

# Peripheral Intravenous Cannula (PIVC) Care

Many children admitted to hospital require a PIVC to administer treatment. There are varying levels of risk associated with different medications that are infused through this device. Children are also prone to pressure injury at the PIVC site. Careful management of PIVCs is necessary to prevent injury. This skill sheet contains key information from the [CHQ Procedure: Infiltration and Extravastation: Prevention, Recognition, Management and Treatment](#) (QH only). Permission has been gained from the [QCH Vascular Access and Management Service \(VAMS\)](#) (QH only). Please refer to the procedure for more detailed information.

## Insertion

<b>S</b>	<p><b>Inserter's Skills</b></p> <ul style="list-style-type: none"> <li>Consider the location and condition of veins.</li> <li>Start in upper limb and avoid antecubital fossa where possible.</li> <li>Use the smallest cannula gauge for anticipated flow rate required.</li> </ul>
<b>U</b>	<p><b>Understand and Prepare</b></p> <ul style="list-style-type: none"> <li>Consider: intended use, alternative route (eg. oral medications), duration of therapy.</li> <li>Utilise pain relief (eg. topical anaesthetic) where appropriate.</li> <li>Availability of resources (eg. equipment, staff to support in procedure).</li> </ul>
<b>C</b>	<p><b>Consent</b></p> <ul style="list-style-type: none"> <li>Obtain verbal consent, involving parents and patient.</li> <li>Obtain three points of positive patient identification.</li> </ul>
<b>C</b>	<p><b>Clean site</b></p> <ul style="list-style-type: none"> <li>20 second scrub with friction and allow to air dry.</li> <li>If re-palpation is necessary, use sterile gloves.</li> </ul>
<b>E</b>	<p><b>Escalate</b></p> <ul style="list-style-type: none"> <li>After 2 attempts, seek assistance.</li> <li>Consider vein quality. Utilise ultrasound guidance where equipment and skill are available.</li> </ul>
<b>S</b>	<p><b>Secure</b></p> <ul style="list-style-type: none"> <li>Ensure skin is clean and dry prior to application of tapes.</li> <li>Secure as per <a href="#">PIVC Taping skill sheet</a>.</li> </ul>
<b>S</b>	<p><b>Sign and Document</b></p> <ul style="list-style-type: none"> <li>Ensure that documentation is completed including date, time, site, cannula gauge, number of attempts and staff member who inserted cannula.</li> <li>Be sure to document reasons for cannula removal and reinsertion.</li> </ul>

Table 1. SUCCESS Principles for Cannulation (Kleidon, Cattanach, Mihala & Ullmann, 2019)





## ALERT

Where peripheral access is required in a patient requiring emergency resuscitation, no more than two urgent attempts at peripheral cannulation should be made before proceeding to the intraosseous route.

### Improve PIVC Management

Propmt Removal	P	<ul style="list-style-type: none"> <li>• Evaluate the clinical indication of the PIVC daily in consultation with the treating team</li> <li>• Remove PIVC under aseptic conditions</li> <li>• Document the removal and the indication for removal</li> </ul>
Inspect Hourly	I	<ul style="list-style-type: none"> <li>• Conduct HOURLY site checks during an infusion</li> <li>• Touch: The site should feel soft, warm, dry and be pain free.</li> <li>• Look: bandages should be taken down to visualise site. The site should be clean, dry, no redness or evidence of pressure areas.</li> <li>• Compare: Bilateral limbs should be the same size, temperature and have equal capillary refill. There should be no evidence of swelling.</li> </ul>
Vein Patency	V	<ul style="list-style-type: none"> <li>• Ensure there is a medication order for a continuous infusion or intermittent flushes.</li> <li>• Visualise site whilst administering flush and consider the rate of delivery</li> <li>• The site should be pain free - pain is indicitive of cannula failure.</li> </ul>
Clean Hands	C	<ul style="list-style-type: none"> <li>• Use Aseptic Non-Touch Technique (ANTT®).</li> <li>• Remember hand hygiene.</li> </ul>
Scrub the Hub	S	<ul style="list-style-type: none"> <li>• Scrub the hub - a vigorous friction scrub of the needleless access device using your alcohol wipe for no less than 15 seconds. Allow to air dry and protect from environmental contamination.</li> <li>• Treat PIVCs with as much respect as central access devices.</li> </ul>

Table 2. PIVCS Principles in Cannula Care (Kleidon, Cattanach, Mihala & Uhlmann, 2019)



## Infiltration (Doellman et al., 2009; Dougherty, 2008)

Infiltration is where the non-vesicant solution that was intended to be administered intravenously, is administered into the surrounding tissue. If a large enough volume infiltrates the surrounding tissue, compression of the nerves and limb compartment syndrome may result.

## Extravasation (Doellman et al., 2009; Dougherty, 2008)

Extravasation is where the vesicant and irritant solutions intended to be administered intravenously, are administered into the surrounding tissue. This can present as localised inflammation and blistering, chemical burns and necrosis of soft tissue. This can result in scarring or require surgical excision of the effected area. In the most severe cases, the child will have sustained long term functional loss.

Factors that influence the severity of extravasation:

- qualities of medication or fluid involved including the chemical profile, pH and osmolarity
- the concentration of the medication or fluid
- volume administered into the tissue
- diluent used to reconstitute the medication
- location of reaction site
- condition of surrounding skin

## Risk factors for infiltration and extravasation (Doellman et al., 2009; Dougherty, 2008)

Device related:

- large gauge cannula relative to vein size
- inadequately secured cannula
- cannula location - areas of flexion are higher risk (eg. antecubital fossa or dominant hand)
- clot formation above the cannula site
- Inappropriate method of administration relative to cannula size

Medication related:

- vesicant potential
- volume infiltrated
- concentration of solution
- repeated use of same vein for vesicant administration
- pH of medication or fluid
- osmolarity of medication or fluid
- vasoconstrictive properties of medication can cause necrosis

Patient related:

- young age
- condition of veins
- impaired communication
- compromised circulation
- altered sensory perception



## Vesicant medications and solutions reported to cause extravasation injury:

Review the list from page 5 of the [CHQ Infiltration and Extravasation: Prevention, Recognition, Management and Treatment Procedure](#) (QH only) for further details on specific medications of risk. It divides common drugs into lower risk, intermediate risk and high risk medications for extravasation injury. The drugs in bold are more likely to be encountered in the ED context.



### ALERT

Extravasation injury is serious. If injury occurs:

- Immediately contact the local medical officer.
- Follow local referral pathways as required for further management of serious extravasation injury.

## Management of infiltration or extravasation injury

- Mark the site with a surgical marker.
- Consult the treating medical officer regarding the specific management for medication or solution specific treatments. Ensure that the appropriate referral has been made to a specialised vascular access service, as per local referral pathways.
- Document the injury in the patient chart. Include the time of injury, area and site of injury, distal circulation and details of the medication or fluid.
- Regularly reassess the site for progression of symptoms. Include circulatory observations distal to the injury. Notify the treating medical officer of any variation.
- Administer analgesia as required.
- If patient is to be discharged, provide education around symptom management to carer. Education should also include the reasons to return for review eg. a change in circulation or increasing pain.
- Contact your local vascular access team. You can also contact the QCH Vascular Access & Management Team by phone (07) 3068 3440 or email [VAMS@health.qld.gov.au](mailto:VAMS@health.qld.gov.au)

## For further information:

[CHQ Procedure: Infiltration and Extravasation: Prevention, Recognition, Management and Treatment \(QH Only\)](#)

[QPEC: Peripheral Intravenous Cannula \(PIVC\) Taping Nursing Skill Sheet](#)

[Management of Peripheral Intravenous Catheters Clinical Care Standard - Australian Commission on Safety and Quality in Health Care](#)



## References:

- Australian Commission on Safety and Quality in Health Care. (2021). Management of Peripheral Intravenous Catheters Clinical Care Standard. [https://www.safetyandquality.gov.au/sites/default/files/2021-05/management\\_of\\_peripheral\\_intravenous\\_catheters\\_clinical\\_care\\_standard\\_-\\_accessible\\_pdf.pdf](https://www.safetyandquality.gov.au/sites/default/files/2021-05/management_of_peripheral_intravenous_catheters_clinical_care_standard_-_accessible_pdf.pdf)
- Doellman, D., Hadaway, L., Bowe-Geddes, L., Franklin, M., LeDonne, J., & Papke-O'Donnell, L. et al. (2009). Infiltration and Extravasation. *Journal Of Infusion Nursing*, 32(4), 203-211. doi: 10.1097/nan.obo13e3181aaco42.
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- Kleidon, T., Cattanach, P., Mihala, G., & Ullman, A. (2019). Implementation of a paediatric peripheral intravenous catheter care bundle: A quality improvement initiative. *Journal Of Paediatrics And Child Health*, 55(10), 1214-1223. doi: 10.1111/jpc.14384
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- Queensland Children's Hospital and Health Service. (2020, July 6). Venous Access Device (VAD). Queensland Health Intranet. [https://qheps.health.qld.gov.au/\\_data/assets/pdf\\_file/0020/710228/proc\\_03450.pdf](https://qheps.health.qld.gov.au/_data/assets/pdf_file/0020/710228/proc_03450.pdf).

This Queensland Paediatric Emergency Skill Sheet was developed by the Emergency Care of Children Working Group, a collaborative of emergency specialty clinicians across the state of Queensland.

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- Providing care within the context of locally available resources, expertise, and scope of practice.
- Supporting consumer rights and informed decision making in partnership with healthcare practitioners including the right to decline intervention or ongoing management.

- Advising consumers of their choices in an environment that is culturally appropriate and which enables comfortable and confidential discussion. This includes the use of interpreter services where necessary.
- Ensuring informed consent is obtained prior to delivering care.
- Meeting all legislative requirements and professional standards.
- Applying standard precautions, and additional precautions as necessary, when delivering care.
- Documenting all care in accordance with mandatory and local requirements.

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