Humber Teaching
NHS Foundation Trust

Protocol for Intravenous Infusion (including the Care and Management of Peripheral and Central Venous Access Devices)

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VALIDITY – Protocols should be accessed via the Trust intranet to ensure the current version is used.

CHANGE RECORD

Version	Date	Change details
1.0	*May 2019*	*New protocol - supersedes the Intravenous and Subcututaneous Administration Policy (2016). This protocol is a supporting document of the Infusion Therapy Policy.*
1.01	*Aug 2019*	*Minor additional of section 6.5*
1.02	*Dec 2022*	*Minor amendments relating to training and scope. All links and refences checked against RCN infusion therapy guidelines noting the RCN gudelines are currently under review. This protocol will therefore require a re-review once the RCN guidelines have been published later in 2022/23.* *Approved at PHMD Group 14-Dec-22*

Contents

1. INTRODUCTION

Many patients admitted to hospital or in receipt of health care in the other settings, including their own homes, will become recipients of infusion therapies at some stage (NICE, 2013; NHS Scotland, 2002). The aim of this procedural document is to support Health Care Professionals in the delivery of high standards of evidence-based care in relation to intravenous infusions, IV drug administration and the care of venous access devices. This document should be read in conjunction with the Standards for Infusion Therapy (RCN, 2016).

2. SCOPE

The protocol is relevant to all registered practitioners who, as part of their role, are responsible for intravenous infusion therapy, and the care and management of intravenous infusion devices.

This protocol does not include the administration of blood or blood product. See the Transfusion of Blood and Blood Products Policy.

This protocol does not include in its scope delivery of specialist therapies such as parenteral nutrition.

3. PATIENT SAFETY AND QUALITY

3.1. Training Requirements

For details on training and competency requirements relating to infusion therapy see Appendix 1 of Infusion Therapy Guidelines.

Training will be delivered via a train the trainer model with a number of experienced registered practitioners having undertaken face to face training, which is delivered by the Trust approved external training provider.

In addition, staff using a variety of venous access devices i.e., skin-tunnelled catheters (hickman line), peripherally inserted central catheters (PICC) and peripheral cannulas, must be able to demonstrate safe care and management of each device and have completed the relevant Trust approved clinical skills competency assessments.

3.2. Documentation

Documentation in patient records must contain complete information regarding any/all infusion therapies, vascular access and adverse drug reactions (INS, 2016; NMC, 2015a).

Documentation must comply with the guidelines for records and record-keeping within the health care professional's code (HCPC, 2016; NMC 2015a).

3.3. Expiry Dates

Manufacturer's guidelines will be followed in relation to storage and expiry dates will be verified prior to administration.

3.4. Labelling

Clear, accurate labelling should be used for product and drug identification. Where pre-prepared ready to use injectable medicines are not available the medications must be drawn up using a closed system and the syringes and should be labelled with the patients name and date of birth, drug name, dose, route of administration, expire date and batch number. This will minimise the risk associated with 'wrong route errors'.

3.5. Contaminated or Out of Date Products
Any contaminated or out of date products will be removed immediately from clinical use and reported to pharmacy.

3.6. Patient Safety Incidents
All patient safety incidents will be reported via the Trust's Datix system.

4. INFECTION PREVENTION AND CONTROL

4.1. General Infection Prevention and Control Principles and Practices
All infusion-related procedures require the use of aseptic technique, observation of standard precautions and use of sterile products. See Infection and Prevention Control policies.

Disposable gloves should be worn to protect hands from contamination from blood and body fluids, and to reduce the risk of cross contamination to both patient and staff.

The choice of sterile or non-sterile gloves should be made based on an assessment of the risks of the procedure however sterile gloves are to be worn when handling central venous access devices or add on devices.

Disposable plastic aprons should be worn whilst carrying out all infusion procedures due to the risk of contact with blood/body fluids or contamination of uniform.

4.2. Reconstitution and Compatibility
Where possible, all drugs should be available in already-to-use form (NPSA, 2007d).

Aseptic technique should be used throughout reconstitution. Cleaning should be undertaken using 2% chlorhexidine gluconate in 70% alcohol or locally determined alternative if chlorhexidine allergy (Loveday et al., 2014).

Blunt fill and blunt filter needles should be used for medication preparation from vials and glass ampoules.

Manufacturers' guidelines should be followed for reconstituting and administration of a specific medication (Injectable Medicine Guide, 2013) https://about.medicinescomplete.com/publication/injectable-drugs-guide.

Adequate flushing with 10ml Sodium Chloride 0.9% for injection is require between the administration of each drug to prevent incompatibilities from occurring (Injectable medicine Guide, 2013).

An IV injection should **never** be administered via a running infusion that also contains a medicine additive. Any infusion containing a medicine will be stopped temporarily with the line being flushed both before and after the injection is given (Injectable Medicine Guide, 2013).

4.3. Safe Use and Disposal of Sharps and Hazardous Material
All needles and cannulas should have a safety device with engineered sharps injury protection.

All needles and syringes will be disposed of as per Waste Management Policy and Waste Management SOP17-002

4.4. Cleaning and Disinfection of Reusable Equipment
Refer to the Medical and Non-medical Devices Policy N-042 and the Cleaning checklists and Guidance IPC Document Store (humber.nhs.uk) for details on cleaning and disinfection of medical devices.

5. INFUSION EQUIPMENT

5.1. Administration Sets

Administration sets used for a continuous infusion must be changed every 96 hours, however, they must be changed if they become disconnected, or the integrity of the product or system has been compromised (Ullman et al, 2013 as cited by RCN 2016).

Administration sets must be changed using aseptic technique, observing standard precautions and following manufacturers' recommendations (Loveday et al., 2014).

Only recommended or designated administration sets will be used in electronic infusion devices.

Date and time labels must be applied to ensure administration sets are changed at the correct interval (Injectable Medicines Guide, 2013).

Care must be taken to avoid backtracking when more than one IV set is connected through multiple ports. Backtracking is where fluid flows away from the intended delivery point and can result in interruption of treatment and/or accidental bolus. The latter can lead to overdose, speed shock and ultimately may result in death. If appropriate, consider alternatives (MHRA, 2010).

5.2. Flow Control Devices – Manual and Electronic

Manual flow control devices are not suitable for all environments where infusion therapy is being delivered, especially when there is limited opportunity for monitoring. Therefore, electronic flow control is favoured for reasons of patient safety and accuracy of flow rates.

However, there may be situations when the rate of infusions can be regulated by manual flow control devices to ensure timely delivery of the prescribed therapy for example in resuscitation situations. In such situation the Registered Health Care Professional is responsible for monitoring the patient.

For the administration of intravenous fluids, the following information will be recorded on the Intravenous Fluid Monitoring Chart (Appendix 1): date, time infusion started, expected completion time, medical device serial number, rate setting, total volume infused, volume remaining, check of IV cannula site. For patient's within an UTC this will be recorded in

Never use a damaged or defective electronic infusion devices and/or equipment used in those devices (MHRA, 2013b). Report any damaged or defective equipment to the Estates Department as per the Medical and Non-medical Devices Policy N-042

The Registered HCP is responsible for regular monitoring of the infusion rate of the prescribed therapy.

5.3. Tourniquets

Tourniquets should be properly applied to promote venous distention and to impede venous but not arterial blood flow (RCN, 2016). Apply the tourniquet proximal to the selected insertion site. A pulse should be palpable distal to the tourniquet location.

Tourniquets should be single use in order to reduce the risk of cross contamination and infection (WHO, 2010).

6. PERIPHERAL CANNULA

Peripheral cannulas will only be inserted by medical doctors or other clinically competent registered practitioner who have a comprehensive understanding of anatomy and physiology, vascular assessment techniques and insertion techniques appropriate to the specific device.

Peripheral cannula should be selected for short term therapy of three to five days and for bolus injections or short infusions in the outpatient/day unit setting (RCN, 2016).

Peripheral cannulas should be equipped with a safety device with sharps injury protection.

Once inserted the device will require stabilising with a sterile transparent film dressing that does not interfere with visual assessment and monitoring of the access site. Dressing can remain in place for the duration that the cannula remains in situ (three to five days) unless the dressing's integrity is compromised, moisture collects under the dressing, or it is visibly contaminated.

Peripheral devices should not be routinely used for blood sampling, but blood can be taken immediately following insertion (WHO, 2010). Do not take blood from an existing peripheral venous access site because this may give false results (WHO, 2010).

Consider the use of an extension set between the peripheral catheter and needleless connector to reduce catheter manipulation (INS, 2016).

Following insertion, using only Luer-Lok™ connections and syringes, flush the cannula with 5-10mls of normal saline for IV injection.

The gauge, product name, batch and/or lot number, number of attempts, anatomical location should be recorded in the clinical records (Appendix 2: Intravenous Cannula Record).

6.1. Aftercare

Hand hygiene and standard precautions including non-sterile gloves and single use disposable apron protocols must be adhered to when accessing and caring for peripheral cannulas.

The Visual Infusion Phlebitis score 1-5 (Appendix 3) will be documented daily and appropriate action taken and documented on the Intravenous Cannula Record (Appendix 2).

All add-on devices should be of closed Luer-Lok™ design (Mustafa et al., 2013). Aseptic technique must be used, and standard precautions must be observed for all add-on device changes (INS, 2016; Loveday et al., 2014). All 'add on' devices must be decontaminated using 2% chlorhexidine gluconate in 70% alcohol which should be allowed to air dry prior to accessing. Aseptic technique will be used.

When add-on devices are used, they should be changed with each cannula or administration set replacement, or whenever the integrity of either product is compromised, and according to manufacturer's recommendations (Loveday et al., 2014).

Blood pressure cuffs and tourniquets should be avoided, if possible, on an extremity where a peripheral device has been placed.

7. CENTRAL VENOUS ACCESS DEVICES

Registered Health Care Professionals will have comprehensive understanding related to the central venous access devices and will have undertaken initially training followed by annual competency-based assessment.

7.1. Dressings and Stabilisation Devices

Following the insertion and confirmed positioning of a Central Venous Access Device (a skin tunnelled catheter, i.e., Hickman line or Peripherally Inserted Central Catheter (PICC). Within an acute hospital setting a patient may be transferred or referred for care within our community services.

A sterile transparent film dressing must be applied and maintained. Dressings must be changed at least once every seven days or more frequently if the dressing's integrity is compromised, moisture collects under the dressing, or it is visibly contaminated.

An aseptic technique should be used for each dressing change and any contact with the insertion site or catheter (Loveday et al., 2014).

Cleansing of the central venous access site should be carried out at dressing change using a single application of 2% chlorhexidine gluconate in 70% isopropyl alcohol (or povidone iodine in alcohol for those with an allergy to chlorhexidine) and allowed to air dry (Loveday et al., 2014).

In addition to sterile dressings, products employed to stabilise devices may include sutures, engineered stabilisation devices and sterile wound closure strips. Ensure a clear plan of care is in place outlining when and if any sutures or closure strips are due for removal and by whom.

At each contact the Registered Health Care Professional will observe the exit site for signs of inflammation or infection.

At each contact the Registered Health Care Professional will observe for migration. If migration is observed the line should not be re-advanced. The line should not be used. Urgent contact should be made with the referring hospital or team.

Extra care should be taken when removing dressings or stabilisation devices to ensure migration does not take place.

Do not use sharp objects or scissors to aid in the removal of dressings.

Never access a central venous access device with a needle. Always ensure devices are accessed using a needle free system and add on devices are of a closed Luer-Lok™ design.

If a CVAD is accidentally ruptured, split, or compromised in any way this could result in an immediate threat to life and therefore requires urgent action. Ensure patient safety is maintained by securing and/or clamping the line, the patient will require emergency transfer to the acute hospital by dialling 999.

7.2. Assessing Patency and Flushing Central Venous Access Devices

The HCP should aspirate central venous access devices to check blood return to confirm patency, assess catheter function and prevent complications prior to administration of medications and/or solutions (INS, 2016).

In the absence of a blood return for central venous access devices, an attempt should be made to flush the device; if resistance is met **force should not be applied**.

The patency of the vascular access device will be checked prior to each administration of medications and/or solutions.

10mls of Sterile 0.9% sodium chloride should be used to flush and lock catheter lumens that are accessed frequently (Loveday et al., 2014; NICE, 2012).

Flushing with 10mls of 0.9% sodium chloride solution to ensure and maintain patency should be performed before, between and after the administration of incompatible medications and/or solutions (INS, 2016).

0.9% saline flushes should be prescribed.

For further details on the procedure for flushing central venous access devices refer to Appendices 5a, 5b, and 5c.

7.3. Catheter Complications

The practitioner caring for the patient with a central venous access device should be knowledgeable about the complications of catheter dislodgement, malposition, occlusion, pinch-off syndrome, thrombosis, fibrin sheath, extravasation and vessel perforation. In any event referral should be made to the acute hospital for assessment and management.

7.4. Medication and Solution Administration

The administration of medicines via a vascular access device should only be undertaken when no other route is suitable (Hallam et al., 2016). The administration of medications and solutions should be in accordance with a prescription from an authorised prescriber (NMC, 2015c; BNF, 2015).

Aseptic technique must be used and standard precautions adhered to in the administration of injectable medications and solutions (NPSA, 2007d; NHS Scotland, 2002).

The registered authorised HCP should check any medication to be given via a vascular access device with another registered authorised professional prior to administration. It should also be the registered health care professional who then administers the IV medication (NMC, 2015b).

7.5. Cytotoxic Chemotherapy

The Trust **does not** support the administration of IV chemotherapeutic agents, however, patients in the community setting may require the disconnection of an ambulatory pump containing chemotherapy and as such registered nurses caring for these patients should ensure they have adequate knowledge and understanding in order to carry out this procedure safely.

Handling of cytotoxic of drugs in the workplace requires safe practice and risk assessment. The patient will be referred from the acute hospital oncology team and provided with equipment including a cytotoxic sharps bin (which will be securely fastened and returned by the patient to the acute hospital) and spillage kits. The acute hospital should also provide a written procedure for the disconnection of the ambulatory pump in line with their Trust policy. Where a written procedure is not available, please see appendices 5e and 5f of this protocol.

All staff caring for patient requiring the disconnection of ambulatory chemotherapy pump will have received local training and be able to evidence annual competency updates.

7.6. Blood Sampling

Refer to appendices 5d and 5e for further details on obtaining blood samples from central venous access devices.

8. MANAGING INFUSION RELATED COMPLICATIONS

The HCP should be competent in assessing the patient receiving an IV medication or fluids for the following administration or device-related complications.

8.1. Phlebitis

Peripheral cannula insertion sites will be monitored at a minimum of every 12 hours using a Visual Infusion Phlebitis (VIP) score (Appendix 3) which is used for measuring degrees or severity of phlebitis/thrombophlebitis.

Signs and symptoms phlebitis include:

- Pain at the cannula site
- Erythema
- Swelling
- Induration

- Palpable venous cord
- Pyrexia

Take action as outlined in the VIP scoring tool see Appendix 3.

Any incident of phlebitis along with the intervention, treatment and corrective action will be documented in the patient's records.

8.2. Infiltration and Extravasation
Infiltration is defined as the inadvertent administration of non-vesicant medication or solution into the surrounding subcutaneous or subdermal tissue instead of into the intended vascular pathway.

Extravasation is defined as the inadvertent administration of **vesicant** medication or solution into the surrounding subcutaneous or subdermal tissue instead of into the intended vascular pathway.

Sign and symptoms infiltration/extravasation include:

- Pain during infusion
- Pain at cannula site
- Swelling at the cannula site

On observing/suspecting infiltration/extravasation the infusion will be immediately stopped.

The peripheral cannula will be removed with on-going observation of the affected area.
Inform the medic and organise for a replacement cannula to be inserted.

Where a patient is receiving ambulatory chemotherapy via a CVAD and extravasation/ infiltration or rupture of the CVAD is suspected urgent advice will be sought from the referring oncology team and the patient will be transferred to the acute hospital for further management.

The severity of the infiltration/extravasation and actions performed will be documented in the patient clinical records.

8.3. Prevention and Management of Infusion/Device-related Bloodstream Infections
Catheter-related blood stream infections are frequently associated with the use of IV devices and can result in life threatening complications.

Standard precautions and aseptic technique should be adopted when accessing any component of the device, site, or line.

Monitor patients for signs and symptoms of infection including:

- Increased heart rate
- High or low temperature
- Low blood pressure
- Abnormal breathing pattern
- Altered level of consciousness/new confusion
- Shaking/rigor

Monitor vital signs using the NEWS2 chart at a **minimum** 12-hourly. Refer to the Deteriorating Patient Policy.

Advise patient to informing nursing staff if they feel unwell/hot/cold/shivery/or have general malaise.

Escalate suspected infection or a rise in NEWS2 score as per the Deteriorating Patient Policy.

When accessing the vascular access device, add on devices and vascular access sites aseptic technique and standard precautions should be undertaken and the device/add-on devices and site cleaned with 2% chlorhexidine gluconate in 70% alcohol, providing that the patient is not sensitive. The hub should be cleaned for a minimum of 15 seconds and allowed to dry.

8.4. Thrombosis

HCPs caring for patients with vascular access devices should be aware of the potentially complications of thrombosis in associated with the use of central venous catheters.

For inpatients, ensure a VTE risk assessment has been completed.

The HCP will observe for secondary effects of thrombosis; for example, pulmonary embolism (PE), deep vein thrombosis (DVT) and report any signs or symptoms immediately.

Sign and symptoms of CVAD related thrombosis may include:

- swelling of the neck, chest, arm, or leg
- pain particularly unilateral leg pain or pain on inspiration
- skin discoloration
- skin temperature changes
- infusion difficulties and an inability to aspirate blood

Whether a PE or DVT is suspected or is an incidental finding following a routine chest X-ray the patient will require urgent medical assessment and transfer to the acute trust for initiation of appropriate therapy.

8.5. Haematoma

HCPs caring for patients with vascular access devices should be aware of the potentially complications of haematomas and haemorrhage associated with the use of central venous catheters.

Signs and symptoms of a CVAD related haematoma or haemorrhage may include:

- Visible bleeding at the exit site
- Swelling or bruising
- Hypotension
- Chest pain

If the HCP identifies or has concern about a haematoma or bleeding related to any venous access device urgent advice will be sought for the medical doctor.

In the rare event of a significant haematoma or moderate to severe haemorrhage an emergency ambulance will be called (dial 999).

8.6. Air Embolus

HCPs caring for patients with vascular access devices should be aware of the potentially lethal complications of air embolus associated with the use of central venous catheters.

Signs and symptoms of air embolism include:

- Chest pain
- Dyspnoea
- Tachycardic or irregular pulse
- Hypotension

If air embolism is suspected call for an emergency ambulance (dial 999). Inform the medical doctor for the ward/unit.

Monitor vital signs every 15 minutes until the paramedics arrives

HCPs should know how to recognise an air embolism and the action to be taken to manage air embolism.

Central venous access devices including Hickman line, central venous catheters and PICC will on every occasion be removed by the acute hospital team and never whilst in the care of Humber Teaching NHS Foundation Trust

When removing a peripheral cannula apply gentle digital pressure to the vein entry site until haemostasis is achieved and apply a sterile occlusive, airtight (air-impermeable) dressing immediately after advising the patient to ensure it remains in situ for 24 hours.

Air-in-line detectors should be used to monitor for air bubbles in administration sets when delivered via an electronic infusion device.

Air should be 'purged' from administration sets and extension tubing prior to attachment to a vascular access device. All equipment used with vascular access devices should have Luer-locking connections, equipment with safety features designed to detect and or prevent air embolism, for example electronic infusion devices with air sensors/alarms and administration sets with eliminating filters (INS, 2016).

Clamps on the catheter and the administration set should be closed when changing equipment

Infusion bags and containers should not be allowed to run dry/empty during an infusion (INS, 2016).

8.7. Pneumothorax and Haemothorax

Patients referred of transferred into the care of Humber Teaching NHS Foundation Trust will have had the position of the central venous access device radiological assessed for any signs of post-insertion pneumothorax/haemothorax and to clarify the catheters position. However, HCPs should be competent to identify pneumothorax/haemothorax in order that emergency treatment can be sought

Signs or symptoms of pneumo/haemothorax may include:

- Pain on inspiration and expiration,
- Dyspnoea

If pneumothorax and haemathorax is suspected call for an emergency ambulance (dial 999). Inform the medical doctor for the ward/unit.

Monitor vital signs every 15 minutes until the paramedics arrives

If is pneumothorax or haemothorax is suspected call for an emergency ambulance (dial 999). Inform the medical doctor for the ward/unit.

8.8. Speed Shock/Fluid Overload and Electrolyte Imbalance

Speed shock is a sudden physiological adverse reaction as a result of an IV medication being administered too quickly.

The HCP administering the medication and/or infusion will have the knowledge of the speed or rate over which to perform administration of infusions to prevent speed shock or fluid overload and/or electrolyte imbalance. The prescription should be referred to at all times: any discrepancies or concerns should be raised with the prescriber or a medic.

Signs and symptoms of speed shock may include:

- flushed face
- headache

- dizziness
- tight feeling in the chest
- irregular pulse/tachycardia
- hypotension
- loss of consciousness
- cardiac arrest

Signs and symptoms of fluid overload may include:

- restlessness
- dyspnoea
- cough
- tachycardia
- hypertension
- low oxygen saturations

Regular monitoring of the patient is required during the administration of fluids, including vital signs and fluid balance charts.

If speed shock or fluid overload is suspected, call for an emergency ambulance (dial 999). Inform the medical doctor for the ward/unit.

8.9. Cardiac Tamponade

An incidence of cardiac tamponade associated with vascular access should be reported as an adverse patient outcome.
The HCP should be competent to identify the acutely ill patient following a possible tamponade and take appropriate action (NICE, 2007).

All information relating to the event should be documented in the patient's nursing and medical notes (NMC 2015a).

Assessment of the risk of tamponade should be carried out by a skilled professional. Risk factors include, but are not limited to, the patient's health status, anticoagulant therapy, and the procedure being performed. Tamponade is associated with central venous catheters and can occur on insertion or subsequently, particularly if the catheter is placed in the heart chambers.

The practitioner should demonstrate knowledge of the signs and symptoms of tamponade.

Observation of the signs and symptoms of tamponade occurrence should prompt immediate treatment to relieve cardiac compression.

Ongoing observation and assessment of the patient should be performed and documented. Information relating to the cause, action taken and outcome of the event should be documented in the patient's records (NMC, 2015a).

Incidence of tamponade, together with the cause, should be recorded so that possible steps for future prevention can be identified. I

Insertion and removal will be conducted within an acute hospital.

9. REFERENCES

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Appendix 1: Intravenous (IV) Fluid Monitoring Chart

(available on the intranet under "Forms")

Patient name	
Date of birth	
NHS number	
Ward/Unit/ Team name	

(Use Addressograph)

DO NOT DESTROY. TO BE FILED IN PATIENT'S MEDICAL RECORDS FOLLOWING DISCHARGE

INTRAVENOUS (IV) FLUID MONITORING CHART

IV preparations must be prescribed on the medicines administration record chart including volume, infusion rate.

For antibiotics the duration of treatment must be specified

Date	Type of I.V. Fluid	Infusion pump serial No	Rate mls/hrs	Additives			Batch Number	Start Time	Administering Nurse Signature / Witness Signature	Expected Stop Time	Stop Time	Volume Infused/remaining		Date/Time Giving set changed
				Name		Dose								
				Electrolyte										
				Drug										
				Electrolyte										
				Drug										
				Electrolyte										
				Drug										
				Electrolyte										
				Drug										
				Electrolyte										
				Drug										
				Electrolyte										
				Drug										

Appendix 2: Intravenous Cannula Record

INTRAVENOUS CANNULA RECORD

DO NOT DESTROY. FILE IN PATIENT'S MEDICAL RECORDS FOLLOWING DISCHARGE

INSERTION RECORD

Please indicate insertion site:

Date:_____ Lot No:_____l

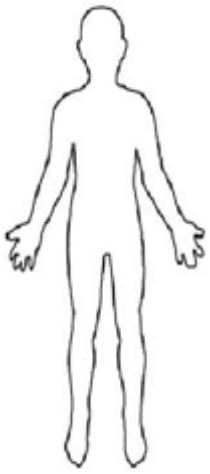
Size:_____ g No. of attempts:_____l

First Insertion: or Re-site:

Reason for insertion:

Reason for re-site:

Inserted by:



REMOVAL RECORD

Date:_____ No. days in situ:

VIP score on removal:

Reason for removal:

Removed by:

DATE					
VIP SCORE (0-5)					
Continuous Infusion	Y / N	Y / N	Y / N	Y / N	Y / N
Dressing renewed	Y / N	Y / N	Y / N	Y / N	Y / N
Staff initials (Please state time, initials & designation)					
Cannula flushed as Per Trust Patient Group Directive/ Policy (Please state time, initials & designation)					

INSERTION RECORD

Please indicate insertion site:

Date:_____ Lot No:_____l

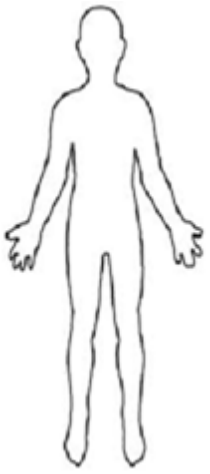
Size:_____ g No. of attempts:_____l

First Insertion: or Re-site:

Reason for insertion:

Reason for re-site:

Inserted by:



REMOVAL RECORD

Date:_____ No. days in situ:

VIP score on removal:

Reason for removal:

Removed by:

DATE					
VIP SCORE (0-5)					
Continuous Infusion	Y / N	Y / N	Y / N	Y / N	Y / N
Dressing renewed	Y / N	Y / N	Y / N	Y / N	Y / N
Staff initials (Please state time, initials & designation)					
Cannula flushed as Per Trust Patient Group Directive/ Policy (Please state time, initials & designation)					

Appendix 3: Visual Infusion Phlebitis Scoring

(adapted from Rotherham General Hospital)

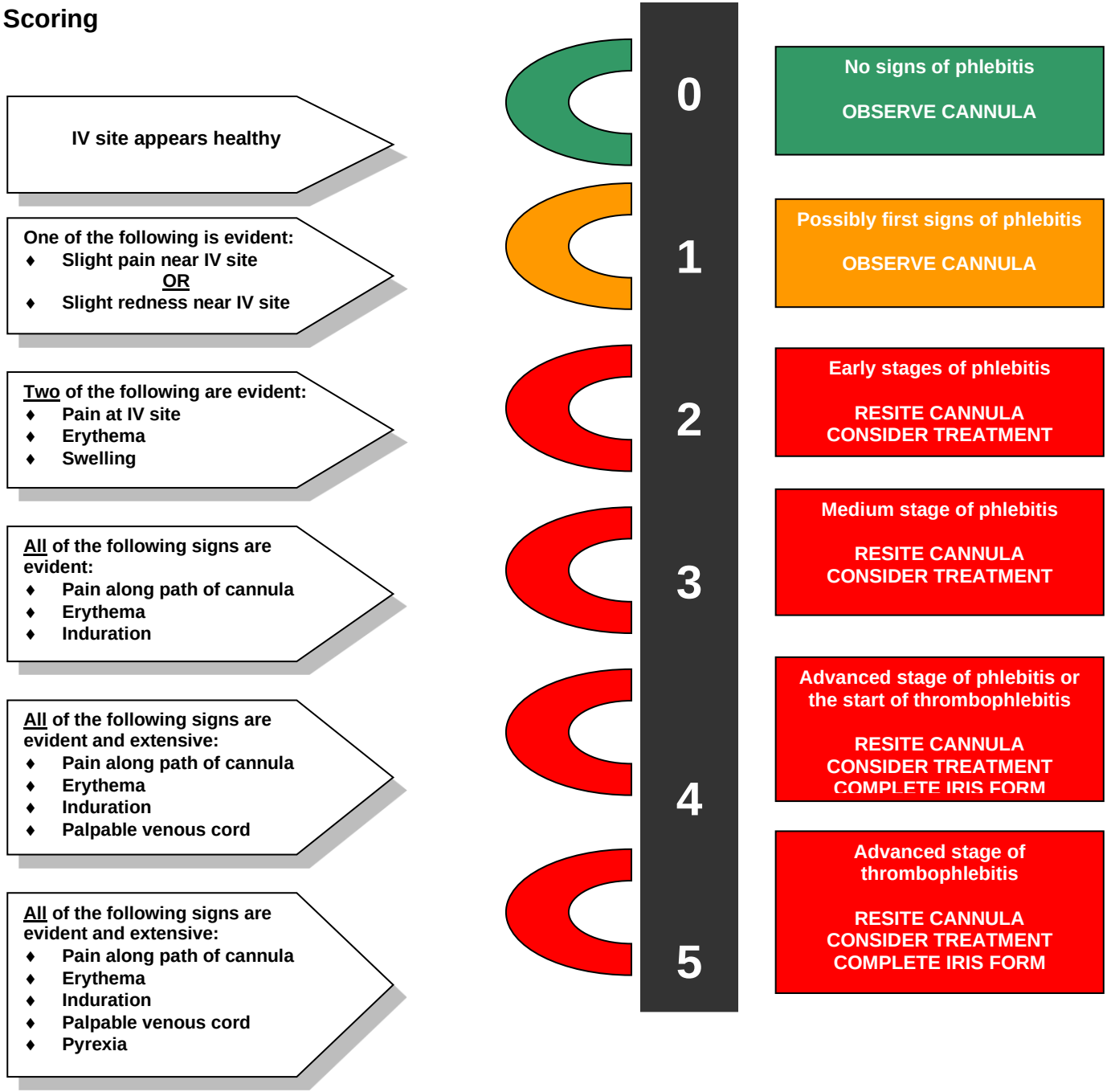
POLICY STATEMENT

All patients with an intravenous access device in place must have the IV site checked at least once every 12 hours for signs of infusion phlebitis. The subsequent score and action(s) taken (if any) must be documented. The cannula site must also be observed:

- **When bonus injections are administered**
- **When IV flow rates are checked or altered**
- **When solution containers/giving sets/lines are changed**
- **If occlusion occurs**

The incident of infusion phlebitis varies, the following 'Good Practice Points' may assist in reducing the incidence of infusion phlebitis:

- → **Observe cannula site at least once every 12 hours**
- → **Secure cannula with a proven intravenous dressing (Opsite IV3000 or Tegaderm IV)**
- → **Replace loose and/or contaminated dressings**
- → **Cannula must be inserted away from joints whenever possible**
- → **Aseptic technique must be followed**
- → **Consider re-siting the cannula every 72 hours**
- → **Plan and document continuing care**
- → **Use the smallest gauge cannula most suitable for the patients' needs**
- → **Replace the cannula at the first indication of infusion phlebitis (stage 2 on the VIP Score)**



Appendix 4a: Flushing Guidance for Central Venous Access Devices: Hickman Lines/Skin-Tunnelled Catheters and Peripherally Inserted Central Venous Access Devices (PICC lines)

To be used in the absence of written guidance from the referring trust

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Nursing responsibilities	**Skin-Tunnelled Catheter (STC, Hickman line)** Flushing procedure see Appendix 4b	**Peripherally Inserted Central Catheter (PICC)** Flushing procedure see appendix 4c
After blood sampling	• 10ml Sodium Chloride 0.9% for injection. • 50 units/5ml Heplock/Hepsal if not in use (Heparin Sodium 10 units/ml)	• 20ml Sodium Chloride 0.9% for injection.
After blood transfusion	• 20ml Sodium Chloride 0.9% for injection.	• 20ml Sodium Chloride 0.9% for injection.
Before and after administration of intravenous medication	• 10ml Sodium Chloride 0.9% for injection.	• 10ml Sodium Chloride 0.9% for injection.
When converting from continuous to intermittent use	• 10ml Sodium Chloride 0.9% for injection.	• 10ml Sodium Chloride 0.9% for injection.
After intermittent therapy	• 10ml Sodium Chloride 0.9% for injection	• 10ml Sodium Chloride 0.9% for injection.
When catheter is not in use	• 5ml Heplock/Hepsal-50 units/5ml (Heparin Sodium 10 units/ml)	• 10ml Sodium Chloride 0.9% for injection.
Frequency of flush when not in use	• Weekly	• Weekly
• Aseptic technique must always be used for accessing central venous catheters		
• Syringe size limited to 25psi/10ml syringe or larger		
• Use pulsating flush technique and finish on positive pressure		
• Before administrating via any central venous catheter blood return must be ascertained.		
In the event of withdrawal occlusion refer patient to the acute hospital/referring trust.		

Appendix 4b: Procedure for Flushing Skin-Tunnelled Catheter (STC, Hickman Line)

- Following the administration of intravenous fluids, medication and/or blood sampling the catheter must be flushed with 10mls normal saline 0.9% followed by 5mls Heplock/Hepsal if catheter will not be in use.
- The Skin Tunnelled Catheter must be routinely flushed every seven days with 5ml Heplock/Hepflush when not in use to maintain patency.
- Needle-free connection end cap device must be changed every seven days as part of the flushing procedure.

EQUIPMENT
Plastic apron
Sterile dressing pack containing powder-free gloves
2% Chlorhexidine in 70% alcohol, or Sani-Cloth CHG 2%
10ml Luer-Lok™ syringe
5mls Heplock/Hepsal
Filter needle
Replacement needle-free connection end cap device (if required)

PROCEDURE

1. Explain the procedure to the patient.
2. The nurse will ensure the procedure is performed using a strict aseptic technique.
3. Place the sterile towel under the catheter.
4. Clean the connectors with gauze, sprayed with Chlorhexidine, or use the Sani-Cloth, and allow to air dry as the drying action of the alcohol kills bacteria.
5. Using a 10ml Luer-Lok™ syringe and filter needle draw up 5ml of Heplock/Hepsal. Remove the needle and push and twist the syringe into the connector.
6. Open switch and flush the line using a brisk ‘push/pause’ action, close switch whilst keeping pressure on the plunger, to ensure a positive pressure is maintained within the line.
7. Unscrew the end cap anti-clockwise, discard and replace with sterile needle-free end cap device. Ensure it is screwed on clockwise securely.
8. For double lumen catheters treat each lumen as separate lines.
9. For difficulty in flushing the STC refer to the ‘Troubleshooting’.

Appendix 4c: Procedure for Flushing Peripherally Inserted Central Catheter (PICC)

Due to the presence of the Groshong valve the catheter must be flushed with 10mls Normal Saline 0.9% following administration of intravenous fluids, medication and/or blood sampling.

The PICC must be routinely flushed every seven days when the catheter is not in use to maintain patency.

The Luer-Lok™ injection device must be changed every seven days, as part of the flushing procedure.

EQUIPMENT

Plastic apron
Sterile dressing pack containing powder-free gloves
2% Chlorhexidine in 70% alcohol or Sani-Cloth CHG 2%
10ml Posiflush or
10ml Luer-Lok™ syringe, blunt needle and 10mls Sodium Chloride for injection
Replacement needle-free connection end cap device (if required)

PROCEDURE

1. Explain the procedure to the patient.
2. The nurse will ensure the procedure is performed using a strict aseptic technique.
3. Place the sterile towel under the catheter.
4. Clean the connectors with gauze, sprayed with Chlorhexidine, or use the Sani-Cloth, and allow to air dry as the drying action of the alcohol kills bacteria.
5. Using a 10ml Posiflush/Luer-Lok™ syringe and blunt needle draw up 10ml of normal saline. Remove the needle and push and twist the syringe into the connector.
6. Flush the line using a brisk ‘push/pause’ action.
7. **When approximately 0.2ml is left in the syringe, remove the syringe whilst keeping pressure on the plunger, to ensure a positive pressure is maintained within the line. There will be some spray back as the syringe is removed which indicates that positive pressure has been obtained.**
8. For double lumen catheters treat each lumen as separate lines.
9. Unscrew the end cap anti-clockwise, discard and replace with sterile needle-free end cap device. Ensure it is screwed on clockwise securely.
10. For difficulty in flushing the PICC refer to the ‘Trouble Shooting’ section of the resource file.

Appendix 4d: Procedure for Blood Sampling from a Skin-Tunnelled Catheter (not including blood cultures)

Blood samples from a STC may be obtained by a syringe or a vacutainer™ blood collection system. It is important when samples have been obtained to flush the catheter almost immediately with 10ml normal saline 0.9% using a pulsating flush technique. Without immediate and adequate flushing the risk of clotting and blockage is possible.

EQUIPMENT

Plastic apron
Sterile dressing pack containing powder free gloves
2% Chlorhexidine in 70% alcohol, or Sani-Cloth CHG 2%
3 x 10ml Posiflush or 10ml Luer-Lok™ syringes/Vacutainer™ blood collection device
1 x blunt needle and 1 x filter needle
Luer-Lok™ syringe of appropriate size for sample required (if syringe being used)
Appropriate blood sample bottle/s
10ml Sodium Chloride 0.9% (if not using Posiflush)
50 units/5ml Heplock/Hepsal
Replacement needle-free connection end cap device
Sharps bin
Laboratory request form

PROCEDURE

1. Explain procedure to patient, to obtain consent and co-operation.
2. The nurse will ensure the procedure is performed using a strict aseptic technique.
3. Wash hands thoroughly and apply disinfectant hand rub.
4. Open sterile pack and prepare equipment on sterile field.
5. Break tops of saline and Heplock ampoules.
6. If intravenous infusion is in progress temporarily discontinue.
7. Clamp catheter, to prevent entry of air or leakage of blood via the catheter.
8. Wash hands and apply sterile gloves.
9. Draw up saline, or prepare Posiflush and Heplock without touching the ampoules.
10. Clean the connector with Chlorhexidine, or Sani-Cloth and allow to air dry as the drying action of alcohol kills bacteria.
11. Using an empty 10ml Luer-Lok™ syringe push and twist into the end cap. Pull gently and slowly aspirate 3-5ml of blood and discard.
12. If blood is difficult to aspirate remove end cap and attach a 10ml Luer-Lok™ syringe containing 5ml of normal saline 0.9% and alternate flush/aspirate (see the 'Trouble Shooting' section of the resource file for further help).
    N.B. Caution should be taken not to contaminate sterile gloves when handling unsterile blood sample bottles.
13. Following collection of sample flush with 10ml normal saline immediately to prevent clotting in the line. Using a push pause motion, and as injecting the last ½ml clamp the line as the syringe is removed from the injection device, thus maintaining positive pressure (to prevent a vacuum causing blood to flow back into the tip of the catheter).
14. Attach the syringe of appropriate heparin solution, flush the catheter, and detach the syringe leaving ½ml in the syringe, ending with a positive pressure disconnection as above.
15. Re-connect a sterile needle-free end cap device if removed for blood sampling.
16. If blood is collected using a syringe, remove cap from blood sample bottles and fill to the specified amount. Replace cap.
17. Label and send acquired samples to the appropriate laboratory with specimen request form.
18. Clean the line using Chlorhexidine solution, or Sani-Cloth. If required, reconnect infusion.
19. Having discarded sharps into a 'sharps' bin during the procedure, fold up sterile field and dispose of any other clinical waste into yellow waste bag.
    N.B When a double lumen catheter is in situ, use the largest lumen for routine blood sampling.

Gentamycin levels must be taken peripherally where possible as minute concentrate of the drug within the line may give an inaccurate result. If peripheral access is limited blood can be taken from the line but must be flushed with 20ml normal saline 0.9% using a push/pause action prior to collection of sample. Document on the pathology request card that the blood has been taken from the STC.

INR must be taken peripherally to avoid the chance of contamination from the heparinised line leading to inaccurate results. If peripheral access is limited withdraw 20mls of blood and discard prior to sample collection. Document on the pathology request card that the blood has been taken from the STC.

Appendix 4e: Procedure for Blood Sampling from a Peripherally-Inserted Central Catheter (not including blood cultures)

Blood samples from a PICC may be obtained by a syringe or a Vacutainer™ blood collection system. It is important when samples have been obtained to flush the catheter almost immediately with 10ml normal saline 0.9% using a pulsating flush technique. Due to the small bore size of the PICC the risk of clotting and blockage is possible.

EQUIPMENT
Plastic apron
Sterile dressing pack containing powder free gloves
2% Chlorhexidine in 70% alcohol, or Sani-Cloth CHG 2%
2 x 10ml Posiflush or 10ml Luer-Lok™ syringes
2 X blunt needles
Luer-Lok™ syringe of appropriate size for sample required/Vacutainer™ blood collection device
Appropriate blood sample bottle/s
20ml Sodium Chloride 0.9% (if not using Posiflush)
Needle-free connection end cap
Sharps bin
Laboratory request form

PROCEDURE
1. Explain the procedure to patient, to obtain consent and co-operation.
2. The nurse will ensure the procedure is performed using a strict aseptic technique.
3. Wash hands thoroughly and apply disinfectant hand rub.
4. Open sterile pack and prepare equipment on sterile field.
5. Break tops of saline ampoules.
6. If intravenous infusion is in progress discontinue temporarily.
7. Wash hands and apply sterile gloves.
8. Draw up saline without touching the ampoules
9. Clean the connector with Chlorhexidine, or Sani-Cloth and allow to air dry as the drying action of alcohol kills bacteria.
10. Using an empty 10ml Luer-Lok™ syringe push and twist into the connector. Pull gently to allow the Groshong valve to open and slowly aspirate 3-5ml of blood and discard. Take blood sample using appropriate size syringe or Vacutainer™ blood collection device.
11. If blood is difficult to aspirate remove end cap and attach a 10ml Luer-Lok™ syringe containing 5ml of normal saline 0.9% and alternate flush/aspirate (see the Trouble Shooting section of the resource file for further help).
    N.B. Caution should be taken not to contaminate sterile gloves when handling unsterile blood sample bottles.
12. Following collection of sample flush with 10ml normal saline immediately to prevent clotting in the line. Due to the small bore size of the line there is a risk of clotting and blockages. Using a push pause motion injecting the last ½ml as the syringe is removed from the injection device, thus maintaining positive pressure (to prevent a vacuum causing blood to flow back into the tip of the catheter).
13. Reconnect a sterile needle-free end cap device if removed for blood sampling.
14. If blood is collected using a syringe, remove cap from blood sample bottles and fill to the specified amount. Replace cap.
15. Label and send acquired samples to the appropriate laboratory with specimen request form.
16. Clean the line using Chlorhexidine solution, or Sani-Cloth. If required, reconnect infusion.
17. Having discarded sharps into a 'sharps' bin during the procedure, fold up sterile field and dispose of any other clinical waste into a yellow waste bag.
    N.B When a double lumen catheter is in situ use the largest lumen for routine blood sampling.

Gentamycin levels must be taken peripherally where possible as a minute concentrate of the drug within the line may give an inaccurate result. If peripheral access is limited blood can be taken from the line but must be flushed with 20ml normal saline 0.9% using a push/pause action prior to collection of sample. Document on the pathology request card that the blood has been taken from the PICC.

INR must be taken peripherally to avoid the chance of contamination from the heparinised line leading to inaccurate results. If peripheral access is limited withdraw 20mls of blood and discard prior to sample collection. Document on the pathology request card that the blood has been taken from the PICC.

Appendix 4f: Procedure to Disconnect a Cytotoxic Ambulatory Pump (PICC)

OBJECTIVE

All staff will have received training and education in the use of Peripherally Inserted Central Catheters.

The correct PICC maintenance procedure for district nurses will be followed to reduce the risk of potential complications.

RESPONSIBILITIES

Before discharge the district nurse who will care for the line will be contacted and be taught any techniques they may need to use to prevent infection and safely manage the catheter.

Equipment will be provided by the referring area upon patient discharge.

Continued training and support should always be available from the referring area.

EQUIPMENT

Sterile dressing pack containing sterile gloves
Sani-cloth CHG 2% (Device only)
IV 3000 dressing (10cm x 14cm) or equivalent
Chloraprep 3ml applicator (skin only)
10mls N/saline x 2 (if not using Posiflush)
10ml Posiflush or 10ml Luer-Lok™ syringe x 2
End cap (i.e. Bionector)
Blunt needles x 2
White connection cap
Cytotoxic sharps bin

PROCEDURE

1. Wash and dry hands thoroughly. Open sterile dressing pack and all other equipment onto the sterile field.
2. Loosen and remove dressing gently, starting at the bung and carefully pulling up towards the exit site ensuring that the PICC remains secured by the anchorage device.
3. Inspect exit site for redness, inflammation and/or swelling. Enquire with the patient if they have experienced any recent problems.
4. Inspect catheter for leakage, damage or kinks.
5. Wash hands and put on sterile gloves.
6. Place the sterile towel underneath the catheter
7. Using the gauze in the dressing pack, pick up the catheter and clean the connections with the Sani-cloth and allow to air dry.
8. Disconnect the infusion pump by turning anti-clockwise and **immediately** attach the white connection cap to the end of the pump before placing the pump into the cytotoxic sharps bin. If a white connection cap is not available do not disconnect the pump as a leakage of chemotherapy from the pump could occur.
9. If not using Posiflush, draw up saline with a needle and syringe maintaining a sterile technique
10. Attach the 10ml Posiflush or 10ml Luer-Lok™ syringe; flush the catheter containing chemotherapy with normal saline using a brisk push/pause technique.
11. Now routinely flush the catheter with 10 mls normal saline using a brisk push/pause technique.
12. Discard the old end cap, clean with chlorhexidine, or sani-cloth and allow to air dry, replace with a new end cap.
13. Clean insertion site with Chloraprep 3ml applicator and allow to air dry. A small N/A dressing can be placed under the connections to protect the skin from pressure prior to affixing an occlusive transparent dressing. This dressing should cover the device from the entry site to the end of the blue line, to provide a waterproof barrier. The extension should be left exposed to allow easy access and unnecessary redressing.

Appendix 4g: Procedure to Disconnect a Cytotoxic Ambulatory Pump (STC)

OBJECTIVE

All staff will have received training and education in the use of Skin-Tunnelled Catheter (STC).

The correct STC maintenance procedure for district nurses will be followed to reduce the risk of potential complications.

RESPONSIBILITIES

Before discharge the district nurse who will care for the line will be contacted and be taught any techniques they may need to use to prevent infection and safely manage the catheter.

Equipment will be provided by the referring area upon patient discharge.

Continuing training and support should always be available from the referring area.

EQUIPMENT

Sterile dressing pack containing sterile gloves
Sani-cloth CHG 2% (Device only)
IV 3000 dressing (5cm x 4cm) or equivalent
10ml Posiflush or 10ml Luer-Lok™ syringe x 2
10mls Normal saline (if not using Posiflush)
Hepsal 50 units/5ml
End cap (Bionector)
White connection cap
Cytotoxic sharps bin
Blunt needles x 2
Chloraprep 3ml applicator (exit site only)

PROCEDURE

1. Wash and dry hands thoroughly. Open sterile dressing pack and all other equipment onto the sterile field.
2. Inspect exit site for redness, inflammation and/or swelling. Enquire with the patient if they have experienced any recent problems.
3. Inspect catheter for leakage, damage or kinks.
4. Wash hands and put on sterile gloves.
5. Place the sterile towel underneath the catheter
6. Using the gauze in the dressing pack pick up the catheter and clean the connections with the Sani-cloth and allow to air dry.
7. Disconnect the infusion pump by turning anti-clockwise and **immediately** attach the white connection cap to the end of the pump before placing the pump into the cytotoxic sharps bin. If a white connection cap is not available do not disconnect the pump as a leakage of chemotherapy from the pump could occur.
8. If not using Posiflush, draw up saline with a needle and syringe maintaining a sterile technique.
9. Attach the 10ml Posiflush or 10ml Luer-Lok™ syringe; flush the catheter containing chemotherapy with normal saline using a brisk push/pause technique.
10. Now routinely flush the catheter with Hepsal 50 units/5ml in a 10 ml syringe using a brisk push/pause technique.
11. Discard the old end cap, clean with chlorhexidine, or Sani-Cloth and allow to air dry, replace with a new end cap.
12. If the exit site dressing requires changing remove gently. Clean exit site with Chloraprep 3ml applicator and allow to air dry before applying a new IV3000.

Appendix 5: Troubleshooting – a Quick Reference Guide for Managing Problems with CVADs

Presenting symptom(s)	Potential problem	Possible cause	Recommended actions
Chest pain Dyspnoea Tachycardia/irregular pulse Hypotension	Air embolism or atrial fibrillation	Air entering the venous system during insertion or catheter use	Seek urgent medical advice/emergency admission
Pain on inspiration and expiration, dyspnoea	Pneumothorax	Air entering the space between the plural lining and the lung	Seek urgent medical advice/emergency admission
Tingling Loss of movement down part or all of the affected limb Shooting pain	Nerve injury	Damage to the nerves in the local area can occur	Contact the referring unit for medical advice
Coughing Ear/neck pain on the side of insertion, palpitations or arrhythmias Inability or difficulty aspirating blood Swelling of neck, chest arm or leg. Shoulder tip pain	Catheter malposition	Catheter in the wrong place	Contact the referring unit for medical advice X-ray may be required
Swelling of neck, chest, arm or leg Skin discoloration Skin temperature changes Infusion difficulties Inability to aspirate blood	Thrombosis in vein	Thought to be caused by damage to vein wall causing the release of thromboplastic substances that cause platelets to collect at injury site. These may grow into a larger thrombus or small bits break away and cause occlusion of a vessel elsewhere	Seek urgent medical advice/emergency admission
Pain redness along the vein, tracking and swelling For PICC lines – if post 10 days insertion consider whether chemical phlebitis or infection. Mechanical phlebitis less likely after 10 days insertion	Mechanical phlebitis/ infection	Irritation of the vein due to movement of the catheter in the vein (not associated with tunnelled CVC's but can occur with PICCs)	Contact the referring unit for medical advice

Presenting symptom(s)	Potential problem	Possible cause	Recommended actions
Continuous back flow of blood into the catheter	Blood present in the lumen of the catheter	Fault in catheter, or line flushed incorrectly	Flush the line using correct technique. If back flow continue seek advice from referring unit Medical advice from the Cancer Centre/Unit
Inability to flush the line	Catheter occlusion Pinch off syndrome	Line adhered together near clamp Line kinked or twisted Clot or fibrin sheath in catheter. Drug precipitate blocking catheter. Lipids from TPN feed blocking catheter When the catheter is compressed between the clavicle and the first rib	Contact the referring unit for medical advice
Difficulty in aspirating blood	Catheter occlusion Pinch off syndrome Fibrin sheath formation	Line adhered together near clamp Clot or fibrin sheath in catheter Line kinked or twisted Drug precipitate blocking catheter. Lipids from TPN feed blocking catheter When the catheter is compressed between the clavicle and the first rib Sheath has formed around the catheter tip	Contact the referring unit for medical advice
Redness and tracking at site. Purulent discharge at site	Infection at insertion site	Infection at insertion site.	Contact the referring unit for medical advice
Pyrexia of unknown origin, rigors. These may occur up to one hour after line has been flushed and should be investigated	Infection associated with the catheter	Infection	Contact the referring unit for medical advice

Presenting symptom(s)	Potential problem	Possible cause	Recommended actions
Leakage from the catheter when used. Damage visible	Damage to catheter.	Use of a sharp object near the catheter or movement twisting of the catheter (PICCs are vulnerable to fracture). High pressure on the syringe as injecting into the catheter.	Contact the referring unit for medical advice May require emergency admission
Line appears longer at the exit site or the cuff is visible. On measurement the length is on longer than upon insertion.	Line migration (Common problem for PICCs)	Can occur with general activity, caution should be taken when removing dressings specifically PICCs not to pull the line.	Contact the referring unit for medical advice X-ray to confirm the catheter tip may be required
Skin changes at insertion site • thickening of skin at point of insertion • pink/red in colour	Skin over granulation	Unknown - possibly due to inflammatory response of injured tissue, as prolonged and excessive inflammation can lead to over granulation (Stephen-Hayes 2013). The presence of a foreign body interfering with healing may also contribute (Widgerow et al. 2010)	Contact the referring unit for medical advice A change of dressing may be indicated. Polyurethane foam dressings e.g. Lyofoam are suggested for over granulation.