

# South Wales Intravenous Access Advisory Group

## Guidelines for the Care and Maintenance of a Peripherally Inserted Central Catheter (PICC).

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South Wales IV Access Advisory Group – PICC guidelines: a real world example  
This local guideline is an example used in the NICE medical technology guidance adoption support resource for SecurAcath for securing percutaneous catheters, and was not produced, commissioned or sanctioned by NICE.

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**April 2014**

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## **Executive Summary**

This document will comprise of information pertaining to the care and maintenance of a Peripherally Inserted Central Catheters (PICCs). This document is required in order to reduce the risks and complications associated with all aspects of PICC care by standardising best practice for all practitioners to follow.

## **Scope of Document**

The document will apply to all healthcare practitioners who use PICC's in the primary or secondary care settings within South Wales.

## **Aims**

This document is based on empirical evidence and expert opinion. This will ensure that the standard of care delivered will be consistent within all Local Health Boards and Trusts throughout South Wales and that the delivery of care concerning the care and maintenance of PICCs will be of a high standard.

## **Statement**

All the Local Health Boards and Trusts involved in the development and implementation of the guidelines are committed to providing the best possible care for patients who require PICC placement for central venous access. The organisations within South Wales are also committed to working in collaboration with other Health Boards in North Wales and throughout the United Kingdom to ensure that the document is updated according to recent research and expert opinion.

## **Education and training**

It is essential that all nurses recognise their professional accountability using sound judgments with a good knowledge base before performing any procedures such as caring for a PICC (NMC 2004). Nurses dressing or flushing or using a PICC for intravenous therapy should be trained appropriately and have achieved competency within their clinical areas ( Loveday et al 2014).

## **Responsibilities**

The South Wales Intravenous Access Advisory Group involved in the development of this document represents all LHB's in South Wales and Velindre NHS Trust. Representation from both secondary and primary care from all 6 Local Health Boards and NHS Trust have contributed to the development of this document namely:

- Velindre Cancer Centre
- Abertawe Bro Morgannwg
- Cwm Taff
- Aneurun Bevan
- Cardiff and Vale
- Powys Teaching HB
- Hywel Dda

Infection control input was

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## **Introduction**

A Peripherally Inserted Central Catheter or PICC is used for medium to long-term intra-venous access. It is a long hollow tube made of silicone or polyurethane.

The catheter is inserted into a peripheral vein in the arm at the ante-cubital fossa or in the upper arm using ultrasound guidance and threaded along the vein until the distal tip rests in the superior vena cava (SVC). In this location, maximum blood flow allows the immediate dilution of infusate administered via the PICC.

The PICC can be used for the administration of fluids, drugs, parenteral nutrition and blood products along with the ability to withdraw blood for laboratory sampling.

A PICC can be either open ended or valved. A valved PICC has a 3-way valve which can be located at the distal or proximal end of the catheter to prevent bleed-back into the catheter. A non-valved catheter will have a clamp in situ.

PICCs may have single or dual lumens and each lumen is separate along the full length of the line and should be treated as two separate catheters when flushing.

## **Routine care and maintenance**

The routine care and maintenance of a PICC involves weekly flushing and dressing. However, if the PICC is used for the administration of drugs or fluids, the PICC has to be flushed immediately post completion of the infusion. Security devices such as statlock/griplock requires changing once every 4 weeks (Appendix I). A risk assessment can be found on the Velindre Cancer Centre Website as described on page 6 in order to practice outside manufacturers' guidelines.

When performing both the dressing and flushing as one procedure, it is considered best practice to flush the catheter prior to re-dressing the exit site. This aims to prevent the contamination of the hub by skin bacteria which could lead to a systemic infection.

The first dressing should be performed within 72hrs of placement.

PICC care and maintenance can be performed using aseptic technique or using aseptic non-touch technique (ANTT). This document will describe the care using ANTT.

### ANTT

ANTT can be described as a standardised aseptic technique where key parts are identified and protected in order to prevent the introduction of infection. Key elements are; to perform effective hand hygiene, institute a non-touch technique and to wear only the appropriate personal protective equipment according to the type of procedure. It incorporates the essential infection control measures in preventing pathogenic micro-organisms on hands, surfaces or equipment from being introduced to susceptible sites during clinical practice (RCN, 2010; Rowley, 2001). Further information concerning ANTT can be found in appendix II.

### Hand hygiene

According to the epic3 guidelines (National based guidelines for preventing healthcare-associated infections 2014) hand decontamination refers to both hand-washing using liquid soap and water the use of alcohol based hand rub. Both will be referred to throughout this

document. Hand hygiene must be performed immediately prior and post each episode of direct contact or care. Alcohol based hand rub can be used for decontamination when there is NO contact with potentially contaminated body fluids; when hands are NOT visibly soiled and when NOT caring for a patient with vomiting and diarrhoea illness. For staff, all wrist and hand jewellery should be removed; wear short sleeved clothing and cover any abrasions with a waterproof dressing.

### Assessment

Prior to any catheter care, it is important to observe the PICC and the surrounding area for any signs of complications and to complete a short assessment: Observe for:

- Pain – arm, shoulder neck or chest
- Redness
- Swelling, engorged veins in the arm, neck or chest.
- Exudate, redness, pain at exit site
- Pyrexia or a history of rigors post flushing.
- Dressing allergy – redness, blistering, itching, pain under the dressing.
- PICC migration
- Leaking of fluid beneath the dressing

All patients should have clear documentation of the external length of the catheter visible outside the body at time of placement in their medical notes and a record of this measurement should be written in a standard letter for the Community Nurse. This will enable any practitioner caring for the PICC to determine if the catheter has moved since the insertion.

Any signs or symptoms of complications should be reported to the placement hospital without delay.

### **Important notes:**

**When a chemotherapy pump is attached to the PICC, no attempt should be made to flush the catheter until the pump is disconnected by an appropriately trained practitioner.**

**A BLOOD RETURN SHOULD ALWAYS BE TAKEN FROM A PICC PRIOR TO USING IT FOR ANY MEDICATION OTHER THAN A ROUTINE FLUSH OF SALINE.**

# Flushing a PICC

The PICC needs to be flushed once weekly with 10mls of 0.9% Sodium Chloride to maintain patency when not in use or after any infusion or bolus injection. There is no need to withdraw blood into the syringe prior to a **routine flush with saline** (RCN 2010).

As with all Central lines, 10 mls is the minimum size syringe to be used to flush a PICC line. Using smaller syringe size can result in excessive pressure being exerted which could result in a damaged catheter.

PICCs should be routinely flushed using a turbulent and positive pressure flush.

A turbulent flush can be described as using a rapid push pause action when flushing. The turbulence created will cleanse the internal lumen of the catheter more efficiently. A positive pressure flush takes place when the syringe is removed from the end of the PICC whilst still flushing – this is to close the valve to prevent blood reflux back into the catheter which could cause an occlusion.

The needle free connector needs to be changed **weekly** (Loveday et al 2014, O'Grady et al 2011).

**It is considered less problematic to use a side tip syringe to flush a valved PICC rather than a luer-lock syringe.**

## The Procedure

The procedure for flushing a PICC will be described using ANTT (aseptic non-touch technique)

### **Equipment**

Clean plastic tray – or you can use a sterile pack in the community if no tray is available.

Detergent wipes/70% alcohol wipes to clean the tray – if using

1 x pair of non-sterile gloves (powder free)

Sterile chlorhexidine 2% in alcohol 70% solution or swab (e.g Clinell) or solution

1 x 10ML or larger syringe – preferably side tip

10ML 0.9% Sterile Sodium Chloride for IV use

Green or blue needle to draw up Sodium Chloride

End connector if required (need changing weekly)

Sharps bin

### **Procedure**

- Wash hands thoroughly
- The ANTT key parts to consider when flushing a PICC are: The end connector or the end of the PICC (with end connector removed); the tip of the syringe; the tip of the needle and the part of the chlorhexidine swab that will clean the end connector.
- Clean tray or open sterile pack
- Prepare the equipment on the clean tray or onto the dressing pack – **keep all within their packaging**

- If using a pre-filled sodium chloride syringe, open onto the clean tray
- Put on non-sterile gloves
- If the end connector needs changing – change prior to flushing. Remove old connector; hold onto the end of the PICC; open the clinell and cleanse the **very end** of the PICC using the chlorhexidine swab and leave to dry. Replace with new end connector.
- If the end connector does not need to be changed hold the end of the PICC, open the clinell and clean the very end of the end connector thoroughly with the chlorhexidine/alcohol swab for at least 15 seconds and allow to dry. It is **imperative** that the solution is left to dry naturally for at least a minute. **Visually check that the end of the end connector is dry**
- Ensure that the PICC end connector does not touch any clothing – keep clean!
- Open the syringe and needle packages and place the needle onto the syringe, open the saline vial and draw up the saline flush and dispel any air – you can hold on to the saline pod with your non-sterile gloved hand
- Flush the PICC. When flushing a PICC line routinely with 0.9% sodium chloride there is no need to withdraw blood from the catheter. **However, if any drug or a solution other than saline is to be used, a blood return has to be verified prior to use in order to verify location within a vein.**
- Attach a syringe containing 10mls of 0.9% Sodium Chloride onto the end connector. Flush using a turbulent, (pulsating push pause) action, finishing with a positive pressure. Positive pressure flushing means continuing to simultaneously flush as the syringe is removed from the end connector i.e the pressure of your thumb remains on the plunger as the syringe is removed from the end connector.

## Flushing a PICC using ANTT (Aseptic Non-touch Technique).



1. Wash hands thoroughly and clean tray with detergent wipes – or in community – can use dressing packs



2. Need: 10ml syringe; green needle; non-sterile gloves; clinell; 10mls saline; end connector. Place in tray don't open packaging



3. Put on gloves. Draw up 10mls saline into a syringe. You may hold onto the saline pod with your gloved hand.



4. Remove needle and place the filled syringe back into the syringe packaging to protect the tip.



5. Open the clinell. Take care not to touch the part of wipe which will have contact with end of PICC.



6. If changing the end connector (needs to be changed weekly), remove – clean end of PICC.



7. Allow to dry and replace with new end connector.



8. If not changing the end connector, cleanse the very end of the connector thoroughly for **15 seconds and leave to dry.**



9. **Observe** end of the connector to ensure its dry - at least 30 seconds.



10. Flush the PICC using push pause (stop-start) turbulent flush



11. Finish with a positive pressure flush: withdraw syringe whilst flushing.



# Dressing a PICC

A PICC will require a dressing in situ at all times as it provides anchorage and protection against infection.

If the patient has a statlock dressing in situ, please refer to internet guide – address on front of document.

## A: Dressing a PICC with a SecurAcath

A PICC exit site needs to be cleansed **weekly** and the occlusive semi-permeable dressing changed weekly. **The securacath device is left in situ for the duration of the lifespan of the PICC.**

### Assessment

Inspect the catheter exit site for swelling, redness, or exudates including pus through the occlusive dressing. If there are symptoms present, contact the referring hospital.

**You will need to cleanse the exit site routinely every week with Chlorhexidine 2% in alcohol 70% eg Chloraprepp single use applicator chloraprepp** or povidone iodine in alcohol for patients with sensitivity to chlorhexidine. (Loveday et al 2014, O'Grady et al 2011,).

Nb: Securacath devices are routinely removed when the PICC is removed; however, in some situations e.g when a securacath is painful, it can be removed and the catheter can remain in situ. Securacath devices **should only** be removed by appropriately trained staff; however if a patient requires urgent removal i.e as a result of infection and staff are unfamiliar with device removal:

- Discuss with placement hospital
- View information from the company website: Interred Medical (securacath removal)

### Equipment Required

- Pair of non-sterile gloves
- Detergent wipes/70% alcohol wipes to clean the tray
- Clean tray – or in the community you can use a dressing pack if no tray available
- Semi-permeable dressing i.e tegaderm or IV 3000 10x12cm
- Chlorhexidine cleaning solution 2% in alcohol 70 % eg chloraprepp

Additional equipment may be required if there is debris between the securacath and the PICC close to the exit site:

- Water for injection if the site has any blood or exudates to clean prior to chlorhexidine.
- Sterile plastic forceps in order to access the small space between the PICC and the securacath to remove debris.

## Procedure

### Step by step guide to dressing a PICC

1. Decontaminate hands thoroughly – wash hands using 6 step guide or use alcohol hand rub.
2. The ANTT key part to consider when dressing a PICC is the exit site of the PICC.
3. Collect equipment
4. Decontaminate hands with alcohol gel and put on non-sterile gloves.
5. Prepare the equipment on the clean tray. Open the following equipment and place within their original packaging within the clean tray or dressing pack: tegaderm or IV 3000; chloraprepp.

**Please follow picture guidelines overleaf: Guide A.**

When problems occur with indentation from the securacath, please follow the picture guide for instructions on how to manage indentation. **Guide B.**

When a duoderm dressing is required (this decision should be made by experienced PICC practitioners), follow the picture guide. **Guide C.**

## Guide A: Dressing a PICC with a Securacath using ANTT (Aseptic Non-touch Technique).



1. **Wash hands** thoroughly and clean tray with detergent wipes.



2. Need: Semi permeable dressing ie tegaderm or IV3000; Chloraprepp; non-sterile gloves. Keep in packaging!



3. Put on non-sterile gloves and remove the semi-permeable dressing.



4. **Take extreme care when removing the dressing from the securacath**



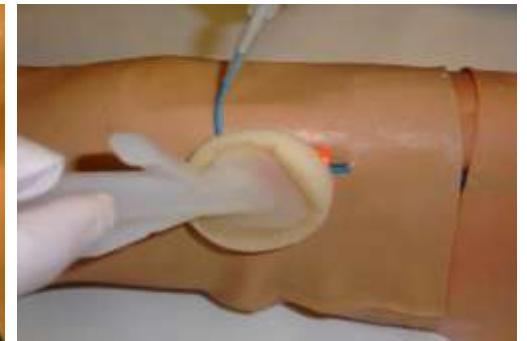
5. If area between the PICC and securacath has debris, clean with a sterile forceps.



6. Clean the exit site thoroughly with the chloraprepp by dabbing the site.



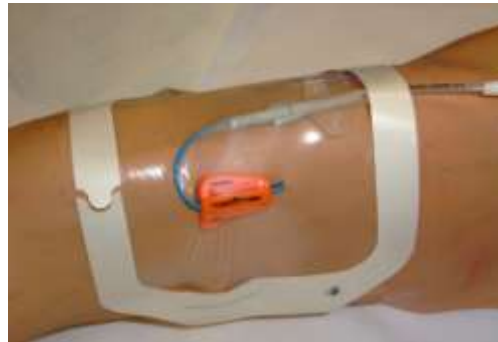
7. Lift the PICC gently, cleanse the site beneath securacath



8 Dab the securacath itself with the chlraprepp giving it a thorough clean. **Allow to dry for 1-2 minutes**



9. When drying, make sure securacath is lifted off the skin!



10. Place the dressing over the PICC. **Ensure the PICC loops without kinks prior to applying dressing**



11. Ensure that the dressing has good contact with skin

## Guide B: Dressing a PICC with Securacath INDENTATION using ANTT (Aseptic Non-touch Technique).



1.. Wash hands thoroughly and clean tray with detergent wipes



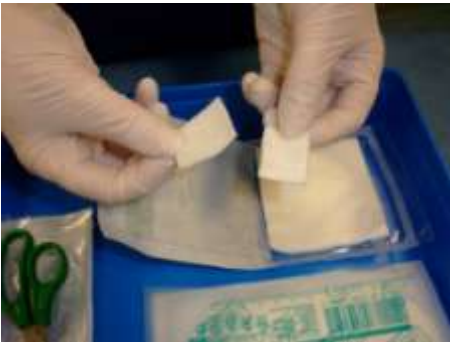
2. Need: Semi-permeable dressing ie tegaderm/IV3000; sterile scissors; gauze; chloraprepp, sterile gloves



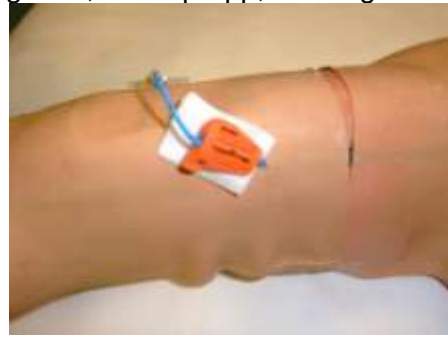
3. Cleanse the PICC using the step by step guide for dressing a PICC.



4. Put on sterile gloves. Using the sterile scissors cut two pieces out of the gauze.



5. Cut two small pieces.



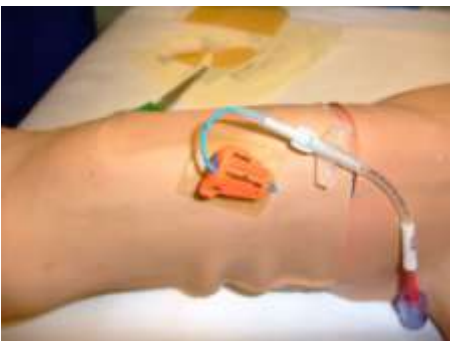
6. Place one piece of gauze under the securacath.



7. Place the other piece **on top** of the securacath.



8. Place clear dressing over the PICC ensuring a nice curved PICC.



9. **Alternatively**, if excoriated skin use small piece duoderm.



10. Cover the duoderm with semi-permeable dressing.

**NB:** Sterile gloves are used for this procedure as we need to handle the gauze and place close to the exit site.

## Guide C: Applying a duoderm dressing to a PICC using ANTT (Aseptic Non-touch Technique).



Need: Duoderm dressing; chloraprep sterile scissors; semi-permeable dressing: tegaderm/IV3000; gloves



2. Wash hands thoroughly and clean tray with detergent wipes



3. Open packaging of duoderm; scissors; semi-permeable dressing; chloraprep in packaging onto tray.



4. Put on non-sterile gloves and remove the PICC dressing.



5. Cleanse the exit site with chloraprep and allow to dry for at least 1 minute.



6. Take the scissors and cut the duoderm in half in the opposite direction to the line.



7. Make sure you cut the duoderm completely in half to give you two pieces.



8. Place the two duoderm pieces on either side of the exit site close together but not overlapping.



9. Place the semi-permeable dressing over the duoderm.



10. Cut any semi-permeable dressing touching the skin with the scissors.



11. Ensure there is no semi-permeable dressing touching the skin

Review the patient in 2-3 days.



## D: Dressing a PICC with a Statlock or griplock

The PICC dressing will need changing and exit site cleansed: **WEEKLY** (Loveday et al 2014, O'Grady et al 2011).

Statlock/griplock will need to be changed: **FOUR WEEKLY** unless soiled, wet or loose.

**Inspect the catheter exit site for swelling, redness, or exudate through the occlusive dressing. If there are symptoms present, contact the referring hospital.**

**You will need to cleanse the exit site routinely every week with chlorhexidine. Chlorhexidine 2% in alcohol 70% is the optimal solution eg Chloraprepp single use applicator or povidone iodine in alcohol for patients with sensitivity to chlorhexidine (Loveday et al 2014, O'Grady et al 2011,).**

### The Procedure

The procedure for dressing a PICC will be described using ANTT (aseptic non-touch technique)

### Equipment Required

Plastic tray - or you can use a sterile pack in the community if no tray is available

Detergent wipes/70% alcohol wipes to clean the tray

1 x pair of non-sterile gloves

Semi permeable dressing - Tegaderm dressing 10 x 12cm or alternative eg IV3000 if allergic to tegaderm (Loveday et al 2014, O'Grady et al 2011,).

Wide steri-strips

Statlock/griplock - if changing (**4 weekly change**)

Chlorhexidine cleaning solution 2% in alcohol 70 % eg chloraprepp

Alcohol swab

### Step by step guide to dressing a PICC

1. Wash hands thoroughly or decontaminate with alcohol gel
2. All receptacles i.e. plastic trays, used during the procedure must be thoroughly cleaned before and after use with detergent wipes or soap and water. Allow it to dry and repeat with an alcohol wipe, both of which eliminate micro-organisms and prevent cross-contamination.
3. The ANTT key part to consider when dressing a PICC is the exit site of the PICC.
4. Collect equipment
5. Clean hands with alcohol gel and put on non-sterile gloves.
6. Prepare the equipment orderly on the clean tray. Open the following equipment and place within their original packaging within the clean tray: statlock/griplock (if required); alcohol swab (if changing the statlock/griplock); tegaderm or IV 3000; steri-strips and chloraprepp.

**Follow picture guide overleaf: Guide D**

**Nb: The picture guide illustrated is a statlock device, the use of a griplock device can be substituted using the guide.**

# Guide D: Dressing a PICC with a statlock/griplock device using ANTT (Aseptic Non-Touch Technique)



Need: Chloraprep; semi-permeable dressing: tegaderm/IV3000; non sterile gloves; statlock; steri-strips.



2. Wash hands thoroughly and clean tray with detergent wipes.



3. Open all equipment place in their packs in the tray.



4. Remove the semi-permeable dressing. LEAVE all the steri-strips in situ.



5. Open the clear clips of the statlock and place the PICC to the side.



6. Open an alcohol swab.



7. Carefully remove the statlock; wiping the skin with the alcohol.



8. Take the adhesive from the statlock pack.



9. Wipe the skin directly where the new statlock will rest.



10. LEAVE the paper on the statlock and place the PICC into statlock.



11. Remove the paper from beneath the statlock one side.



12. Repeat on other side.





13. Carefully remove the steri-strips away from the exit site.



14. Cleanse the exit site thoroughly and carefully with chloraprep. Allow to dry for 1 minute.



15. Place the 1<sup>st</sup> steri-strip close to the exit site but not covering the site.



16. Place 3-5 steri-strips to cover and stabilize the blue.



17. Place a semi-permeable dressing over the exit site; statlock and steri-strips.



18. Ensure there is good contact with the skin and the dressing by pressing the palm of your hand over the PICC.

# Blood sampling from a PICC

## Follow picture guide: guide E

The vacutainer system of collecting blood samples CAN be used with PICC lines.

### The Procedure

The procedure for blood sampling from a PICC will be described using ANTT.

### Equipment

Clean plastic tray or dressing pack

Detergent wipes/70% alcohol wipes to clean the tray

1 x pair of non-sterile gloves (powder free)

Sterile chlorhexidine 2% in alcohol 70% solution or swab (e.g Clinell)

Luer adaptor

Vacutainer holder/blood collection system

Blood bottles

1 x 10ml syringe

1 x 20ml syringe

20mls 0.9% sterile Sodium Chloride for IV use – additional volume in case flushing is required to aid blood return

Green or blue needle to draw up Sodium Chloride

Needle-free connector

Sharps bin

### Procedure

- Wash hands thoroughly
- The ANTT key parts to consider when taking blood from a PICC are: The end connector or the end of the PICC (with end connector removed); the tip of the syringe; the tip of the needle; the part of the chlorhexidine swab that will clean the end connector and the luer adapter.
- Clean tray or open sterile pack
- Place the equipment on the clean tray or onto the dressing pack – **keep all within their packaging**
- Screw the luer adaptor onto the vacutainer holder firmly and leave the cover on loosely – leave in the tray or dressing pack
- If using a pre-filled sodium chloride syringe, open onto the clean tray
- Put on non-sterile gloves
- If the end connector needs changing – change prior to flushing. Remove old connector; hold onto the end of the PICC; open the clinell and cleanse the **very end** of the PICC using the chlorhexidine swab and leave to dry. Replace with new end connector.
- It is best practice to change the end connector **after** taking blood samples except when taking blood cultures – remove the end connector – take blood cultures and replace end connector. This is to prevent a build up of blood within the connector which increases the risk of infection. Nb: when routinely flushing a PICC where blood withdrawal is not performed, it is advisable to change the end connector prior to flushing.
- If the end connector does not need to be changed hold the end of the PICC, open the clinell and clean the very end of the end connector thoroughly with the chlorhexidine/alcohol swab for at least

15 seconds and allow to dry. It is **imperative** that the solution is left to dry naturally for at least a minute. **Visually check that the end of the end connector is dry**

- Ensure that the PICC end connector does not touch any clothing – keep clean!
- Open the 20ml syringe and needle packages and place the needle onto the syringe, open the saline vial/s and draw up the 20ml saline flush and dispel any air – you can hold on to the saline pod with your non-sterile gloved hand. Remove the needle and place the filled syringe back into the syringe packaging to protect until required.
- Open the 10ml syringe and place it onto the end of the PICC and withdraw 3 mls of blood from the PICC and discard. If the PICC fails to give a blood return, flush the PICC with saline and ask the patient to move position, take a deep breath or cough whilst attempting to get a blood return. If blood withdrawal remains absent, flush the PICC with 3-5mls of saline. See end note if problem persists. When using the saline syringe, place back within the syringe packaging to protect.
- Attach the luer adaptor firmly into the end of the PICC and take the blood bottles according to your local hospital order of draw. Invert the bottles of blood 5-8 times.
- Without delay, attach a syringe containing 20mls of 0.9% Sodium Chloride onto the end connector. Flush using a turbulent, (pulsating push pause) action, finishing with positive pressure. Positive pressure flushing means continuing to simultaneously flush as the syringe is removed from the end connector i.e the pressure of your thumb remains on the plunger as the syringe is removed from the end connector.
- Dispose of equipment as per area procedure, wash hands effectively and document.

### **Inability to withdraw blood**

The following strategies can be initiated:

- Observe for kinks or damage to the PICC through the dressing
- Extend arm out to shoulder level
- Flushing briskly with a small amount of 0.9% Sodium Chloride before withdrawal using a turbulent action
- Ask the patient to lie flat
- Using a 20ml syringe with 5-10mls of saline use a 'push pull' method to try to obtain blood from the PICC

If none of the above leads successfully to blood withdrawal – **flush the PICC** and report to Hospital where insertion took place.

## Guide E: Taking blood from a PICC using ANTT (Aseptic Non-touch Technique).



1. **Wash hands thoroughly** and clean tray with detergent wipes



2. 10ml + 20ml syringe; green needle; non-sterile gloves; clinell; 20mls saline; luer adaptor and holder; end connector



3. **Put on non-sterile gloves.** Draw up 20ml saline, place back into the syringe packaging to protect.



4. If changing end connector, remove.



5. Open clinell. Take care not to touch the part of wipe which will have contact with PICC



6. Cleanse the very end of the PICC thoroughly and leave to dry.



7. Replace with a new end connector.



8. If not changing end connector – clean thoroughly with clinell for 15 seconds and **leave to dry!** Check!



9. Remove 10ml syringe from packaging and place in connector, withdraw and **WASTE** 3mls of blood  
SW PICC Guideline: Updated April2014



10. **Alternatively;** you can **WASTE** The first blood into a spare blood bottle (order of draw!) and discard..



11. Take samples using order of draw and invert bottles 5-8 times.



12. Flush the PICC using push pause turbulent flush + pos pressure

# How to access a PICC for intravenous fluids or drugs

## Pre-use Assessment:

Observe for:

- Redness, pain exudate at the PICC entry site
- Swelling of the arm
- Pain in the arm
- Any history of rigors or feeling unwell post flushing

**If any of the above present, contact the hospital who placed the PICC or experienced practitioners within the hospital.**

## Equipment required:

Clean plastic tray – or you can use a sterile pack in the community if no tray is available.

Detergent wipes/70% alcohol wipes to clean the tray

1 x pair of non-sterile gloves (powder free)

Sterile chlorhexidine 2% in alcohol 70% solution or swab (e.g Clinell) or solution (O'Grady et al 2011, Loveday et al 2014).

2 x 10ML or larger syringe – preferably side tip

10ML 0.9% Sodium Chloride

Green or blue needle to draw up Sodium Chloride

End connector if required (need changing weekly)

Sharps bin

## Procedure

- Wash hands thoroughly
- All equipment (i.e. plastic trays) used during the procedure must be thoroughly cleaned before and after use with detergent wipes or soap and water. Allow it to dry and repeat with an alcoholwipe, both of which eliminate micro-organisms and prevent cross-contamination.
- The ANTT key parts to consider when accessing a PICC are: The end connector or the end of the PICC (with end connector removed); the tip of the syringe; the tip of the needle and the part of the chlorhexidine swab that will clean the end connector.
- Collect all equipment
- Clean hands with alcohol gel and put on non-sterile gloves.
- Prepare the equipment orderly on the clean tray.
- If using a pre-filled sodium chloride syringe, open onto the clean tray
- Otherwise, open the syringe and needle (keep both within the packaging) onto the clean tray.
- Open the Sodium Chloride 0.9% (10ml) ampoule and place in the tray.
- Open the needle free connector (if changing) but leave within its packaging.
- Open the chlorhexidine swab but leave within its packaging
- Draw up the saline flush and dispel any air.
- Place the filled syringe back into the packaging to protect the tip.

- If the end connector needs changing – change prior to flushing. Remove old connector; hold onto the end of the PICC; cleanse the **very end** of the PICC using the chlorhexidine swab and leave to dry.
- If the end connector does not need to be changed hold the end of the PICC, clean the very end of the end connector thoroughly with the chlorhexidine swab for at least 15 seconds (Loveday et al 2014) and allow to dry. It is **imperative** that the solution is left to dry naturally for at least a minute.
- **Visually check that the end of the end connector is dry**
- Place the empty syringe into the needle free connector at the end of the PICC and pull on the plunger to withdraw blood into the syringe. If the blood does not come out, don't delay and flush with a small amount of saline and try again.
- Waste small amount of free flowing blood to verify blood return.
- Attach a syringe containing the 10mls of 0.9% Sodium Chloride onto the end connector and **flush with 5-10mls of saline**. Connect the infusion line firmly onto the end of the PICC. You can now use the PICC as with any other central line. You **can** use a volumetric infusion pump with a PICC.
- If you are giving bolus medication, infuse directly into the PICC and flush thoroughly after administration with saline.
- **Disconnecting an infusion:**
- **Always** flush a PICC with a bolus syringe flush after disconnecting an infusion line. Follow figure 13 above using strict asepsis.
- Draw up a further 10mls of saline and attach a syringe containing 10mls of 0.9% Sodium Chloride onto the end connector. Flush using a turbulent, (pulsating push pause) action, finishing with a positive pressure. When using a valved PICC, positive pressure flushing means continuing to simultaneously flush as the syringe is removed from the end connector i.e the pressure of your thumb remains on the plunger as the syringe is removed from the end connector. When using an open ended PICC, the catheter is clamped as the last 1ml is flushed.

As with all Central lines, 10 mls is the minimum size of syringe to be used with PICC line. Using smaller syringe size can result in excessive pressure being exerted which could result in a damaged catheter.

#### **Flushing technique:**

A turbulent flush can be described as a rapid push pause action. The turbulence created by this form of flushing will cleanse the internal lumen of the catheter more efficiently.

A positive pressure flush is when the syringe is removed from the end of the PICC whilst still flushing – this is to close the valve at the very end of the PICC to prevent blood reflux back into the catheter which could cause a blockage.

The needle free connector needs to be changed **weekly**.

**Don't ever force a flush into a PICC.**

## Removing a PICC Line

**This section deals with a PICC without a SecurAcath. If a SecurAcath is in situ, please ask for advice from the referring hospital – untrained staff should not attempt to remove a SecurAcath.**

**If the patient has been diagnosed with a thrombus, it is important that the line is removed carefully in a department that has access to emergency equipment due to the small risk of pulmonary embolus. The PICC will need to be removed with the patient lying on a bed.**

### The Procedure

The procedure for removing a PICC will be described using ANTT (aseptic non-touch technique)

### **Equipment**

Clean plastic tray

Detergent wipes/70% alcohol wipes to clean the tray

2 x pairs of non-sterile gloves (powder free)

Chloraprep single use applicator (2% chlorhexidine in 70% alcohol)

Semi-permeable occlusive dressing eg tegaderm or IV3000

Sterile gauze

Alcohol swab

### **Procedure**

- Wash hands thoroughly
- All equipment i.e. plastic trays used during the procedure must be thoroughly cleaned before and after use with detergent wipes or soap and water. Allow it to dry and repeat with an alcohol wipe, both of which eliminate micro-organisms and prevent cross-contamination.
- The ANTT key part to consider when removing a PICC is the exit site.
- Collect equipment
- Clean hands with alcohol gel and put on non-sterile gloves.
- Prepare the equipment orderly on the clean tray. Open the semi-permeable occlusive dressing; alcohol swab and the sterile gauze, chloraprep and place in the tray (keep all items within the packaging).
- Remove the semi-permeable occlusive dressing and the steri-strips
- Remove the statlock/griplock using the alcohol wipe.
- Grasp the PICC and gently pull the catheter straight out parallel to the vein, using hand over hand technique.
- Once the whole PICC has been removed, apply sterile gauze to the insertion site, and apply pressure for at least 2 minutes. If the patient is receiving anti-coagulant treatment then a longer period of pressure will be needed.
- Cover the site with a semi-permeable occlusive dressing
- Measure and examine the PICC to make sure all is removed. The tip of a valved PICC is black. Report any discrepancy immediately.
- The tip of the PICC does not routinely need to be sent to microbiology – only in the event that there has been a suspicion or a diagnosis of infection.

- The patient should be kept under supervision for 10 minutes post removal to observe for any complications – mainly bleeding at the exit site
- Dispose of equipment as per hospital procedure and wash hands. Document the procedure.

The dressing can be removed 48 hours post removal.

PICC catheters are generally easily removed. However, occasionally some resistance is encountered. If this should occur then please refer to one of the suggested strategies described below or refer the patient to the hospital.

## Stuck PICC

Venous spasm during PICC removal can prevent the smooth movement of the PICC out of the vein and will prevent successful removal in 1% of PICCs (Drewett 2000). The management of this complication involves the application of heat to the arm to encourage vaso-dilation. If catheter removal is not achieved despite the application of heat the following actions can be considered.

Action	Rationale
Apply slight tension and retape	Slight tension at the point of venous spasm will, when the venous spasm has subsided, then allow for easy removal of the device
Apply a warm compress to entire arm for 20 minutes	Heat encourages vasodilation
Remove compress, apply tourniquet under the axilla	Venous spasm will occur in the upper arm veins. Applying the tourniquet high will prevent further irritation of the vein and encourage venous dilation by filling

Taken from Drewett (2002)



## Dual Lumen PICCs

A Dual Lumen PICC refers to a PICC with two separate lumens within one catheter.

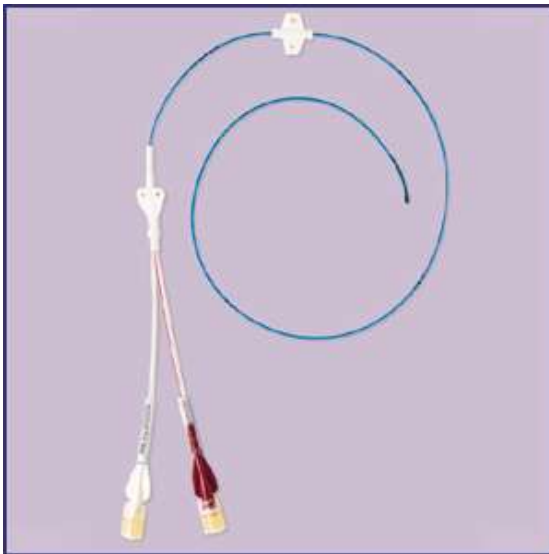
Each lumen of a Dual Lumen PICC should be treated separately in line with other multi lumen central catheters.

When not in use both lumens need to be flushed ONCE WEEKLY with 10mls 0.9% Sodium Chloride to maintain patency using a turbulent pulsating flush, and maintaining positive pressure as the syringe is removed. See flushing a PICC at the beginning of this document for further information.

As Dual Lumen PICCs have smaller lumens, they have an increased risk of occluding if not correctly flushed using the method described above. Flushing should be performed IMMEDIATELY after blood sampling, after each bolus injection or pump change.

Please note that if one lumen is attached to a chemotherapy pump, the other lumen will need to be flushed.

**Nb: It is not possible to repair a double lumen valved PICC should a problem occur. Therefore it is vital that the dressing procedure is strictly adhered to, in order to reduce the risk of PICC migration.**



## **When to refer to specialist centre/practitioner**

### **Please refer any patient to the Hospital where the PICC was placed**

1. Rigors or feeling cold after flushing or any history – urgent referral!
2. Pyrexia – temperature over 37.5 degrees
3. Leaking of fluid at the exit site or at any location along the external portion of the PICC.
4. Swelling redness pain or exudate at the exit site
5. Inability to flush the catheter, or blood cannot be withdrawn - persistent withdrawal occlusion (PWO)
6. Line migration i.e PICC looks shorter or longer
7. Signs and symptoms of thrombosis, i.e., swelling of the arm, neck or chest, discoloration of limb or bleeding at the exit site
8. Allergy to dressings

## Complications

**A comprehensive guide for the management of PICC related complications can be found at**

Google (or other search engines)  
Velindre Cancer Centre  
Clinicians tab  
IV Access PICC/Hick  
Complication management

Site address: <http://howis.wales.nhs.uk/sites3/page.cfm?orgid=357&pid=37365>

## Troubleshooting

This section gives examples of problems and possible solutions. Further advice and complication management needs to be undertaken by experienced PICC complication trained nurses within secondary care. Patients will need to be referred to the hospital where the PICC was placed.

### A. Unable to flush the PICC

#### ***Possible causes:***

- Blood clot within the catheter lumen
- Mechanical obstruction
- Drug or mineral precipitate
- Lipid residue
- Blocked needle-free connector

The following actions should be taken:

- Ensure that the arm is straight
- Observe for any external kinks – the dressing may need to be renewed to aid close observation
- Attempt to flush without exerting force
- If the PICC remains blocked contact experienced practitioner for same day referral

### B. Unable to obtain a blood sample from the PICC

#### ***Possible causes:***

- Fibrin sheath – a collection of coagulative matter at the tip of the line
- Movement of the tip of the PICC into a location other than the SVC
- Catheter tip resting close to the vein wall
- Valve malfunction
- Mechanical obstruction

The following action should be taken:

- Ensure that the arm is straight
- Observe for any external kinks – the dressing may need to be removed to aid close observation

- Flush the PICC with saline using a push pause method
- If no blood return - attempt to flush with saline using a push pull method, ending on a flush
- Change the position of the patient and encourage deep breaths
- If blood withdrawal is not possible, flush the PICC with 15mls of saline and inform the relevant Hospital where PICC was placed.

### C. Leaking of fluid at the exit site or along the PICC

Possible tear in the PICC.

Do not remove the dressing – refer to experienced practitioner in the hospital.

### D. The PICC looks shorter or longer

The following action should be taken:

- Measure the external length of the PICC – with Groshong valved PICCs all that you can see is blue
- Compare with the initial insertion length which will be recorded in the discharge letter to the Community team
- If there is discrepancy, contact the relevant hospital for advice and leave the dressing intact

### E. The patient is experiencing any of the following symptoms:

- Pain in the arm shoulder, neck or chest
- Redness, swelling, exudate or pain at the exit site
- Swelling of the hand, arm, neck or shoulder
- Redness tracking up the arm
- Pyrexia or rigor post PICC flush

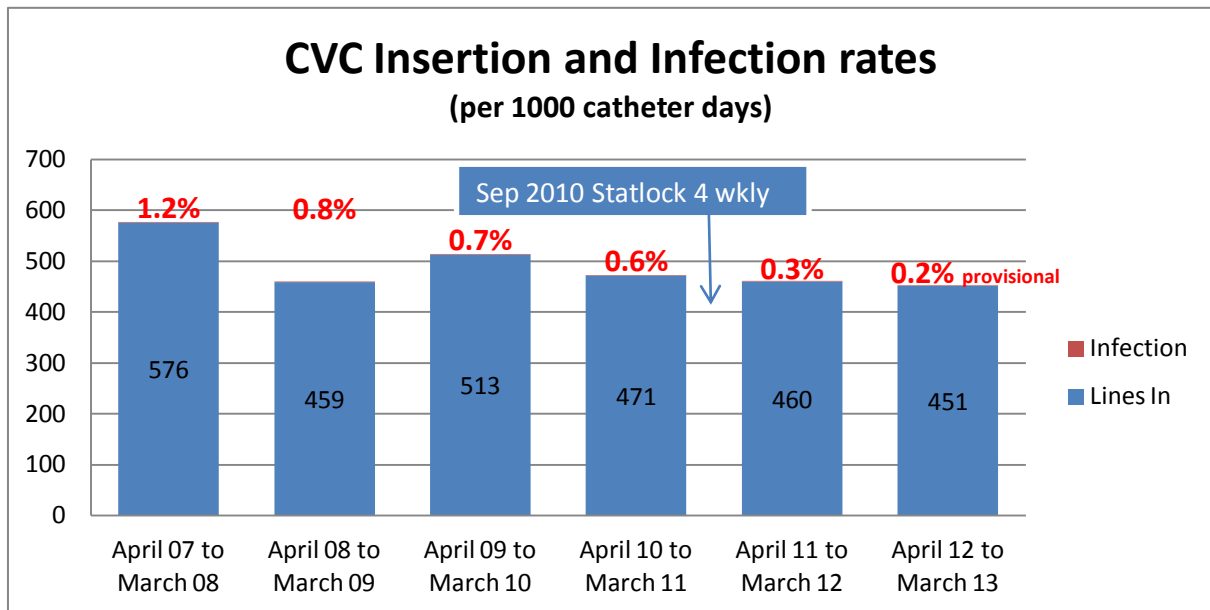
Referral to the Hospital responsible for the patient's care should be made whenever any of the symptoms above are present.

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**ANTT Principles ([www.antt.org.uk](http://www.antt.org.uk))**

## Appendix I



Graph developed by Infection Control Department at Velindre Cancer Centre demonstrating the reduction in the incidence of infection pre and post introduction of four weekly statlock change at the hospital.

## Appendix II

### ANTT – aseptic non-touch technique

Healthcare associated infection (HCAI) remains high on the agenda of the government agencies. These infections affect an estimated 100,000 people, resulting in 5,000 to 15,000 deaths and cost the National Health Service (NHS) in excess of £1 billion a year. It is also estimated that 30% of HCAs are in fact preventable; therefore, effective prevention and control of infection needs to be embedded into everyday clinical practice (DH, 2005; DH, 08; National Audit Office, 2009).

In 2000, the National Audit office reported 'unsatisfactory levels of compliance with hygiene standards' and 'a lack of adherence to hand-washing procedures', recommending that staff apply 'rigorously and consistently the measures known to be effective in reducing risks of healthcare associated infections' (National Audit Office, 2009). The ANTT framework was developed at University College Hospital in London in the mid 90's in order to raise clinical standards and standardise aseptic clinical practice. Over the years it has evolved to divide into standard and surgical aseptic technique and is endorsed by the Department of Health Saving lives: a delivery programme to reduce healthcare associated infection including MRSA (2005).

EPIC3: National evidence-based guidelines for preventing catheter-related healthcare-associated infections in NHS hospitals in England (2014) and the Royal College of Nursing Standards for infusion therapy (2010) advocate ANTT as an example of how to improve and standardise clinical practice whilst performing invasive procedures (Loveday et al 2014, Rowley 2001; DH, 2005; RCN, 2010).

ANTT incorporates the essential infection control measures in preventing pathogenic micro-organisms on hands, surfaces or equipment from being introduced to susceptible sites during clinical practice (RCN, 2010; Rowley, 2001).

## **Terminology**

### Key parts

Any part of a piece of equipment used during aseptic technique that will increase the risk of infection if contaminated by infectious material. Examples include: cannulae tip, injectable ports, hubs of catheters, syringe tip, needles, vacutainer needle/connector, giving set spike, vials, central venous catheters (CVCs), urinary catheters (Rowley, 2010).

### Key site

The area on the patient for the procedure (e.g. insertion site, skin, wound) (Rowley, 2010).

### Non-Touch Technique

Pathogenic organisms can not always be removed by effective hand washing. Therefore, a non touch-technique (i.e. being able to identify the 'key-parts' and not touching them either directly or indirectly) is perhaps the single most important component of achieving asepsis (Rowley, 09).

### Asepsis

The complete absence of bacteria, fungi, viruses or other micro-organisms that could cause disease (Merriam-Webster, 2010).

### Aseptic field

A clean working environment and an aseptic field are essential precautions for all clinical procedures.

### Aseptic Non Touch Technique

A standardised aseptic technique where staff are taught to identify and protect the keyparts of any procedure, perform effective hand hygiene, institute a non-touch technique, wear only the appropriate personal protective equipment according to the type of procedure.

### Aseptic Technique

A method developed to ensure that only uncontaminated objects/fluids make contact with sterile/susceptible sites. It is performed in the 'effort to keep a patients as free from hospital micro-organisms as possible' and unlike sterile techniques, aseptic technique is achievable in typical wards / home (Rowley, 01).

### Invasive procedure

A medical procedure that invades (enters) the body, usually by cutting or puncturing the skin or by inserting instruments into the body cavity.

ANTT improves aseptic technique by:

- Promoting staff awareness and understanding of the various terms associated with asepsis and aseptic practice.
- Promoting awareness and understanding of the key-parts/key sites and how to protect them.
- Providing a step by step clinical guideline of best practice, helping to establish a safe, standardised aseptic technique for clinically invasive procedures.
- Promoting staff to perform effective hand hygiene, wear the appropriate protective clothing and institutes a non-touch technique.

- Providing an audit cycle whereby staff are trained and re-trained on an ongoing basis, promoting sustainability.
- Developing a culture of peer pressure, which in itself helps promote standardised and safe practice.

### **Performing ANTT**

The ANTT step by step clinical guidelines are designed to allow the practitioner to:

- ensure effective hand decontamination is undertaken
- ensure appropriate personal protective equipment is used
- assess need for sterile/non-sterile gloves
- ensure effective decontamination and preparation of the aseptic field
- identify and protect the key parts during a procedure
- institute a non-touch technique

### **ANTT Rationale**

ANTT aims to prevent the contamination of wounds and other susceptible sites, by ensuring that only uncontaminated equipment, referred to as 'key parts' come into contact with susceptible or sterile body