



Peripheral Intravenous Cannula (PIVC) Guideline

1. Guiding Principles

The purpose of this guideline is to outline the principles associated with insertion, care and management of a peripheral intravenous cannula (PIVC) throughout the WA Country Health Service (WACHS).

This guideline is aligned with the Australian Commission for Safety and Quality in Health Care (ACSQHC)'s [Management of Peripheral Intravenous Catheters Clinical Care Standard](#) and should be read in conjunction with the Clinical Care Standard and the WA Health MP 0038/16 [Insertion and Management of Peripheral Intravenous Cannulae in Western Australian Healthcare Facilities](#).

A peripheral intravenous cannula provides direct access to the patient's bloodstream and therefore poses a serious risk for infection from microorganisms introduced either at the time of insertion or while the cannula is in situ.¹

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.¹

2. Guideline

A cross reference of the elements of care from the WA Health Mandatory Policy and the ACSQHC Clinical Care Standard are contained within a table in [Appendix 1](#) of this guideline.

2.1 Assess intravenous access needs

Refer to Quality Statement 1 of the ACSQHC's Management of Peripheral Intravenous Catheters Clinical Care Standard.²

Purpose: To ensure that all alternative routes of administration are considered and excluded before using the intravenous route.²

Considerations:

- If a patient requires medicines or fluids, assess the patient to identify the most appropriate route of administration for their clinical needs before starting therapy
- Consider whether another route of administration (for example, the oral, intramuscular, subcutaneous, rectal route) is appropriate before using the IV route
- Consider if the patient already has venous access insitu that could be utilised
- If all other routes of administration have been excluded and IV access is needed, assess whether peripheral or central venous access is appropriate by considering the:
 - Patient's medical history, immunological status, age, clinical and vascular condition (e.g. lymph node clearance post breast cancer, history of DVT, or fistula in haemodialysis patients)
 - Expected duration of therapy

- Likelihood of repeated or prolonged administration of vesicants or irritants such as vancomycin, flucloxacillin, potassium or certain types of chemotherapy
- Patient's history of infusion therapy and whether there were complications associated with its use – for example, difficulty locating suitable veins
- Availability of appropriate insertion sites and the likelihood of first-time insertion success
- Position of the patient during any planned procedures
- Patient's lifestyle, body image, and preferences for therapy and location of the device, and whether therapy can be delivered safely in accordance with their preferences
- Availability of resources and ability to care for the device.
- Collection of pathology samples:
 - is not a valid reason to insert a PIVC if not required for another reason:
 - although this often happens in emergency departments, it can lead to unused PIVCs being left insitu. If frequent sampling is required, exceptions may be considered after individual assessment, e.g. fourth hourly troponin levels, to optimise patient comfort, or if there is difficult venous access²
 - with infants and children if multiple blood sampling is required for short term investigative procedures or emergency management, a peripheral blood sampling line can be inserted¹
 - in adults 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 therapy¹
 - in **neonates, infants and children** refer to WA Health MP0028/16 (Appendix B, Section 9.3) for specific guidance on PIVC blood sampling (including blood cultures)
 - PIVCs should not be used to obtain blood cultures as this leads to an increased risk of contamination to the blood culture and PIVC.² If the procedure is performed, a second set of blood cultures collected by venepuncture are to be collected¹ Additionally, an exception may be in select cases on the advice of Infectious Diseases/Microbiology – they may request sampling from the PIVC followed by removal of the PIVC
 - refer to the WACHS Specimen Collection Procedure Table for blood sampling via PIVC.

Vascular access decision pathway

(contained in [Appendix 2](#)) can be used by clinicians in deciding on the type of vascular access needed.

D.R.I.P Criteria

The D.R.I.P Criteria asks four simple questions that support risk assessment at the time of PIVC insertion and in monitoring the ongoing need for a PIVC. If the answer is 'No' to **all** criteria, the PIVC may not be required.

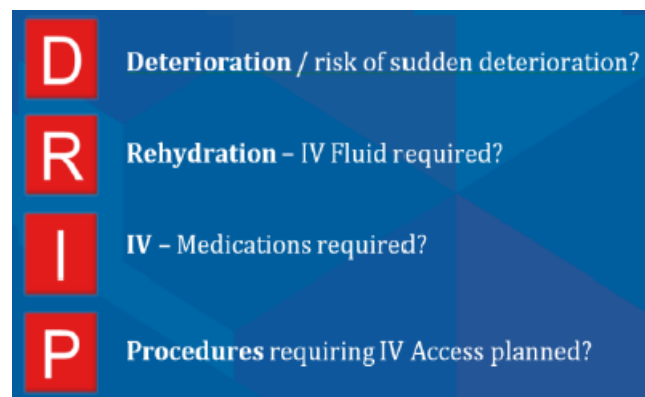


Figure 1: D.R.I.P Criteria

A poster is available ([Appendix 4](#)) to be printed and laminated (so it can be cleaned appropriately) and attached to all WACHS IV Trolleys and computers-on-wheels (to encourage removal at the decision point).

Rapid infusion catheters

The WACHS Emergency Medicine Leadership Group endorsed (June 2021) the use of the NSW Emergency Care Institute Procedure '[Circulation – rapid infusion catheter \(RIC\)](#)' for use in WACHS.

Scope: Medical staff with skills, knowledge, and experience with RIC insertion. All health care professionals are to work within their scope of practice appropriate to their level of training and responsibility

The procedure covers:

- Indications
- Contraindications
- Alternatives
- Informed consent
- Potential complications
- Procedural hygiene
- Area (in WACHS areas for use include, but are not limited to emergency departments, critical care areas (ICU/HDU), operating theatres and maternity)
- Equipment
- Positioning
- Sequence
- Post-procedure care (documentation and patient advice)
 - WACHS – use the MR179 (refer to [section 2.7](#) for more information regarding specific areas and documentation)
- Tips

Removal of RIC: Once patient is stable enough to move from a critical care bed e.g. ED or ICU/HDU, clinician should consider removal.

2.2 Inform and partner with patients

Refer to Quality Statement 2 of the ACSQHC's Management of Peripheral Intravenous Catheters Clinical Care Standard.²

Purpose: To ensure that, when clinically possible, a patient is given information about their need for IV access and the procedures associated with inserting, maintaining and removing a PIVC. This is so patients can consider the risks and benefits and make a decision about whether it is right for them. Patients also have the opportunity to ask questions so that they can be engaged in the management of their PIVC and help reduce the risk of device-related complications.²

Pre-insertion resources: The Australian Commission on Safety and Quality in Health Care has developed the [IV Wise – patient discussion tool](#) – this tool provides key discussion points for clinicians and patients to help involve patients in their care and prevent PIVC-related complications.

Post-insertion resources:

WACHS	<ul style="list-style-type: none"> • Your intravenous cannula-drip: How to care for your drip while in hospital (adult version) • Your intravenous cannula-drip: How to care for your drip while in hospital (paediatric version)
ACQSHC	<ul style="list-style-type: none"> • Looking after your cannula – patient information • IV Wise – patient discussion tool

2.3 Ensure competency

Refer to Quality Statement 3 of the ACSQHC’s Management of Peripheral Intravenous Catheters Clinical Care Standard.²

Purpose: To minimise trauma to the patient by ensuring that PIVCs are inserted and/or maintained by appropriately skilled members of the healthcare team.²

Scope of practice: In WACHS clinicians inserting PIVCs are to work within their individual and professional scope of practice, level of training and experience, and job role. Clinicians are encouraged to maintain evidence of currency within their professional portfolio.

2.3.1 Training

Note: Insertion of PIVC has a pre-requisite of completion of the WACHS Aseptic Technique course via our Learning Management System (LMS).

For those new to the skill or refreshing there are a number of training opportunities and resources available in WACHS. These include:

- **eLearning program** via our LMS - Peripheral Intravenous Cannulation Insertion.
- **Skills trainers** - observe and practice cannulation on a skill trainer prior to supervised cannulation of a patient (seek support of a staff member that has PIVC insertion within their scope of practice)
- **Video** – PIVC insertion by Anaesthetist Royal Perth Hospital (<https://www.youtube.com/embed/liuGJdKARCE>) – also available as a resource within the Peripheral Intravenous Cannulation Insertion training program via our LMS
- **Supervised practice** – evidenced using the WACHS [PIVC Insertion Observation Checklist](#) (two successful insertions). This document can also be used as evidence for Aseptic Technique Competence and recorded in the LMS.

2.4 Choose the right insertion site and PIVC

Refer to Quality Statement 4 of the ACSQHC’s Management of Peripheral Intravenous Catheters Clinical Care Standard.²

Purpose: To ensure that an appropriate PIVC is selected and inserted in a suitable site that minimises the risk of failure and other PIVC-related complications, taking into account the patient’s clinical condition and preferences for the location of the PIVC.²

Device considerations:

- **Safety engineering** - use devices with safety-engineered protective features to reduce the risk of injury involving a sharp
- **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 Access⁸:
 - 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
- **Patients with chronic renal impairment:**
 - the veins of the forearm, upper arm and subclavian are not routinely used for venous access because they are of critical importance for the creation of arterio-venous fistula for haemodialysis. Cannulation in an emergency is acceptable with early removal of the PIVC once the patient is stabilised. If the patient has a fistula, a PIVC should not be inserted into the fistula
 - In patients with chronic renal impairment or receiving dialysis who require a PIVC, the metacarpal veins (on the dorsum of hand) is the preferred site. Avoid cannulation of the arm with a functioning arteriovenous fistula in place
 - The medical team of patients with chronic renal impairment must determine and document the most appropriate type and site for vascular access devices considering current and future dialysis access requirements
- **Neutropenic patients** – refer to the WACHS [Nursing Management of the Neutropenic ADULT Haematology and Oncology Patient Procedure](#) for specific considerations for venous access
- **Rapid infusion catheters** - consider the use of [rapid infusion catheters](#) in situations where rapid volume infusions is needed
- **Aeromedical retrieval** - consider if the patient is likely to require aeromedical retrieval - Refer to the [Royal Flying Doctor Service \(RFDS\) Clinical Manuals](#) for PIVC requirements for WACHS Patient Transport
- **Contrast media for diagnostic purposes** - consider whether the PIVC is to be used to administer contrast media for diagnostic purposes. In some cases, radiology may require certain size PIVCs located in more proximal veins. Clinicians should request advice from radiology as appropriate

2.5 Maximise first insertion success

Refer to Quality Statement 5 of the ACSQHC's Management of Peripheral Intravenous Catheters Clinical Care Standard.²

Purpose: To reduce multiple failed insertion attempts that increase the risk of device failure and cause patient's undue pain and anxiety, as well as diminished vascular health.²

Considerations^{1,2:}

Multiple PIVC insertion attempts can increase patient's anxiety, increase overall procedural pain, reduce patient satisfaction, and increase risk of infection. Reducing the number of unsuccessful PIVC attempts and time to PIVC insertion is important to improve patient and staff experience, patient outcomes, patient flow and overall costs to the organisation.¹⁸

- If the clinical presentation of a patient is such that the likelihood of inserting a PIVC successfully on the first attempt is low given the clinician's current experience in PIVC insertion, refer to a clinician who is more experienced in PIVC insertion where possible
- Strategies to optimise first-time insertion success include^{1,2:}
 - escalating to a more experienced clinician
 - using technology-assisted devices such as ultrasound (improves identification of suitable veins in patients with difficult IV access and reduces the requirement for central venous lines, which are more time-consuming and carry a higher risk of complications¹⁸)
 - adjunct supportive therapies such as local anaesthetics
 - for paediatric patients, consider using parental support or child play therapy to maximise the likelihood of successful insertion on the first attempt
- Difficult or unsuccessful insertions can cause bruising, thrombosis, delays in treatment, reduced access to veins for future health needs, and undue pain and anxiety for the patient
- It is important to conduct a thorough assessment of risk factors that may contribute to difficult insertion, ask the patient about whether they have had issues with PIVC insertions previously, and escalate to a more experienced clinician where possible
- If more than one attempt to insert the PIVC is required, specify the reason (for example, lack of more experienced staff to escalate to in the after-hours setting, or patient dehydration) in the patient's healthcare record and escalate to a more experienced clinician

2.6 Insert and secure

Refer to Quality Statement 6 of the ACSQHC's Management of Peripheral Intravenous Catheters Clinical Care Standard.²

Purpose: To emphasise the need for correct infection prevention and control measures regarding PIVC insertion. The device is secured to minimise complications and unintentional loss of IV access, and the PIVC and insertion site can be easily monitored.²

Key points:

- Insert and secure a PIVC using standard precautions, including aseptic technique

- Use a dressing pack (or PIVC insertion pack where stocked)
- Sterile gloves are to be used (as per MP 0038/16)¹
- Decontaminate the skin with 2% chlorhexidine gluconate in 70% alcohol unless contraindicated or in neonates¹
- Use a sterile, transparent, semipermeable dressing to secure the PIVC (refer Figure 2 for sample PIVC dressing)^{1,2}:
 - consider patient characteristics such as allergies to tapes
 - secure the dressing, taking care not to contaminate the insertion site
 - ensure that the dressing remains intact for the duration of the insertion to prevent complications such as unintended dislodgement (unless there is no longer a seal or there is excessive accumulation of blood or moisture)
- All PIVC are to have an extension set attached¹ (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)
- Labelling in accordance with the National Standard for User-applied Labelling of Injectable Medicines, Fluids and Lines^{1,2}
 - specifically, catheters must be identified when there is a risk of wrong route of administration (for example, where the patient entry port is distant from the administration site).



Figure 2: Example of PIVC Dressing

2.7 Document decisions and care

Refer to Quality Statement 7 of the ACSQHC's Management of Peripheral Intravenous Catheters Clinical Care Standard.²

Purpose: To ensure that the plan of care for a patient's PIVC is clear and that decisions relating to the PIVC and its condition are accurately recorded and accessible to all clinicians involved in the patient's care.²

Insertion information:

- the clinician inserting the PIVC documents the record of insertion site, date, time and their name^{1,2}
- where an insertion sticker is available, this is completed and affixed to the MR179
- insertion details recorded on the MR179 and healthcare record include²:
 - Why the PIVC is needed
 - Length and gauge of the PIVC
 - Where the PIVC is located
 - Who inserted the PIVC
 - Date and time of insertion (this should also be recorded on the label)
 - Infection prevention and control methods used (use of aseptic technique, dressing, and any issues arising during insertion)
- PIVC is labelled with date and time of insertion, and is affixed:
 - for Adults and paediatrics – on the edge of the PIVC dressing so as not to interfere with visible assessment of the PIVC site¹
 - for Neonates – on the splint¹⁹

- **A plan of care** for the patient's PIVC should include details about when the device is expected to be removed and any results of assessments of the need for the PIVC (refer [section 2.9](#))
- **Pre-hospital environment:**
 - St John Ambulance patients who have cannulas inserted in the pre-hospital environment will have a special 'Emergency' insertion IV dressing to prompt removal within/by 24hs (see Figure 3).



Figure 3: Sample emergency insertion IV dressing (Image used with permission by 3M)

- **Theatre patients:**

It is recognised that the peri-operative setting provides a controlled environment in relation to performing aseptic technique procedures, in comparison to a semi-controlled environment such as a medical wards and uncontrolled environments such as an emergency department.

PIVC insertion in the Peri-operative setting is routinely undertaken by Anaesthetists who specialise in this procedure. In this unique environment some modified insertion practices may be applied as follows:

- Use of a sterile pack / field e.g. IVC starter kit, dressing pack, sterile sheet or anaesthetic pack
- insertion is to be documented on the anaesthetic record when PIVC is inserted by the anaesthetist
- any additional cannula insertions / insertion attempts in the peri-operative setting are to be documented
- any cannulas that are required to remain insitu must be documented and relevant information transferred to the MR179 WACHS Peripheral Intravenous Cannula Observation Record
- each point of transition of care i.e. from theatre – recovery – ward, provides an opportunity to ensure that PIVC documentation is complete
- **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)
 - 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.

2.8 Routine use: inspect, access and flush

Refer to Quality Statement 8 of the ACSQHC's Management of Peripheral Intravenous Catheters Clinical Care Standard.²

Purpose: To reduce the risk of PIVC device failure and preserve vessel health by ensuring that PIVCs are regularly reviewed and access is maintained using standard precautions, including aseptic technique. PIVCs are also flushed at intervals to maintain patency, reduce the risk of blockage, and prevent mixing of incompatible medicines or solutions.²

Inspect

- Routinely inspect the PIVC and insertion site for signs of complications that can lead to device failure^{1,2}
- Inspection is performed at least every eight hours while the PIVC is insitu, each time the PIVC is accessed, and continued for 48 hours post removal^{1,2}
- a peripheral intravenous assessment score (PIVAS) is documented on the [MR179 WACHS Peripheral Intravenous Cannula Observation Record](#)
- any ongoing PIVC site issues are to be documented in the patient's healthcare record
- where a patient has a PIVC inserted, **the PIVAS score must be included in clinical handover**
- **Neonates and paediatrics**¹: 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.
- During the inspection:
 - **Look:** observe the PIVC site for erythema, swelling or exudate. Is the dressing intact, clean and dry?
 - **Listen:** Ask the patient or use visual cues. Is there pain or tenderness on infusion/ palpation or movement? Ask the patient questions to check whether they are tolerating their PIVC, and whether they understand why it is needed and the treatment they are having. Ask if they have any concerns associated with the use of their PIVC and deal with those concerns.
 - **Feel:** palpate the site through the intact dressing for heat or vessel hardening.

Access

- Use standard precautions, including aseptic technique, when accessing the PIVC or performing site care to help reduce the risk of PIVC-associated infections²
- Decontaminate needleless connectors before and after access with 70% alcohol and allow to fully air dry^{1,2}
- Administration sets are single use devices. 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 technique¹ (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 tip¹¹)

Flush

- Sodium chloride 0.9% (5-30ml) may be administered without prescription to maintain venous access patency and flushing. Consider compatible diluents
- With 5-10mls of sterile sodium chloride 0.9% using a 10ml Luer-lock syringe or commercially available pre-filled syringe to help avoid excessive pressure using a pulsatile motion (push-pause)¹:
 - after the PIVC is inserted and prior to use to confirm placement
 - before each medication or infusion is given to ensure the PIVC is still patent
 - after each injection / infusion to remove irritant material from the vein
 - between multiple infusions or medications to prevent interactions and incompatibilities
 - prior to and after blood drawing (refer section 9. Blood collection)
 - at least every 12 hours if the PIVC is not in use (strong consideration should be given to removing the PIVC if it has not been accessed for 12 hours)
- Special circumstances:
 - **Adult Resuscitation** - 20-30mL sodium chloride 0.9% is used to flush medications in adult resuscitation situations, followed by external cardiac compression⁹
 - **Infant and child resuscitation** - small boluses of sodium chloride 0.9% is used⁹
 - **Amiodarone** - glucose 5% is used.⁹

2.9 Review ongoing need

Refer to Quality Statement 9 of the ACSQHC's Management of Peripheral Intravenous Catheters Clinical Care Standard.²

Purpose: To ensure that PIVCs are promptly removed when they are no longer needed.²

Review:

- daily or when clinically indicated, for ongoing need and removed as soon as no longer required¹
- refer to the [D.R.I.P criteria section](#)
- if continued access is required refer to [Section 2.10](#)
- whether switching from IV to oral therapy is possible^{1,2}
- whether an alternative device is indicated if extended IV therapy is anticipated (refer to [Section 4.1](#)).²

2.10 Remove safely and replace if needed

Refer to Quality Statement 10 of the ACSQHC's Management of Peripheral Intravenous Catheters Clinical Care Standard.²

Purpose: To minimise complications by ensuring that PIVCs are removed safely when they are no longer needed, when they malfunction or when complications develop. Replacement with a new device only occurs when IV therapy needs to continue.²

Removal:

Remove PIVCs as soon as they are no longer needed (e.g. if a patient can tolerate oral therapy) or if complications occur^{1,2} (as indicated by the PIVAS score – refer to MR179).

Encourage the placement of removal packs on computer-on-wheels for doctors on ward rounds to remove unnecessary PIVCs at point of decision.

- **Circumstances for removal within/by 24hs** – PIVCs inserted by:
 - ambulance services or in an emergency situation or where adherence to aseptic technique is uncertain or unknown (e.g. insertion during a medical emergency) are to be replaced as soon as the patient’s condition has stabilised or within 24 hours of insertion¹
 - external medical imaging departments should be considered for removal within/by 24hs
- **Adults** - if continued access is required all are to be re-sited at 72 hours or more frequently if clinically indicated¹
- **Paediatrics** – not routinely replaced. The PIVC can remain 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
- **Documentation** - removal 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
- **Observations** - observe the insertion site for 48 hours after the PIVC is removed for signs of post-infusion pain, redness or swelling^{1,2}
- **Discharge:**
 - for inpatients, ensure that PIVCs are removed before discharge, unless the PIVC is intended to continue beyond discharge as part of the patient’s care plan²
 - on discharge from hospital, explain what signs they should look out for after the PIVC is removed and who they should contact if signs of infection develop^{1,2} (provide the patient with the written patient information – refer to [section 2.2](#) Post insertion resources)

3. Definitions

Refer to the Glossary in the ACSQHC’s [Management of Peripheral Intravenous Catheters Clinical Care Standard](#) for an extensive list of terms.

PIVAS	Peripheral intravenous assessment score. A validated tool for evaluating and documenting the status of PIVC sites.
PIVC	Peripheral intravenous cannula. A device that is designed to be inserted into and remain within a peripheral vein (excludes peripherally inserted central line catheters).
RIC	Rapid infusion catheters (RIC) is a device used to convert standard peripheral intravenous access into a large-volume resuscitation portal. RICs are useful for patients requiring prompt, large volume fluid resuscitation. The high-flow, low-resistance device may be readily

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inserted in a large peripheral vein via a standard guidewire/dilator/catheter insertion technique by trained clinicians.
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4. Roles and Responsibilities

Clinicians are required to work within policies and guidelines and within their identified scope of practice, level of experience and work role.

5. Compliance

Failure to comply with this policy document may constitute a breach of the WA Health Code of Conduct (Code). The Code is part of the [Integrity 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.

6. Records Management

All WACHS clinical records must be managed in accordance with [Health Record Management Policy](#).

7. Evaluation

Monitor patient outcomes via Staphylococcal Aureus Blood Stream Infection (SABSI) Healthcare Infection Surveillance WA (HISWA) reports quarterly.

Monitor Aseptic Technique using the agreed WACHS audit tool – frequency to be determined at the regional level using a risk assessment approach.

8. Standards

[National Safety and Quality Health Services \(NSQHS\) Standards](#) - 1.2, 1.7, 1.8, 1.11, 1.16, 2.3-2.7, 2.9, 2.10, 3.1 - 3.12, 4.1 – 4.4, 4.13, 8.10

Australian Commission on Safety and Quality in Health Care:
[Management of Peripheral Intravenous Catheters Clinical Care Standard](#)
[National Standard for User-applied Labelling of Injectable Medicines, Fluids and Lines](#)

9. Legislation

[Carers Recognition Act 2010](#) (Commonwealth)
[Health Practitioner Regulation National Law \(WA\) Act 2010](#)
[Occupational Safety and Health Act 1984](#) (WA)
[Occupational Safety and Health Regulations 1996](#) (WA)
[Privacy Act 1988](#) (Commonwealth)

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10. References

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19. Child and Adolescent Health Service (CAHS) [Peripheral Intravenous Cannula \(PIVC\) Insertion and Management Neonatology Guideline](#) 25/02/2020 [Accessed 25 November 2021]

11. Related Forms

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](#)

12. Related Policy Documents

WACHS [Admission, Discharge and Intra-hospital Transfer Clinical Practice Standard](#)
WACHS [Aseptic Technique](#)
WACHS [Chaperone Policy](#)
WACHS [Clinical Observations and Assessments Clinical Practice Standard \(physiological, neurovascular, neurological and fluid balance\)](#)
WACHS [Contrast Extravasation – Outpatient Information](#)
WACHS [Documentation Clinical Practice Standard](#)
WACHS [Hand Hygiene Policy](#)
WACHS [Infection Prevention and Control Policy](#)
WACHS [Nursing Management of the Neutropenic ADULT Haematology and Oncology Patient Procedure](#)
WACHS [Royal Flying Doctor Service \(RFDS\) Clinical Manuals – Endorsed For Use in Clinical Practice Policy](#)
WACHS [Specimen Collection Procedure](#)
WACHS [Waste Management Policy](#)

13. Related WA Health System Policies

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

14. Policy Framework

[Public Health](#)

15. Appendix

Appendix 1: [Elements of care – cross reference of WA Health Mandatory Policy and ACSQHC Clinical Care Standard](#)

Appendix 2: [Vascular access decision pathway](#)

Appendix 3: [Complication – Extravasation](#)

Appendix 4: [The D.R.I.P. Criteria - poster](#)

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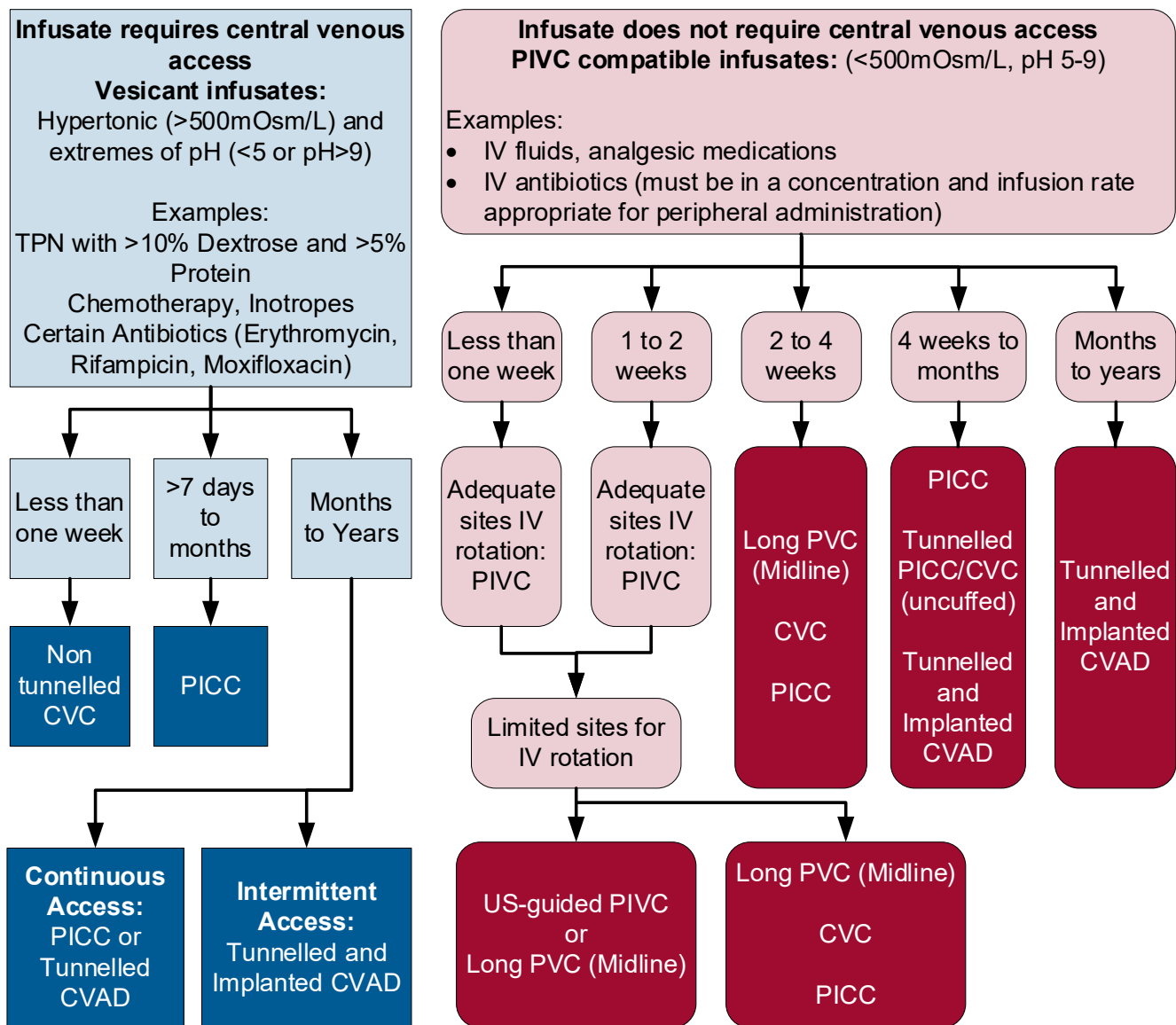
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Appendix 1: Elements of care – cross reference of WA Health Mandatory Policy and ACSQHC Clinical Care Standard

Element of care	MP 0038/16 Appendix A Adults	MP 0038/16 Appendix B Neonate & Paediatrics	ACSQHC Clinical Care Standard Quality Statements (QS)
PIVC site selection	Section 1	Section 1	QS 1: Assess intravenous access needs; and
PIVC selection	Section 2, Appendix C	Appendix C	QS 4: Choose the right insertion site and PIVC
Local Anaesthetic	Section 3		QS 5: Maximise first insertion success
Skin Preparation / disinfection	Section 6	Section 4	QS 6: Insert and secure
Securement and dressing management	Section 7	Section 6	
PIVC assessment	Section 8	Section 8	QS 8: Routine use: inspect, access and flush
PIVC blood collection	Section 9	Section 9	QS 1: Assess intravenous access needs
PIVC Flushing	Section 12	Section 7	QS 8: Routine use: inspect, access and flush
Duration and reinsertion	Section 13	Section 10	QS 10: Remove safely and replace if needed
Removal of PIVC	Section 14		QS 10: Remove safely and replace if needed
Documentation	Section 15		QS 7: Document decisions and care
Management of administration lines	Section 11	Section 11	QS 6: Insert and secure (re labelling standards)
Patient education	Section 16, Appendix F		QS 2: Inform and partner with patients

Appendix 2: Vascular access decision pathway



Factors to consider to decide type of Venous access for patients:

- Infusate characteristics
- Expected duration of treatment
- Patient factors (Age/Weight/Comorbidities/preferences)
- Indications: Difficult IV Access (DIVA) and requirements for blood draws
- Procedural management considerations of patient
- Vein status/venous health – any known abnormalities (thrombosis or stenosis)
- Medical history/chronicity of disease/course – includes need for multiple CVADs in future
- Inpatient or outpatient IV therapy

Source: Adapted from the Perth Children’s Hospital “Vascular Access Decision Pathway” (CVAD and Midline Insertion and Management Guidelines, 2019)

Appendix 3: Complication – Extravasation

Paravenous leak / extravasation occurs where a drug or substance breaches the venous wall and leaks into the surrounding tissues⁷ 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 as¹⁵:

- **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 occurs¹⁵:

- 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 Polymolose).

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

Patient related risk factors¹⁵:

- 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 factors¹⁵:

- 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 [eviQ Extravasation Clinical Procedures and resources](#) and the use of the [MR59C.4 Cancer Services Antineoplastic Drug Extravasation Assessment Tool](#)
- **Specialised Medication** – refer to WACHS [Specialised Medication – Adult Intravenous Iron Therapy 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:

STOP the injection/infusion immediately

LEAVE the venous access device in place

ASPIRATE any residual drug from the venous access device using a sterile syringe

PLAN

- **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 injections¹².

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.

Managing the contrast extravasation

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

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](#) (see 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 responsibilities

- 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.