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<th>PREVENTION OF INTRAVENOUS DEVICE RELATED INFECTIONS</th>
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<td>Matron for Burns Intensive Care Unit</td>
<td>16/03/2020</td>
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<td>Infection Prevention Matron</td>
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Related Trust Policies (to be read in conjunction with)

- Infection Prevention Policies
  - 14019 PICC / Mid service line management: maintenance and troubleshooting
  - Umbilical Arterial Catheters insertion (MEHT external guideline)
  - Umbilical Venous Catheters insertion (MEHT external guideline)
  - Supportive Care Protocols
  - 08092 Mandatory training policy

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Appendix 4: Procedure for the removal of a non-tunneled central venous catheter

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1.0 Purpose

1.1 To provide guidance to all healthcare workers about safe and effective insertion, care and removal of intravenous (IV) devices thus reducing healthcare associated infection (HCAI).

2.0 Definition

2.1 Intravenous cannulation / catheterisation is an invasive procedure commonly used in the management of patients in acute settings to administer various fluids and medication, for haemodynamic monitoring and for treatment such as haemodialysis.

2.2 Intravenous access devices include peripheral cannulae and central venous catheters (CVCs). CVCs include those inserted peripherally (PICC), non-tunnelled and tunnelled and totally implantable CVCs. The use of any of these devices can result in blood stream infections (BSI).

3.0 Introduction

3.1 Infection continues to be a major problem associated with intravenous (IV) therapy. Catheter-related bloodstream infections (CR-BSI) associated with the insertion and maintenance of CVCs are potentially the most dangerous complications associated with healthcare. Peripheral lines are less frequently associated with CR-BSI but there have been bacteraemia cases reported within this trust associated with infected peripheral lines.

3.2 It has been reported that the national prevalence of BSI is 0.5%, accounting for 7.3% of healthcare associated infections. Of these 64% occurred in patients with a vascular access device.

3.2.1 These guidelines are based on the principles set down in the ‘Guidelines for Preventing Infections Associated with the Use of Intravascular Access Devices’ produced by the Healthcare Infection Society 2013 epic Project, Saving Lives (DoH 2007) and the Healthcare Infection Control Practices Advisory Committee (HIPAC) recommendations (2011).

4.0 Scope

4.1 This policy applies to all staff involved in the selection, insertion, ongoing management and removal of venous access devices

4.2 ‘Venous access devices’ include peripheral lines, CVCs, Swan Ganz Catheters, Implantable ports, parenteral nutrition lines, haemodialysis lines and Vas-Caths. Peripherally Inserted Central Catheters (PICCs) and Mid-lines have a more specific separate policy.

4.3 The policy includes adult patients, children and neonates.
5.0 **Equality Impact Assessment**

5.1 Mid Essex Hospital Services NHS Trust is committed to the provision of a service that is fair, accessible and meets the needs of all individuals. (Refer to appendix 5)

6.0 **Responsibilities**

6.1 **Chief Executive**
The Chief Executive has overall responsibility for ensuring that the Trust has the necessary management systems in place to enable the effective implementation of this policy and overall responsibility for the health and safety of staff, patients and visitors.

6.2 **Director of Nursing**
The Director of Nursing has strategic responsibility for ensuring that systems are in place to facilitate the awareness of nursing staff of this policy and that appropriate support is given to enable staff to deliver practice as outlined within it.

6.3 **Medical Director**
The Medical Director has strategic responsibility that systems are in place to facilitate the awareness of medical staff of this policy and that appropriate support is given to enable staff to deliver practice as outlined within it.

6.4 **Director of Infection Prevention and Control (DIPC) Medical Director**
The DIPC will:

- Have operational responsibility for the effective implementation of this policy;
- Give expert advice around the care of patients affected by BSI and liaise with the medical teams around positive results and antibiotic treatment if required;
- Include the number of cases of venous access device infections in the monthly and annual DIPC reports.

6.5 **Infection Prevention and Control Team (IPCT):**

- Will ensure all staff are made aware of this policy;
- Offer expert infection prevention and control advice and information to staff caring for patients with intravenous access devices;
- Promptly investigate reports of IV line related infection;
- Ensure lessons learnt from cases of IV related infection are communicated at the Directorate Governance meetings and Infection Prevention Link Practitioner meetings.

6.5 **Matrons**
Have systems in place to monitor the insertion and ongoing management of intravenous access devices within their clinical areas.
6.6 **All relevant staff:**

- Must comply with this policy;
- Have a responsibility to ensure that infection prevention is embedded into their everyday practice and applied consistently at all times, adhering to appropriate infection prevention precautions;
- The team caring for any patient with an IV device related bloodstream infection should undertake a root cause analysis investigation (with the help of the Infection Prevention team) to establish what lessons may be learnt from the case.

7.0 **At Risk Groups**

7.1 Any patient with an IV device will be at increased risk of bloodstream infection.

7.2 The risk of infection depends on a number of factors; the type of vessel the IV device occupies (e.g. peripheral or central venous), the site of insertion, the duration of use, the length of the device and whether it is tunneled or non-tunneled (the latter applies to CVC lines).

8.0 **Clinical Features**

8.1 The types of infection range from localised infection to septicemia as illustrated by table 1 on the next page. These are largely preventable if potential sources of contamination are identified and effective infection control strategies outlined in these guidelines are implemented.

**Table 1: Infection Processes**

<table>
<thead>
<tr>
<th>Infection</th>
<th>Signs and Symptoms</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Local inflammation</td>
<td>Inflammation</td>
<td>Can occur at insertion site</td>
</tr>
<tr>
<td>Phlebitis</td>
<td>Tenderness, erythema, swelling, pus formation, palpable vein cord.</td>
<td>Usually occurs as a result of chemical or mechanical irritation of the vein. Two or more symptoms must be present to make the diagnosis. May be a precursor to bacteraemia.</td>
</tr>
<tr>
<td>Septic thrombosis</td>
<td>Septic shock</td>
<td>Thrombus forms around the IV device, this becomes infected with subsequent abscess formation and discharge of micro-organisms into the blood stream. This is a rare complication, and often fatal.</td>
</tr>
<tr>
<td>Bacteraemia</td>
<td></td>
<td>Presence of bacteria in the blood</td>
</tr>
<tr>
<td>Septicaemia</td>
<td>Pyrexia, hypotension, rigors,</td>
<td>Presence of bacteria in the blood accompanied by the symptoms of</td>
</tr>
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9.0 Pathogenesis of Infection

9.1 A loose fibrin sheath forms around the intravascular portion of the device 48 – 72 hours after insertion. This provides an ideal medium for the growth of microorganisms that manage to contaminate the device.

9.2 There are four recognised routes for contamination of catheters leading to bloodstream infection (refer to Figure 1 below):

- Migration of skin organisms at the insertion site into the cutaneous catheter tract and along the surface of the catheter with colonisation of the catheter tip. This is the most common route of infection for short term catheters;
- Direct contamination of the catheter or catheter hub by contact with hands or contaminated fluids or devices;
- Catheters may, less commonly become haematogenously seeded from another focus of infection;
- Contaminated infusate may lead to catheter related bloodstream infection (CRBSI), though this is rare.

9.3 Micro-organisms which are commonly isolated from the tip of a cannula include:

- Staphylococcus epidermidis;
- Pseudomonas sp.
- Staphylococcus aureus;
- Candida sp.
- Klebsiella sp.
- Enterococcus sp.

9.4 The predominant source of these organisms is likely to be the patient’s skin or the hands of the clinical staff. Contamination of the catheter hub may be an important contributory factor to the intra-luminal colonisation, especially of long term catheters.
10.0 Prior to Insertion of an Intravenous(IV) device

10.1 The first key point to consider is the actual need for the IV device, being clear why and for what purpose it is required in the first instance. The site chosen should facilitate safe and effective maintenance and be comfortable for the patient.

10.2 Considerations when choosing a site for IV devices include Vessel Health Preservation:

- The clinical need for the IV device;
- Vessel assessment;
- Anatomy, avoid joints e.g. antecubital fossa whenever possible;
- The duration of the therapy;
- The clinical status of the patient; relevant PMH,
- Age of the patient;
- Patient preference when possible.

(UK Vessel Health Preservation, 2015)

11.0 Prevention of Intravenous Device Related Infections

11.1 Strict adherence to aseptic techniques and hand washing are the most important infection control practices for the care of IV devices and systems. Clinical staff must be aware of the hazards and the measures that can reduce them.

11.2 Aseptic Technique

11.2.1 Aseptic precautions are taken to reduce the risk of potentially pathogenic microorganisms, including the skin flora of the clinical staff, colonising the insertion site or entering the IV delivery system.

11.2.2 The principles of infection risk reduction include:

- Effective hand decontamination;
- Use of appropriate personal protective equipment;
- Disinfection of the insertion site;
- Non-touch technique / maximal sterile barrier precautions* (dependent on vascular access device);
- Sterile dressings;
- Daily review of all lines;
- Care of the insertion site.

*Defined as “the use of sterile gowns, mask/goggles (for staff protection), sterile gloves and a large sterile drape”.

Figure 1: Potential sources for contamination of intra-vascular devices.
11.3 **Hand Decontamination**

11.3.1 Thorough hand hygiene is one of the most important means of reducing and preventing healthcare associated infections (HCAI), it removes transient organisms to below the level necessary to constitute an infective dose. It is essential to perform hand hygiene before handling any invasive device which breaches the skin. Hands should either be disinfected using Chlorhexidine or Povidone Iodine scrub or washed with soap and water prior to disinfecting with alcohol gel:

- Prior to any invasive procedure e.g. insertion of peripheral cannula;
- Before contact with any part of the IV system during ongoing care.

11.4 **Use of Gloves**

11.4.1 Powder free nitrile gloves must be worn by ALL staff when there is any possibility of contact with blood or body fluids.

11.4.2 Clean disposable gloves combined with a non-touch technique must be worn for:

- Insertion and removal of peripheral cannulae;
- Manipulations of side ports, catheter hubs etc.

11.4.3 Sterile gloves must be worn for:

- Insertion of central lines;
- For all manipulations of central venous access devices (CVADS) of neutropenic and haematology patients;
- Manipulations of parenteral nutrition (PN) feeding lines;
- Dressing change of all (CVADS), PN lines

11.5 **Disinfection of the Insertion Site**

11.5.1 Skin disinfection must be performed prior to the insertion of any IV device to reduce the cutaneous colonisation of the insertion site.

11.5.2 Clean skin is a pre-requisite to effective skin disinfection. Therefore, grossly contaminated skin should be washed with soap and water prior to disinfection.

11.5.3 Effective skin preparation will remove bacteria from both skin and hair. This avoids the need for shaving which can result in skin damage and thus microbial colonisation.

11.5.4 The skin disinfectant used should have a rapid action and be effective at reducing the patient’s resident skin flora.

11.5.5 The preferred skin disinfection for adults is 2% Chlorhexidine in 70% alcohol (or povidone iodine in alcohol for those with sensitivity to chlorhexidine). The form of 2% Chlorhexidine / 70% alcohol will depend on whether the device is to be situated in a peripheral or central vein.

11.5.6 For neonates with delicate skin Chlorhexidine 0.5% may be used.
11.5.7 The skin disinfectant MUST be allowed to dry prior to the insertion of any device.

11.5.8 Superfluous hair may be removed by clipping if necessary. Dry shaving must never be performed as this increases the risk of infection.

11.6 **Use of a non - touch technique**

11.6.1 The external parts of an IV system in use will be colonised with microorganisms. A non-touch technique avoids contact with key parts of the system which is in direct or indirect contact with the patient’s bloodstream thereby preventing intra-luminal colonisation. The non-touch technique should be used when:

- Changing bags/containers of IV fluids, changing / attaching giving sets and accessories and when manipulating hubs or side ports;
- Giving bolus injections.

11.7 **Sterile dressings**

11.7.1 All intravenous devices should be securely anchored in place with a sterile dressing to prevent movement of the device in the vein which may carry microorganisms from the skin into the blood stream. An intact occlusive dressing will also prevent extrinsic contamination of the site.

11.7.2 IV lines may need to be supported using adhesive tape to help prevent the weight of the lines pulling the dressing loose. Non-sterile adhesive tape must not come into contact with the insertion site.

11.7.3 To aid monitoring of the insertion site a transparent dressing should be used.

11.8 **Monitoring the insertion site for signs of infection**

11.8.1 Early identification of phlebitis can prevent more serious IV device related infection occurring.

11.8.2 The insertion site of any device should be inspected and the visual infusion phlebitis (VIP) score documented:

- 8 hourly;
- If the patient complains of pain at the site;
- If there are signs of leakage, inflammation or swelling.

12.0 **Care of Peripheral IV devices (PVDs)**

12.1 **Choice of site**

12.1.1 To reduce the risk of catheter related blood stream infection (CR-BSI) and phlebitis cannulae should be inserted in to the upper in adults. Cannulae in lower limbs are no longer recommended in adults (especially diabetics) due to the
higher incidence of infection, poor flow and phlebitis due to the veins being small & friable.

12.1.2 In paediatric patients, the upper or lower extremity (or scalp in young infants) can be used for siting a PVD if required but only by a skilled clinician.

12.2 Skin decontamination prior to insertion

12.2.1 For peripheral line insertion single use 2% Chlorhexidine in 70% chloraprep may be used.

12.2.2 The insertion site should be wiped in an up and down and side to side motion for 30 seconds before leaving to dry.

12.2.3 If re-palpation of the site is required prior to insertion of the cannula, the site must be cleaned again.

12.3 Insertion of a PVD

12.3.1 All lines inserted in an emergency must be removed as soon as possible and if required re-sited using ANTT.

12.3.2 Clinical staff undertaking IV cannulation must have been trained and assessed as competent for this specialist practise.

12.3.3 The cannula must be inserted using an aseptic non-touch technique (ANNT) and covered with a sterile dressing.

12.3.4 The cannula must be flushed with 0.9% sodium chloride once inserted.

12.3.5 The insertion must be documented in the patient’s notes, in the High Impact Intervention (HII) document and on Vitalpac (where appropriate).

12.4 Choice of dressing

12.4.1 Transparent dressings should be used to ensure easy site inspection.

12.4.2 Any dressing must be sterile and adhere well to the skin on all edges to prevent entry of micro-organisms.

12.4.3 The transparent dressing must be changed if it becomes soiled with blood or becomes non-adherent around the edges and when the cannula is re-sited.

12.4.4 A clean bandage may be used to protect the advice and to support the administration set tubing, but this must be removed to observe the site and changed if visibly soiled.

12.5 Care of the Insertion Site

12.5.1 The site should be inspected for signs of extravasation, local infection and phlebitis:
• At least every 8 hours;
• Before giving a bolus injection;
• Before re-starting an infusion;
• When a soiled dressing is changed.

12.5.2 Inspection should include:

• Observing the area around the site;
• Gentle palpation of the vein and the insertion site through the dressing;
• Asking the patient if the insertion site is pain free;
• Observing for signs of leakage or discharge.
• NB: VIP score can still be performed with an impregnated sponge at site (Biopatch) due to the size of this being smaller than the diameter of 2cm accepted for VIP scoring.

12.6 Removal/change of Peripheral IV device

12.6.1 A peripheral cannula must only be changed/removed if:

• It is no longer required for any IV Therapy
• If it is clinically indicated i.e. signs of infection - VIP score greater or equal to 2 (Doctor must also be informed), blockage or infiltration.
• It was inserted in A&E;

https://www.nice.org.uk/guidance/cg139/evidence/evidence-update-185182813
https://www.cochrane.org/CD007798/PVD_replacing-peripheral-venous-catheter-when-clinically-indicated-versus-routine-replacement

12.6.2 The cannula should be removed using a non-touch technique and the site must be protected with a sterile waterproof dressing for 24 hours

13.0 Care of Central venous catheters (CVCs)
(Refer to Appendices 2, 3 & 4)

13.1 Risk factors

13.1.1 Among the factors that affect the risk of infection related to CVC are:

• The site at which the catheter is placed;
• The barrier precautions taken during placement;
• The skill of the person inserting the catheter;
• A higher infection rate is associated with triple lumen catheters and catheters with multiple connections, e.g. three-way taps, “traffic lights”. Therefore any catheter inserted should have no more lumens than are absolutely necessary. However, a triple lumen line may be preferable to a single lumen with multiple connections;
• Multiple manipulations/disconnections
• Immunocompromised patients
• Patient with known colonisation
13.2 Catheter Material

13.2.1 Various CVCs are impregnated or coated with antimicrobial or antiseptic agents which can decrease the risk of CR-BSI. However robust evidence is required for their insertion in all patients.

13.2.2 The use of antibiotic-impregnated catheters could be considered only after consultation with microbiology & the infection prevention team;

- If the line infection rate in an individual department or ward area remains high despite vigorous efforts at control;
- For high risk patients such as those in burns units.

13.3 Choice of Site

13.3.1 The benefits of placing a central venous device at a recommended site to reduce infectious complications must be weighed against the risk of mechanical complications (e.g. pneumothorax, thrombosis).

13.3.2 The femoral vein should be avoided for CVC placement in adults as these have a higher rate of infection.

13.3.3 CVC placement in close proximity to a tracheostomy stoma should be avoided where possible.

13.3.4 The subclavian vein is the preferred site for non-tunelled CVC placement in adults to minimise infection risk but carries a higher risk of pneumothorax.

13.3.5 Appendix 2 gives further information regarding the choice of site for central line insertion.

13.4 Insertion of the Central Venous Catheter

13.4.1 Insertion must be performed or supervised by an experienced operator.

13.4.2 A catheter with the minimal number of required lumens should be used.

13.4.3 The placement of a CVC should be considered a minor operation and, should whenever possible be performed in an area of optimal cleanliness, where there is sufficient uncluttered space, and appropriate privacy and dignity for the patient e.g. ICU or theatre or a dedicated space.

13.4.4 Systemic antibiotic prophylaxis is not recommended in most cases.

13.4.5 All lines should be inserted using ultrasound imaging.

13.4.6 For immuno-compromised patients CVCs should be inserted in theatre or designated area whenever possible.
13.4.7 All central venous devices should be inserted using maximal sterile barrier precautions:

- The operator should wear a face mask, sterile gown and sterile powder-free gloves;
- Goggles should be worn for patients known to be in the ‘infection risk from blood’ category or any patient if there is thought to be a danger of blood splashing;
- Large sterile surgical drapes should be used to provide a sterile field.

13.4.8 Other Central Venous Access Devices should be considered for patients requiring long courses of IV therapy or intermittent IV access. Discuss with PiCC & Vascular Access Team.

13.4.9 A list of all equipment required for CVC insertion can be seen in Appendix 3.

13.4.10 The insertion technique should aim to minimise the amount of tissue trauma.

13.5 **Skin Decontamination**

13.5.1 Skin cleansing is the most critical part of care before the insertion.

13.5.2 A single use application of 2% Chlorhexidine Gluconate in 70% alcohol (Chloraprep) MUST be used for all central lines (except in cases of Chlorhexidine sensitivity).

13.5.3 The insertion site should be wiped in an up and down and side to side motion for 30 seconds before leaving to dry.

13.5.4 Where there is a history of Chlorhexidine sensitivity an alcoholic povidine iodine solution may be used.

13.6 **At the end of the insertion procedure**

13.6.1 The line MUST be sutured in using the hubs provided unless a suitable sutureless securement device is agreed. (‘Securacath’)

13.6.2 The insertion site must be cleaned to remove blood or any exudate. It should then be cleaned with a single use application of 2% Chlorhexidine in 70% alcohol (Chloraprep) which must be allowed to dry before applying the dressing (see section 13.7) using an aseptic non-touch technique.

13.6.3 The date and the site of the CVC insertion should be recorded in the patient’s notes using a CVC HII sticker together with the insertion checklist (Appendix 4). The documentation must also include, indication for the procedure, type of line used, site of entry, and position of tip on imaging, signature, printed name and designation.

13.6.4 The date and site of insertion of the CVC should be recorded on the HII monitoring tool or VitalPac.
13.7 Choice of dressing

13.7.1 Preferably a sterile transparent semi-permeable dressing will be used on central lines. The recommended dressings are currently:

- IV 3000;
- Tegaderm 1635 IV dressing.

13.7.2 Transparent dressings may be changed weekly or sooner if the:

- Dressing works loose;
- Dressing is visibly soiled/wet;
- There is visible moisture under the dressing;
- The catheter is replaced.

13.7.3 A sterile gauze dressing covered with a sterile transparent semi-permeable dressing (or Cosmopore dressing) may be considered if the patient has profuse perspiration, or if the insertion site is bleeding or oozing. This should be changed to a transparent semi-permeable dressing as soon as possible.

13.7.4 If used, the gauze / Mepore dressing must be changed daily to allow visualisation of the site for VIP score, or sooner if the:

- Patient complains of pain at the site;
- Dressing works loose;
- Dressing is visibly soiled / wet;
- Catheter is replaced.

13.7.5 Any dressing used must be securely fixed on all sides to prevent entry of micro-organisms.

13.7.6 Topical antiseptics are not effective in preventing infection and may promote resistance.

13.8 Ongoing care of the CVC insertion site

13.8.1 The site should be cleaned with a single patient use application of 2% Chlorhexidine in 70% alcohol which must be allowed to dry before applying a fresh sterile dressing using a non-touch technique.

13.8.2 For neonates, Steret-H can be used.

13.8.3 Any insertion site must be inspected 8 hours for signs of pain, swelling, inflammation or discharge VIP score and the condition of the site must be documented on the HII document and/or VitalPac.

13.9 Catheter access

13.9.1 Ports to access to the device should be protected by Needle-free IV access devices which can be easily cleaned 'Caresite'. (specialised obturators)

13.9.2 An aseptic non-touch technique must be used to access the CVC.
13.9.3 Ports must be swabbed with 2% Chlorhexidine gluconate in 70% alcohol (e.g. Sanicloths) for 20 seconds prior to accessing the line for administration of IV fluids or injections.

13.10 **Administration set replacement**

13.10.1 Administration sets must be replaced immediately after administration of blood or blood products.

13.10.2 For total parenteral nutrition, lines must be changed every 24 hours (every 72 hours if no lipid being infused).

13.10.3 Administration sets must be discarded (and associated IV fluid) once detached from the CVC line.

13.11 **Short Term CVC- Replacement or Removal**

13.11.1 CVCs do not require routine replacement as this has not been shown to reduce infectious complications.

13.11.2 The continued need for the CVC should be reviewed on a daily basis and removed as soon as it is no longer clinically required.

13.11.3 CVCs should be removed and re-sited when clinically indicated (i.e. fever with local signs of infection) or when a positive blood culture suggests the possibility of line infection such (e.g. repeated isolation of a coagulase negative staphylococcus from blood).

13.11.4 The clinical decision to remove a line should be based on the patient’s clinical condition, the function of the line and the virulence of the infecting organism.

13.11.5 Replacement of a CVC using a guide wire line exchange technique increases the risk of blood stream infections and **MUST** not be used where an infection is suspected.

13.11.6 Prior to removal the skin must be cleaned with a single use application of 2% Chlorhexidine gluconate in 70% alcohol.

13.11.7 After removal the line should be carefully inspected to ensure it is complete. (If it is incomplete inform the doctor immediately and keep the removed section for investigation).

13.11.8 CVC tips are no longer sent for culture due to contamination from skin dermis upon removal.

13.11.9 Apply a sterile dressing to the site and leave in situ for at least 72 hours.

13.11.10 Document the date and reason for removal in nursing / medical notes.

13.11.11 Refer to Appendix 4 for further information on line removal.
14.0 Swan–Ganz Catheters

14.1 There are no recommendations on the preferred site for insertion of pulmonary artery (Swan-Ganz) catheters.

14.2 Maximal sterile barrier precautions must be taken to insert the line.

14.3 Pulmonary artery catheters do not need to be changed more frequently than every 7 days.

14.4 Disposable pressure monitoring devices must be used and changed according to local protocol.

15.0 Long Term - Tunnelled Central Venous catheters (e.g. Hickman)

15.1 Central venous catheters are commonly used for patients requiring long term vascular access. These catheters have a sub-cutaneous tunnelled portion exiting on the anterior chest wall and a Dacron cuff under the skin.

15.2 Insertion of these lines will take place in an operating theatre or in a dedicated insertion area using maximal sterile barrier precautions and inserted by a skilled practitioner. The area should be scrupulously clean, have sufficient uncluttered space and maintain patient privacy and dignity.

15.3 Once the line is established the patients should receive clear verbal and written information and be encouraged to care of their own lines.

15.4 Removal requires surgical removal by a skilled practitioner in an operating theatre or dedicated area.

16.0 Long Term - Tunnelled CVC’s for Parenteral Nutrition

16.1 Central catheters used for long term parenteral nutrition (PN) must be inserted in the operating theatre or dedicated insertion area using maximal sterile barrier precautions and MUST be used solely for the administration of nutrient solutions.

16.2 Taking blood specimens and administration of drugs through a PN line MUST only be undertaken in accordance with the specific guidelines issued by the dietetic department.

16.3 A single lumen tunnelled line should be used, dedicated to PN only.

16.4 If a multi-lumen catheter is to be used to administer PN one lumen MUST be designated and labelled on insertion for this use only.

16.5 Three-way taps MUST NOT be used on a PN line.

16.6 Choice of dressing and frequency of changes is as in section 13.7
17.0 **Total Implantable Vascular Access Device TIVAD (Ports, Portacaths®.)**

17.1 An implantable port TIVAD is designed to provide repeated access to the venous system for the delivery of intravenous therapy and blood sampling.

17.2 It consists of a reservoir constructed of titanium or lightweight plastic with an attached silicone open ended or valved catheter. The catheter portion enters the vein (internal/external jugular or subclavian) and the catheter tip sits in the lower third of the superior vena cava, above the right atrium of the heart at the cavoatrial junction. The catheter is tunneled under the skin and attached to the round reservoir which is situated beneath the subcutaneous tissue, usually on the chest wall.

17.3 Ports are accessed by the percutaneous insertion of a non-coring needle. (Huber needle) This system consists of a two primary components; (titanium or non metallic) a port reservoir with a self sealing silicone septum and a radiopaque (silicone or polyurethane) central venous catheter which can be open ended or valved.

17.2 TIVADS also require essential care & maintenance whilst in use. Weekly dressing and specialist flushing by trained registered nurses.

17.3 Removal - Surgical removal in an operating theatre is required if the device fails or is no longer required & the patient wishes for it to be removed.

18.0 **Haemodialysis Lines**

18.1 Haemodialysis catheters should be used solely by haemodialysis (trained staff only) unless no alternative vascular access (e.g arteriovenous fistula) is feasible as this the most common factor contributing to bacteraemia in dialysis patients.

18.2 The line should be cuffed if it is to remain in situ longer than three weeks and if required long term an A-V fistula should be considered.

18.3 If the patient has an unexplained pyrexia or pain over the insertion site, the site should be inspected, removing the dressing if necessary. Signs and symptoms of infection should be escalated to renal medical staff.

18.4 Use of a dialysis line and / or dressing changes should be performed by trained dialysis personnel.

18.5 Lines are locked with a prescribed amount of anti-coagulation fluid that prevents the line from becoming blocked.

18.6 Dialysis lines are usually protected by a Chlorhexidine impregnated dressing (Biopatch) that fits around the exit site of the line. This is in place for 7 days (unless moist or soiled) and prevents organisms from colonising.
18.7 Dressings should be replaced once a week on same day as Biopatch change, or if dressing appears loose or exudate is present.

18.8 Observation of the site and dressing changes should be documented in the patient notes and on the HII form.

18.9 Removal – Surgical removal in a renal procedure room is required if the device fails or is no longer required & the patient wishes for it to be removed.

19.0 Vas Caths

19.1 A ‘vas-cath’ is a double-lumen central venous catheter usually placed in a femoral or internal jugular vein or (rarely) in a sub-clavian vein and used in GICU.

19.2 Insertion, care and removal of a ‘vas-cath’ is the same as for any CVC

19.3 The ‘vas-cath’ must only be used for renal replacement therapy unless no other intravenous access can be obtained in an emergency situation.

19.4 Lines are anticoagulant locked twice daily according to local critical care policy to prevent blockage of individual lumens and this should only be carried out by trained critical care personnel.

19.5 ‘Cosmapore’ dressings are used to protect the insertion site. Dressings are replaced daily and the insertion site inspected at the same time.

19.6 The use of and ‘locking’ of the ‘vas-cath,’ observation of the site and dressing changes should be documented in the patient notes (HII form in ‘Metavision’ software).

20.0 Children and Neonates

20.1 Most blood stream infections in paediatric patients are related to the use of an intravascular device

20.2 Paediatric data that is available is based on studies carried out in the Paediatric ICUs and Neonatal ICUs where rates of infection are usually higher than on general paediatric wards. The epidemiology of intravascular-device-related infections in paediatric patients is less well described than in adults, mainly due to Coagulase negative Staphylococci with additional risk factors associated with the use of lipids, particularly in low birth weight infants less than 1000g.

20.3 Adequate education and training, maximal sterile barrier precautions on insertion, Chlorhexidine skin preparation and early removal are essential in minimising the risk of infection.

20.4 Routine replacement of CVCs is not recommended as there appears to be no relationship between duration of catheterisation and probability of infection.
20.5 Hickman and Broviac catheters used for paediatric patients are generally associated with a low rate of infection. Risk factors include age (less than 2 years) malabsorption syndrome and administration of PN.

20.6 There are no recommendations for the frequency of umbilical catheter replacement. Refer to neonatal guidelines in relation to insertion of umbilical arterial / venous catheters and check the site hourly for any signs of infection.

20.7 There are no recommendations for the frequency of replacement of peripheral arterial catheters.

20.8 There are no recommendations for the use of antiseptic/antimicrobial impregnated catheters in paediatric patients.

20.9 Refer to Supportive care protocols for paediatric haematology/oncology available on the intranet and on Phoenix Unit, for the care of central venous devices in children receiving shared with a Primary Treatment Centre.

21.0 Burns Patients

21.1 Dressings over the insertion site of an IV device may not always be appropriate because of the proximity of the burn wound to the site. The burn wound dressing is used to cover the line site.

21.2 If a line dressing is deemed necessary, the appropriate dressing will be used as per current guidelines.

21.3 CVC’s are changed more frequently in burn injuries because of the high skin colonisation and difficulty in identifying sites of infection in patients who are septic.

21.4 A needle–free access device is used for attaching infusions, giving IV medicines etc. Care of these is as for the connections described in sections 13.9 and 22.3.

22.0 Care of Administration Equipment

22.1 The equipment used for IV therapy must be maintained as a closed system whenever possible. The number of breaks and manipulations should be kept to a minimum to reduce the risks of microbial contamination.

22.2 Hand hygiene must be performed before manipulation of any part of the IV system. Aseptic non-touch technique must be used.
22.3 Care of Connections

22.3.1 The preferred method of administering IV drugs or fluid is via a needle-free IV access device (Caresite). The access port must be decontaminated with 2% Chlorhexidine in 70% alcohol (Sanicloth) for 20 seconds and left to dry prior to attaching administration sets or giving stat doses of medication.

22.3.2 Needle-free access devices do not need to be changed more frequently than at 72 hours. The caresite can be accessed up to 1000 times.

22.3.3 Three-way taps, side ports, and stopcocks can become contaminated during use and should only be added to a line as a last resort.

22.3.4 The catheter hub and side ports must be disinfected with a single use application of 2% Chlorhexidine Gluconate in 70% alcohol (Sanicloth), which must be allowed to dry prior to any manipulation.

22.3.5 If not in continuous use catheter hubs and stopcocks should be covered with a sterile protective cap at all times.

22.4 Care of Administration Sets

22.4.1 Before use the expiry date and packaging and content of all IV sets must be checked.

22.4.2 Each giving set must be labelled with date and time of start of use and changed every 96 hours if used for clear fluid, unless disconnected in which case they should be discarded as they are single use items. (IVAD37 Epic 3 guidelines)

22.4.3 See table 6 for administration set change frequencies for other types of fluid.

22.4.4 Administration sets must be changed at least every 24 hours when used for the administration of drugs (see drug manufacturer’s advice).

22.4.5 Syringes used for syringe drive pumps are single use, but should be changed at least daily (if used for slow infusions).

22.4.6 At the present time it is recommended that IV fluid giving sets should be changed every 24 hours.

Table 6: Changing Times for IV Lines

<table>
<thead>
<tr>
<th>IV Product</th>
<th>Frequency of Changing IV Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood and blood products</td>
<td>At completion of transfusion</td>
</tr>
<tr>
<td>Parenteral Nutrition</td>
<td>Every 24 hours</td>
</tr>
<tr>
<td>Intralipids</td>
<td>Every 24 hours or with Total Parenteral Nutrition change</td>
</tr>
<tr>
<td>Drugs</td>
<td>As indicated in manufacturers guidelines</td>
</tr>
</tbody>
</table>
23.0 Reporting of Breaches

23.1 Any breach in the clinical guidance must be recorded on Datixweb.

23.2 Breaches that result in an intravenous line-associated bacteraemia will be investigated as a serious untoward incident.

23.3 Any intravenous line infection identified will be investigated and reported in the monthly Director of Infection Prevention and Control (DIPC) report and on the executive dashboard.

23.4 Learning as a result of risk events and breaches will be disseminated through the DIPC report and via the Nursing and Midwifery Executive Group, Matrons and Infection Prevention Link Nurse meetings. It will also be discussed at Directorate Governance meetings.

24.0 Training

24.1 All staff should undertake training in accordance with the Trust training needs analysis (Mandatory training Policy).

24.2 No staff should be involved in the management of IV devices unless they have been deemed competent to do so.

25.0 Audit and Monitoring

25.1 Compliance with this guideline will be assessed within the Saving Lives, High Impact Interventions Number 1 and number 2 audits carried out according to the audit schedule. This information will be included in the DIPC report and will be monitored at Directorate Governance meetings.

25.2 In addition, ad hoc audits of compliance with this guideline will be undertaken as part of the Infection Prevention and Control Annual audit programme. Audit results will be reported to the Trust Board via the DIPC report and the DIPC Annual Report. Results will also be disseminated through Nursing and Midwifery Executive Group and Directorate Governance meetings.

26.0 Communication and implementation

26.1 The policy will be uploaded on the Trust Intranet site and website and will be communicated to staff via staff newsletter.

26.2 The policy will be circulated to Clinical Directors, Associate Chief Nurses, Matrons and Ward Managers to disseminate.
28.0 References/Further Reading


## CENTRAL LINE SITE SELECTION CRITERIA

### Infraclavicular Subclavian
- Suitable long-term site
- When considering infection risk only, the subclavian vein has lowest rates of infection compared with other central line sites
- Should be avoided for dialysis catheter insertion due to risk of subclavian vein stenosis
- If arterial puncture should occur, the site has the least ability to control bleeding.
- Least suitable insertion site for patients with potentially severe lung pathology due to the risk of pneumothorax
- Least suitable insertion site for patients with uncorrected coagulopathy, as it is associated with the greatest risk of uncontrollable haemorrhage
- The left Infraclavicular subclavian is more likely to result in satisfactory catheter location than the right.

### Internal Jugular
- Convenient site for short-term central line access
- The preferred site for intra-operative access
- The route with the least acute complications (after PICC) especially if ultrasound guidance is used
- Preferred site for pulmonary artery catheter insertion
- Suitable site for dialysis catheter insertion
- More suitable for patients at special risk of pneumothorax or haemorrhage
- The right internal jugular approach is more likely to result in satisfactory catheter location.

### External Jugular
- Insertion can be technically difficult due to the presence of valves, however if the guidewire can be passed then placement of the line is usually possible.
- It is not suitable for dialysis catheter insertion due to the catheter size and rigidity
- May be a useful alternative particularly in coagulopathic patients
- May be a site for surgically inserted, tunnelled Central Lines (e.g. Portacaths)

### Femoral
- There is a greatly increased risk of infection at this site compared with other sites.
- Another useful site when internal jugular or subclavian sites are not appropriate or in coagulopathic patients
- Suitable site for dialysis catheter insertion
- Arterial puncture, if it occurs is easily compressed
- Patient does not need to be tilted head down
- May be unsuitable for restless or ambulatory patients

### Arm Veins - Peripherally Inserted Central Catheter (PICC)
- Low risk of serious complications
- Recommended for long-term
- Not recommended when more than two lumens or high flow rate infusions required

### Arm Veins
- Closed system, non-Seldinger peripheralCentral Lines, (e.g.Braun CavaFix)
- Primarily used for perioperative pressure monitoring.
- If the clinical need for a central line persists past this period, a central line should be inserted at another site.
CVC Inventory

Check the following items are available before CVC insertion Central Line insertion packs are available at MEHT

<table>
<thead>
<tr>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sterile gauze</td>
</tr>
<tr>
<td>Syringes 20ml, 10ml, 5ml, 2ml</td>
</tr>
<tr>
<td>Needles 22G (blue), 25G (orange), 21G (green)</td>
</tr>
<tr>
<td>Hepsal or 0.9% Saline for flush</td>
</tr>
<tr>
<td>Lidocaine 1%, 2% (only to be kept on trolley if complies with Trust Drug Policy)</td>
</tr>
<tr>
<td>Chlorhexidine 2% in 70% alcohol skin prep (Chloraprep)</td>
</tr>
<tr>
<td>Stitch cutter</td>
</tr>
<tr>
<td>Steri strips</td>
</tr>
<tr>
<td>Surgical blades/scalpels</td>
</tr>
<tr>
<td>Sterile, clear, semi-permeable, occlusive dressing</td>
</tr>
<tr>
<td>Sutures 00, 2-0, 3-0 nylon, 2-0, 3-0 silk</td>
</tr>
<tr>
<td>3-way taps, bungs, bionectors</td>
</tr>
<tr>
<td>Transducer sets</td>
</tr>
<tr>
<td>0.9% saline, 500mls, flush bags</td>
</tr>
<tr>
<td>Sterile drapes</td>
</tr>
<tr>
<td>Sterile gowns</td>
</tr>
<tr>
<td>Face masks +/- shields</td>
</tr>
<tr>
<td>Sterile gloves ranging from 6.0-8.5</td>
</tr>
<tr>
<td>Ultrasound probe covers</td>
</tr>
<tr>
<td>Ultrasound gel</td>
</tr>
<tr>
<td>Blood culture bottles</td>
</tr>
<tr>
<td>Central venous catheter sets</td>
</tr>
</tbody>
</table>
# Appendix 3  
## Adult and Paediatric CVC Insertion Checklist

This checklist should be completed by an observer. If a significant breach of aseptic technique is observed the observer must stop the procedure.

<table>
<thead>
<tr>
<th>Patient Surname</th>
<th>Patient Forename</th>
<th>Hospital Number</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Procedure Date:</th>
<th>Time:</th>
<th>Assistant:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator:</td>
<td>Observer:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Catheter type</th>
<th>Insertion site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective</td>
<td>Multi-lumen</td>
<td>Subclavian</td>
</tr>
<tr>
<td>Emergency</td>
<td>Dialysis</td>
<td>Jugular</td>
</tr>
<tr>
<td>Re-wire</td>
<td>Introducer/Sheath</td>
<td>Femoral</td>
</tr>
<tr>
<td>Ultrasound used?</td>
<td>PICC</td>
<td>Right</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>ECMO / VAD</td>
</tr>
</tbody>
</table>

There are nine essential steps to take before, during and after the procedure.

### Before the procedure

1. Hands washed by operator and assistant
2. 2% Chlorhexidine Gluconate / 70% isopropyl alcohol formulation applied procedure site and allowed to dry
3. Use a large drape to cover the patient in a sterile manner

### During the procedure

4. Sterile gloves and sterile gown worn by operator and assistant
5. Hat and mask worn by operator and assistant
6. Sterile field maintained
7. Sterile sheath and sterile gel used with ultrasound probe (if applicable)

### After the procedure

8. Injection site caps placed using sterile technique
9. Sterile dressing (Tegaderm / Opsite 3000) applied using sterile technique

### Complications

<table>
<thead>
<tr>
<th>Pneumothorax</th>
<th>Arterial puncture</th>
<th>Malposition</th>
<th>Haemorrhage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd person required</td>
<td>Unable to cannulate</td>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Date of catheter removal</td>
<td>Infection detected</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td>Reason for removal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 4

Procedure for the removal of a non-tunnelled short term central venous catheter
(based on Department of Critical Care Procedure and Dougherty & Lister (2008)

- Explain the procedure to the patient.
- Place patient in a supine position (to potentially prevent embolism).
- Perform hand hygiene.
- Prepare sterile field and open supplies.
- Using clean gloves remove old dressing and dispose of it appropriately.
- Cleanse hands with alcohol rub
- Discontinue and disconnect infusions
- Inspect the area for signs of infection. If indicated swab insertion site for culture.
- Wash hands and put on sterile gloves.
- Prep the catheter site with Chlorhexidine 2%. Commence cleansing at the catheter
- Insertion site, moving outward, in a circular motion. Allow solution to dry.
- Clip and remove the sutures, holding the catheter (to make sure it is completely free).
- Instruct patient on Valsalva manoeuvre. i.e.; Valsalva manoeuvre, forcible exhalation effort against a closed glottis; the resultant increase in intrathroacic pressure interferes with venous return to the heart (Taylor 1988).
- Place sterile gauze dressing over the insertion site
- Employing the Valsalva manoeuvre, using gentle traction, withdraw the catheter. If any resistance is encountered do not force the catheter and seek senior advice.
- Apply pressure to gauze over site, using free hand.
- Avoid any contamination of the catheter tip during removal, if culture is to be obtained.
- If the catheter tip is to be cultured: have a colleague assist by cutting off 1 to 2 inches of the catheter at tip into a sterile container, using a pair of sterile scissors—NOT the ones used to cut sutures. N.B. Routine line removals do not require the line tip to be sent for culture.
- Only send tip of line if line related sepsis is suspected.
- As soon as the catheter is free, apply firm steady pressure to the exit site and place patient in a 45 degree sitting position.
- Hold pressure for a minimum of 5 minutes.
- When bleeding stops, dress the site with a sterile transparent bio-occlusive dressing (Tegaderm etc)
- Inspect the catheter to make sure the tip was removed intact. If not inform senior staff.
- If the site bleeds, maintain pressure for a further 15 minutes.
- If bleeding is still present after 15 minutes of undisturbed pressure, contact senior staff.

**Ongoing care/observation:**

1. Instruct patient to:
   - Avoid lifting, stooping, squatting, or any strenuous activity for 24-72 hours
   - Avoid getting dressing wet or soiled
   - Leave dressing in place for 24 hours

2. Signs and symptoms to report:
   - Bleeding.
   - Shortness of breath.
   - Fever.
   - Swelling of the site, (face, neck, arm or groin depending on site of catheter).
   - Drainage from the site.
Appendix 5: Preliminary Equality Analysis

This assessment relates to: Prevention of Intravenous Device Related Infections/ 07077

A change in a service to patients | A change to an existing policy | X | A change to the way staff work
--- | --- | --- | ---
A new policy | Something else (please give details) | --- | ---

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What are you proposing to change?</td>
<td>Full Review</td>
</tr>
<tr>
<td>2. Why are you making this change? (What will the change achieve?)</td>
<td>Review and updating of all Vascular Access device elements</td>
</tr>
<tr>
<td>3. Who benefits from this change and how?</td>
<td>Patients and clinicians</td>
</tr>
<tr>
<td>4. Is anyone likely to suffer any negative impact as a result of this change? If no, please record reasons here and sign and date this assessment. If yes, please complete a full EIA.</td>
<td>No</td>
</tr>
<tr>
<td>5. a) Will you be undertaking any consultation as part of this change?</td>
<td>Yes</td>
</tr>
<tr>
<td>b) If so, with whom?</td>
<td>Refer to pages 1 &amp; 2</td>
</tr>
</tbody>
</table>

Preliminary analysis completed by:

| Name | Julie Godfrey | Job Title | Lead Vascular Access CNS | Date | January 2020 |