



# Peripheral Intravenous Cannulae (PIVC) Management Clinical Practice Standard

## 1. Purpose

The purpose of this policy is to establish minimum practice standards for the insertion, care and management of peripheral intravenous cannulae (PIVC) throughout the WA Country Health Service (WACHS).

This policy is to be read in conjunction with the WA Health [Insertion and Management of Peripheral Intravenous Cannulae in Western Australian Healthcare Facilities](#) Mandatory Policy 0038/16, which identifies mandatory clinical requirements in relation to PIVC management in WA Health settings.

Excluded from this CPS is guidance regarding:

- Central Venous Access Devices (e.g. Peripherally Inserted Central Catheter [PICC], Central Venous Catheter [CVC], Ports) – refer to WACHS [Central Venous Access Device \(CVAD\) Management CPS](#)
- Specimen collection (blood sampling) via a central venous access device – refer to the WACHS [Specimen Collection \(including Phlebotomy\) and Pathology Results Clinical Practice Standard](#).

Removing unwanted variation in clinical practice and following best practice guidelines has been found to reduce inappropriate care (overuse, misuse and underuse) thus improving health outcomes, reducing preventable harm and decreasing wastage.

Further information relating to specialty areas including Child and Adolescent Health Service (CAHS), Perth Children's Hospital (PCH) and Women and Newborn Health Services (WHNS) can be found via [HealthPoint](#) if not covered in this policy.

## 2. Scope

All medical, nursing, midwifery, anaesthetic technician and medical imaging staff employed within the WACHS and any students in those fields working under the direct supervision of those staff.

All health care professionals are to work within their scope of practice appropriate to their level of training and responsibility.

Further information may be found via [HealthPoint](#) or the [Australian Health Practitioner Regulation Agency](#).

### 3. Procedural Information

[Potential issues during or post PIVC insertion](#)  
[PIVC Insertion and PIVC Blood Specimen Collection](#)  
[PIVC Dressing Care](#)  
[PIVC Flushing](#)  
[Complication: Extravasation](#)

### 4. Considerations

Peripheral intravenous cannulae (PIVC) provide direct access to the patient's bloodstream and therefore pose a serious risk for infection from microorganisms introduced either at the time of insertion or while the cannula is in situ.

PIVC related infections are associated with increased morbidity and mortality, prolonged hospital stay and additional healthcare costs. Infections associated with PIVC are considered preventable adverse events.

**Key considerations** taken from the WA Health Insertion and Management of Peripheral Intravenous Cannulae in Western Australian Healthcare Facilities Mandatory Policy 0038/16) and include WACHS specific processes – are:

- All PIVC insertion must be performed by, or under the direct supervision of, a clinician working within their scope of practice experienced in PIVC cannulation.
- Strict adherence to hand hygiene and aseptic technique is required for the insertion of PIVC.
- Sterile gloves are to be used and skin antisepsis is to be achieved with the use of a 2% chlorhexidine in 70% alcohol solution, except in the case of a documented allergy or in neonates.
- All PIVC are to have an extension set attached, e.g. j-loop, except for those PIVC utilised for short stay therapy in an outpatient, emergency or procedural setting, where the use of a needleless valve is acceptable (extension sets help maintain stability and reduce trauma to the vein).
- The clinician inserting the PIVC is responsible for labelling the PIVC device and completing the documentation requirements (refer to the [documentation section](#))
- All PIVC are to have a peripheral intravenous assessment score (PIVAS) performed at least every eight hours while the PIVC is insitu and continued for 48 hours post removal, documented on the MR179 WACHS Peripheral Intravenous Cannula Observation Record. Any ongoing PIVC site issues are to be documented in the patient's health record. Where a patient has a PIVC inserted, the PIVAS score **must** be included in clinical handover.
- All PIVC are to be reviewed daily or when clinically indicated, for ongoing need and removed as soon as no longer required. If continued access is required all adult PIVCs are to be re-sited at 72 hours or more frequently if clinically indicated. For paediatrics the PIVC can stay in situ if the PIVC is clinically

indicated; there is no evidence of local (redness, pain, tracking) or systemic (fever and rigors) signs of infection; is still flushing well without resistance or leakage from the insertion site.

- All PIVC inserted by ambulance services or in an emergency situation or where inserted without adherence to aseptic technique, e.g. resuscitation, are to be replaced as soon as the patient’s condition has stabilised or within 24 hours of insertion.
- Removal of the PIVC is to be documented on the MR179 WACHS Peripheral Intravenous Cannula Observation Record /inpatient notes/short stay discharge documentation. Information is to include date and time of removal, clinician name who removed PIVC and the reason for removal.
- For Neonates and children, inspect the PIVC insertion site at least hourly when a continuous infusion is in progress, and with each intermittent medication and flush administration. Ensure any covering is removed completely to perform an assessment of the insertion site and to observe above and below the site
- Administration sets are single use devices and if they are disconnected from the intravenous cannula for any reason, e.g. intermittent medication dosing, the set is to be discarded and a new administration set connected using aseptic technique<sup>1</sup> (Intermittent disconnection of administration sets increases risk of infection through manipulation of the hub and contamination, and occlusion due to reflux of blood into the catheter tip<sup>10</sup>)

## 5. General Information

The WA Health Insertion and Management of Peripheral Intravenous Cannulae in Western Australian Healthcare Facilities Mandatory Policy 0038/16 describes requirements in relation to PIVCs, as outlined in the following table:

Element of care	MP 0038/16 Appendix A Adults	MP 0038/16 Appendix B Neonate & Paediatrics
PIVC site selection	Section 1	Section 1
PIVC selection	Section 2, Appendix C	Appendix C
Local Anaesthetic	Section 3	
Skin Preparation / disinfection	Section 6	Section 4
Securement and dressing management	Section 7	Section 6
PIVC assessment	Section 8	Section 8
PIVC blood collection	Section 9	Section 9
PIVC Flushing	Section 12	Section 7
Duration and resiting of PIVCs	Section 13	Section 10

Continued next page Element of care	MP 0038/16 Appendix A Adults	MP 0038/16 Appendix B Neonate & Paediatrics
Removal of PIVC	Section 14	
Documentation	Section 15	
Management of administration lines	Section 11	Section 11
Patient education	Section 16, Appendix F	

Potential issues related to PIVC insertion are listed in [Appendix 1](#).

Staff are to comply with the specific requirements in alignment with the WACHS Infection Prevention and Control Policy.

Patient identification and procedure matching processes must be undertaken.

Patient privacy and dignity is to be maintained. Offer the presence of a chaperone where appropriate to patient and clinician requirements (refer to the WACHS Chaperone Policy and MR30AA WACHS Patient Consent to a Chaperone Form).

Provide the opportunity for an accredited interpreter and/ or Aboriginal Liaison Officer where appropriate to the patient’s language or communication requirements (refer to the MP0051/17 WA Health System Language Services Policy).

Sodium Chloride 0.9% (5-30ml) may be administered without prescription to maintain venous access patency and flushing, prior to and post prescribed medication. Consider compatible diluents.

## 6. Clinical Communication

### Clinical Handover

Where a patient has a PIVC inserted, the PIVAS score **must** be included in clinical handover.

- **Pre-hospital environment:** St John Ambulance patients who have cannulae inserted in the pre-hospital environment will have a special ‘Emergency’ insertion IV dressing to prompt removal within/by 24hs (see Figure 1).
- **Peri-operative areas:** Each point of transition of care i.e. from theatre – recovery – ward, provides an opportunity to ensure that PIVC documentation is complete.



Figure 1: Emergency insertion IV dressing  
(Image used with permission by 3M)

### Documentation

It is the responsibility of the clinician inserting the PIVC to document the record of insertion site, date, time and their name. Where an insertion sticker is available, this is completed.

Insertion information to be documented on the anaesthetic record (when PIVC inserted by anaesthetist) or on the MR179 WACHS Peripheral Intravenous Cannula Observation Record or as below for medical imaging.

If an inpatient in theatre requires additional cannula insertion and the cannula remains insitu, theatre staff to ensure insertion information is documented/ transferred to the MR179 WACHS Peripheral Intravenous Cannula Observation Record and returned with the patient for ongoing use.

For paediatric patients there is a requirement to inspect the PIVC insertion site at least hourly when a continuous infusion is in progress, and with each intermittent medication and flush administration, ensuring any covering is removed completely to perform an assessment of the insertion site and to observe the limb above and below the site. Site assessment can be recorded in the PIVAS column on the MR144P WACHS Neonatal / Paediatric Fluid Balance Worksheet. Any adverse findings are to be documented in the patient's medical record.

**Medical imaging:** for patients attending WACHS Medical imaging departments who have a PIVC inserted by medical imaging staff for administration of contrast media for computed tomography (CT) scans or other procedures (and are removed prior to leaving their appointment), the insertion sticker from the PIVC insertion pack is to be completed and attached to the IV contrast patient questionnaire or medical imaging request form, then scanned into the Radiological Information System (RIS).

Additionally if an inpatient in medical imaging already has an MR179 WACHS Peripheral Intravenous Cannula Observation Record and requires additional cannula insertion (and this is subsequently removed following their imaging procedure), the insertion and removal are also recorded on the existing MR179.

Where an outpatient's PIVC remains insitu e.g. if patient is going to the emergency department (ED) for triage after having CT scan, the cannula is left insitu and the insertion information is recorded by the radiology staff on the MR179 WACHS Peripheral Intravenous Cannula Observation Record. The MR179 is sent with the patient to ED for ongoing use.

Refer also to the WACHS Documentation CPS.

### **Patient/Carer information**

Ensure patients are provided with information in relation to their PIVC and possible complications.

Department of Health resources to support conversations with patients includes Appendix F "Your Intravenous Cannula or 'IV'" Consumer Information Sheet within the Insertion and Management of Peripheral Intravenous Cannulae in Western Australian Healthcare Facilities Mandatory Policy 0038/16.

## 7. Compliance Monitoring

- Monitor patient outcomes via Staphylococcal Aureus Blood Stream Infection (SABSI) Healthcare Infection Surveillance WA (HISWA) reports quarterly
- Monitor Aseptic Non-Touch Technique using the agreed WACHS audit tool – frequency to be determined at the regional level using a risk assessment approach

Failure to comply with this policy document may constitute a breach of the WA Health system MP0031/16 Code of Conduct (Code). The Code is part of the [Employment Policy Framework](#) issued pursuant to section 26 of the [Health Services Act 2016](#) (WA) and is binding on all WACHS staff which for this purpose includes trainees, students, volunteers, researchers, contractors for service (including all visiting health professionals and agency staff) and persons delivering training or education within WACHS.

WACHS staff are reminded that compliance with all policies is mandatory.

## 8. Relevant Legislation

(Accessible via: Government of Western Australia ([State Law Publisher](#) or [ComLaw](#)))

*Carers Recognition Act 2004*

*Health Practitioner Regulation National Law (WA) Act 2010*

*Occupational Safety and Health Act 1984*

*Occupational Safety and Health Regulations 1996*

*Privacy Act 1988*

## 9. Relevant Standards

[National Safety and Quality Health Services \(NSQHS\) Standards](#)

Preventing and Controlling Healthcare-Associated Infections Standard - 3.1, 3.2, 3.9. 3.10.

## 10. Related WA Health System Policies

MP0053/17 [Clinical Alert \(Med Alert\) Policy](#)

OD0651/16 [Clinical and Related Waste Management Policy](#)

OD0611/15 [Clinical Incident Management Policy](#)

OD0657/16 [Consent to Treatment Policy](#)

MP0038/16 [Insertion and Management of Peripheral Intravenous Cannulae in Western Australian Healthcare Facilities](#)

MP0051/17 [WA Health System Language Services Policy](#)

## 11. Relevant WACHS documents

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[Admission, Discharge and Intra-hospital Transfer Clinical Practice Standard](#)

[Chaperone Policy](#)

[Clinical Observations and Assessments Clinical Practice Standard \(physiological, neurovascular, neurological and fluid balance\)](#)

[Contrast Extravasation – Outpatient Information](#)

[Documentation Clinical Practice Standard](#)

[Infection Prevention and Control Policy](#)

[MR144P WACHS Neonatal / Paediatric Fluid Balance Worksheet](#)

[MR179 WACHS Peripheral Intravenous Cannula Observation Record](#)

[MR30AA WACHS Patient Consent to a Chaperone Form](#)

[MR5 Outpatient Notes](#)

[MR55A Inpatient Progress Notes](#)

[Royal Flying Doctor Service \(RFDS\) Clinical Manuals – Endorsed For Use in Clinical Practice Policy](#)

[Specimen Collection \(including Phlebotomy\) and Pathology Results Clinical Practice Standard](#)

## 12. Other Related Documents

[Guidelines for the Administration of Blood Products](#) Australian and New Zealand Society of Blood transfusion Ltd and Royal College of Nursing Australia

[Guidelines for Iodinated Contrast Administration](#) Royal Australian and New Zealand College of Radiologists

[Post contrast extravasation incident – outpatient follow up record](#) WACHS Medical Imaging

[Recommended Order of Draw](#) PathWest

## 13. Policy Framework

[Public Health](#)

## 14. Acknowledgement

Acknowledgment is made of the previous SMHS / WACHS site endorsed work used to compile this Peripheral Intravenous Cannulae (PIVC) Management WACHS Clinical Practice Standard.

## 15. References

1. Western Australian Government Department of Health. [Insertion and Management of Peripheral Intravenous Cannulae in Western Australian Healthcare Facilities](#) Mandatory Policy MP 0038/16; October 2016. [Accessed 2 November 2017]
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7. Australian and New Zealand Society of Blood Transfusion Ltd, Royal College of Nursing Australia [Guidelines for the Administration of Blood Products](#), 3rd edition, 2018 [Accessed 17 October 2019]
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9. New South Wales Ministry of Health [Peripheral Intravenous Cannula \(PIVC\) Insertion and Post Insertion Care in Adult Patients](#). 2013. [Accessed 24 November 2017]
10. Queensland Government Department of Health [Intravascular device management \(I-care\): Peripheral Intravenous Catheter \(PIVC\) Guideline](#). 2015. [Accessed 5 June 2018]
11. Wolters Kluwer [Complications of Peripheral IV Therapy](#) Lippincott Nursing Centre, Feb 9 2015. [Accessed 22 May 2018]
12. The Royal Australian and New Zealand College of Radiologists. [Iodinated Contrast Media Guideline](#). Sydney: RANZCR; 2018.
13. Royal Perth Bentley Group [Insertion and Management of a Peripheral Intravenous Cannula Clinical Practice Standard](#). 2017. [Accessed 12 June 2018]
14. Queensland Government Department of Health [eviQ Clinical Resources: Extravasation Management](#). [Accessed 19 June 2018]
15. Royal Perth Bentley Group [Extravasation Management Clinical Guideline](#). 01/05/2018. [Accessed 19 June 2018]

## 16. Definitions

<b>Carer</b>	Carers provide unpaid care and support to family members and friends who have a disability, mental illness, chronic condition, terminal illness, an alcohol or other drug issue or who are frail aged (Carers Australia, 2015)
<b>Patient</b>	A person who is receiving care in a health service organisation
<b>PIVAS</b>	Peripheral intravenous assessment score. A validated tool for evaluating and documenting the status of PIVC sites.
<b>PIVC</b>	Peripheral intravenous cannula. A device that is designed to be inserted into and remain within a peripheral vein (excludes peripherally inserted central line catheters).



## 17. Appendices

[Appendix 1: Potential issues during or post PIVC insertion](#)

[Appendix 2: PIVC Insertion and PIVC Blood Specimen Collection](#)

[Appendix 3: PIVC Dressing Care](#)

[Appendix 4: PIVC Flushing](#)

[Appendix 5: Complication: Extravasation](#)

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## Appendix 1: Potential issues during or post PIVC insertion

Issue	Trigger	Signs/Symptoms	Actions
<b>Infection:</b> All vascular access devices hold the potential risk for patients developing localised site and systemic bloodstream infections either at the time of insertion or whilst being maintained <sup>3</sup> .	Contaminates for infection have four identified routes for introduction <sup>4</sup> : <ul style="list-style-type: none"> <li>• Insertion site: micro flora introduced on insertion.</li> <li>• Catheter hub: microorganisms spreading inwards along the intra-lumen surface.</li> <li>• Haematogenous seeding: patient's with existing focus of infection spreading via the blood stream to colonise the catheter.</li> <li>• Fluid contamination: contamination of fluid or administration set.</li> </ul>	<b>Localised Infection:</b> <ul style="list-style-type: none"> <li>• Redness, swelling or pain at insertion site</li> <li>• Cellulitis or tracking extending from insertion site.</li> <li>• Purulent discharge from insertion site.</li> <li>• Fever <math>\geq 38^{\circ}\text{C}</math> – not attributed to any other causes</li> </ul>	Refer to page 2 of the MR179 WACHS Peripheral Intravenous Cannula Observation Record for actions
		<b>Systemic Infection</b> Fever $\geq 38^{\circ}\text{C}$ , rigors – particularly when flushing the device Malaise, chills, hypotension Others: diaphoresis, tachycardia, elevated respiratory rate	
<b>Phlebitis:</b> Localised inflammation at the insertion site, with or without pain or swelling <sup>2,5</sup> .	It is more common: <ul style="list-style-type: none"> <li>• in distal peripheral veins following 2-3 days of continuous infusions.</li> <li>• cannula size too large for vein.</li> </ul>	Redness, swelling or pain near the device insertion site and then along the PIVC +/- hardness, or discharge Fever $\geq 38^{\circ}\text{C}$ not explained by any other causes may also be present.	

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Issue	Trigger	Signs/Symptoms	Actions
	<p>When tip is located near a flexion area.                      In patients with more fragile veins, e.g. elderly patients                      Where device remains for longer than 48 hours.</p>	<p>Taut skin and oedema near the insertion site                      Blanching and coolness of skin near the insertion site.                      Damp or wet dressing                      A slow infusion or an infusion that has stopped.</p>	<ul style="list-style-type: none"> <li>• Stop infusion/administration<sup>11</sup></li> <li>• Elevate the limb to increase patient comfort, a warm compress may be applied (consider cold pack depending on type of fluid/medication)</li> <li>• Consider need for resiting IV, consult with medical officer as needed</li> <li>• Document actions and assessments in health record</li> </ul>
<p><b>Extravasation:</b>                      Where a vesicant solution breaches the venous wall and leaks into the surrounding tissues<sup>6</sup> leading to tissue damage with potential for further harm.</p>	<p>The degree of patient harm is directly related to the infusions vesicant properties, the volume and length of time the infusion infiltrated the surrounding tissues.</p>	<p>Symptoms near the insertion site:</p> <ul style="list-style-type: none"> <li>• burning or stinging pain, sudden 'heat'</li> <li>• taut skin and oedema</li> <li>• blanching and coolness of skin</li> <li>• slow or ceased infusion.</li> <li>• damp or wet dressing</li> </ul>	<p>Refer to <a href="#">Appendix 5: Complication - Extravasation</a></p>
<p><b>Haematoma:</b>                      Formed following the leakage of blood from the vein into the surrounding tissues<sup>5</sup>.</p>	<p>Insufficient pressure applied after removal of catheter.</p>	<p>Localised swelling and bruising at exit site                      Patient complaints of pressure</p>	<ul style="list-style-type: none"> <li>• Record and monitor symptoms</li> <li>• Seek medical help if condition advances</li> <li>• Vigilance is required in patients with coagulopathy</li> </ul>

## Appendix 2: Insertion and blood specimen collection

### Pre-procedure key points

- Refer to the Royal Flying Doctor Service (RFDS) Clinical Manuals for PIVC requirements for WACHS Patient Transport.

### Administration of blood products

When selecting venous access for the administration of blood products consider the following information from the: Australian and New Zealand Society of Blood transfusion Ltd and Royal College of Nursing Australia, Guidelines for the Administration of Blood Products, specifically Section 6.1 Venous Access:

- Intravenous access cannula size must be large enough to maintain an adequate flow rate for the transfusion.
- An 18-20G or larger is recommended for non-emergency transfusion in adults. Smaller gauge devices can be used but may restrict the flow rate of the transfusion and result in a much longer time to infuse a component. 22-24G or larger is recommended for paediatric patients. However, the individual clinical context of the patient requiring transfusion will determine the size and type of IV access.
- In the critical bleeding / massive transfusion setting, large diameter IV access may be required to achieve adequate flow rates to resuscitate the patient. Additional IV access points may also be required if blood products need to be administered concurrently.
- In paediatric patients, and in adults with fragile or difficult veins, a smaller gauge cannula may restrict the flow rate and impact on infusion times<sup>7</sup>.

### Patients with chronic renal impairment

The veins of the forearm, upper arm and subclavian are not routinely used for venous access, and are of critical importance for the creation of arterio-venous fistula for haemodialysis.

The medical team of patients with chronic renal impairment must determine and document the most appropriate type and site for vascular access devices (VAD) considering future dialysis access requirements.

Patients with chronic renal impairment who require VAD are to utilise the metacarpal veins (on dorsum of hand) with a peripheral intravenous cannula (PIVC).

### Staffing requirements

- As specified in the WA Health Insertion and Management of Peripheral Intravenous Cannulae in Western Australian Healthcare Facilities Mandatory Policy 0038/16.

- All PIVC insertion must be performed by, or under the direct supervision of, a Health Care Worker (HCW) working within their scope of practice experienced in PIVC cannulation.
- The HCW inserting the PIVC is to seek assistance from a more experienced HCW after two unsuccessful attempts. Where this is not possible the HCW must assess the risk of further attempts against the risk of a delay in treatment. Consider the use of ultrasound guidance to locate veins. Alternatives are to be considered where further attempts have been made by the most senior HCW.

### Equipment

Note: WACHS sites stock PIVC insertion packs, which include some of the following items:

- Intravenous cannula of appropriate size
- Dressing pack (or PIVC insertion pack where stocked)
- 2% chlorhexidine in 70% alcohol sticks/swabs/wipes/solution (use alternate if known allergy or neonates).
- Sterile gloves
- Sterile gauze swabs
- Surgical adhesive tape
- Sharps disposal container
- Water proof protective sheet ('bluey')
- Single patient use tourniquet of appropriate size (Note: for neonates – do not use a tourniquet, apply gentle pressure to the vein proximal to the insertion site)
- Sodium chloride 0.9%, drawing up needle, syringe for priming extension set and flushing PIVC (note: a prefilled syringe may be included in PIVC insertion pack)
- Intravenous extension set e.g. J-loop or needleless valve (A needleless valve is acceptable for those PIVC utilised for short stay therapy in an outpatient, emergency or procedural setting).
- Insertion details sticker for patient's medical record
- Sterile, transparent, semi-permeable IV dressing with site insertion details sticker

### Additional items:

- Single-use surgical clipper
- Topical local anaesthetic
- Tubular bandage (not crepe)
- Immobilisation splint

### Insertion procedure

1. Confirm need for PIVC. Consent patient. Explain procedure
2. Clean trolley with alcohol/detergent wipes. **Allow to air dry**. Collect all equipment required (check for sterility and/or expiry date)
3. Ensure patient comfort and privacy. Adjust level of bed for staff member
4. **Perform hand hygiene**. Open the PIVC insertion pack / dressing pack, establishing aseptic field. Place sterile equipment onto field
5. **Perform hand hygiene**. Place patient in appropriate position, ensure insertion site is free from jewellery. Clip hair if necessary
6. Assess and select patient vein by applying a clean single patient use tourniquet
  - Ensure radial pulse can be palpated (upper limb cannulation only)
  - Place water proof protective sheet under site to be cannulated
  - Instruct the patient to clench and unclench hand (if able). Clenching and unclenching of the hand may be useful as are alternatives such as applying warmth
  - If unable to locate vein, release tourniquet, postpone procedure and seek assistance
  - Once suitable vein located, loosen the tourniquet
7. Cleanse skin with 2% chlorhexidine in 70% alcohol sticks/swabs/wipes/solution, except in the case of a documented skin allergy or neonates, and **allow to air dry**
8. Retighten tourniquet and check pulse if required
9. **Perform hand hygiene with antiseptic solution and don sterile gloves**
10. Aseptically prepare IV flush and prime extension set with sodium chloride 0.9%. Remove the backing of the PIVC dressing
11. Using non dominant hand, anchor the vein below puncture site
12. Insert cannula with bevel up, at 10-45 degree angle depending on depth of vein, slowly advance cannula by 5 mm parallel to the vein, and withdraw stylet 2 mm once flash of blood is observed
13. Progress the cannula gently off the stylet into the vein until the hub meets the insertion site
14. Release tourniquet, apply digital pressure 2.5 cm above cannula end to occlude the vein
15. Dispose of stylet in sharps container
16. Connect selected extension set directly to cannula,
17. Secure device and dress the PIVC insertion site - refer to [Appendix 3: PIVC Dressing Care](#)
18. Flush cannula - refer to [Appendix 4: PIVC Flushing](#)



19. Before leaving the patient ensure that the:

- PIVC insertion site is visible and cannula hub is accessible
- Cannula lumen is not occluded
- Limb circulation is not impeded

20. Dispose of equipment appropriately, remove gloves and **perform hand hygiene**<sup>9,10</sup>

21. For each PIVC inserted ensure the document requirements have been met (refer to [documentation section](#))

### **If you fail your first attempt at cannulation:**

- If the sterile field on the trolley has been breached use a new PIVC/dressing pack
- If the sterile field on the trolley has been maintained then continue to use the already opened pack, add new IVC, sterile gauze, sterile towel/drape and sterile gloves. Use fresh 2% chlorhexidine in 70% alcohol sticks/swabs/wipes/solution to prep skin.

**NB:** Under no circumstances should you reuse the same cannula from the previous insertion attempt.

## **PIVC Blood Specimen Collection**

### **Pre-procedure key points**

Blood samples may be drawn from a PIVC directly after insertion, but not at other times. Do not routinely aspirate blood samples directly from PIVC due to potential risk of haemolysis.

Exceptions are in an emergency when the patient has limited vascular access or is at increased risk of bleeding or receiving thrombolytic therapy.

Except in neonates, infants and children (refer Appendix B of MP 0038/16) collection of blood cultures at time of insertion of a PIVC is not encouraged due to the increased risk of contamination at the time of collection. If the procedure is performed, a second set of blood cultures collected by venepuncture are to be collected.

Refer to PathWest's Recommended Order of Draw.

For specimen collection not via PIVC refer to the WACHS Specimen Collection (including Phlebotomy) and Pathology Results Clinical Practice Standard.

### **Additional equipment**

- Specimen request form
- Required vacuum blood specimen tubes

- Non-sterile gloves
- One of the following types of blood collection device:
  - 1 x Vacutainer® Luer lock Access Device or,
  - 1 x Vacutainer® holder + Vacutainer® Direct Draw Adapter – Assembled
  - 1 x syringe (minimum 10 mL) + 1 x Vacutainer® Blood Transfer Device

### Blood specimen collection procedure

1. Perform hand hygiene and don gloves
2. Obtain collection device(s) and appropriate blood tubes
  - include a spare blood tube of first tube in order of draw to be used as discard if extension set is primed with sodium chloride 0.9% (label as DISCARD)
3. Ensure single patient use tourniquet is applied
4. Scrub the extension set hub with 2% chlorhexidine in 70% alcohol sticks/swabs/wipes/solution and **allow to air dry**
5. Attach collection device to extension set port. Note: Blood samples are NOT affected by drawing through extension set
6. Withdraw the required amount of blood, by either:
  - inserting vacuum blood specimen tubes into the Vacutainer® holder, or
  - drawing on the syringe, avoiding generating excessive negative pressure on vein
7. Collect DISCARD tube first to remove saline from extension set if primed then withdraw requested specimens in the correct order of draw and mix gently
8. Release the tourniquet. Apply digital pressure 2.5 cm above the PIVC insertion site.
9. Flush cannula with 10mL sodium chloride 0.9% for injection using pulsatile motion (push/pause technique)
10. Close slide clamp prior to disconnection of collection device
11. Ensure cannula and add on devices are secure and dressing is intact
12. Dispose of waste appropriately and remove PPE. Perform hand hygiene
13. Label samples and complete forms as per WACHS Specimen Collection (including Phlebotomy) and Pathology Results Clinical Practice Standard.

## Appendix 3: PIVC Dressing Care

### Pre-procedure key points

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.

### Equipment

- Sterile transparent, semi-permeable dressing with site insertion details sticker
- Dressing pack
- Non-sterile gloves
- 2% chlorhexidine in 70% alcohol sticks/swabs/wipes/solution
- Adhesive tape
- Tubular bandage (not crepe)
- Adhesive remover (consider dressing in use and select solvent adhesive remover if required)

### Procedure

Note: To dress a PIVC as part of PIVC insertion procedure, start at Step 6.

1. Perform hand hygiene, clean work surface, prepare dressing pack and equipment.
2. Perform hand hygiene and don gloves.
3. Carefully remove dressing as required, then remove gloves and dispose.
4. Perform hand hygiene and don gloves.
5. Swab site with 2% chlorhexidine in 70% alcohol sticks/swabs/ wipes/solution and **allow to air dry**.
6. Secure the dressing to the patient's skin with the transparent end covering the PIVC insertion site and the split on either side of the extension set, allowing for visual inspection of the site.
7. Pinch the dressing firmly around the bridge where the cannula hub and extension set connect, ensuring that there is no tenting.
8. Apply pressure over entire dressing and peel away the paper frame of the dressing.
9. Apply second strip of securing tape just below the extension set
10. Ensure [documentation requirements](#) have been met.
11. Apply tubular bandage over the cannula site (for additional protection if required).
12. Dispose of waste appropriately, remove gloves and perform hand hygiene.



Figure 2: PIVC Dressing

## Appendix 4: PIVC Flushing

### Equipment

- Non Sterile Gloves
- Kidney dish
- 2% chlorhexidine in 70% alcohol sticks/swabs/wipes/solution
- Closed end syringe cap - all prepared syringes are to be capped during transport to the patient
- Sodium chloride 0.9% sterile solution for injection (commercially prepared syringes can be used)

If commercially prepared syringes are not available:

- 10 mL Luer lock syringe/s
- Ampoule of Sodium Chloride 0.9%
- Drawing up needle

**NOTE:** 20-30mL sodium chloride 0.9% is used to flush medications in adult resuscitation situations, followed by external cardiac compression. For infant and child resuscitation situations small boluses of 0.9% sodium chloride is used<sup>8</sup>  
Glucose 5% is used for amiodarone<sup>8</sup>

### Procedure

**Note:** If initial flush at time of insertion, start at Step 4

1. Perform hand hygiene and don gloves.
2. Draw up sterile solution for injection and cover tip with syringe cap.
3. Maintaining aseptic non-touch technique, scrub the hub of the needleless injection port with 2% chlorhexidine in 70% alcohol sticks/swabs/wipes/solution. **Allow to air dry.**
4. Insert the syringe into the needleless injection port and gently flush cannula, whilst assessing for the following signs:
  - Resistance
  - Pain or swelling distal to the insertion site
  - Leaking around the insertion site

If any problems are identified cease flushing and do not proceed:

- Disconnect syringe and discard
  - Clean the hub of needleless injection port with 2% chlorhexidine in 70% alcohol sticks/swabs/wipes/solution
  - Liaise with shift coordinator/medical officer – consider resiting to a new position
5. If no problems are encountered complete flush. Disconnect syringe, place in kidney dish.
  6. Clean hub of needleless injection port with 2% chlorhexidine in 70% alcohol sticks/swabs/wipes/solution.
  7. Dispose of waste appropriately, remove gloves and perform hand hygiene.
    - Before leaving the patient ensure that: the PIVC insertion site is visible and cannula hub is accessible; cannula lumen is not occluded; and limb circulation is not impeded

## Appendix 5: Complication - Extravasation

Paravenous leak / extravasation occurs where a drug or substance breaches the venous wall and leaks into the surrounding tissues<sup>6</sup> leading to tissue damage with potential for further harm.

The consequences of drug extravasation depend on the particular drug administered, the amount extravasated, the concentration of the drug, and the time to recognise and treat. The drug/substance can be classed as<sup>14,15</sup>:

- **Non-irritant** (neutrals) - Drugs that do not cause local irritation when extravasated
- **Irritant** – Any drug or substance that causes stinging, aching, tightness, and phlebitis but without necrosis when extravasated
- **Irritant with vesicant properties** – These drugs or agents are difficult to classify as either a vesicant or irritant; they are capable of causing tissue damage and ulceration. The potential for tissue damage and ulceration, is proportional to the amount and concentration of the drug extravasated into the tissue
- **Vesicant** - Any drug or substance that is capable of causing tissue destruction when extravasated. **Extravasation of a vesicant is a medical emergency**; early detection and prompt appropriate action is required to prevent necrosis and functional loss of the tissue or limb involved. Vesicants are sub classified as:
  - DNA binding vesicants:
    - have a direct affect on the cell in healthy tissue when they are extravasated
    - cause progressive tissue destruction as they bind to cellular DNA and recycle locally
    - may cause skin blistering, ulcer formation and necrosis. Tissue destruction may extend into underlying tendons, ligaments, nerves, and bone which may require excision and skin grafting
  - DNA non-binding vesicants – according to the mechanism by which they cause cell damage:
    - have an indirect rather than a direct affect on the cell in healthy tissue when they are extravasated
    - are metabolised in the tissue and are more easily neutralised than DNA binding agents
    - the type of injury that results is similar to a burn, is mildly to moderately painful and can result in ulceration
    - normal tissue healing occurs within 3 to 5 weeks

Extravasation should be suspected if the following occurs<sup>14,15</sup>:

- Patient complains of burning, stinging, pain or discomfort
- Patient complains of thoracic pain
- Evidence of swelling, oedema, erythema, leakage at the site
- Absence of free flow of infusion
- Change in infusion flow (i.e. slow or sluggish)

- Loss of blood return or change in blood flow
- Increase in resistance when administering IV bolus drugs

**Late symptoms of an extravasation injury include inflammation, hardening of the skin and/or blistering. Some symptoms may be delayed up to 8 or more days post infusion (e.g. Iron Polymaltose).**

Risk factors for extravasation may be patient-related or medication/infusion related.

Patient related risk factors<sup>14,15</sup>:

- Small and/or fragile veins (e.g. elderly and children)
- Hard and/or sclerosed veins
- Limited vein availability
- Obesity in which peripheral access is difficult
- Patient movement
- Predisposition to bleeding, increased vascular permeability or coagulation abnormalities
- Disease with impaired or altered circulation (e.g. lymphoedema, advanced diabetes, Raynaud Syndrome, Superior Vena Cava Syndrome)
- Impaired communication (e.g. non-English speaking patients, patients with communication difficulties, sedation, young children)

Medication/infusion related risk factors<sup>14,15</sup>:

- Vesicant potential of drug
- Concentration of drug
- Volume of drug administered
- High flow pressure (e.g. infusion pump)
- Long infusion period
- Untrained or inexperienced staff in vascular access and the management of antineoplastic drugs
- Multiple attempts at cannulation
- Unfavourable cannulation site
- Choice of equipment (e.g. cannula choice, size, steel “butterfly” needle)
- Inadequate dressing or poor fixation of peripheral IV cannula (PIVC) or central venous access device (CVAD)
- Deeply implanted port, leading to wrong placement of needle or dislodgement of needle
- Backflow secondary to fibrin sheath or thrombosis in CVAD
- CVAD damage, breakage or separation
- Displacement or migration of CVAD catheter from the vein

### **Management - specific**

There are specific management guidelines as follows:

- Chemotherapy – refer to WACHS [Chemotherapy Administration Clinical Practice Standard](#)



- Specialised Medication – refer to WACHS [Specialised Medication -Iron Polymaltose Guideline](#) or [Specialised Medication - Ferric Carboxymaltose Guideline](#)
- Paediatric [Cytotoxic/Biotherapy Agents: Extravasation](#) (Perth Children's Hospital)
- Contrast media – [Management of contrast extravasation in WACHS Medical Imaging Departments](#)

### Management - general

Early recognition and treatment may help to prevent serious toxicity. In the event of a mixed drug extravasation it is recommended to act in accordance with the drug that has the most harmful properties.

The recommended protocol for WACHS is to follow the S.L.A.P. steps:

**S**TOP the injection/infusion immediately

**L**EAVE the venous access device in place

**A**SPIRATE any residual drug from the venous access device using a sterile syringe

**P**LAN

- **Call for assistance** notify medical officer, pharmacies and/or a senior nurse/midwife. Document in the patient health record all actions taken.

Following review, you may need to:

- **Assess** the affected area for the presence of symptoms e.g. erythema, swelling, burning, pain and TRACE the affected area with a marker pen.
- **Photograph** the area
- **Remove** IV device – do not apply pressure
- **Apply** a cold pack and elevate the affected limb
- **Administer** pain relief if indicated
- **Administer** antihistamine if required
- **Arrange** for imaging/surgical review (if vesicant extravasation)
- **Refer patient for further follow up** to authorise prescriber as soon as possible, who may arrange review by senior medical office for long term management (according to individual case if clinically indicated)

**Treatment should be initiated as soon as possible**, ideally within 10 minutes of the extravasation injury, preferably within one hour and definitely within 24 hours.

If tissue damage progresses as a consequence of extravasation, a surgical consultation is imperative.

### Management - contrast extravasation in WACHS Medical Imaging Departments

This section is specifically for the management of contrast media extravasation in WACHS Medical Imaging Departments. For those sites that use private medical imaging services this information should be shared with the private service to assist with collaboration toward best practice and better patient outcomes.

Extravasation of contrast media into the subcutaneous tissue is uncommon occurring in less than 1% of intravenous injections<sup>12</sup>.

Risk factors include:

- use of small veins,
- use of small gauge cannulas resulting in higher injection pressures,
- fragile or previously damaged veins,
- obesity,
- high osmolar contrast agents, and
- large volume and/or high flow rate contrast injections

Most contrast extravasation injuries are minor. Rarely, severe injury may occur including:

- cutaneous ulceration,
- tissue necrosis, and
- compartment syndrome.

The risk of contrast extravasation may be reduced by:

- use of an appropriately sized vein and cannula in relation to contrast injection (flow rate)
- use of appropriate plastic cannula. **Butterfly needles are NOT used for ANY contrast injections.**
- checking if PICC/port is rated for power injection
- testing of the cannula/device with saline at an appropriate injection rate, with the patient's arm in the position the contrast injection is to occur, to ensure:
  - the cannula/device is satisfactorily located within the vein prior to contrast administration
  - the cannula/device and vein are capable of withstanding the injection of contrast at the necessary flow rate
- direct visual monitoring of the injection site during the injection where possible
- use of non-ionic contrast.

### Management

Management of contrast extravasation, as outlined here, is aligned with the [RANZCR Guidelines for Iodinated Contrast Administration](#) (2018). Conservative treatment is adequate for most instances of contrast extravasation.

Where a Medical Officer (MO) is needed to review an outpatient post incident, review may occur in the medical imaging department or the patient may need to be triaged through the local Emergency Department (ED). If the patient attends the ED it must be noted in the Radiology Information System (RIS) and in [Datix CIMS](#) .

If contrast extravasation occurs the following steps are to be taken:

Volume <20ml	<ul style="list-style-type: none"> <li>• Patient to be clinically assessed including observation of the affected limb</li> <li>• Notify the Radiologist or MO (as appropriate) to review patient</li> <li>• Radiologist/Nurse/MO to document review information</li> <li>• Patient given “Contrast Extravasation – Outpatient Information” sheet on leaving department</li> <li>• 24hour follow up phone call by the MIT for outpatients who have returned to their usual place of residence (use the Post contrast extravasation incident – outpatient follow up record)</li> </ul>
Volume 20-50ml	<ul style="list-style-type: none"> <li>• Return patient to holding bay (where available) and handover to Nurse/MO on duty</li> <li>• Remove IV cannula</li> <li>• Notify the Radiologist/MO to review patient (if not already in attendance)</li> <li>• Nurse/MO Perform and record baseline vital signs</li> <li>• Apply cold pack</li> <li>• Elevate the affected limb above the heart</li> <li>• Document all actions and interventions</li> <li>• Follow up as determined by the Nurse/MO post discharge</li> </ul>
Volume > 50ml	<p>Perform the above steps, and in addition the Nurse/MO:</p> <ul style="list-style-type: none"> <li>• Perform neurovascular observations to affected limb</li> <li>• Plastics consult may be required for patient – to be reviewed by MO to determine ongoing care or specialist referral</li> <li>• Document all actions/interventions/referrals</li> <li>• Follow up as determined by the Nurse/MO post discharge</li> </ul>

**Notify Medical Officer urgently (if not in attendance) if:**

- there is swelling or tightness
- there is stinging or burning pain at the site of extravasation
- skin blistering occurs
- tissue perfusion is altered (decreased capillary refill over or distal to injection site)
- increasing pain after 2 hours
- change in sensation distal to the site of extravasation

**Clinical Handover**

For inpatients, appropriate handover of the incident, observations and interventions is to occur with nursing/medical staff when transferring the patient back to the hospital area/ward or to the Emergency Department (as per the

WACHS Admission, Discharge and Intra-hospital Transfer Clinical Practice Standard). A record of handover and any actions is recorded by the MIT in the RIS.

### Documentation

- Patient Information Sheet – WACHS Contrast Extravasation – Outpatient Information is to be given to the patient before they leave medical imaging/hospital. Ensure patient understands the information provided.
- MIT or Nurse involved to ensure details of the incident have been recorded in [Datix CIMS](#) (refer to next section).
- Nurse or MO document observations, interventions and follow up in the health record using the MR55A Inpatient Progress Notes or MR5 Outpatient Notes.
- A Post contrast extravasation incident – outpatient follow up record is completed for all outpatients with an extravasation volume of <20mLs. Once complete, this is scanned into the RIS under the relevant patient visit. This can be retrieved at a later date if the patient presents to the ED with ongoing issues related to the extravasation. Should any concerns be identified during the follow up process or the patient answers yes to any of the questions listed, they should be directed to seek medical review through their GP or local hospital.

### Datix CIMS to be completed

Information to be included:

- Modality
- Contrast Medium type/batch number
- Approximate volume extravasated
- Date
- Time
- When extravasation was recognised i.e. during/after administration
- Whether power injected (include rate) or hand injected
- Cannula gauge
- Date and time of IV cannula insertion
- Easy or difficult cannulation, whether ultrasound guidance was used (if known)
- Number of cannulation attempts (if known)

### Post discharge follow-up

#### Responsibility

- Inpatients/ED patients – It is the responsibility of the patient's medical team to provide follow up review post incident
- Outpatients who have left the medical imaging department and returned to their usual place of residence:
  - <20mLs extravasation volume - It is the responsibility of the MIT involved with the extravasation occurrence to conduct outpatient follow up. If the MIT involved is not able to complete all aspects of the follow up (e.g. not rostered or follow up is needed over a weekend/public holiday period) he/she is to ensure appropriate

- handover to another MIT or nurse to then ensure the required follow up 24hrs post extravasation incident is completed
- >20mLs extravasation volume – it is the responsibility of the nurse/MO who reviewed the patient to determine required follow up