives have been considered
- The benefits outweigh the risks.

2.2.2 Remove PIVCs as soon as they are no longer clinically required\(^7,8\).

2.2.3 Trained clinicians should keep written evidence of training and competence so that it can be produced when transferring to other health services.

2.2.4 Develop and implement escalation procedures to minimise patient harm: e.g. when difficulty arises during insertion of a PIVC that requires more than two attempts and a more experienced clinician is not available, or when complications arise and the patient deteriorates. Each facility should nominate who should be contacted during an escalation.

2.2.5 Inexperienced clinicians should make no more than two attempts at cannulation, except during an emergency or when an experienced (not necessarily more senior) clinician is not available (refer to local escalation policy).

2.2.6 When repeated or prolonged administration of chemical irritants, such as potassium chloride or vancomycin, is required, central venous access should be considered, to avoid peripheral vein damage\(^7,8\).

2.2.7 In-line filters are ineffective and not recommended to reduce the risk of infection\(^8\).

2.2.8 There is evidence that local anaesthetics reduce the pain of insertion\(^9,10\). Their use should be considered before the insertion of any PIVC, regardless of PIVC size and age of patient.

2.2.9 Only “capless” injection sites should be used on PIVCs. Ideally these should be of the split septum type.

3 PATIENT FACTORS

3.1 Except in an emergency the following should be done before inserting a PIVC:
- Correctly identify the patient
• Check whether the patient has allergies to skin antiseptics (e.g. chlorhexidine or iodine) or dressing materials
• If the patient can respond, confirm their identity, ask about allergies, explain the procedure and obtain their verbal consent.

3.2 Select the most appropriate vein for insertion of the PIVC. Points to consider include:
- Size and condition of patient’s veins
- Indication for PIVC and expected duration of PIVC
- Position of patient during any planned procedure(s)
- Use non-dominant forearm if practical
- Use basilic or cephalic veins on the posterior (dorsal) forearm if possible
- The metacarpal veins on the dorsum of the hand are easier to visualise but are more liable to clot, difficult to stabilise, and prone to vessel damage
- In patients with chronic renal failure, the use of the anterior (ventral) forearm veins (especially the cephalic vein) should be avoided, as these may be required for fistula formation for dialysis.

3.3 Avoid the use of veins in the following sites, if possible:
- Areas of flexion, e.g. antecubital fossa, or bony prominences
  - Uncomfortable as this requires splinting
  - Vein easily damaged
- Areas below previous cannulation site
  - Vein may be damaged
- Bruised or phlebitic areas
  - Poor venous return
  - Pieces of clot can be dislodged into the system
- A limb with an arteriovenous fistulae or shunt
  - May compromise haemodialysis access
- An arm on the same side as a previous lymph node dissection, mastectomy or affected by cerebrovascular accident
  - Poor venous and/or lymphatic return
- An infected limb e.g. with cellulitis
- A limb with a peripherally inserted central catheter (PICC) or implanted venous access device (port-a-cath)
- Lower limbs
  - Risk of deep vein thrombosis
  - Limits access, patient comfort and mobility.

4 NECESSARY EQUIPMENT

Ensure that all equipment required to insert the PIVC aseptically is available before commencing, including insertion pack, a variety of PIVCs, capless valves, syringes and preparation solutions (refer to Appendix 2)

5 PIVC SELECTION

5.1 The PIVC should be equipped with a safety device with engineered sharps injury protection. The only exceptions to this are devices required for a specialised procedure, for which no safety device is available and after a risk assessment has been done.
5.2 The size of the PIVC should be determined by the intended use (e.g. blood and blood products, drug therapy, hydration etc), the condition of the patient’s veins, likely length of time PIVC is expected to remain in situ and the insertion site.

5.3 The PIVC should be the shortest and smallest gauge that can meet the anticipated clinical need (i.e. operating theatre, trauma, labour). Please refer to Appendix 3.

6 ASEPTIC TECHNIQUE

6.1 No touch technique

Touching the insertion site, the shaft or tip of the PIVC or other sterile equipment breaches aseptic technique. To follow aseptic technique, clinicians should avoid touching:
- The insertion site after decontamination
- Sterile parts of the PIVC (i.e. shaft and tip)
- Other sterile equipment.

6.2 Personal protective equipment

6.2.1 Clinicians perform hand hygiene as set out in the Hand Hygiene Policy.

6.2.2 Clinicians should wear appropriate personal protective equipment. Gloves should be worn for PIVC insertion after performing hand hygiene. There is debate over the use of sterile versus clean non-sterile gloves for insertion of PIVCs. At this time the evidence for mandating sterile gloves is inconclusive. Individual facilities or local health districts should decide whether to mandate the use of sterile gloves for PIVC insertion based on a risk assessment.

6.2.3 Clinicians should wear protective eyewear when inserting and removing a PIVC due to the risk of a splash injury occurring.

6.3 Skin Preparation

6.3.1 Remove hair at the insertion site (prior to antiseptic application) if necessary, using clippers to improve adherence of the dressing.

6.3.2 Clean the skin with neutral soap and water if the insertion site is visibly dirty.

6.3.3 Decontaminate the skin using a single-use swab. Apply antiseptic (Appendix 5) to cover an area of approximately 5 x 5cm in a side to side or up and down motion with light friction, repeat with a second swab and allow the skin to air-dry (do not wipe, fan or blot dry the area). Allow at least 1 minute.
- For PIVCs that are inserted in Day Only or Extended Day Only patients, >70% alcohol solution/swabs should be used (to reduce unnecessary exposure to chlorhexidine when residual antimicrobial activity is not required)
- For all other PIVCs alcohol-based chlorhexidine gluconate swabs (≥0.5% chlorhexidine in ≥70% isopropyl alcohol) should be used as antimicrobial activity is desirable.
6.3.4 For patients with a history of chlorhexidine sensitivity/allergy, use
- 5% alcohol-based povidone-iodine swab
- ≥70% alcohol
- 10% aqueous povidone-iodine (suitable for patients in whom alcohol is contraindicated).

6.3.5 Do not touch the planned insertion site after decontamination or, if touching is necessary to confirm anatomy, repeat decontamination, as above.

6.3.6 Do not use antimicrobial creams/ointment at the insertion site.

7 INSERTION OF A PIVC

7.1 Follow the steps outlined in Appendix 4.

7.2 If a PIVC is contaminated at any stage during insertion discard it and use a new PIVC.

7.3 PIVC Stabilisation

7.3.1 The PIVC can best be stabilised with adhesive tape to prevent dislodgement. Avoid placing non-sterile tape on the PIVC-skin junction site.

7.3.2 The insertion site should remain visible for regular inspection. Therefore do not place opaque tape directly over the insertion site.

7.3.3 Do not reinsert a PIVC after it has become accidentally/inadvertently partially withdrawn or dislodged. A new PIVC should be inserted at a new site as soon as practical.

7.4 Dressing the PIVC

7.4.1 Use a sterile, transparent semi-permeable dressing to protect the insertion site from contamination\(^7,8,11\) allow continuous observation of the site and stabilise and secure the PIVC except;
- When the patient is sweating – specialised dressings should be used.
- When the patient has excessive bleeding or oozing from the PIVC site – use sterile gauze secured with a sterile transparent, semi-permeable dressing.

7.4.2 When the patient has multiple PIVCs each PIVC should be dressed separately, unless the puncture sites are close together.

7.4.3 Regardless of the dressing type, position it so that the PIVC insertion site is well covered and sealed by the dressing. Ensure IVC is dated on the dressing.

8 DEVICES TO ASSIST IN IDENTIFYING VEINS

8.1 Ultrasound machines and other devices may be used to assist with identifying peripheral veins that are not visible or palpable (e.g. in elderly, dehydrated, haematology/oncology patients).
8.2 Previous experience and training is required to use ultrasound effectively. If ultrasound probes are used then the probe should be cleaned according to manufacturer’s instructions between patients, a sterile covering placed over the probe before use and sterile gel used on the patient’s skin.

9 POST INSERTION CARE OF PIVCS

9.1 PIVC review

9.1.1 The PIVC is to be assessed for patency each time it is accessed for use.

9.1.2 Nursing staff should assess the PIVC at each shift for patency, erythema, tenderness, pain, swelling and dressing integrity, PIVC position. Document any actions taken in the patient’s health record each shift.

9.1.3 Assess the PIVC on transfer between inpatient departments or facilities and document in the patient’s health record.

9.1.4 Review the PIVC daily to determine whether it is still required and document in the patient’s health record. If the PIVC is no longer required (e.g. when the patient is able to take oral fluids or medication), remove it immediately. Nursing staff should contact the relevant medical officer to discuss change from IV to oral medication, where relevant.

9.1.5 Facilities should develop standing orders or local protocols/processes for the routine removal of PIVCs (for example after IV medications are ceased or could be replaced by oral).

9.2 Accessing the PIVC or administration set

9.2.1 Change administration sets, including all IV tubing, connections and split septum capless valves when the PIVC is resited.

9.2.2 Before accessing, decontaminate all injection ports by rubbing vigorously with a 70% alcohol swab (to reduce unnecessary exposure to chlorhexidine, do not use a chlorhexidine-containing solution) and allow to air dry prior to accessing ports (to give an injection or take blood) or attaching side-lines.

9.2.3 When blood or blood products have been infused; change the administration set, including all IV tubing and connections immediately after completion of the infusion or every 12 hours, whichever is first.

9.3 Care of administration sets

9.3.1 Label all administration sets attached to the PIVC with an intravenous line label in accordance with NSW Policy User applied labelling of Injectable Medicines, Fluids and Lines.

9.3.2 IV tubing sets should not be disconnected for routine care, but may be disconnected for transient, controlled disconnections such as changing IV infusions, removing a sling or sleeve, or access in Operating Theatres, Medical Imaging or Radiology Departments.
9.3.3 Except for transient controlled disconnections as above, if the IV giving set is disconnected, replace the entire IV tubing.

9.4 Duration of PIVC insertions

9.4.1 PIVCs should not routinely remain in situ for longer than 72 hours\textsuperscript{7,8,14}. The responsible Medical Officer should review the PIVC at as close as possible to 72 hours after insertion to determine whether it should be removed or replaced, based on clinical need and risk/benefit analysis. The PIVC should be removed if there are signs of local infection or thrombosis.

9.4.2 A PIVC may be retained beyond 72 hours, if there are no signs of inflammation and:
- Replacement is likely to be difficult and the risk is judged to be greater than retention
- The PIVC is likely to be needed for another 24 hours or less.
- The decision should be documented in the patient’s health record.

9.4.3 If prolonged IV therapy is likely to be required, a PICC should be used rather than multiple replacements of PIVCs.

9.4.4 Remove PIVCs that may have been inserted without full aseptic procedure (e.g. emergency situation) as soon as practical, preferably within 24 hours, and replace if clinically warranted.

9.5 Dressing care

9.5.1 The PIVC dressing should remain intact for the life of the PIVC unless:
- There is no longer a seal; or
- There is excessive accumulation of blood or moisture.

9.5.2 When used, sterile gauze and dressing should be changed daily and whenever loose, soiled or moist.

9.5.3 If the PIVC dressing needs to be changed\textsuperscript{6}:
- Perform hand hygiene
- Use aseptic technique including sterile dressing pack, drape and gloves
- Use care when removing old dressing to avoid dislodgement of cannula
- Remove blood or ooze from insertion site with sterile 0.9% sodium chloride
- Decontaminate the area with ≥ 0.5% chlorhexidine and alcohol (over an area slightly larger than the final dressing) for at least 30 seconds and allow to air dry prior to applying the new sterile dressing (do not wipe or blot).

9.6 Patient Education

Advise the patient to:
- Not touch the insertion site or dressing
- If used, avoid touching the roller clap or infusion pump
- Keep the site dry and minimise excessive movement whilst the PIVC is in situ
- Notify staff if pain, swelling or redness at the PIVC site is experienced.
9.7 Flushing PIVCs

9.7.1 Where possible, PIVCs should have a continuous flow of IV fluids through them.

9.7.2 Where a continuous flow is not possible then the PIVC should be flushed:
- After the PIVC is inserted to confirm correct placement
- Before each medication/infusion is given (to ensure the PIVC is still patent)
- In between serial/multiple infusions and between medications to prevent interactions and incompatibilities
- After each injection/infusion (to remove irritant material from the vein)
- After blood sampling (to clear the cannula of blood)
- For inpatients, at least every 8 hours if not otherwise used (note: consider if the PIVC needs to stay in).

9.7.3 Perform hand hygiene before accessing the PIVC or tubing.

9.7.4 Scrub the tubing access port with a 70% alcohol swab or solution (to reduce unnecessary exposure to chlorhexidine, do not use a chlorhexidine-containing solution) and allow to air-dry before accessing the tubing or connecting new tubing.

9.7.5 Points to note when flushing PIVCs:
- Use sterile 0.9% saline
- Use a Luer-lock 10ml syringe or commercially available prefilled syringe (to help avoid excessive pressure)
- Do not use excessive force
- Use aseptic technique at all times.

9.7.6 The flushing solution and flushing intervals should be either ordered on a medication chart or given according to facility standing order or local protocol.

9.8 Blood collection via the PIVC

9.8.1 Blood may be drawn from a PIVC directly after insertion, but not at other times unless the PIVC has been inserted for the purpose of blood collection.

10 DOCUMENTATION

10.1 Each facility or local health district should determine where PIVC assessments are to be documented in the patient’s health record and to do so consistently so they can be easily accessed.

10.2 The date/time the PIVC was inserted along with the size and site of insertion should be documented in the patient’s health record.

10.3 Place an IV insertion sticker on the external transparent dressing of the PIVC so that it is visible but will not interfere with assessing the PIVC site.

10.4 Document in the patient’s health record for all PIVCs:
- Condition of the PIVCs at every shift
- Result of daily PIVC review – that the PIVC is still required or should be removed
- Any complication such as infection, injury, loss of patency (including if the complication was reported in IIMS - see below)
- Date and time of PIVC removal; condition of site at the time of removal; and whether cannula and tip were complete and intact.

10.5 Report significant local and PIVC-related site infection or injury, as required, in the Incident Information Management System (IIMS)\(^5\).

10.6 Report all PIVC-associated bloodstream infections in IIMS as at least a SAC 2. Notify the Attending Medical Officer and Infection Prevention and Control Professional (ICP) and document in the patient’s health record.

11 REMOVAL OF THE PIVC

11.1 Perform hand hygiene and don non-sterile gloves and protective eyewear.

11.2 Remove the dressing. Clean site thoroughly with $\geq 70\%$ alcohol and allow to air dry.

11.3 Withdraw the cannula and apply digital pressure with sterile gauze until haemostasis is achieved.

11.4 Inspect the PIVC to ensure the whole device was removed and none has been retained in the patient.

11.5 Cover the site with a dressing. Sterile gauze can be used under the dressing if bleeding or discharge continues. Remove the dressing after 24 hours or, if the patient is discharged sooner, instruct the patient to remove the dressing.

11.6 Observe the PIVC site for 48 hours after removal to detect post-infusion phlebitis. If the patient is discharged within that period advise the patient who to contact if pain, swelling, discharge or bleeding at the site or systemic symptoms of infection develop.

11.7 Routine culturing of PIVC tips is not recommended unless infection is suspected.

11.8 Advise the patient to notify staff if any swelling or discharge occurs at the insertion site after the PIVC is removed.

11.9 Document the removal in the patient’s health record including the time and date; if the PIVC was intact, whole and included the tip; and the condition of the site post removal.
## APPENDIX 1 – COMPLICATIONS AND SUGGESTED MANAGEMENT

<table>
<thead>
<tr>
<th>Complication</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blocked or extravasated PIVC</td>
<td>Clot(s) in valve or PIVC.</td>
<td>Remove PIVC.</td>
</tr>
<tr>
<td>Blood under transparent occlusive dressing</td>
<td>Insertion trauma or skin tears.</td>
<td>• Remove dressing to check cause of bleeding.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reapply dressing aseptically.</td>
</tr>
<tr>
<td>Bruising – blue to black skin discoloration around the PIVC site</td>
<td>Extravasation of blood into surrounding tissue.</td>
<td>• Check whether the PIVC has tissued; if so remove it.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inform MO.</td>
</tr>
<tr>
<td>Erythema – redness of the skin surrounding the PIVC site</td>
<td>Can be caused by infection, inflammation or injury.</td>
<td>• Check PIVC is patent, continue therapy but check PIVC every 4 hours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check with patient whether there is any pain.</td>
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<td></td>
<td></td>
<td>• Review if IV medication therapy is still required; and if so, if route is appropriate.</td>
</tr>
<tr>
<td>Extravasated PIVC - swelling of tissue proximal to the end of the PIVC</td>
<td>IV fluid infiltration in surrounding tissue.</td>
<td>• Stop infusion immediately, remove PIVC, elevate limb.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inform MO.</td>
</tr>
<tr>
<td>Infusion not running</td>
<td>IV solution has run out.</td>
<td>Check IV solution</td>
</tr>
<tr>
<td></td>
<td>Volumetric pump has failed or volume limit reached.</td>
<td>Check volumetric pump</td>
</tr>
<tr>
<td></td>
<td>Volumetric pump set removed from pump (automatic off).</td>
<td>Put set back into volumetric pump.</td>
</tr>
<tr>
<td></td>
<td>Roller clamp closed on infusion line.</td>
<td>Check all roller clamps</td>
</tr>
<tr>
<td></td>
<td>Kinked IV tubing.</td>
<td>Check IV tubing is secured and without kinks.</td>
</tr>
<tr>
<td></td>
<td>Patient position – PIVC ocluding against venous valve in current patient position.</td>
<td>Check patient position and reposition arm.</td>
</tr>
<tr>
<td></td>
<td>Clot in capless valve.</td>
<td>• Change split septum capless valve and attempt to flush.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Do not force flush if resistance felt.</td>
</tr>
<tr>
<td>Insertion site infection – pus noted at the insertion site. Site is swollen, inflamed, red and warm to touch. Patient may be febrile.</td>
<td>Bacterial infection.</td>
<td>• Stop infusion immediately, remove PIVC, elevate limb.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inform MO.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Document in IIMS.</td>
</tr>
<tr>
<td>Leaking PIVC</td>
<td>Loose connections between PIVC and administration sets or capless valve.</td>
<td>• Check all connections are secure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Flush with 10mL 0.9% saline and observe for site of leak.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Change lines/connections.</td>
</tr>
<tr>
<td>Patient complaining of pain/burning at PIVC site</td>
<td>Device not secured properly and causing irritation against the vein wall. Early signs of infection.</td>
<td>• Check PIVC and tubing are securely attached to patient.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check that what is being administered is sufficiently diluted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check if the cannula is extravasated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inspect for signs of local infection; remove PIVC if present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inform MO.</td>
</tr>
</tbody>
</table>
APPENDIX 2 – SUGGESTED EQUIPMENT FOR PIVC INSERTION

- Appropriate PPE, including gloves and eye protection
- PIVC - selection based on clinical and patient factors (see Appendix 3)
- Cleaned procedural trolley
- Sterile dressing pack or IV starter pack (if your facility uses them)
- Tourniquet: either a single use disposable or single patient use.
- Antiseptic solution as recommended in Appendix 5
- 0.9% sodium chloride solution 10mL
- Protective sheet
- Appropriate transparent occlusive dressing
- Appropriate sterile adhesive strips/securing devices
- Local anaesthetic (lignocaine 1%)
- Luer-lock 10mL syringe or commercially available prefilled syringe for flush
- Luer-lock 2mL syringe and 30G needle for local anaesthetic
- Split septum capless valve
- Sterile gauze squares
- PIVC insertion sticker
- Sharps disposal bin.

It is the responsibility of the clinician inserting the PIVC to ensure items have not passed their expiry dates and that the integrity of the packaging has been maintained.
## APPENDIX 3 – RECOMMENDED PIVC SELECTION SIZE

<table>
<thead>
<tr>
<th>PIVC Size</th>
<th>Applications</th>
</tr>
</thead>
</table>
| 14G       | Trauma patients  
Rapid, large-volume replacement |
| 16G       | Trauma patients  
Major surgery  
Intra-partum or post partum  
GIT Bleeding  
Multiple line access  
Multiple blood transfers  
High volume of fluids |
| 18G       | Blood products  
Delivery of irritant medications  
Multiple line access  
Large volume of fluids  
Major surgery  
Imaging requiring power injection of  
CT contrast  
Delivery of irritant medications |
| 20G       | General use  
IV maintenance  
IV antibiotics  
IV analgesia |
| 22G       | Small or Fragile veins  
Cytotoxic therapy |
| 24G       | Cancer services |

### Selecting an appropriate site

- Consider the length of PIVC
- Start distally in the upper extremities
- Choose firm, round, elastic, well filled veins
- Assess the length of the vein
- Inspect and palpate for problems
- Look at or ask the patient for their previous history of cannulation (if possible)
- See also sections 3.2 and 3.3
### APPENDIX 4 – PIVC Insertion – Summary

**Steps for peripheral line insertion**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ensure a PIVC is indicated.</td>
</tr>
<tr>
<td>2.</td>
<td>Obtain a mobile sharps bin and a procedural trolley. Clean the procedural trolley surface.</td>
</tr>
<tr>
<td>3.</td>
<td>Collect all required equipment.</td>
</tr>
<tr>
<td>4.</td>
<td>Where possible, introduce yourself to the patient, verify identity, explain the procedure and obtain verbal consent. Check for allergies, e.g. to tape, iodine or chlorhexidine.</td>
</tr>
<tr>
<td>5.</td>
<td>Remove wrist and hand jewellery, roll up long sleeves to the elbow.</td>
</tr>
<tr>
<td>6.</td>
<td>Perform hand hygiene.</td>
</tr>
<tr>
<td>7.</td>
<td>Open dressing/IV starter pack, establishing aseptic field; place sterile equipment onto field.</td>
</tr>
<tr>
<td>8.</td>
<td>Position patient to ensure best access to site; ensure adequate lighting. Position procedural trolley for easy access and the sharps bin to allow for immediate sharps disposal (to prevent injuries).</td>
</tr>
<tr>
<td>9.</td>
<td>Inspect and assess the site for the PIVC (if the site is visibly dirty clean with soap and water prior to decontamination) and decide on the type, size and length of the PIVC.</td>
</tr>
<tr>
<td>10.</td>
<td>Place a tourniquet around the limb proximal to where the PIVC is to be inserted.</td>
</tr>
<tr>
<td>11.</td>
<td>Inspect and assess the insertion site again.</td>
</tr>
</tbody>
</table>
| 12.  | To further dilate the vein if required  
- The patient can assist by clenching their fist  
- Stroke or tap the vein with your fingers (only before skin disinfection)  
- Allow the arm to hang over the side of the bed  
- Apply a warm compress to the area before skin decontamination. |
| 13.  | Perform hand hygiene |
| 14.  | Don gloves. |
| 15.  | Thoroughly decontaminate skin with ≥0.5% chlorhexidine in 70% alcohol (or ≥70% alcohol if the PIVC is inserted in Day Only or Extended Day Only patients), swab with side-to-side or up and down motion with light friction; repeat with a second swab; allow to air dry (allow at least 1 minute before insertion). Do not touch site once it has been prepared. |
| 16.  | In conscious patients, administer lignocaine 1% to the insertion site and wait 15-30s for it to take effect. Alternatively apply anaesthetic cream 30 minutes prior to insertion. |
| 17.  | Using the thumb of the non-dominant hand stretch the skin distal to the vein in order to apply counter traction and steady the vein. |
| 18.  | Insert PIVC according to the manufactures’ guidelines. Be aware that each manufacturer has a slight variation for each PIVC for insertion. |
| 19.  | Entry into the vein is signalled by a flashback of blood. |
| 20.  | Hold needle steady, flatten the cannula, advance 2-5 mm, then further advance the cannula up the vein. |
| 22.  | Apply pressure to skin over tip of PIVC to prevent blood spillage while needle is completely removed. It is the responsibility of the operator to safely dispose of sharps. |
| 23.  | Attach capless valve. |
| 24.  | Apply transparent occlusive dressing to ensure secure fixation and visibility of site, and write date of insertion on dressing or apply PIVC insertion sticker. |
| 25.  | If a blood sample is required aspirate the required amount via the capless valve and transfer into required vacutainers. |
| 26.  | Flush PIVC with 10mL of 0.9% saline. |
| 27.  | Attach correctly labelled administration set if commencing continuous infusions. |
| 28.  | Dispose of equipment into waste containers, remove gloves; perform hand hygiene. Clean the procedural trolley surface and perform hand hygiene. |
| 29.  | Document in patient’s health record: date, time, site of insertion; person who performed insertion. |
| 30.  | If an inexperienced clinician has not inserted PIVC after two attempts, assistance from an experienced clinician (where possible) should be sought or local escalation policy followed. |
APPENDIX 5 – ANTISEPTICS FOR SKIN PREPARATION

In order of effectiveness

1. Chlorhexidine 2% in ≥70% alcohol (swab twice and wait at least 1 minute before insertion) where available (unless contraindicated, e.g. flammability issues or where the PIVC is inserted in Day Only or Extended Day Only patients).
2. Chlorhexidine 0.5-1% in ≥70% alcohol may also be used.
3. Chlorhexidine 2% in water (allow to air dry before beginning insertion). 1% aqueous chlorhexidine may also be used.
4. Povidone Iodine 10% in ≥70% alcohol (allow to air dry before beginning insertion).
5. Povidone Iodine 10% in water (allow to air dry before beginning insertion).
6. ≥70% alcohol (swab twice and wait at one minute before insertion) (note: should be used where the PIVC is inserted in Day Only or Extended Day Only patients)

Notes3,7,15:
- For a cannula that is likely to be in for <24 hours, skin cleaning with at least 70% alcohol is sufficient.
- For all other cannulae for recommended skin preparation is with alcoholic (70%) chlorhexidine (≥0.5%) or if there is hypersensitivity to chlorhexidine, either alcohol as above or alcoholic povidone.
REFERENCES


