GUIDELINE

Peripheral Intravenous Catheter (PIVC)
1. Introduction
This guideline has been developed as part of the I-CARE intervention bundle for the management of intravascular devices (IVDs). The guideline is intended to be used by Hospital and Health Services (HHS) to support a system for the use and management of invasive devices based on current best practice and evidence for the prevention and control of healthcare associated infection (HAI).

<table>
<thead>
<tr>
<th>KEY CRITICAL POINTS</th>
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<tr>
<td>Only competent staff (or training staff supervised by competent staff) are to insert Peripheral Intravenous Catheters (PIVC)</td>
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<tr>
<td>Accurate documentation and record keeping should be maintained to ensure patient safety</td>
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2. General Requirements
- The clinician should choose an appropriate Intravascular Device (IVD) – consider catheter type, number of lumens, length, type of therapy, site of insertion, risk of complications including infection, and patient factors.
- Only competent staff (or training staff supervised by competent staff) should insert IVDs to minimise infection and other complications.
- The clinician should explain to the patient (if possible) or parent/guardian the procedure and need for catheterisation.
- All sterile fields should be set up immediately prior to any procedure by the clinician or suitably trained assistant.
- Accurate documentation and record keeping should be maintained by the clinician to ensure patient safety, to allow for audits, and to track outbreaks of infection.
- The documentation should include the date and time of insertion including type of IVD and gauge, anatomical site, skin preparation solution used, name of operator, site observations and device removal/replacement details.

Education and Competency Assessment
- All staff involved in the insertion and maintenance of IVDs should complete all competency assessments as required by the healthcare facility. A record of this should be maintained by the facility.

Hand Hygiene
- Healthcare workers should perform hand hygiene with an antiseptic-containing soap solution or use an alcohol-based waterless cleanser:
  - before and after palpating catheter insertion sites
  - before and after accessing, repairing, or dressing an intravascular catheter; this includes associated components such as administration sets and access ports.
- The use of gloves does not obviate the need for hand hygiene.
- The clinician should educate patients and carers about the importance of hand hygiene and ask that they remind all caregivers to clean their hands.

Surveillance
Surveillance should be conducted in high-risk patient populations by a facility appointed person to determine healthcare associated (HCA) IVD-related Bloodstream Infection (BSI) rates, monitor trends in rates and assist in identifying lapses in infection control practices.
• A facility-appointed person should:
  - report HCA IVD-related BSIs at least monthly to all stakeholders
  - investigate all clusters of HCA IVD-related BSIs for common cause problems

• The introduction of new products or processes should be monitored to identify any increase or decrease in the occurrence of device associated infection.

3. Insertion & Management Requirements

General
• Solutions and medications should be considered by the clinician for potential to cause infusate-induced vessel damage including osmolality (or tonicity), pH and chemical properties of the solution or medication e.g. Potassium chloride, Vancomycin. Repeated administration of chemical irritants warrants central venous access to limit peripheral venous damage.
• Assistance should be provided when inserting a PIVC to ensure asepsis and appropriate technique.
• Adhesive labels indicating insertion details should be placed onto the dressing.

Catheter Types and Materials
• The use of steel needles should be avoided due to the risk of extravasation and needlestick injury.
• PIVC and steel-winged infusion sets (if used) should be equipped with a safety device with engineered sharps injury protection.
• For infusions of viscous fluids such as blood and for rapid infusions, the largest catheter (14 – 16 gauge) should be used by clinicians. Smaller sizes (18 – 20 gauge) suffice for crystalloids. The smallest catheters (20 – 24 gauge) are adequate for the intermittent administration of drugs, except those given by rapid infusion. A minimum of 20 gauge is recommended for peripheral parenteral nutrition (PPN).

Prophylactic Antibiotics
• Prophylactic antibacterial or antifungal agents (oral, intranasal or parenteral) are not recommended at the time of insertion or during use of a PIVC to prevent catheter colonisation or bloodstream infection.

Catheter Site Selection
• Clinicians should assess specific patient factors such as pre-existing catheters, anatomic deformity, site restrictions (e.g. mastectomy, arteriovenous [AV] fistula or graft), the relative risk of mechanical complications and the risk of infection.
• Selection of catheterisation site:
  - site selection should be routinely initiated in the distal areas of the upper extremities; subsequent catheterisation should be made proximal to the previously catheterised site
  - catheters inserted into the lower limbs have a greater risk of thrombophlebitis and thrombosis than the upper limbs
  - veins should be selected on the non-dominant forearm (especially if the catheter is to remain in position for any length of time)
- the basilic or cephalic veins on the posterior (dorsal) forearm are the preferred site for catheterisation (also refer Figures 1 & 2)
- the metacarpal veins on the dorsum of the hand are easiest to visualise but are more liable to block, difficult to stabilise, and prone to infusate or medication induced vessel damage
- the use of the anterior (ventral) forearm veins (particularly the cephalic veins) should be avoided in patients with renal failure and impending need for dialysis in whom preservation of upper-extremity veins is needed for fistula or graft implantation
- the dorsum of the hand should be used for PIVC in patients with chronic renal failure
- when venipuncture of the arm veins is necessary, sites should be rotated
- site selection should avoid areas of flexion although this may not always be possible in an emergency situation such as during resuscitation when the antecubital fossa is recommended\(^{11}\) (Catheters inserted in emergency situations, when adherence to asepsis cannot be ensured, should be replaced within 24 hours or sooner if the patients condition is stabilised\(^{1}\)

- Using a short extension set attached to the catheter can reduce complications associated with catheter movement.

**Local Anaesthesia**

- Topical local anaesthetic e.g. ‘eutectic mixture of local anaesthetics’ - lignocaine with prilocaine, can be applied by clinicians 60 minutes prior to catheterisation to reduce discomfort during insertion, particularly in children:
  - creams can leave a lipid residue that may create a focus for microbial growth; therefore residue of topical anaesthesia should be removed with a soap and water scrub, prior to skin preparation (disinfection)
  - soap and water has been found to be superior to alcohol-impregnated swabs for removing residual lipid from the skin.
- Local anaesthetic (i.e. subcutaneous lignocaine) can be considered by clinicians for use in adults, before insertion of any size of intravenous catheter.

**Procedure for Insertion**

- The following steps should be followed by clinicians. Staff should also refer to locally developed procedures for PIVC insertion:
  - perform routine hand hygiene and don plastic apron and protective eyewear
  - apply tourniquet, select and palpate an appropriate vein for catheterisation
  - release tourniquet
  - perform hand hygiene and set up aseptic field and equipment (sterile dressing/insertion pack)
  - remove hair from insertion site using clippers if necessary (refer: Skin Preparation-Insertion Site)
  - wash hands and forearms for at least 1 minute using a soap or antiseptic-containing soap solution
  - prep catheter insertion site (refer: Skin Preparation-Insertion Site)
  - allow skin preparation to dry then reapply tourniquet
  - perform hand hygiene
  - apply clean (well-fitting) non-sterile gloves
  - drape the insertion site with a sterile towel
  - insert the catheter using an aseptic technique
  - apply dressing over the site (refer: Dressing Type and Replacement Interval)
  - secure adhesive label to dressing or record insertion details on dressing and in the patients chart.
Skin Preparation: Insertion Site

- Hair at the insertion site should only be removed by the clinician (prior to antiseptic application), using clippers (not shaved) to improve adherence of the dressing.
- The skin should be physically cleaned (if necessary) prior to applying the antiseptic solution and inserting the catheter.
- Removal of skin lipids (defatting) with alcohol, ether or acetone is not recommended.
- A solution containing 1-2% chlorhexidine gluconate (CHG) in ≥ 70% ethyl or isopropyl alcohol (alcoholic chlorhexidine) should be used by clinicians for preparation of the insertion site.
- If CHG is contraindicated (e.g. sensitivity, allergy) clinicians should use povidone-iodine 10% in 70% ethyl alcohol (ethanol) (povidone-iodine should remain on the skin for at least 2 minutes and until dry before inserting the catheter).
- If alcohol contraindicated (e.g. allergy, sensitivity, skin condition) clinicians should use aqueous povidone-iodine 10%* or sterile normal saline 0.9% (*NB: the drying time for aqueous based antiseptics is longer than alcohol based products).
- The solution should be applied meticulously by the clinician to an area of skin approximately 10cm x 10cm in a circular motion beginning in the centre of the proposed site and moving outward, for at least 30 seconds.
- The clinician should allow the antiseptic to air dry completely prior to inserting the catheter; do not wipe or blot.
- Palpation of the insertion site or stabilisation of the vein should not be performed by the clinician after the application of antiseptic, unless aseptic technique is maintained. If the operator needs to re-establish the identification of the vein, the site should be re-prepped with the antiseptic solution and allowed to thoroughly dry.
- Clinicians should not use antimicrobial ointment or creams under the dressing at the insertion site.
- Topical venodilators (e.g. glyceryl trinitrate) or anti-inflammatory agents (e.g. cortisone) should not be used near the insertion site.

Catheter Fixation

The catheter should be stabilised by the clinician with the transparent dressing and sterile adhesive tape or sterile adhesive/wound closure strips, to prevent catheter dislodgement (refer: Dressing Type and Replacement Interval).

- Clinicians should not:
  - use adhesive tape directly on the insertion site
  - apply non-sterile adhesive tape under the transparent dressing
  - obscure the ability to visualise the PIVC site and surrounding tissues with adhesive tape.
- A catheter that has migrated externally should not be readvanced by the clinician prior to restabilisation.

Dressings: Types, Replacement Intervals and Procedure

- Sterile, transparent, semi-permeable, self-adhesive, (standard or hyperpermeable) polyurethane dressings should be used by clinicians to protect the site from extrinsic contamination, allow continuous observation of the insertion site, and to help stabilise and secure the catheter.
- The dressing (including polyurethane types) should not be immersed or submerged in water.
• Clinicians should replace dressing on insertion site routinely every 7 days or if the dressing becomes damp, loosened, no longer occlusive or adherent, soiled, if there is evidence of inflammation, or excessive accumulation of fluid under the dressing.

• If the dressing on a PIVC needs to be changed:
  - the clinician should utilise an aseptic technique including sterile dressing change pack with dressing towel and clean non-sterile gloves when changing the dressing on a PIVC
  - the clinician should remove blood or ooze from catheter insertion site with sterile 0.9% sodium chloride
  - alcoholic chlorhexidine is the preferred solution for skin preparation for dressings however, if contraindicated the clinician should use the same solution utilised for site preparation prior to PIVC insertion (refer: Skin Preparation-Insertion Site)
  - the clinician should cleanse the area (the size of the final dressing) around the catheter including under the hub
  - cleansing should be performed by the clinician using a circular motion moving in concentric circles from the site outward
  - the clinician should apply the antiseptic solution meticulously for at least 30 seconds and allow to air dry prior to applying the new dressing; do not wipe or blot.

• Each catheter should be dressed by the clinician as a separate procedure.

PIVC Review

• PIVC should be reviewed each shift and those that are no longer clearly needed should be promptly removed.

• The insertion site should be visibly inspected by the clinician hourly with continuous infusions and at least every 8 hours if no infusion, for phlebitis, tenderness, catheter position and infiltration. More frequent assessments are necessary when using high-risk solutions and medications.

• Review of the PIVC should be documented in the patient record each shift.

• Patients should be encouraged by the clinician to report any discomfort such as pain, burning, swelling or bleeding.

In-line Filters

• In-line filters are not recommended for infection control purposes.

Flushing of PIVCs

• Where possible, continuous intravenous fluids should be administered by the clinician.

• If the patient is receiving intermittent injections or infusions the PIVC should be flushed under positive pressure after each injection and/or infusion.

• Flushing is recommended to promote and maintain patency and prevent the mixing of incompatible medications and solutions.

• The optimal volume and frequency of flushing of catheters used for intermittent injections or infusions is unclear:
  - the literature suggests the volume of flush should equal at least twice the volume of the catheter and add on devices
  - the volume of the lumen is approximately 0.5ml, a small extension set approximately 0.2ml +/- access device 0.1ml, therefore a minimum of 2ml flushing solution should be sufficient (check manufacturers advice)
  - sterile 0.9% sodium chloride for injection should be used by clinicians to flush a catheter
  - only single-dose solutions should be used
- clinicians should use a 10mL (or larger) syringe to avoid excessive pressure (syringes smaller than 10mL can produce higher pressure in the catheter)
  - infusion pressures should never exceed 25 psi because pressures higher than that may also damage blood vessels
  - a 3mL syringe generates pressure greater than 25 psi, whereas a 10mL syringe generates less than 10 psi
- clinicians should use an aseptic technique including cleaning the access port(s) with a single-use 70% alcohol-impregnated swab and allowing to dry prior to accessing the system
- the clinician should flush in a pulsatile (push-pause or start-stop-start) motion
- clinicians should flush catheters immediately:
  - after placement
  - prior to and after fluid infusion (as an empty fluid container lacks infusion pressure and will allow blood reflux into the catheter lumen from normal venous pressure) or injection
  - prior to and after blood drawing (refer: Blood Collection from PIVC)
  - or at least every 24 hours if not in use (strong consideration should be given to removing the PIVC if not in use)
- disconnecting the flush syringe allows reflux of blood into the tip of the catheter to displace the space occupied by the syringe. To prevent this source of occlusion, clinicians should clamp the extension set or withdraw the syringe while administering the last 0.5 ml of flush (positive pressure technique).

• The flush solution and flushing intervals should be documented by the clinician in the patient record and/or the medication chart as per facility guidelines.

**IV Admixtures**

- Clinicians should admix all intravenous fluids using an aseptic technique.
- Clinicians should not use containers of intravenous fluid that have visible turbidity, leaks, cracks or particulate matter, or if the manufacturer’s expiration date has passed.
- Clinicians should use single-dose vials for parenteral additives or medications when possible.
- Clinicians should use the recommended needle gauge for injecting additives into infusion bags and/or burettes.

**Replacement of IV fluids**

- Clinicians should replace infusions of:
  - standard (crystalloid) and non-lipid parenteral solutions every 24 hours
  - lipid-containing solutions within 24 hours of hanging the solution
  - lipid emulsions alone within 12 hours of hanging the emulsion (if volume considerations require more time, the infusion should be completed within 24 hours)
  - all blood components should be infused within 4 hours unless otherwise specified on product information sheet (with the exception of factor VIII or IX prepared for continuous infusion)
  - drug infusions (e.g. heparin, insulin) every 24 hours.
- When any IVD is resited, both the infusion and administration set should be replaced by the clinician regardless of when the infusion was initially commenced. It is not acceptable to attach a new line to an infusion less than 24 hours old, nor place a device, e.g. a capped needle, over the line in the interim.
- All IV fluids should be stored by facilities according to manufacturer’s guidelines.
- Bags or bottles of intravenous solution should not be used as a common source of supply for multiple patients.³
Administration Set Changes

- Clinicians should ensure all components of the administration system (this includes burettes) are compatible, including needleless intravascular devices to minimise leaks and breaks in the system:
  - add-on equipment should be of luer-lock design.
- Clinicians should leave administration sets that do not contain lipids, blood or blood products in place for intervals of up to 4 days\(^3\), unless they become disconnected or the catheter is changed.
- Clinicians should change administration sets used for lipid/lipid-containing parenteral nutrition within 24 hours of initiating the infusion.
- Administration sets used for chemotherapeutic agents should be removed by the clinician immediately after use.
- Clinicians should change administration sets used to infuse propofol at a minimum of 12 hours or as per the manufacturers guidelines.\(^3\)
- **Blood components** must be transfused using an administration set approved for this purpose. This must incorporate a standard filter which removes clots and small clumps of debris that may form during collection and storage. The recommended filter pore size is 170-200 micron.\(^7\)
- Any number of red cell units may be transfused during a 12-hour period provided the flow rate remains adequate.\(^7\) However specific manufacturer’s recommendations defining the maximum number of units per blood administration set must not be exceeded.\(^7\) Administration sets should be removed by the clinician immediately after use.
- **Heparin infusions**: Clinicians should change extension tubing with every syringe change. Both should be changed every 24 hours and when the catheter is changed, to prevent risk of BSI associated with heparin infusions.
- **Other infusions**: extension tubing should be changed when the catheter is changed or following disconnection of the tubing from the catheter.
- Clinicians should not intermittently disconnect administration sets used for continuous infusions, due to the increased risk of infection through manipulation of the hub and occlusion due to reflux of blood into the catheter tip when the line is disconnected.
- Intermittent administration sets should be discarded after each use if disconnected.\(^1\)
  - If the administration set is disconnected from the intravascular device the set is to be discarded and a new administration set connected using aseptic technique and observing standard precautions.
  - The set should be disconnected immediately upon suspected contamination and discarded when the integrity of the product or system has been compromised.\(^1\)
- Administration sets should not be disconnected (and reconnected at a later time) for the purpose of the patient showering or toileting as this may increase the risk of complications such as infection and catheter occlusion.\(^2\)

Medication Labelling

- Clinicians should abide by labelling recommendations for ALL injectable products prepared in the ward or clinical area, including recommendations for labelling containers (bags, bottles and syringes) and conduits (lines and catheters).\(^8\)
- Clinicians should ensure labelling complies with the national recommendations for user-applied labelling of injectable medicines, fluids and lines (current edition) as set out by The Australian Commission on Safety and Quality in Healthcare [link](http://www.safetyandquality.gov.au/internet/safety/publishing.nsf/Content/com-pubs_MedSafety-38757-LabRec-con)
**Intravenous Access Ports**

- Clinicians should minimise catheter manipulation (e.g. number of intermittent infusions).
- Needleless access ports should be used by clinicians according to manufacturer’s recommendations.
- Needleless components should be changed as frequently as the administration set.\(^{14}\)
- All persons handling or accessing the intravascular system should first perform hand hygiene.
- All intravenous access ports should be meticulously cleaned by the clinician with a single-use 70% alcohol-impregnated swab and allowed to dry prior to accessing the system. For example a typical intermittent infusion of medication may involve:
  - swabbing the port before the initial saline injection to assess catheter patency
  - before attaching the sterile infusion tubing or syringe, and
  - before flushing and/or locking the catheter with saline after administering the medication.
- The intravenous port should be accessed by the clinician with a sterile single-use device.
- Stopcocks should be end-capped when not in use.
- For continuous infusions, clinicians should:
  - change stopcocks at least as frequently as administration set changes
  - change needless access ports per manufacturer’s instructions AND if the integrity of the port is compromised.
- For catheters left in situ or lumens with no infusion, clinicians should:
  - change luer caps per manufacturer’s instructions AND after each manipulation
  - change needleless or closed (IV bung) access ports with no infusion per manufacturer’s instructions OR if the integrity of the port is compromised.
- Anytime an access port is removed from a catheter, the clinician should discard it and a new sterile access port should be attached:
  - the integrity of the access port should be confirmed by the clinician before and immediately after each use. If the integrity of the port is compromised or if residual blood remains within the port, it should be replaced immediately and consideration given to changing the administration set.
- Clinicians should not use adhesive tape as a means of junction securement between the hub and access port or infusion line.

**Catheter Duration and Replacement**

Facilities are to locally determine through their Infection Control Committee which of the following 2 options they will adopt. A single option should be selected for the entire facility. The decision to use option 2 is to be based on a formal risk assessment including a point prevalence survey using the Inpatient PIVC Point Prevalence Survey Tool available from: [http://www.health.qld.gov.au/chrisp/icare/point_preval.pdf](http://www.health.qld.gov.au/chrisp/icare/point_preval.pdf).

Additional factors to be considered as part of the risk assessment include:
- availability of a dedicated IV Service which includes monitoring for complications
- patient and staffing profiles
- local Healthcare Associated Blood Stream Infection data related to PIVC
- PRIME incident reporting data
- availability of staff appropriately trained to insert PIVCs on all shifts
- whether stringent documentation processes are in place to prompt and record regular review of devices.
OPTION 1:
Replace every 72-96 hours unless extenuating circumstance criteria is met.

- PIVCs should be removed as soon as they are no longer required. If it can be forecast that a PIVC would be *in situ* for more than 96 hours than an alternative device should be considered such as peripherally inserted central catheter (PICC)\(^5\). If the PIVC is *in situ* for 72-96 hours and is necessary for an extended period it should be removed and resited at this time\(^5\).

- In extenuating circumstances a cannula may be left *in situ* after 96 hours if the all of the following criteria are fulfilled:
  - the patient has very poor peripheral access
  - no one else can cannulate the patient
  - the patient still requires peripheral access
  - the cannula is patent
  - there is no sign of phlebitis or infection\(^5\).

- If the PIVC is not re-sited, the following criteria should be fulfilled
  - the risk assessment for the above must be carried out and documented each shift while the PIVC remains in-situ
  - reasons for not re-siting the cannula must be clearly documented\(^5\).

- PIVCs should be removed by the clinician at the first sign of phlebitis (warmth, tenderness, erythema, palpable venous cord).

- Catheters inserted in *emergency situations*, when adherence to asepsis cannot be ensured, should be replaced by a clinician within 24 hours\(^1\) or sooner if the patient’s condition is stabilised.
  - Patients transferring from other healthcare facilities with a PIVC *in situ* should have this device removed by a clinician upon arrival, unless otherwise clinically indicated. There may be emergency situations where access via the original device is necessary; in this case the device should be replaced in 24 hours.

- Clinicians should replace all fluid administration tubing and connectors when the PIVC is replaced.

OPTION 2:
Replacement of a PIVC when clinically indicated

- Clinicians should remove and replace PIVCs when no longer required or as clinically indicated\(^4\) due to complications.

- PIVCs should be removed by the clinician at the first sign of phlebitis (warmth, tenderness, erythema, palpable venous cord) and when they are no longer needed.

- Catheters inserted in *emergency situations*, when adherence to asepsis cannot be ensured, should be replaced by a clinician within 24 hours\(^1\) or sooner if the patient’s condition is stabilised.

- Patient’s transferring from other healthcare facilities with a PIVC *in situ* should have this device removed by a clinician upon arrival, unless otherwise clinically indicated. There may be emergency situations where access via the original device is necessary; in this case the device should be replaced in 24 hours.

- Clinicians should replace all fluid administration tubing and connectors when the PIVC is replaced.

**PIVC Blood Collection**

- Clinicians can draw blood from a PIVC if necessary, but only if it is in a relatively large vein and only immediately following insertion.

- Blood cultures should never be collected through a peripheral venous cannula due to the increased rate of blood culture contamination at the time of collection.\(^9\)
Blood Culture for Diagnosis of a BSI


- PIVC blood should not be used for blood cultures.
- Blood cultures should always be collected by clinicians from a peripheral vessel:
  - approximately 20 mL is required and 10 mL should be placed in each of the anaerobic and aerobic blood culture bottles
  - staff should read the instructions on the blood culture bottle as different blood culture systems have different requirements
  - each anaerobic and aerobic bottle constitutes a blood culture ‘set’. No more than 3 sets are required in one episode. Two sets has a sensitivity of >90% while collecting 3 sets will increase that to >98%.9
- If catheter-related bloodstream infection is suspected:
  - the clinician should use strict aseptic technique and hand hygiene prior to blood culture collection to reduce the risk of microbial contamination
  - the clinician should utilise sterile collection equipment
  - the clinician should use standard precautions when collecting blood cultures including sterile gloves and eye protection
  - the clinician should meticulously cleanse the skin using chlorhexidine gluconate in ≥ ethyl or isopropyl alcohol swabs9 and allow to dry prior to venipuncture
  - the blood culture bottle diaphragm should be swabbed by the clinician with a sterile 70% alcohol-impregnated wipe prior to inoculating the bottle9
  - there is no need to change the blood culture collection needle between venipuncture and bottle inoculation9 (careful skin preparation is a more important factor than changing needles in reducing contamination during blood culture collection).
- If further blood tubes are required for testing, they should be collected by the clinician after the blood cultures are drawn.

Culturing of PIVC Tips

- Culture of vascular catheter tips may be useful in confirming the source of line related bacteraemia when performed concurrently with peripheral blood cultures. Depending on local laboratory practice, vascular catheter tips are only processed if there is an associated positive blood culture.10 Consult with local laboratory.
- The tip should be aseptically cut from the end of the catheter directly into a sterile yellow top specimen container. Transport to laboratory as quickly as possible to prevent excessive drying.10
- If pus is present at the insertion site, the clinician should swab the site prior to cleaning and send for culture.

Removal of PIVC

- Also refer to local hospital procedure for removal of PIVC.
- Clinicians should perform hand hygiene and don non-sterile gloves.
- Digital pressure should be applied by the clinician until haemostasis is achieved.
- Clinicians should cover site with gauze and a transparent dressing; remove the dressing in 24 hours.
- PIVC sites should be observed for 48 hours after device removal to detect post-infusion phlebitis.
- PIVC removal should be documented in the patient’s medical record.
4. Glossary of Terms

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<tr>
<th>Term</th>
<th>Definition / Explanation / Details</th>
<th>Source</th>
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<tr>
<td>Healthcare Associated Infection (HAI)</td>
<td>Healthcare associated infections (HAI) are those infections that are not present or incubating at the time of admission to a healthcare program or facility, develop within a healthcare organisation or are produced by micro-organisms acquired during admission.</td>
<td>ACSQHC¹⁴</td>
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<td>Exit-site infection</td>
<td>Inflammation (erythema, warmth, tenderness, induration within 2cm of the exit site) or purulence, confined to the area surrounding the catheter exit site, not extending superiorly beyond the cuff if the catheter is tunnelled, with exudate confirmed to be positive by microscopy/culture and no systemic symptoms or positive blood cultures.</td>
<td>NKF K/DOQI, 2006¹³</td>
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<td>Catheter-related bacteraemia (BSI)</td>
<td>Blood cultures are positive for the presence of bacteria with or without the accompanying symptom of fever, and no apparent source for the infection other than the catheter.</td>
<td>NKF K/DOQI, 2006¹³</td>
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5. References

11. United Kingdom. Royal College of Nursing. Standards for Infusion therapy, The Royal College of Nursing IV therapy Forum. 2010

6. Bibliography


44. American Society of Health-System Pharmacists. ASHP therapeutic position statement on the institutional use of 0.9% sodium chloride injection to maintain patency of peripheral indwelling intermittent infusion devices. American Journal of Health-System Pharmacy 2006; 63: 1273-1275.


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10. Revision History

<table>
<thead>
<tr>
<th>Version Number</th>
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<tbody>
<tr>
<td>1.0 [QH-GDL-321-6-5:2012]</td>
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<td>2.0</td>
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