



Procedure for prevention of

peripheral and central venous

catheter related infection



1.0 INITIATION

1.1 Purpose

This purpose of this procedure is to enhance the safety and quality of care by reducing healthcare associated infection and other adverse effects related to use of peripheral and central venous catheters. This is based on the HPSC Guideline on Prevention of Intravascular Catheter-Related Infection in Ireland 2009 and updated in 2014 and best national and international practice.

This document does not specifically address peripheral arterial catheters although similar principles apply to prevention of infection with all intravascular access devices.

1.2 Scope

Target Users

This procedure is intended for use by all HSE staff responsible for the insertion care and management of peripheral and central venous catheters (PVC and CVC) in either hospital or community settings.

Populations to whom it applies

This guidance applies to all people including adults, babies and children cared for by the HSE for whom the use of a venous catheter is considered.

1.3 Objectives

To optimise safety and quality of care by reducing the risk of healthcare associated infections and other adverse effects resulting from use of venous catheters.

1.4 Outcomes

- Reduced use of venous catheters in situations where they are not strictly required
- Reduction of hospital acquired and healthcare associated *Staphylococcus aureus* blood stream infection (National Service Plan Key Performance Indicator)
- Reduced incidence of other adverse effects resulting from use of venous catheters

1.5 PPPG Development Group

Antimicrobial Resistance and Infection Control Implementation Team.

Wide stakeholder engagement and consultation process was undertaken to inform this guidance document. See Appendix III for list of stakeholders involved in consultation and review process.

This procedure has been developed in line with the HSE PPPG format.

1.6 PPPG Development Governance Group

Antimicrobial Resistance and Infection Control Oversight Group.

1.7 Supporting Evidence

See reference list

1.8 Glossary of Abbreviations

AMRIC – antimicrobial resistance and infection control

AMR – antimicrobial resistance

AMS – antimicrobial stewardship

AV- arterio venous

CEO – chief executive officer

CRBSI – catheter related blood stream infection

CVC – central venous catheter

GM – general manager

HCAI – healthcare associated infection

HCW – healthcare worker

HIQA – Health Information and Quality Authority

HPSC – Health Protection Surveillance Centre

HSE – Health Service Executive

IPC – infection prevention and control

IV – intravenous/intravascular

OCT – outbreak control team

PICC – peripherally inserted central catheter

PPE – personal protective equipment

PVC – peripheral venous catheter

SABSI – *staphylococcus aureus* bloodstream infection

2.0 DEVELOPMENT OF PPPG

This procedure was developed because data from a number of sources listed below indicate that venous catheters are a significant contributor to hospital acquired *Staphylococcus aureus* blood stream infection (BSI) in the HSE. Other harms to people related to venous catheters are more common. This conclusion is supported by experience in clinical practice in HSE hospitals and international literature. Common harms include blood stream infection related to other microorganisms, extravasation, tissue damage, local site infection.

Sources of information include:

The HSE Business Information Unit, data from acute hospitals.

The Health Protection Surveillance Centre data on enhanced surveillance of *Staphylococcus aureus* blood stream infections (SABSI) European Centre for Disease Prevention and Control. Point Prevalence Survey of Hospital-Acquired Infections & Antimicrobial Use in European Acute Care Hospitals 2017.

Elements of procedure:

The elements of this procedure are presented under the headings of Peripheral Venous Catheter and Central Venous Catheter with the following elements under each heading:

- a. Assessing the requirement for a venous catheter
- b. Communicating with the person
- c. Competence to site a venous catheter
- d. Preparing yourself to site a venous catheter
- e. Insertion of a venous catheter
- f. Using and caring for a venous catheter
- g. Removal of a venous catheter
- h. Surveillance of use and safety of venous catheters

Note: Use of 2% chlorhexidine in 70% isopropolol

The use of chlorhexidine 2% alcohol 70% is recommended for skin decontamination prior to PVC/CVC insertion, for CVC site disinfection at dressing changes and prior to accessing the catheter hub (scrub the hub).

No recommendation can be made for the safety or efficacy of chlorhexidine in infants aged less than 2 months. If used in neonates, preterm infants, especially those born before 32 weeks of gestation and within the first 2 weeks of life it should be used with caution. The use of chlorhexidine solutions, both alcohol based and aqueous, has been associated with chemical burns in this age group when used for skin antisepsis prior to invasive procedures.

Healthcare workers should be aware of the risk of chlorhexidine allergy including anaphylaxis.

2.1 Peripheral Venous Catheter

2.1.1 Assessing the requirement for a PVC

Peripheral venous catheters should only be inserted when there is a clear indication for their use such as:

- a. an immediate plan to administer intravenous fluids or intravenous medication*
- b. an immediate risk of rapid deterioration of the person's condition that may require vascular access

Note: Using an intravenous medication when there is an appropriate oral option exposes a person to the unnecessary risk of venous catheter-associated infections. Even in a patient with a PVC in place for other reasons the risk of infection is likely to be reduced if the PVC is accessed as little as possible. All intravenous medication prescriptions should be reviewed daily with a view to stopping or changing to a suitable oral preparation. The following antimicrobials have at least 90% oral bioavailability, and so should usually be given by mouth if practical to do so: metronidazole, clindamycin, ciprofloxacin, levofloxacin, co-trimoxazole, linezolid, fusidic acid, rifampicin and fluconazole.

Situations when a PVC should not be inserted

PVCs should not be inserted:

- a. as a routine practice in all people accessing a service; for example, PVCs should not be routinely inserted for unscheduled admissions to hospital
- b. for the purpose of taking blood samples (blood cultures should not be taken through a PVC)
- c. in anticipation that there may be a requirement for intravenous fluids or intravenous medication arising from subsequent assessment

Clinical assessment of the person should be undertaken prior to the insertion of a PVC. The following should be taken into account:

- Indication for PVC
- Clinical condition (acute/chronic/emergency) of the person
- Condition of the person's veins (visual inspection and palpation)
- History of bleeding disorders or anticoagulation or long term steroid therapy
- The safety and practicality of insertion and care of the PVC in the context of the person's behaviour.

The indication for insertion of the PVC should be documented in the clinical notes.

2.1.2 Communicating with the person

- Discuss the procedure with the person in so far as possible in the clinical context. For paediatric PVC insertion explain the procedure to the child as appropriate to the child's age and understanding and to other relevant people (for example parent or guardian).
- Allow opportunities to voice any concerns, express any preferences or ask any questions. Refer to local interpreter services, if required
- An information leaflet should be offered to the person, or relevant other person as appropriate (Appendix IV)
- Check if the person has any known allergies to skin preparations and adhesive materials and document any allergies reported in the clinical notes.
- Establish the person's venous history and any relevant status (for example pre-existing PVC or CVC, anatomical abnormality, factors that influence choice of site such as arterio-venous (AV) fistula or disturbance of lymphatic drainage).
- In so far as possible provide information on symptoms of harm related to the PVC (for example phlebitis or infection) and encourage the person to alert healthcare staff to any changes or concerns.
- Answer questions the person has about the PVC. This may enhance the person's acceptance of the need for the PVC and ability to support care of the PVC thus reducing risk of complications.

2.1.3 Competence to site a PVC

- All staff involved in the insertion and maintenance of PVCs should complete all competency assessments as required for their role by the HSE healthcare facility.
- Only competent, trained staff (or staff in training who are supervised by competent staff) should insert, maintain and remove PVCs. This means that insertion and maintenance of PVCs is within their scope of clinical practice, determined by the individual's credentials, education, training, competence.
- Consideration needs to be given by the practitioner to their own competence to successfully complete the procedure in each individual person following assessment of the person's general condition and venous status. If the practitioner considers that they are unlikely to successfully insert the PVC, they should seek assistance rather than proceed with the attempt unless the urgency of the situation demands that an attempt must be made without delay.
- Where peripheral intravenous access is poor and cannulation is likely to be difficult, alternative methods of access should be considered and discussed with the person and appropriate colleagues.

2.1.4 Preparing yourself to site a PVC

a) Prior to procedure

Preparation in designated clean utility area is required

- Confirm the indication for procedure
- Perform hand hygiene
- Use a pre-assembled PVC insertion pack if one is available
- Pre-assembled PVC insertion packs should generally be available in acute hospital settings or other settings in which insertion of a PVC is frequently required
- If no pack is available, clean a procedure tray with a disinfectant wipe and assemble equipment.

Equipment includes the following:

- A clean procedure tray with integrated sharps container
- Tourniquet (Use a disposable tourniquet for single patient use)
- Appropriate gauge sizes of safety cannula
- Needle free connector or extension set primed unless blood collection required
- Alcohol based skin preparation in a single patient use applicator of 2% chlorhexidine in 70% alcohol (alternative of povidone iodine 10% in 70% alcohol if the patient has a history of allergy to chlorhexidine). (see note above)
- A semi-permeable transparent adhesive dressing
- 5 mls of sterile normal saline (0.9% NaCl) in sterile 10ml syringe (minimum flush of 5mls)
- Topical anaesthetic agent, if appropriate/prescribed (cream or spray)
- Sterile gauze
- Disposable non-sterile sheet.

Note: Healthcare workers should be aware of the risk of chlorhexidine allergy including anaphylaxis. No recommendation can be made for the safety or efficacy of chlorhexidine in infants aged less than 2 months

b) At the patient zone

- Perform hand hygiene with alcohol hand rub.
- Don appropriate personal protective equipment (PPE) as required-PPE selection based on risk of exposure to blood/body fluids and on additional patient factors.
- Ensure the person is in a comfortable position, assess need for assistance to maintain a comfortable and safe position, support the chosen limb/insertion site.
- Open equipment carefully by peeling back packaging and ensure that all key-parts (iv cannula, tip of the syringe) remain sterile and covered until use.
- Place disposable non-sterile sheet under the person's limb.

If at any time a piece of equipment may have been contaminated discard it immediately and replace it.

c) Choosing the size of the PVC

Factors to be considered when selecting the size and design of cannula:

- The size and condition of the person's vein
- The purpose of the PVC
- The type of infusion and required flow rate for the therapy to be administered
- Choose the shortest and smallest gauge PVC suitable for the prescribed therapy as this can reduce the risk of phlebitis.
- PVCs selected for use should have a safety device with engineered sharps injury protection to minimise possible serious consequence of sharps injury.

2.1.5 Insertion of a PVC

Insertion of an intravenous catheter is a minor surgical procedure and requires aseptic technique. Aseptic technique is the term used to describe a technique that maintains asepsis in the non-touch area – the susceptible site should not come into contact with any item that is not sterile.

- PVC insertion should be carried out as close as possible to the time of use to reduce the risk of accidental dislodgement and related complications
- A PVC should not be sited in close proximity to another cannula. If it is essential that two cannulas are inserted in close proximity they should be secured with separate dressings
- A practitioner should not normally puncture the skin more than twice whilst attempting to site a PVC unless the urgency of the situation demands that further attempts must be made without delay. In most circumstances if unsuccessful after two attempts it is recommended that another suitably trained practitioner attempts to site the PVC.

- **Choice of vein:** Selecting a site placement of a PVC (Appendix V)

Select where possible:

- the person's non-dominant forearm
- the basilic or brachial veins on the posterior (dorsal) surface of the forearm.
- In paediatric patients the scalp, upper or lower limbs
- Note that the metacarpal veins on the dorsum of the hand are easiest to visualise but more liable to thrombosis and are prone to vessel damage

Avoid the following sites where possible:

- areas of flexion (wrists and antecubital fossa) as this may predispose to phlebitis.
 - areas below previous cannulation sites, bruised or phlebitis areas
 - an infected limb or a limb with a peripherally inserted central venous catheter or other access device
 - an arm on the side of the body where lymph node clearance was performed, lymphatic drainage is poor or there is an arteriovenous fistula
 - lower limbs
 - the anterior (ventral) forearm veins, especially the cephalic vein in patients with chronic renal failure
- Ensure that the selected site is exposed
 - Check that the insertion site is visibly clean (if not, it should be washed with soap and water and dried)
 - Put the tourniquet in position 5 to 6 cm above the chosen site and tighten slowly. Do not leave the tourniquet in place for more than 1 minute.
 - Place a disposable non-sterile sheet under the person's arm (optional)
 - Ask the person to open and close their fist, keep their fist closed or place the arm below the level of the heart to encourage venous filling
 - Inspect and palpate the insertion site as required
 - Release tourniquet and leave it in position, ready to reuse
 - Perform hand hygiene and don non sterile gloves- non sterile gloves can be worn for the insertion of peripheral intravascular catheters, if the access site is not touched after the application of skin antiseptics.
 - Disinfect the skin using a single use applicator as 2% chlorhexidine in 70% alcohol (alternative of povidone iodine 10% in 70% alcohol if the patient has a history of allergy to chlorhexidine).
 - Disinfect the skin in a circular motion from insertion site outwards and allow to air dry for 30 seconds.
 - Do not re-palpate the chosen vein or touch the skin after disinfection
 - Reapply the tourniquet (ensure a rest period of 2 minutes has elapsed)
 - Insert the cannula into the vein, check for flashback of blood.
 - Release the tourniquet but leave in place
 - Remove the needle introducer and dispose of immediately into a sharps container.
 - Hold the sterile gauze by one corner and place under the cannula hub to absorb blood spillage.
 - Ensure only section of gauze that is sterile is in touch with hub.
 - Attach hub, blood collection device, a short extension set with a clamp primed with NaCl 0.9% or infusion as required.
 - Stabilise the PVC in position with a sterile, transparent, semipermeable polyurethane dressing.
 - Flush cannula with prescribed sterile sodium chloride (NaCl 0.9%).
 - All used sharps must be disposed of carefully into an approved sharps container at the point of use
 - Remove gloves and any additional PPE that may have been required.

-
- Perform hand hygiene
 - Remove all waste from the patient zone and dispose of it in appropriate waste stream
 - Complete PVC insertion care bundle identifying date, time, site and include signature of healthcare worker inserting the PVC (Appendix VII)

2.1.6 Using and Caring for a PVC

Management of PVC and accessories

- Aseptic technique should be employed at all times when accessing the PVC for medication administration or changing the dressing
- Ensure that the PVC is in the correct position and that an intact sterile semi-permeable transparent dressing covers the PVC insertion site
- Ensure that the PVC insertion site is visible through the dressing
- The site should be kept clean and dry at all times
- The dressing should only be changed if it becomes loose, wet or soiled. Routine dressing change is not recommended.
- Perform hand hygiene immediately before accessing hubs and sampling ports.
- Disinfect and scrub the sampling port (scrub the hub) prior to access using a single antiseptic containing 2% chlorhexidine in 70% isopropyl alcohol solution. Allow to dry before accessing the port.
- PVC administration sets for continuous administration of IV fluids use do not need to be replaced more frequently than every 96 hours unless they are disconnected or the PVC is replaced. (Appendix XI)
- PVC giving sets should only be disconnected for clinical reasons and a new set must be used if the giving set is disconnected for whatever reason
- Manufacturer's recommendations must be followed for changing accessories.

Assessing for signs of PVC failure (inflammation, infection, loss of patency or extravasation)

- Use the Visual Infusion Phlebitis (VIP) Score to inspect the PVC insertion site twice daily for signs of tenderness, redness, swelling, inflammation, discharge or thrombosis and guidance as to the appropriate actions to implement. (Appendix VI)
- Complete and document the inspection of the PVC site in care bundle (Appendix VII)
- Any member of staff who observes signs of local adverse effects of a PVC should report this to the medical or nursing staff promptly.
- Any member of nursing or medical staff who observes local adverse effects related to a PVC should remove the PVC promptly. Indications for removal include increasing pain at the PVC insertion site, erythema, swelling, induration, discharge/ooze and resistance to injection (thrombosis).
- The indication for removal and date and time of removal should be documented in the person's clinical notes

2.1.7 Removal of a PVC

It is recommended that PVCs are changed every 96hrs or when clinically indicated.

- PVCs should be removed promptly when there is evidence of PVC failure as above.
- The need for the PVC should be assessed daily.
- PVCs should be removed where there is no longer a clear indication for their use.
- PVCs should not be left in place in anticipation that there may be a requirement for intravenous fluids or intravenous medication arising from subsequent assessment.
- When it is apparent that aseptic technique was difficult to assure during PVC placement (for example when it is inserted during a medical emergency) the PVC should be removed as soon as possible and, if necessary, replaced by a new catheter
- Patients transferred from another healthcare facility with a PVC should be assessed to determine if the PVC is required. If it is not required, it should be removed and documented.
- All persons on discharge home should have their PVC removed and documented in clinical notes unless there is a specific documented requirement for retention of the PVC.

Removal of the PVC

- Inform the person of the intention to remove the PVC and ensure that they are prepared.
- Perform hand hygiene and apply non-sterile gloves.
- Carefully remove the adhesive dressing, holding the PVC in place at all times
- Hold a piece of sterile gauze over the insertion site but do not apply pressure.
- Slowly withdraw the PVC, maintaining a neutral angle with the person's skin
- Cover site with dressing for example sterile gauze and tape
- Advise that the sterile gauze and tape and or adhesive plaster should remain in place for up to 24 hours.
- Remove gloves, perform hand hygiene.
- Dispose of waste according to clinical practice, perform hand hygiene.
- Document date and reason for removal of PVC.

2.1.8 Documentation

For delivery of a high standard of care and accountability it is essential that accurate records of PVC access and management are maintained for each patient. Documentation required includes:

- Date of device insertion.
- Type of device inserted.
- Site of insertion.
- Name of person inserting the device.
- Suggested date of device removal.
- Actual date of device removal.
- Name of the person removing the device.
- Reason for removal.
- Culture results (if applicable).

Care Bundles

Care bundles are groupings of evidence based best practices with respect to a disease process that individually improve care, and when applied together result in substantially greater improvement. All elements of the care bundle must be adhered to for every person every time the procedure is performed.

- All intravascular devices (PVC and CVC) should have an insertion and maintenance bundle in place and completed twice a day for PVC and CVC.
- An ongoing programme of audit of care bundles is recommended.
- PVC care bundles examples are available in:
 - Appendix VII for PVC care bundle
 - Appendix IX for PVC prevention of infection poster

2.1.8. Surveillance of use and safety of PVCs in the hospital setting

- An ongoing programme of education and training including the use of care bundles, audit and quality improvement planning is required.
- Ongoing audit quality assurance/improvement, risk management and surveillance programmes should be in place to monitor the incidence of infection and other adverse events associated with PVCs including senior management and risk management
- All PVC related blood stream infections and other complications with significant patient impact (for example requiring systemic antimicrobial treatment or delay in discharge) should be reported as incidents on the National Incident Management System (NIMS) and require an incident review.

2.2. Central Venous Catheters (CVC) including Peripherally Inserted Central Catheter (PICC) and tunnelled CVCs

2.2.1 Assessing the requirement for a Central Venous Catheter

Clinical assessment of the person should be undertaken prior to the insertion of a CVC with the following considerations:

- Indication for CVC
- Clinical condition of the person
- History of bleeding disorders or if receiving anticoagulation therapy or long term steroids
- The safety and practicality of care of the CVC in the context of the person's placement in the hospital (central venous catheters should generally be avoided in clinical areas where staff are not expert in their use and care)
- The safety and practicality of insertion and care of the CVC in the context of the person's behaviour

Central venous catheters should only be inserted when there is a clear indication for their use such as:

- a. Infusion of cardiovascular support medication
- b. Haemodynamic monitoring
- c. High volume fluid resuscitation
- d. Administration of essential Total Parenteral Nutrition (TPN)
- e. Haemodialysis
- f. Poor peripheral venous access
- g. Intravenous administration of hyperosmolar and irritating solutions and solutions or alkaline pH, which may cause endothelial damage and subsequent phlebitis and thrombus formation (for example, chemotherapy, vesicants, TPN)

The clinician should choose an appropriate intravascular device considering the catheter type, number of lumens, length, type of therapy, site for insertion, risk of complications including infection and patient factors.

The indication for insertion of the CVC should be documented in the clinical notes.

2.2.2 Communication with the patient

- Discuss the procedure and need for catheterisation with the person and other relevant person (for example parent or guardian) as appropriate to the clinical context. Give them the opportunity to voice any concerns, express any preferences or ask any questions if possible.
- Check if the person has any known allergies to skin preparations and adhesive materials and document any allergies reported in the clinical notes.
- Establish the person's venous history and any relevant status (for example pre-existing PVC or CVC, anatomical abnormality, factors that influence choice of site such as an arteriovenous fistula or disturbance of lymphatic drainage).
- Provide information on symptoms of harm related to the CVC (for example infection) and advise the person to alert healthcare staff to any changes or concerns.
- Answer any questions the person may have about the CVC. This may enhance the person's acceptance of the need for the CVC and ability to support care of the CVC thus reducing risk of complications.

2.2.3 Competence to site a CVC

- Only competent, trained staff (or staff in training supervised by competent staff) should insert, maintain and remove CVCs. This means that insertion and maintenance of CVC's is within their scope of clinical practice, determined by the individual's credentials, education, training, competence.
- Consideration needs to be given by the practitioner to their own competence to successfully complete the procedure in each individual person following assessment of the persons' general condition and venous status. If the practitioner considers that they are unlikely to be successful, in inserting the CVC, they should seek assistance rather than proceed with the attempt unless the urgency of the situation demands that an attempt must be made without delay.

2.2.4 Site selection and preparing yourself to site a CVC

The site at which a vascular access catheter is placed can influence the subsequent risk of catheter-related blood stream infections (BSI) because of variation in both the density of local skin flora and the risk of thrombophlebitis. In selecting an appropriate insertion site, the risk of infection complications should be balanced against the risks of mechanical complications

- Clinicians should assess specific factors such as pre-existing catheters, anatomic deformity, site restrictions, the relative risk of mechanical complications and the risk of infection
- The subclavian vein is the preferred site for CVC placement in adults and should be used where possible. Where this is not possible the jugular vein is preferred to the femoral vein to minimise infective complications. It is accepted the femoral vein may be used in certain clinical circumstances.
- For all of these venous sites the right side of the patient is usually favoured because usual vessel anatomy allows direct access to the superior vena cava and the inferior vena cava and provides the shorter easier route for the practitioner inserting the device
- Where possible any catheter inserted into a jugular vein should be replaced with a subclavian or peripherally inserted central catheter as soon as feasible, as the risk of infection increases after two days following insertion
- Subclavian vein catheterisation should be avoided to the greatest degree possible for temporary access in all patients with chronic renal failure due to the risk of central vein stenosis
- Clinicians should consider using ultrasound guided central venous access for line placement (if this technology is available) to reduce the number of cannulation attempts and mechanical complications. Ultrasound guidance should only be used by those fully trained in its use.
- Skin creases should be avoided.

2.2.5 Choosing the size/type of the CVC

- The minimum necessary number of lumens, connectors and ports should be used. Multi-lumen catheter insertion sites may be particularly prone to infection because of increased trauma at the insertion site or because multiple ports increase the frequency of CVC manipulation.
- If total parental nutrition is being administered, clinicians should dedicate one lumen of the CVC exclusively for that use.
- Anticipate duration of access - for people expected to require regular or continuous access, a tunnelled CVC is preferred. A peripherally inserted central catheter may be considered for people in whom medium term (6 weeks to 6 months) intermittent access is required
- In units or patient populations that have high catheter related blood stream (CR-BSI) rate despite compliance with basic CR-BSI prevention practices, antiseptic or antimicrobial impregnated CVC's should be considered in those whose catheter is expected to remain in place for greater than 5 days.
- Heparin coated catheters are not recommended.

2.2.6 Insertion of a CVC

CVCs should be inserted in a clinical area where asepsis can be maintained (radiology suite, intensive care unit or operating theatre) and where the patient can be monitored.

Hand hygiene and aseptic technique including use of sterile drapes are essential during catheter insertion and must be practiced by the person inserting the device and staff assisting in the procedure.

When adherence to aseptic technique cannot be ensured (for example catheters inserted during a medical emergency), replace the catheter as soon as possible within 48 hours unless there is a compelling clinical reason not to do so.

CVC insertion packs containing all the necessary items for CVC insertion are recommended.

A chest x-ray should be performed post CVC insertion to confirm catheter placement and prior to use

The length of the CVC used should be noted prior to insertion and clearly documented in the clinical notes.

The date of CVC insertion should be clearly documented in the clinical notes

Skin preparation (at insertion site)

- The persons' skin should be physically clean- If the skin is visibly dirty, it should be washed with soap and water and allowed to dry fully prior to CVC insertion.
- Hair at the insertion site should be removed prior to skin disinfection using clippers (not shaving) to improve adherence of the dressing.
- Hand hygiene should be performed before application of skin decontaminant. Decontaminate hands using alcohol based hand rub (minimum 30 seconds) or wash with liquid soap and water if hands are potentially contaminated with organic matter, blood or body fluids and follow with alcohol based hand rub (minimum 30 sec).
- Decontaminate the skin site with a single patient use application solution of 2% chlorhexidine gluconate and 70% isopropyl alcohol. (see note above)
- The solution should be applied vigorously to an area of the skin 30cms in diameter in a circular motion beginning in the centre of the proposed insertion site and moving outward for at least 30 seconds.
- Allow the skin to dry before inserting the CVC.
- Palpation of the insertion site should not be performed after application of antiseptic unless aseptic technique is maintained
- Apply full body drape.

Procedure

Maximal sterile barrier precautions are required for the insertion of all CVC's and when exchanging a CVC over a guide wire.

The person inserting the device and staff assisting must wear personal protective equipment including a cap, surgical mask, protective eye wear, full length long sleeved sterile gown and sterile gloves (ensure gloves cover cuff of the gown).

- CVC insertion requires aseptic technique
- Use a sterile pre prepared CVC Set containing necessary sterile equipment
- Surgical hand scrub or surgical hand rub should be performed prior to the procedure. Decontaminate hands using alcohol based hand rub (minimum 30 seconds) or wash with liquid soap and water if hands are potentially contaminated with organic matter, blood or body fluids and follow with alcohol based hand rub (minimum 30 sec)
- Don sterile PPE (listed above)
- Prepare catheter insertion site, allow to dry (refer to skin preparation of insertion site above)
- Drape the entire body of the patient while maintaining a sterile field with a large sterile drape, leaving only a small opening for the insertion site.
- Insert the CVC maintaining aseptic technique throughout the procedure.
- A suture-less securement device is recommended to reduce infection risk, if not available secure the catheter with sutures to minimise movement of the catheter.

Dressings

- A sterile, transparent, semipermeable polyurethane dressing is recommended to cover the insertion site.
- If the patient is diaphoretic or if the site is bleeding or oozing, a sterile gauze dressing can be used until this is resolved
- Dressings should be changed every 7 days or sooner if they are no longer intact or become damp, no longer occlusive or adherent, soiled or if there is evidence of inflammation or excessive accumulation of fluid.
- Document date of dressing change in CVC care bundle (Appendix VIII)
- Where a sterile gauze dressing is used, the dressing should be changed at least every second day, and when the exit site is not visualised, palpation of the site should form part of the daily assessment
- Evidence supports the use of a chlorhexidine impregnated sponge dressing in adult patients with a central venous catheter to reduce catheter related infections. (see note)
- For all dressing changes the site should be disinfected with single-use application of 2% chlorhexidine gluconate in 70% isopropyl alcohol (or povidone iodine in alcohol for patients with sensitivity to chlorhexidine)
- Local wound care and dressing policy and manufacturer recommendations should be followed

Note: There is currently no evidence to demonstrate efficacy of chlorhexidine impregnated sponge dressing in people age less than 18 yrs, however this is not to say that they are less effective in this group. It should be used with caution in people with fragile/ complicated skin pathologies.

2.2.7 Management of CVC accessories

Migration of skin organisms at the insertion site into the cutaneous catheter tract and along the surface of the catheter with colonization of the catheter tip and direct contamination of the catheter or catheter hub by contact with hands or contaminated fluids or devices are the two most common routes of infection in CVCs.

- Hand hygiene is required before and after contact with the CVC and use of aseptic technique during CVC care.
- In adults and children more than 2 months of age single-use application of 2% chlorhexidine gluconate in 70% isopropyl alcohol (or povidone iodine in alcohol for patients with sensitivity to chlorhexidine) should be used to decontaminate the access port or catheter hub. The hub should be cleaned or scrubbed for a minimum of 15 seconds and allowed to dry before accessing the system.
- If needleless devices are used manufacturer's recommendations for changing the needleless components should be followed. All components of the system should be compatible and secured, to minimise leaks and breaks in the system. Adhesive tape is should not be used as a means of junction securement between the hub and connector or infusion line.
- Aseptic technique and standard precautions are required during manipulation (connection and disconnection) of all administration sets. Disconnection should only occur when absolutely necessary.
- For IV fluid replacement intervals and administration sets changes (Appendix XIII)
- Flush and lock catheter lumens with sterile normal saline (0.9% NaCl) for injection at every episode of access.
- The use of disinfectant caps on needleless access ports may be considered for intermittently used devices.
- The manufacturer's recommendations for only using disinfectants that are compatible with specific CVC materials must be followed.

2.2.8 Caring for a CVC

The safe maintenance of a CVC and relevant care of the insertion site are essential components of a comprehensive strategy for preventing CVC related infections. The ongoing need for the device should be reviewed daily and CVCs that are no longer clinically indicated should be removed.

- All CVCs should have an insertion and maintenance care bundle in place, reviewed twice daily, documented as reviewed (Appendix VIII)
- Administration sets for ongoing infusions refer to Appendix XI or local policies/manufacturers guidelines on recommended change times.
- The use of daily cleansing with chlorhexidine in adults with a central venous catheter should be considered as a strategy to reduce catheter related bloodstream infection.
- The insertion site should be examined daily for discharge, tenderness, pain, redness, swelling, and CVC position and findings documented. Patients should be encouraged where possible to report any changes in their CVC site or any new discomfort.
- In the event of tenderness at the site, fever without obvious source, symptoms of local or systemic infection or the presence of exudates, the dressing should be removed and site inspected directly.
- If infection is suspected inform clinical team. If sepsis is suspected follow local sepsis pathways.

2.2.9 Catheter Replacement

When and how CVCs are replaced can influence the risk of infection.

- Different CVCs have different recommended durations of use. Refer to device specific manufacturer's instructions for recommended dwell times.
- Do not routinely replace CVCs, PICCs, haemodialysis catheters, or pulmonary artery catheters to prevent catheter-related infections.
- Do not remove CVCs or PICCs on the basis of fever alone. Use clinical judgment regarding the appropriateness of removing the catheter if infection is evidenced elsewhere or if a non-infectious cause of fever is suspected.
- When adherence to aseptic technique cannot be ensured (for example when CVCs are inserted during a medical emergency), replace CVC as soon as possible.
- Use guide wire assisted CVC exchange to replace a malfunctioning catheter, or to exchange an existing catheter only if there is no evidence of infection at the catheter site or proven catheter related blood stream infection (CRBSI).

-
- Do not use guide wire assisted catheter exchange for people with catheter related infection. If continued vascular access is required, remove the implicated CVC, and replace it with another CVC at a different insertion site.
 - If a guidewire exchange is to be used, maximum sterile barrier precautions are required and new sterile gloves, drapes and skin preparation solution are to be used after handling the old catheter.
 - All fluid administration tubing and connectors should be replaced when the CVC is changed.
 - For patients transferring out of critical care areas (ICU/HDU/CCU) an assessment for need for CVC is required. CVCs should normally be removed before leaving a critical care area unless there is a clear continuing need and the receiving area has the skills and capacity to care for the CVC appropriately

2.2.10 Removal of a CVC

Removal of a CVC should only be performed by a healthcare professional who is competent in this procedure. A CVC should be removed when no longer clinically indicated or if removal is indicated due to infection.

- Inform the patient of the procedure and obtain consent
- Aseptic technique should be followed for removal of a CVC
- Place the patient in a supine position prior to removal of the CVC
- Perform hand hygiene and don PPE (this will normally include gloves and apron and may include additional PPE based on patient factors and risk of task being performed)
- Carefully remove the adhesive dressing
- Clean site with chlorohexidine gluconate 2% in 70% isopropyl alcohol, (see note for precautions above)
- Gently pull device from patient while instructing patient to hold their breath / Valsalva technique when pulling from the patient and apply digital pressure at site until haemostasis is achieved.
- Apply an occlusive dressing
- Access line integrity
- Remove PPE and perform hand hygiene
- Dispose of waste as per clinical waste guidance and perform hand hygiene
- Document date and reason for removal in the clinical notes.

Note: Culturing of line tips is not routinely indicated. If the CVC is the suspected source of infection and the tip is required for culture, removal of the CVC and collection of the tip should be performed using aseptic technique.

2.2.11 Patient Education

Written information about the care of the CVC should be provided to the patient. Where a patient is managed as an outpatient while the device is in place, additional care information may be required. A patient's understanding of this information should be checked prior to discharge.

2.2.12 Documentation

For delivery of a high standard of care and accountability it is essential that accurate records of CVC access and management are maintained for each patient. Documentation required includes:

- Date of device insertion.
- Type of device inserted.
- Site of insertion.
- Catheter length and measurement at skin, and the actual tip location must be documented by the inserter.
- Name of person inserting the device.
- Suggested date of device removal.
- Actual date of device removal.
- Name of the person removing the device.
- Reason for removal.
- Culture results (if applicable).
- The serial number /batch number of the device placed.

Care Bundles

Care bundles are groupings of evidence based best practices with respect to a disease process that individually improve care, and when applied together result in substantially greater improvement. All elements of the care bundle must be adhered to for every person every time the procedure is performed.

- All intravascular devices (PVC and CVC) should have an insertion and maintenance bundle in place and completed twice daily for PVC and CVC.
- An ongoing programme of audit of care bundles is recommended.
- CVC care bundles are available in:
Appendix VIII for CVC care bundle
Appendix X for Prevention of infection for CVC

2.2.14 Surveillance of use and safety of CVC

- An ongoing programme of education and training including the use of care bundles and audit is required
- Ongoing audit quality assurance/improvement, risk management and surveillance programmes should be in place to monitor the incidence of infection and other adverse events associated with CVCs which includes senior management and risk management.
- All CVC related blood stream infections and other complications with significant patient impact (for example requiring systemic antimicrobial treatment or delay in discharge) should be reported as incidents on the National Incident Management System (NIMS) and have an incident review completed.

3.0 GOVERNANCE AND APPROVAL

AMRIC Implementation Team.
AMRIC Oversight Group.

4.0 COMMUNICATION AND DISSEMINATION

This guideline is circulated through HSE Acute and Community Operations to all Hospital CEOs, Chief Officers and General Managers for dissemination to relevant healthcare staff.
This guideline is also available on line www.hse.ie/infectioncontrol.

5.0 IMPLEMENTATION

Implementation of this guideline is the responsibility of Hospital Group CEOs, Hospital Managers and Chief Clinical Directors supported by all healthcare staff.

6.0 MONITORING, AUDIT AND EVALUATION

The learning from this guideline should be shared with relevant professionals at team meetings.

7.0 REVISION/UPDATE

The AMRIC Implementation Team.

8.0 REFERENCES

Australian Government, National Health and Medical Research Council, Australian Commission on Safety and Quality in Healthcare (2019). Australian Guidelines for the Prevention and Control of Infection in Healthcare. National Health and Medical Research Council, Australian Commission on Safety and Quality in Healthcare.

Available at:

<https://www.nhmrc.gov.au/about-us/publications/australian-guidelines-prevention-and-control-infection-healthcare-2019#block-views-block-file-attachments-content-block-1>

Healthcare Infection Control Practices Advisory Committee (HICPAC). (2011 (2017 Update)). Guidelines for the Prevention of Intravascular Catheter-Related Infections. The Healthcare Infection Control Practices Advisory Committee, Centre for Disease Control (CDC).

Health Information and Quality Authority (2018) National Standards for infection prevention and control (IPC) in community services. Health Information and Quality Authority.

Available online at:

<https://www.hiqa.ie/reports-and-publications/standard/national-standards-infection-prevention-and-control-community>.

Health Information and Quality Authority (2017) National Standards for the prevention and control of healthcare associated infections in acute healthcare services Health Information and Quality Authority.

Available online at:

<https://www.hiqa.ie/sites/default/files/2017-05/2017-HIQA-National-Standards-Healthcare-Association-Infections.pdf>

Health Information and Quality Authority (2012). National Standards for Safer Better Healthcare. Health Information and Quality Authority.

Available online at:

<https://www.hiqa.ie/sites/default/files/2017-01/Safer-Better-Healthcare-Standards.pdf>

Health Protection Surveillance Centre (2014) Peripheral vascular catheter care bundles and central catheter care bundles. Health Protection Surveillance Centre.

Available at:

<https://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/carebundles/peripheralvascularcatheterpvc/File,3457,en.pdf>

Health Protection Surveillance Centre (2014) Prevention of Intravascular catheter-related Infection in Ireland. Update of 2009 National Guidelines. SARI Prevention of Intravascular Catheter-related Infection Sub-Committee, Health Service Executive, Dublin.

Available at:

<https://www.hpsc.ie/a-z/hepatitis/guidanceforrenalunits/File,4115,en.pdf>

HSE Health Protection Surveillance Centre (2021) Interim Guidance on Infection Prevention and Control for the Health Service Executive 2020 HSE Health Protection Surveillance Centre V1.3. January 2021

Available on:

<https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/guidance/infectionpreventionandcontrolguidance/hseinfectionpreventionandcontrolguidanceandframework/Interim%20HSE%20Guidance%20on%20IPC.pdf>

HSE Office of the Nursing and Midwifery Services Director (2017) Guiding Framework for the Education, Training and Competence Validation in Venepuncture and Peripheral Intravenous Cannulation for Nurses and Midwives. Section 3. Infection Prevention and Control pages- 58-66.

Available at:

<https://healthservice.hse.ie/filelibrary/onmsd/guiding-framework-training-competence-validation-in-venepuncture-and-peripheral-intravenous-cannulation-for-nurses-and-midwives-2017.pdf>

Loveday, H.P., Wilson, J.A., Pratt, R.J., Golsorkhi, M., Tingle, A., Bak, A., Browne, J., Prieto, J., Wilcox, M. (2014) EPIC 3: National Evidence-Based Guidelines for Preventing Healthcare Associated Infections in NHS Hospitals in England. *Journal of Hospital Infection*, 86: p. S1-S70.

Available at:

https://improvement.nhs.uk/documents/847/epic3_National_Evidence-Based_Guidelines_for_Preventing_HCAI_in_NHSE.pdf

National Institute for Clinical Excellence (2017) Healthcare-associated infections: prevention and control in primary and community care NICE London

Available at:

<https://www.nice.org.uk/guidance/cg139>

National Institute for Clinical Excellence (2015)-Intravenous fluid therapy in children and young people in hospital London: NICE London.

Available at:

<https://www.nice.org.uk/guidance/ng29>

NHS Greater Glasgow and Clyde (2017) Vascular Access Procedure and Practice Guideline. NHS Scotland.

Available at:

<https://www.clinicalguidelines.scot.nhs.uk/media/1515/vascular-access-procedure-and-practice-guidelines.pdf>

Queensland Government, Department of Health Queensland. (2018) Percutaneous Central Venous Catheters Guideline. Department of Health Queensland.

Available at:

https://www.health.qld.gov.au/__data/assets/pdf_file/0028/444493/icare-pcvc-guideline.pdf

Queensland Government., Department of Health Queensland. (2018) Peripheral Venous Catheter Guideline. Department of Health Queensland.

Available at:

https://www.health.qld.gov.au/__data/assets/pdf_file/0025/444490/icare-pivc-guideline.pdf

Queensland Government., Department of Health Queensland. (2019) Recommendations for the prevention of infection in intra-vascular devices. Department of Health Queensland.

Available at:

<https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/infection-prevention/intravascular-device-management>

9.0 Appendices

Appendix I	Signature Sheet
Appendix II	Front page of HSE PPPG Procedure for the Prevention of Peripheral and Central Venous Catheter Related Infection
Appendix III	Membership of PPPG development group, governance group and stakeholder involvement
Appendix IV	RESIST Patient Information Leaflet
Appendix V	Vein selection
Appendix VI	Modified VIP Score
Appendix VII	PVC Care Bundle
Appendix VIII	CVC Care Bundle
Appendix IX	Prevention of Infection PVC Poster
Appendix X	Prevention of Infection CVC Poster
Appendix XI	Replacement of IV Infusions and administration sets

Appendix I

Signature Sheet

I have read, understand and agree to adhere to this Policy, Procedure, Protocol or Guideline:

Print Name	Signature	Area of Work	Date

Appendix II

Front page of HSE PPPG Procedure for the Prevention of Peripheral and Central Venous Catheter Related Infection



Procedure for Prevention of Peripheral and Central Venous Catheter Related Infection

Policy

Procedure

Protocol

Guideline

All acute hospitals and community healthcare organisations

Title of PPPG Development Group:	Antimicrobial Resistance and Infection Control Implementation Team		
Approved by:	AMRIC Oversight Group		
Reference Number:	2021-02		
Version Number:	Version 1		
Publication Date:	09.2021		
Date for revision:	Q3 2022		
Electronic Location:	www.hse.ie/infectioncontrol		
Version	Date Approved	List section numbers changed	Author
1	08.2021		AMRIC team

This is a controlled document: While this document may be printed the electronic version posted on the website is the controlled copy and can only be guaranteed for 24 hours after downloading.

Appendix III

Membership of PPPG Development Group

- Prof Martin Cormican, Clinical Lead, HSE AMRIC , Office of HSE CCO
 - Dr Eimear Brannigan, Infectious Disease Consultant, HSE AMRIC , Office of HSE CCO
 - Shirley Keane, Programme Manager, HSE AMRIC , Office of HSE CCO
 - Josephine Galway, IPC DON, HSE AMRIC , Office of HSE CCO
 - Mary McKenna, IPC ADON, HSE AMRIC, Office of HSE CCO
 - Eimear O'Donovan, IPC ADON, HSE AMRIC, Office of HSE CCO
 - Audrey Lambourn, Communications Lead, HSE AMRIC, Office of HSE CCO
-

Membership of AMRIC Oversight Group

- Dr. Colm Henry, Chief Clinical Officer (chair)
 - Prof. Martin Cormican, Clinical Lead, Antimicrobial Resistance and Infection Control
 - Dr. Lorraine Doherty, National Clinical Director Health Protection
 - Dr. Kevin Kelleher, Assistant National Director, Public Health
 - Liam Woods, National Director, Acute Operations
 - Yvonne O'Neill, National Director, Community Operations
 - Dr. Siobhan Ni Bhriain, Lead Integrated Care, Office of Chief Clinical Officer
 - Dr. Eimear Brannigan, Deputy Clinical Lead, Antimicrobial Resistance and Infection Control
 - Shirley Keane, Programme Manager, Antimicrobial Resistance and Infection Control
 - Josephine Galway, Director of Nursing, Antimicrobial Resistance and Infection Control
-

List of those involved in consultation and review process

- Antimicrobial Resistance Infection Control team
 - Antimicrobial Resistance Infection Control Implementation Team
 - Antimicrobial Resistance Infection Control Oversight Group
 - Clinical Design and Innovation Clinical Advisory forum
 - Infection Prevention and Control Lead Nurses
 - Infection Prevention Society
 - Irish Society Clinical Microbiologists
 - National Patient Safety Office Department of Health
 - Office of the Nursing and Midwifery Services Director
-

Appendix IV Resist Patient information leaflet



Learn about your IV Line (Drip)

What is an IV cannula (tube)?

An IV cannula is a small plastic tube that passes through your skin into a vein. We will refer to it as a tube in this leaflet. It is often called an IV line or a drip. A needle is used to put the tube in through the skin. After the tube is in place the nurse or doctor takes away the needle and leaves the tube in place. There may be a cap or lid on the end of the tube outside the body or it may be attached to another tube to give you fluids or medication.

The tube can be used to give you fluids or blood or medicines and some can be used to take blood samples. The tube means that you do not need to have a needle jab every time you get a medicine that is given into the vein. Usually the tube goes through the skin into one of the arm veins.

Sometimes the tube goes through the skin on the chest wall or the neck and into one of the big veins inside the chest. A tube that goes into one of the big veins in the neck is called a central venous catheter or central line (often called a CVC). It can be uncomfortable when one of these tubes is being put in place but after that is done most people find it comfortable.

What can go wrong with an IV cannula (tube)?

The tube leaves a small hole in your skin and it sits in that hole with one end outside on the skin and the other end inside your vein. As long as there is a tube in place and a little hole in the skin there is a risk that bacteria (bugs) can track along the tube to get under your skin or into your vein. If this happens you can get an infection.

Infection from an IV cannula (tube)

Infection is sometimes just at the place where the tube is placed. This local infection can cause soreness or pain near the tube and the skin may get red and hot. Sometimes there is crusting or small scabs at the place where the tube goes through the skin. If you notice any of these things tell your nurse or doctor right away.

Infection from an IV cannula (tube) can sometimes be very serious with spread of bacteria into the blood. When this happens the person usually feels very sick and may have shivering, temperature and feel very weak. If this happens to you tell your nurse or doctor right away.

What can be done to protect you from IV cannula (tube) infection?

Even with the best care that is possible there is always a risk of infection with an IV cannula (tube). The risk is higher in people with very complicated illness, people who are very vulnerable to infection and in people where it is very hard to put in the tube because their veins are hard to find.

The most important thing to reduce the risk of infection is that people should only get a tube put in if they need one. The tube should be taken out as soon as it is no longer needed. If you have an IV tube it is OK to ask every day if you still need it.

The risk of infection from the tube is less when the skin is cleaned carefully before the needle is put through the skin. Risk of infection is less if the doctor or nurse putting in the cannula is careful about cleaning their hands before they put it in. It is OK to remind people to clean their hands.

The risk of getting an infection from an IV cannula (tube) is less if everyone carries out hand hygiene before they touch the tube or give you medicines through it. It is OK to remind people to clean their hands.

Watch out for and tell nurses and doctors if you get

- soreness or pain near the tube
- the skin near the tube gets red and hot
- there is crusting or small scabs at the place where the tube is placed
- there is pus at the place where the tube is placed
- the tube is still in place but no one has used it for a day
- you get shivering or a high temperature or feel suddenly very unwell

Further information

Please do not hesitate to ask the healthcare staff caring for you if you have any questions, or if you require more information about IV cannula (tube). Information on hand hygiene, infection control and managing superbugs at home is available

on www.hse.ie/infectioncontrol or on www.hpsc.ie

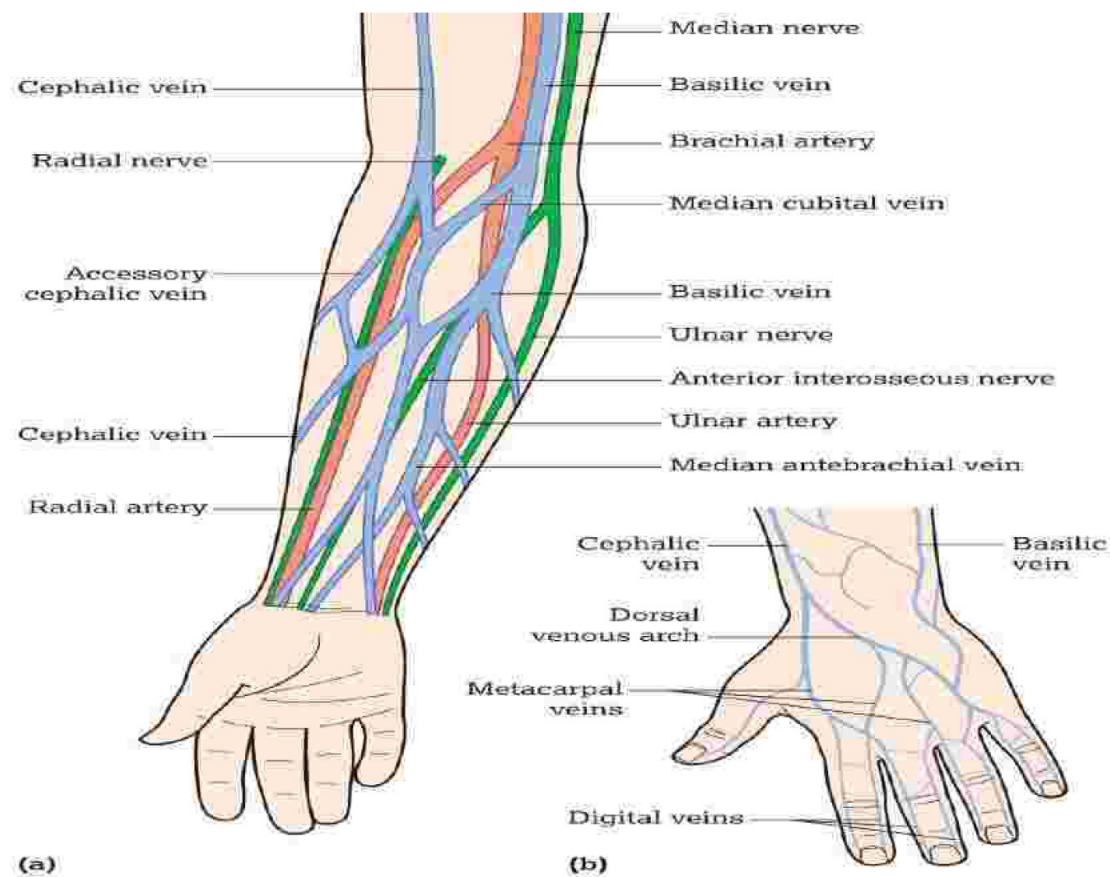
This information is approved for use by the HSE's Antimicrobial Resistance and Infection Control national programme. Text awarded Plain English mark from the National Adult Literacy Agency.

Published: January 2019

*Printed copies of patient leaflets are available from the Infection Prevention and Control leads in hospitals and community services. A4 factsheets are online if the information is needed urgently, the **online** fact sheets are available in French, Irish, Polish, Russian and Spanish. The preference is to give patients the printed version as the professionally printed document is preferred and is valued more.*

Appendix V

Anatomy of upper extremity veins:



VEIN SELECTION

- The superficial veins of the upper extremities of the body are used for cannulation because they are located just beneath the skin in the superficial fascia.
- The cephalic vein is a large vein, which is easily stabilised and accessible. Its size and position make it an excellent choice for cannulation. Its position at a joint however may increase complications such as mechanical phlebitis.
- The basilic vein is often overlooked for the purpose of cannulation. It is a large, easily palpable vein but it is more difficult to access and stabilise due to its location, and the presence of valves may inhibit cannula advancement.
- The median cubital and basilic veins in the antecubital fossa are usually used for venepuncture. Their size and superficial location make them easy to palpate and visualise and they are well supported by muscular and connective tissue. The median cubital vein crosses in front of the brachial artery, therefore care must be taken to avoid puncturing the artery.
- The digital veins flow along the lateral portion of the fingers. These are only used as a last resort and can only accommodate a very small gauge needle.
- The metacarpal veins are formed by the union of digital veins, making them accessible and easily visualised and palpated. They also allow subsequent sites for cannulation above previous puncture sites. The use of these veins and should be avoided if possible in older people, however, where skin is turgor and subcutaneous tissue is diminished (Dougherty 1996).

Note: The most distal vein of the extremity should be selected, depending on the condition of the vein

Appendix VI VIP Score

Peripheral Vascular Cannula (PVC) Insertion & Maintenance

Modified V.I.P (Visual Infusion Phlebitis) Score		
IV site appears healthy	0	No phlebitis: Observe cannula
One of the following is evident: slight pain or redness near site	1	Possible first signs: Observe cannula
Two or more of the following are evident: pain, redness, swelling	2	Early stage of phlebitis: Remove & resite cannula
All of the following are evident: pain, redness, hardening of surrounding tissue	3	Phlebitis/Thrombophlebitis: Remove & resite cannula Seek further advice
As above including: palpable venous cord	4	
As above including: pyrexia	5	

Appendix VII PVC care bundle with modified VIP

PERIPHERAL VENOUS CATHETER (PVC) INSERTION & MAINTENANCE BUNDLE

One PVC per form- for additional PVCs use additional forms.

Insertion Bundle – complete on PVC insertion

Clinical indication: <input type="checkbox"/> Diagnoses <input type="checkbox"/> Resuscitation <input type="checkbox"/> IV Medication <input type="checkbox"/> IV Fluids <input type="checkbox"/> Transfusion <input type="checkbox"/>		
Chlorhexidine skin prep used	Transparent semi-permeable dressing	Location of insertion:
Hand hygiene immediately before insertion	Yes/No	Ward
Aseptic technique throughout procedure	Yes/No	ED
		Other
Date: / /	PVC inserted by: Dr/SN	
Insertion site: _____		
Size of cannula: _____		

Write or affix label

Name:
Address:

Chart No.

DOB:
Hospital
Ward:

Maintenance Bundle – complete fully twice daily *All intravenous medications should be reviewed daily with a view to stopping or changing to a suitable oral preparation- IV to PO switch

PVC	Has the PVC been used in the past 24 hours?	Absence of inflammation and/or extravasation Record VIP score	The pvc dressing is dry and intact	Hand hygiene before accessing PVC	Scrub the hub with 2% Chlorhexidine isopropyl wipe before accessing	If answer is no to any of the criteria and VIP score is 2 or more and PVC left in place, document rationale for decision in comments.	Initial
Day 1 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	VIP	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/>	
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	VIP	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/>	
Day 2 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	After 24 hours - review clinical reason and/or justify rationale for PVC to remain in place; if not required consider removal	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/>	
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	VIP	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/>	
Day 3 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	After 48 hours - review clinical reason and/or justify rationale for PVC to remain in place; if not required consider removal	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/>	
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	VIP	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/>	
Day 4 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	After 72 hours - review clinical reason and/or justify rationale for PVC to remain in place; if not required consider removal	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/>	
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	VIP	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/>	
Day 5 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	After 96 hours - review clinical reason and/or justify rationale for PVC to remain in place; if not required consider removal	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/>	
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	VIP	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/>	

120 hrs-review clinical reason and justify rationale for PVC to remain in place- consider removal/replacement.
If venous access is for long-term therapy (7-14 days or longer), consider if insertion of a PICC or CVC would be more appropriate.

Comments

Signature

Modified V.I.P. (Visual Infusion Phlebitis) Score

IV site appears healthy

0 No phlebitis: **Observe** cannula

1 Possible first signs: **Observe** cannula

2 Two or more of the following are evident: pain, redness, swelling

3 Early stage of phlebitis: **Remove & resite** cannula

4 All of the following are evident: pain, redness, hardening of surrounding tissue

5 Phlebitis/Thrombophlebitis: **Remove & resite** cannula **Seek further advice**

As above including: palpable venous cord

As above including: pyrexia

Date Removed: _____ Reason for PVC Removal: _____

Reason PVC in greater than 96 hours: _____

Appendix VIII CVC Care Bundle



CENTRAL VENOUS CATHETER (CVC) INSERTION AND MAINTENANCE

Please complete for each CVC inserted
Care and maintenance to be undertaken and documentation completed twice per day.
 (if CVC in longer the 7 days please use an additional CVC insertion and maintenance document as continuation sheet)

Write or affix label
 Name:
 Address:
 Chart No.
 DOB:
 Hospital
 Ward:

Insertion – When inserting a CVC ensure that:

1. Surgical scrub or surgical rub is performed before application of maximal sterile barrier precautions.
2. Maximal sterile barrier precautions are used: sterile gown and gloves, surgical hat and mask.
3. Sterile drape used to cover whole patient.
4. Aseptic technique maintained throughout insertion procedure.
5. Skin prepared by decontamination of the insertion site using 2% Chlorhexidine gluconate in 70% isopropyl alcohol and allowed to dry completely.
6. The subclavian vein is preferred site, jugular and femoral veins if clinically indicated.
7. A sterile, transparent semi-permeable dressing is used to cover the catheter site.

Good practice includes the documenting of the date & time of CVC insertion. This provides a baseline for ongoing catheter maintenance and to enable timely line removal when clinically no longer required.

CVC insertion details – please record any variances in section below

Where inserted: ED <input type="checkbox"/> Theatre <input type="checkbox"/> ICU/HDU <input type="checkbox"/> Interventional Radiology <input type="checkbox"/> Ward/other		Date/time inserted		Inserted by (Name & Designation)	
Clinical indication		Urgent access <input type="checkbox"/>		Emergency <input type="checkbox"/>	
IV Fluids/IV Medication <input type="checkbox"/> Chemotherapy <input type="checkbox"/>		Total Parenteral Nutrition <input type="checkbox"/>		Elective <input type="checkbox"/>	
1. Surgical scrub Yes <input type="checkbox"/> No <input type="checkbox"/>		5. Skin prep Yes <input type="checkbox"/> No <input type="checkbox"/>		Haemodialysis <input type="checkbox"/>	
2. & 3. Maximal sterile barrier precautions and sterile drape Yes <input type="checkbox"/> No <input type="checkbox"/>		4. Aseptic technique Yes <input type="checkbox"/> No <input type="checkbox"/>		6. Subclavian <input type="checkbox"/> Jugular <input type="checkbox"/> Other <input type="checkbox"/>	
7. Sterile transparent semi-permeable dressing affixed Yes <input type="checkbox"/> No <input type="checkbox"/>		Real time Ultrasound Guidance Yes <input type="checkbox"/> No <input type="checkbox"/>		7. Sterile transparent semi-permeable dressing affixed Yes <input type="checkbox"/> No <input type="checkbox"/>	
Type of CVC (Tunnelled/Non-tunnelled) please record		If used: Guidewire removed & intact Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>		Position confirmed by Chest X-ray (if applicable) Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
Needle free device placed on end port(s) Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>		Has there been more than one puncture attempt? Yes <input type="checkbox"/> No <input type="checkbox"/>			
Variance recording:					



Antimicrobial Resistance
and Infection Control Team

Maintenance – When maintaining an inserted CVC and accessing the insertion site and line ensure that:	
Signs and symptoms of CVC infection	Systemic infection
1. The requirement for the CVC is reviewed and recorded on a daily basis. 2. The CVC dressing is intact. (If not intact, the dressing must be changed) 3. The CVC dressing has been changed in the last 7 days. (document date of change) 4. Chlorhexidine gluconate 2% in 70% isopropyl alcohol is used for cleaning the insertion site during dressing changes. 5. Chlorhexidine impregnated dressing in place (if not record as variance) 6. Hand hygiene is performed immediately before accessing the site or line 7. An antiseptic containing Chlorhexidine gluconate 2% in 70% isopropyl alcohol is used to clean the access hub (needle free device) for minimum 15 seconds (scrub the hub). Allow to dry completely before accessing line. If infection suspected take blood cultures (peripheral and central), send line tip to microbiology lab for culture.	<ul style="list-style-type: none"> Erythema / inflammation /exudate Hot to touch Pain tenderness Hypotension Tachycardia Pyrexia Rigors
If lumen blocked: seek medical advice as soon as possible as this could potentiate complications.	

Maintenance – To be completed twice per day (Observe for signs and symptoms of local or systemic infection) Please record any variances in section below										
Day & Date	Has the need for CVC been reviewed today?	Any sign of CVC infection?	The CVC dressing is intact?	Hand hygiene before accessing site and hubs.	Exit site, line & hubs cleaned with 2% Chlorhexidine in 70% IPA	Aseptic technique for all access and care	Chlorhexidine impregnated dressing in place?	What has been done?	Date dressing due to be changed	Initial
Day 1 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
Day 2 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
Day 3 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
Day 4 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
Day 5 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
Day 6 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
Day 7 AM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		
PM	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Left in place <input type="checkbox"/> Removed <input type="checkbox"/> Redressed <input type="checkbox"/>		

If CVC in longer the 7 days please use an additional CVC maintenance bundle sheet to document care

Variance recording:	
----------------------------	--

Reason for removal	Exit site infection <input type="checkbox"/>	Blood stream infection <input type="checkbox"/>	Poor flow/dysfunction <input type="checkbox"/>	Leak/bleed <input type="checkbox"/>	End of treatment <input type="checkbox"/>	Other:
---------------------------	--	---	--	-------------------------------------	---	--------

If infection is suspected take blood cultures, peripheral and from line, and send line tip to Microbiology lab for culture.

Algorithm Steps

PREVENT INFECTION when inserting and maintaining a peripheral venous catheter (PVC)



PVC INSERTION

- The PVC is clinically indicated
- Aseptic technique
- Hand hygiene before insertion of PVC
- 2% Chlorhexidine in 70% IPA to disinfect the skin
- Sterile transparent semi-permeable dressing in place

Have you completed **PVC insertion** care bundle? _____

PVC MAINTENANCE

- Review clinical need for PVC daily
- Remove if no longer required
- Hand hygiene before accessing the PVC
- 2% Chlorhexidine in 70% IPA wipe before accessing catheter hub (scrub the hub)
- PVC dressing is dry and intact
- Remove the PVC if signs of infection or VIP greater than 2

Have you completed **PVC maintenance** care bundle? _____

Important Practice Points

- When adherence to aseptic technique cannot be ensured (for example when PVCs are inserted during a medical emergency), consider replacing PVCs as soon as possible.
- Remember IV to PO switch where appropriate - clinical staff to review IV and antibiotic therapy daily



Antimicrobial Resistance
and Infection Control Team

Algorithm Steps

PREVENT INFECTION when inserting and maintaining a central venous catheter (CVC)



CVC INSERTION

- Surgical scrub
- Maximal sterile barrier
- Sterile body drape
- Aseptic technique
- 2% Chlorhexidine in 70% IPA for skin decontamination
- The subclavian site is used if possible, jugular and femoral sites if clinically indicated
- Sterile transparent semi-permeable dressing to CVC

Is the **CVC insertion** care bundle completed? _____

CVC MAINTENANCE

- Review clinical need for CVC daily
- Remove if no longer clinically required
- Inspect site for signs of infection
- Chlorhexidine-impregnated dressing in place
- Dressing is dry and intact and changed in the last seven days
- 2% chlorhexidine in 70% IPA for cleaning insertion site
- Hand hygiene before accessing site and hubs
- 2% chlorhexidine in 70% isopropyl alcohol wipe before accessing catheter hubs

Is the **CVC maintenance** care bundle completed? _____

Important Practice Points

- When adherence to aseptic technique cannot be ensured (for example when CVCs are inserted during a medical emergency), consider replacing CVC where possible.
- Remember IV to PO switch where appropriate - clinical staff to review IV and antibiotic therapy daily



Antimicrobial Resistance
and Infection Control Team

Appendix XI

Replacement of IV infusions

Table 1: Recommended IV fluid replacement interval

Fluid	Replacement Interval
Standard (crystalloid) and non-lipid parenteral solutions	Every 24 hours
Lipid-containing solutions	Within 24 hours
Lipid emulsions	Within 12 hours
All blood components (excluding factor VIII or IX for continuous infusion)	Within 4 hours
Drug infusions (e.g. heparin, insulin)	Every 24 hours

When a PVC/CVC is replaced or re-sited, the infusion and administration set should also be replaced. Fluid containers should only be spiked once, and the spike should be advanced all the way into the container.

Intravenous administration set changes

Intermittent disconnection of giving sets increases the risk of infection and is not recommended for any reason. If a giving set is disconnected for any reason or for any length of time, the entire giving set and infusion/fluid therapy must be changed.

The span of time that an administration set should be used for depends on its use. Please see Table 2 or refer to local procedure/manufacturers guidelines for specific maximum use times.

Table 2: Recommended administration set replacement interval

Administration	Replacement
Not containing lipids, blood or blood products	After 96 hours but at least every 7 days*
Lipid/lipid-containing parenteral nutrition	Within 24 hours
Chemotherapeutic agents	Remove immediately after use*
Propofol	Every 6 to 12 hours, when the vial is changed or as per manufacturer*
Heparin	Every 24 hours
Other infusions (not including those listed above)	After 96 hours but at least every 7 days*

***All administration sets should be replaced when disconnected or if the catheter is changed. When an administration set is changed, the IV fluid bag should also be changed**

Healthcare Infection Control Practices Advisory Committee (HICPAC). (2011 (2017 Update)). Guidelines for the Prevention of Intravascular Catheter-Related Infections. The Healthcare Infection Control Practices Advisory Committee, Centre for Disease Control (CDC).

NOTES

Produced by the HSE national antimicrobial resistance and infection control team (HSE-AMRIC)
Reference 2021- 02
September 2021

www.hse.ie/infectioncontrol • hcai.amrteam@hse.ie