

# Recommendations for the prevention of infection in intra-vascular devices

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# Purpose

This guideline provides recommendations regarding best practice for the prevention of infection related to intra-vascular devices (IVD).

# Scope

This guideline provides best practice infection prevention advice for all Queensland public health system employees (temporary, permanent and casual) and all organisational and individuals acting as its agents. This guideline does not address the use or care of umbilical catheters or arterial catheters. It does not address product choice decisions, insertion techniques or device use and acknowledges that some areas of Queensland have different product requirements that may be based on local requirements.

# Related documents

Point of care tools (Appendices 1–6)

Staphylococcus aureus Bloodstream investigation checklist (Appendix 7)

# Infection, Prevention and Control

To ensure that the risk of healthcare associated infections and the burden of adverse health impacts are minimised, healthcare workers who insert, use/manage and remove intra-vascular devices (IVDs) must strictly implement standard precautions during the insertion, management and removal of all IVDs. Standard precautions encompass hand hygiene, aseptic technique (AT), environmental cleaning, the use of personal protective equipment, respiratory hygiene and cough etiquette, waste management, the reprocessing of reusable medical equipment and appropriate linen management.<sup>3, 6-10</sup> Additionally, transmission-based precautions should be used where indicated by a patient's suspected or confirmed colonisation or infection with an infectious agent.<sup>6-8, 11, 12</sup>

In performing the “[Five moments of hand hygiene](#)”<sup>5-7, 13</sup>, the use of gloves does not replace the need for hand hygiene. Hand hygiene should be performed before touching an IVD or immediately before the insertion of a device.<sup>1, 3-10, 12, 14-17</sup>

Strict adherence to the principles of AT should be adhered to when inserting, administering or providing care management to IVDs.<sup>3-5, 7, 8, 15</sup> Non-adherence to the standardised principles of asepsis may lead to infection.<sup>3, 7, 8, 16, 19</sup> See local facility procedures and education for more information about AT.

Lastly, all medical devices, reusable equipment and instruments must be reprocessed between uses in accordance with AS/NZS 4187: Reprocessing of reusable medical devices in health service organisations<sup>8</sup>, manufacturer recommendations and local facility procedures. Staff involved in the insertion, management and removal of IVDs should ensure that all equipment used is reprocessed as required before its use.<sup>7, 8, 20</sup>

## Surveillance and Quality Improvement

Reporting and surveillance on healthcare associated infections, primarily *Staphylococcus aureus* bloodstream infection is required under the National Healthcare Agreement as part of performance reporting. Queensland Health facilities are to establish a healthcare associated infection surveillance program in conjunction with the Australian Commission on Safety and Quality in Health Care [Standard 3: Preventing and Controlling Healthcare Associated Infection Standard](#). Staff involved in the insertion, management and removal of IVDs should be made aware of infection rates related to IVDs.<sup>5, 17</sup> Data should be used to determine quality improvement activities to improve outcomes for patients and improve practice.<sup>4-6, 17</sup> The practice of “bundled” interventions or a small group of principles interventions implemented collectively and correctly, should be used to improve outcomes.<sup>3, 4, 17</sup> Practice for care and insertion should change as best evidence changes and ongoing training should occur where new procedures or products are introduced.<sup>5-7</sup>

## Patient Considerations

### Patient Education

Each facility should have a procedure regarding education of patients and providing them with written and verbal information, in a way they can understand, about preventing infections associated with their IVDs.<sup>5, 6, 8</sup> The provision of both written and verbal advice and ongoing education regarding the care of their specific IVD should be provided to the patient and their carer.<sup>6, 7</sup>

Practical and theoretical training is recommended to be provided by clinicians that includes step-by-step instructions in text and images i.e. dressing changes, hygiene, flushing techniques and handling of the catheter.

### Consent

Informed consent is a legal right of the patient. Local procedures and legislation must be followed. Facilities should have a procedure for documenting consent and ensuring that the potential specific risks are discussed with the patient<sup>6, 8</sup> for example, risk of infection during insertion, accessing or dressing changed of an IVD.<sup>6, 7</sup>

# Documentation

Insertion and care of an IVD should be documented as per local policy.<sup>7</sup> At a minimum the date, time, type of device, gauge, dressing type, skin preparation used, inserter details and IVDs that are trimmable should have the overall length and measurement at skin documented at the time of insertion. Each dressing change or direct observation should also be documented in the patient care charts or as dictated by local procedure.<sup>6</sup>

# Catheter Selection

Correct catheter selection can reduce the risk of infection and other device related complications.<sup>5</sup> An IVD that has the least number of lumens and smallest gauge required for patient management should be inserted.<sup>7, 14</sup>

Catheter selection should be carefully considered before the commencement of therapy. The most appropriate device for the type of therapy, length of therapy, patient condition and patient lifestyle should be considered as early as possible. Consideration should be given to a central catheter if the duration of therapy is a week or greater or the therapy to be administered is a known vein irritant. Osmolality, pH, patient vasculature, potential adverse events associated with a particular catheter type and the ability or resources of a facility to care for a device need to be considered.<sup>6, 14, 17</sup>

# Insertion

Insertion Bundles are used to prevent insertion-related complications. A Central Venous Catheter (CVC) must have catheter length and measurement at skin, documented by the inserter. The “actual” CVC tip location must be documented by the inserter or medical officer.

# Insertion location

Non-acute or routine insertion of an IVD should only take place where the clinician can assure that appropriate asepsis can be maintained. This may require a dedicated insertion space for some IVDs. Where a bedside insertion occurs, a clinician should ensure that control of the environment can be suitably maintained to prevent contamination of sterile or clean items and to ensure that the skin preparation prior to insertion is maintained.

# Prophylactic antibiotics

The use of prophylactic antibiotics for the insertion of IVDs is not routinely recommended.<sup>3, 5, 7</sup>

# Catheter site selection

The choice of IVD insertion site should be determined by its indication, anatomical variation, risk of infection, risk of mechanical complication, patient comfort and its intended use.<sup>5-7, 23</sup> Site selection can have an impact on the infection risk and other complications for the patient.<sup>3-5, 23</sup> This should be considered when selecting the insertion site.

## Maximal barrier precautions

The insertion of a CVC requires the use of maximal barrier precautions, including the use of sterile gloves and sterile gown to be worn by all staff involved in the procedure and sterile drapes.<sup>3-5, 7</sup> Equipment and techniques for achieving this will vary in each facility.

## Skin preparation at insertion site

Appropriate skin preparation will reduce the risk of infection and other device complications. Hair should be removed from around the insertion site to an area slightly larger than the area of the dressing to allow for adherence of the dressing to skin. Hair should be removed by clippers, not shaved.

If the area is visibly soiled, soap and water can be used to clean the area and dried prior to the use of disinfectant. A 2percent Chlorhexidine and 70percent alcohol solution should always be used for skin preparation prior to the insertion of IVDs and allowed to air dry.<sup>3-5, 7, 24</sup> Single use applicators should be used, such as 70percent alcohol and 2percent chlorhexidine impregnated swab sticks or <sup>7, 25</sup> allow the solution to dry.

Palpation of the insertion site should not be performed after the application of antiseptics unless AT is maintained.

Please note: Swab sticks are not sterile. If the operator uses the swab stick to disinfect the skin, they should change gloves and perform hand hygiene.

Alternative solutions, such as povidone iodine and alcohol or aqueous chlorhexidine, should be available for those that have an allergy to one or more of the active ingredients.<sup>3, 7</sup>

Multiple applications of the solution may be required. The area prepared should be slightly larger than the final dressing area and may be additionally dependent on any drapes that are required for insertion.

## Post insertion care, dressing types and replacement intervals

The dressing used on any IVD will be decided by local policy, purchasing arrangements and patient requirements including skin integrity.<sup>6, 26</sup> Some device dressings may require a competency to be completed before a healthcare worker carries out the procedure.

Sterile, transparent, semi-permeable dressings may have a dwell time of up to 7 days.<sup>3-7</sup> Semi permeable dressings are only changed in neonates when wet or the integrity is breached due to increased risk for skin trauma.<sup>3</sup> Local policy and manufacturer recommendations should be followed.

Transparent dressings allow visualisation of the insertion site and in certain circumstances, are less likely to allow dislodgement.<sup>27</sup> Where gauze dressings are used, they should be changed at least every second day<sup>3, 4</sup> and when the exit site is not visualised, palpation of the site should form part of the daily assessment.<sup>6</sup>

If a gauze is used under a transparent dressing post insertion, the dressing should be removed, and the gauze removed after 24 hours and replaced with a transparent dressing as per local policy. Removal of the dressing for visual inspection should occur if there is any suspicion of infection.

Any dressing that becomes soiled, wet, damaged, is no longer adherent, has visible ooze under it or starts to lift should be changed immediately.<sup>3, 5, 6, 28</sup> IVDs and their dressings should never be submerged in water.<sup>3</sup> The use of a chlorhexidine impregnated sponges may be considered to prevent extraluminally-transmitted infection.<sup>3, 5, 7, 29</sup>

A 2percent Chlorhexidine and 70percent alcohol solutions (or a solution or the same as that used to prepare the skin for the insertion), should be used to clean the area around the catheter during dressing changes and the area that will be covered and allowed to dry before covering again.<sup>3, 5, 7, 24</sup> Aseptic technique should be adhered to during a dressing change.<sup>3, 4, 6, 7</sup>

Use chlorhexidine -impregnated dressings with caution in premature neonates and among patients with fragile skin/and or complicated skin pathologies; contact dermatitis and pressure necrosis have occurred.

Topical antibiotic ointments or creams should not be routinely used on insertion sites.<sup>3</sup>

Please refer to your local procedure regarding dressing changes in your facility for more information.

## Securement devices

It is recommended that a sutureless securement device is used to reduce the risk of infection.<sup>3, 4</sup>

Securement devices should not obscure the site, impair circulation and flow of infusates. Use a securement device that does not have the potential to harbour pathogenic organisms.

Replace secondary securement device every 7 days or when clinically indicated.

## Device review

The ongoing need for the device should be reviewed daily. All IVDs and dressings should be reviewed daily, at a minimum<sup>3, 6, 7, 30</sup> and ideally more often.<sup>6, 28</sup> Insertion sites should be assessed for erythema, exudate, swelling, tenderness, pain and swelling.<sup>3, 6, 30</sup>

The length of catheter should be checked, when relevant, as well as the integrity of the securement device, needleless connectors, dressing and attached lines.<sup>6</sup> Patency of all lumens should be assessed.<sup>6</sup>

Patients should be educated to inform staff if they have any concerns or notice changes at the insertion site and<sup>3</sup> to request hand hygiene by those accessing their line.

Signs of systemic infection should be monitored. Infection caused by a line may not have physical signs at the insertion site.<sup>3</sup>

## Flushing and locking

Flushing and locking reduce microbial growth and the risks of infection from bacteria entering through the site portal of entry.

A locally approved policy that defines procedures that must be followed by a clinician when flushing and locking intravascular device.

The following processes and key recommendations should be considered:

- Wherever possible, continuous intravenous fluids should be administered by an infusion pump.
- Consult manufacturer's instructions regarding best practice for flushing.
- In fluid restricted patients, such as paediatric patients, manufacturer stated minimum flush volumes should be noted.
- Manufacturer's recommended size of syringe to be used to flush or access the catheter stated by the manufacturer should always be adhered.
- In most cases, 0.9% saline solutions are sufficient for flushing and locking catheters.
- Single access vials should always be used. Please consult local guidelines.

## Replacement of IV fluids

To prevent microbial growth in intravenous fluids at a given room temperature and prevent infection, please see Table 1 for the recommended maximum replacement interval of IV fluids after being accessed.

**Table 1: Recommended IV fluid replacement interval**

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

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

## Administration set changes

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

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

**Table 2: Recommended administration set replacement interval**

Administration	Replacement
Not containing lipids, blood or blood products	After 96 hours but at least every 7 days* <sup>3</sup>
Lipid/lipid-containing parenteral nutrition	Within 24 hours <sup>3</sup>
Chemotherapeutic agents	Remove immediately after use*
Propofol	Every 6 to 12 hours, when the vial is changed or as per manufacturer* <sup>3</sup>
Heparin	Every 24 hours
Other infusions (not including those listed above)	After 96 hours but at least every 7 days* <sup>3</sup>
*All administration sets should be replaced when disconnected or if the catheter is changed. When an administration set is changed, the IV fluid bag should also be changed	

# Needleless access ports

Needleless connectors (access ports) are recommended for access to all IVDs or IV tubing.<sup>6</sup> AT should be used for any access, removal and addition or changing of ports.<sup>6, 15</sup> Needleless connectors should be changed as frequently as the giving set at a minimum weekly and not more frequently than 96 hours or as clinically indicated.<sup>3</sup>

The needleless access port should be decontaminated by applying mechanical friction with a swab impregnated with 70percent alcohol or 2percent chlorhexidine and 70percent alcohol for at least 15 seconds and allowed to air dry.<sup>3, 5, 16, 31</sup> Only sterile devices should be used to access an IVD or IV line.<sup>3, 15</sup> There should never be an “open” access port on any circuit attached to an IVD. There should be a needleless access port or sterile cap at each possible access point. Manipulation and access of lines attached to an IVD should be minimised to reduce the opportunity for infection.<sup>3</sup> Where possible, a facility should only stock compatible components to prevent possible leaking and breaks in the system.<sup>3</sup>

# Disinfectant caps

The use of disinfectant caps on needless access ports could be considered, depending on facility’s specific requirements, especially for intermittently used devices.<sup>5, 31, 32</sup>

Recommendation of their general use to prevent IVD related BSIs requires more evidence.<sup>31</sup> If used, follow manufacturer’s recommendations for their use.

# Blood culture collection for diagnosis of BSI

Blood cultures for the diagnosis of a blood stream infection should be taken from a peripheral vessel in accordance with the pathology provider’s policy. Pathology Queensland’s recommendation for blood culture collections in adults can be found here: <http://qis.health.qld.gov.au/DocumentManagement/Default.aspx?DocumentID=26423> (please note: this can only be accessed from a computer on the Queensland Health network).

CVC blood cultures may be taken if there is no other foci of infection and the catheter is the suspected source. Please see local procedures for more detail regarding the specific requirements for blood culture collection. The principles of AT should be followed to reduce the chance of contamination of the specimen.

## Culturing line tips

Culturing of line tips is not routinely indicated. If the CVC is the suspected source of infection and the tip is required for culture and sensitivity, removal of the CVC and collection of the tip should be performed under aseptic technique. The tip should only be cultured if catheter-associated blood stream infection is suspected and definitive confirmation and sensitivities are required. Please liaise with your local lab for their requirements for a line tip culture or see the Queensland Pathology standard operating procedure at <http://qis.health.qld.gov.au/DocumentManagement/Default.aspx?DocumentID=29160&DocumentInstanceID=109753> (please note: this can only be accessed from a computer on the Queensland Health network).

## Ethanol lock therapy

The aim of ethanol lock therapy is to prevent infection by inhibiting microbial growth in the catheter.

Follow the local procedure for ethanol locking of IVDs.

Please note that ethanol may degrade polyurethane over time and therefore these devices may not be suitable for this type of therapy. Please consult with local procedures and manufacturer guidelines.

## Catheter duration, replacement and removal

All IVDs should be removed as soon as they are no longer required.<sup>3, 5, 6</sup> Removal of devices should be documented in the patient record, including the reason for removal.<sup>6</sup>

Different IVDs have different recommended durations. Please see the device specific appendix for further information. IVDs should only be replaced where there is an indication for their further use.

Follow the principles of AT for the removal of IVDs.<sup>6</sup> Please see line specific appendices and local procedures for more information.

# Definitions

Disinfection	the process that inactivates non-sporing infectious agents, using either thermal or chemical means. <a href="https://www.nhmrc.gov.au/book/australian-guidelines-prevention-and-control-infection-healthcare-2010/b1-5-4-disinfection">https://www.nhmrc.gov.au/book/australian-guidelines-prevention-and-control-infection-healthcare-2010/b1-5-4-disinfection</a>
Ethanol lock therapy	the process of placing ethanol in the central line to prevent or treat line infection. The ethanol sits in the line / lumen when administering IV medication.
Maximal barrier precautions	strict compliance with hand hygiene and wearing a cap, mask, sterile gown, and sterile gloves. The use of maximal head barrier precautions reduces the risk of catheter infection.
Prophylactic antibiotics	the use of antibiotic to prevent infection before an invasive procedure.
Transmission based precautions	used in addition to standard precautions to minimise the transmission of healthcare-associated infections where the suspected or confirmed presence of infectious agents represents an increased risk of transmission.

## Document approval details

### Version control

Version	Date	Prepared by	Comments
1.0	2012	CHRISP	[QH-GDL-321-6-1:2012] Rescinded
2.0	March 2013	CHRISP	
3.0	January 2015	CDIM	
4.0	November 2019	CDIM	Complete review of document

# Appendix 1

## Tunnelled CVC specific information

This line specific information is intended to provide guidance on the minimum standards to ensure prevention of infection with specific devices and is not intended to address insertion techniques or device use.

Surgically inserted into an incision in the chest and tunnelled through the soft tissue beneath the skin of the clavicle then advanced to the superior vena cava.

A transparent dressing should be used over the exit site until it is well healed<sup>3</sup> or patient is no longer immunocompromised.

Consider use of tissue adhesive to reduce post-operative bleeding immediately post CVC insertion.

Allow three weeks for the cuff to become ingrown and act as securement. A dressing must remain in place for 3 weeks if the patient is immunocompromised.

Document actual tip location and confirm prior to commencement of IVT

If applicable, remove sutures from the entry site at 1-week post insertion and exit site at 3 weeks post insertion.

It may be preferable for tunnelled CVCs to be managed without a dressing. Assess individual patient, clinical need and patient's preference to decide if dressing will continue. Consider the following for suitability of being dressing-free:

- non-immunocompromised patient
- reddened, painful and ulcerated surrounding skin
- known adhesive allergies and adhesive-related skin injury

Written information about the care of the tunnelled CVC should be provided to the patient.<sup>3</sup> Where a patient is to be an outpatient for the use of this device, additional care information may be required. A patient's understanding of this information should be checked prior to discharge. Practical and theoretical training is recommended to be provided by clinicians that includes step-by step instructions in text and images, dressing changes, hygiene, flushing techniques and handling of catheter.

Confirm medical order for removal

Removal only by qualified clinician as may require surgical intervention for cuff removal.

The Valsalva technique should be utilised for removal and digital pressure to the vein puncture site applied until haemostasis is achieved, followed by an occlusive dressing to minimise risk of air embolism and bleeding.

Assess line integrity following removal.

# Appendix 2

## PICC specific information

This line specific information is intended to provide guidance on the minimum standards to ensure prevention of infection with specific devices and is not intended to address insertion techniques or device use.

Ultrasound guidance with or without ECG Technology must be used for insertion to avoid possible mechanical complications and numbers of attempted cannulations.<sup>6</sup>

Select a PICC with the least number of lumens essential to patient management.

The use of a non-suture securement device is recommended.

The use of Chlorhexidine impregnated sponge dressings under the transparent dressing is recommended in adult populations.<sup>5</sup>

Tip location confirmation should be done prior to first-time use. Literature supports the use of ECG confirmation systems as an acceptable alternative to X-ray confirmation alone. Local procedure must support the use of such systems before their implementation. Staff must be educated and assessed as competent in the systems use prior to implementation.<sup>6</sup>

Removal of PICC:

- Also refer to local procedure regarding PICC removal.
- Gather required equipment.
- Check if tip culture is required (See: Culturing – line tips, for more information)
- Perform hand hygiene.
- Don PPE.
- Remove securement and dressing.
- Clean the area around PICC with alcoholic 2percent chlorhexidine solution and allow to air dry.
- Gently pull device from patient while instructing patient to hold his breath / Valsalva technique when pulling from the patient and apply digital pressure at site until haemostasis is achieved.
- Dress as per local policy.
- Check line integrity following removal.
- Measure the removed line and compare the measurement to the line length documented on insertion.
- Document the removal in the patient record, including the measurement and reason for removal.

Routine replacement of PICCs is not recommended to prevent infection.<sup>5</sup>

Consider use of antimicrobial PICC in patients at high risk of infection.

Consider use of anti-thrombogenic PICC for patients at risk of developing thrombosis.

Guidewire exchanges should only be considered where the risks of new insertion outweigh the risk of infection using the same site.

If a guidewire exchange is to be used, new sterile gloves, drapes and skin preparation are to be used after handling the old catheter.

Highlight the importance of hand hygiene in handling any device/line.

Written information about the care of the PICC should be provided to the patient. Where a patient is to be an outpatient for the use of this device, additional care information may be required. A patient's understanding of this information should be checked prior to discharge.<sup>6</sup>

## Appendix 3

### Percutaneous CVC specific information

This line specific information is intended to provide guidance on the minimum standards to ensure prevention of infection with specific devices and is not intended to address insertion techniques or device use.

Use ultrasound guidance for insertion where possible to avoid possible mechanical complications and numbers of attempted cannulations.<sup>3, 5, 6</sup>

Femoral and jugular sites should be avoided, and subclavian sites used in adult patients to reduce the possibility of infection.<sup>3, 6</sup>

Consider use of tissue adhesive to reduce post-operative bleeding immediately post CVC insertion.

Guidewire exchanges are not recommended where there is evidence of infection.

Guidewire exchanges increases the risk of infection. It should only be considered where the risks of a new insertion site outweigh the risk of infection using the same site.

If a guidewire exchange is to be used, new sterile gloves, drapes and skin preparation are to be used after handling the old catheter.<sup>3</sup>

Use a catheter with the minimum number of ports essential for patient management.<sup>3</sup>

All attempts should be made to avoid blocked lumens. Where possible all lumens should be used to prevent blockages.

Where a lumen is not in use, adhere to local policy flush volume and frequency procedure.

If a lumen becomes blocked and attempts to unblock the line are unsuccessful, the line should be removed within 24 hours.

Where aseptic technique cannot be ensured, the catheter should be replaced as soon as possible.<sup>3</sup>

Highlight the importance of hand hygiene in handling any device/line.

Written information about the care of the CVC should be provided to the patient to ensure they understand the care required whilst in hospital.

# Appendix 4

## PORT or Port-a-cath specific information (Totally Implanted Central Venous Access Port)

This line specific information is intended to provide guidance on the minimum standards to ensure prevention of infection with specific devices and not is intended to address insertion techniques or device use.

Written information about the care of the port should be provided to the patient.<sup>3</sup> Where a patient is to be an outpatient for the use of this device, additional care information may be required. A patient's understanding of this information should be checked prior to discharge.

Ports are usually inserted into the subclavian, internal jugular or basilic veins by qualified clinicians. It is best to avoid insertion sites under the arm, in the breast or soft tissue of the abdomen

Pressure injectable port-a-cath can be identified by palpating raised nodule or a triangular shape of the port housing.

Most definitive confirmation is via radiological scanning wherein letters "C" and "T" will be visible at the back of the port.

Only use the correct fit size of non-coring (Huber) safety needle with bonded extension on top of the needleless connector to access the port.

Do not tilt, rock, rotate or pull on needle when accessing port.

If needle is too short, the reservoir will not be entered, and it will not be possible to aspirate and administer medications. Consider a tissue thickness of 0.5 to 2 centimetres.

If the needle is too long, it will protrude and potentially dislodge.

Accessing using an ordinary needle at an incorrect angle will cause extravasation causing skin and soft tissue injury.

The needle and dressing must be changed weekly or once accessed, the non-coring (Huber) safety needle should be removed and replaced in conjunction with the weekly dressing changes or as outlined in the local policy procedure.

It is recommended to flush the device every 4 weeks when not frequently used.

Ensure blood flashback prior to every bolus administration or when starting an infusion to confirm placement of needle.

Assess for swelling around port needle location in the body, chest pain or shoulder whilst flushing or infusing, do not remove the needle but stop infusion immediately and notify medical team.

Highlight the importance of hand hygiene in handling any device/line.

Confirm medical order for removal.

Removal only by qualified clinical as may require surgical intervention for cuff removal.

AT should be adhered to for removal.

Assess line integrity following removal.

## Appendix 5

### Haemodialysis catheter specific information

This line specific information is intended to provide guidance on the minimum standards to ensure prevention of infection with specific devices and is not intended to address insertion techniques or device use.

Devices that require confirmation of tip position prior to use should have this done prior to use. Literature supports use of ECG confirmation systems as an acceptable alternative to X-ray confirmation alone. Local procedure must support the use of such systems before their implementation. Staff must be educated and assessed as competent in the systems use prior to implementation.<sup>6</sup>

Guidewire exchanges are not recommended where there is evidence of infection.

If a guidewire exchange is to be used, new sterile gloves, drapes and skin preparation solution are to be used after handling the old catheter.<sup>3</sup>

Femoral sites should be avoided to reduce the possibility of infection.<sup>3</sup>

The use of antiseptic ointments at the catheter exit site at the end of a dialysis session may be considered, if the ointment doesn't interact with the catheter material.

Large catheters such as tunnelled dialysis catheters may bleed more than usual, monitor for excessive or uncontrolled bleeding. Apply firm pressure, initiate medical review as per organisational policy/procedure for patient deterioration.

Avoid excessive dressing changes during active bleeding so clotting will not be disturbed. Consider secondary dressing reinforcement.

Refer to your hospital policy/procedure on catheter choice.

Refer and adhere to local policy flush volume and frequency procedure. There is no evidence that specific flushing volumes or frequency has an effect on failure rates.

Written information about the care of the port should be provided to the patient.<sup>3</sup> Where a patient is to be an outpatient for the use of this device, additional care information may be required. A patient's understanding of this information should be checked prior to discharge. Practical and theoretical training is recommended to be provided by clinicians that includes step-by-step instructions in text and images i.e. dressing changes, hygiene, flushing techniques and handling of catheter.

Highlight the importance of hand hygiene with patients in handling their own line and when to seek medical attention.

Confirm medical order for removal.

Removal only by qualified clinical as may require surgical intervention for cuff removal.

The Valsalva technique should be utilised for removal and digital pressure to the vein puncture site applied until haemostasis is achieved then an occlusive dressing is applied to minimise risk of air embolism and bleeding.

Assess line integrity following removal.

## Appendix 6

### Peripheral intravenous catheter specific information

This line specific information is intended to provide guidance on the minimum standards to ensure prevention of infection with specific device and is not intended to address insertion techniques or device use.

PIVCs should be assessed at each access, at least every 8 hours at a minimum and hourly if continuous fluids are infusing or for high risk populations such as neonates, paediatrics, unconscious and elderly patients.

Thorough assessment includes touch, look and compare with contralateral limb.

Refer and adhere to local policy flush volume and frequency procedure. There is no evidence that specific flushing volumes or frequency has an effect on failure rates.<sup>33</sup>

While there is no evidence that a gauze dressing performs any worse than a transparent dressing at preventing infection it may not be as effective as preventing dislodgement.<sup>27</sup> Further, a gauze dressing prevents easy regular visual inspection of the insertion site. If a gauze dressing is used, the site should be palpated for hardness or tenderness and removed, and the site inspected if any of these are found.<sup>3</sup> Please see local procedures for the recommended dressing in your facility.

Local policies should dictate the length of time that a PIVC can remain in-situ;

- Usually this would be either 72–96 hours or clinically indicated PIVC changes.
- The facility should undertake a risk assessment considering the skill mix and experience of the inserters and carers of the PIVCs and current catheter related BSI rate when deciding on their policy.<sup>34</sup>

PIVCs should be replaced as soon as possible and within 24 hours if inserted in an emergent situation, where asepsis may not have been maintained or there is no documentation regarding the insertion of the device.

PIVCs should be immediately removed when there are any signs of phlebitis, infection or malfunction.<sup>3</sup>

Consideration should be given to a central venous catheter if the duration of therapy is a week or greater or the therapy to be administered is a known vein irritant.

Highlight the importance of hand hygiene of patients in handling their own line.

Enhanced patient education should be provided regarding monitoring for initial signs of infections developing such as pain, redness or swelling in the catheter and emphasise to report any signs of infection to nursing/ medical staff immediately.

Written information about the care of the PIVC should be provided to the patient to ensure they understand the care required whilst in the hospital.

# Appendix 7

## Staphylococcus aureus bloodstream investigation checklist

### Investigation Process:

An investigation should be undertaken of all episodes of Healthcare Associated Intravascular Device (IVD)-Related Staphylococcus aureus Bloodstream Infection (BSI)

This involves:

1. Establish the *S. aureus* BSI meets the criteria for investigation.
2. Investigate the episode using an Investigation Checklist to identify factors that may have contributed to the BSI.
3. Undertake an Event Analysis.
4. Develop an Action Plan and report outcomes in accordance with the local governance arrangement.

The relevant Department of Health Guidelines for Recommendations for the prevention of infection in IVD should be used as a reference point for the investigation.

Ensure that immediate actions and controls to manage risk are implemented.

# Staphylococcus aureus bloodstream investigation checklist

## STEP 1

CRITERIA FOR INVESTIGATION OF A HEALTHCARE ASSOCIATED INTRAVASCULAR DEVICE-RELATED Staphylococcus aureus BLOODSTREAM INFECTION	INVESTIGATION REQUIRED?
Causative organism Staphylococcus aureus (including methicillin resistant strains)?	Yes
Meets criteria for diagnosis of a bloodstream infection (BSI)?	Yes
Healthcare associated?	Yes
BSI acquired in this healthcare facility?	Yes
Patient has or had an IV device in situ in the 48 hours prior to collection of the positive blood culture(s)?	Yes
<b>If yes recorded for all the above criteria, proceed to Step 2</b>	

## STEP 2

INTRAVASCULAR DEVICE RELATED BLOOD STREAM INFECTION		
PATIENT DETAILS		
<u>Patient Identification</u> (or affix label) MRN: Hosp Name: Surname: Given Name: Address: Suburb: Post Code: Phone: DOB: ___/___/___ Sex: <input type="checkbox"/> M <input type="checkbox"/> F	Date of completion of audit: ___/___/___  Name of person completing audit: _____  Approximate time taken to complete all steps of the investigation: _____	
Date Admitted: ___/___/___	Attributable Ward: _____ Attributable Unit: _____	Date of Separation or Death: ___/___/___
Transfers/movements after admission:		

### SPECIMEN (BLOOD CULTURE) DETAILS

Date of Collection: \_\_\_/\_\_\_/\_\_\_\_\_ Specimen Lab No: \_\_\_\_\_

(NB: The isolation of *S. aureus* from a blood culture collected through a line does not necessarily indicate a catheter was infected if peripheral blood cultures were also collected and were positive)

Was *S. aureus* also isolated from:

- Exit site swab
- Catheter distal tip
- Other focus of infection - if yes, does this truly fit the criteria of an IVD-related infection in the presence of another source? (refer Step 1)

Is the patient known to be colonised with *S. aureus*?  Yes  No

**Note:**

**If specimen is collected within 48 hours of insertion, please complete Step 3 section A**

**If specimen is collected >48 hours after insertion, please complete Step 3 section B**

### PATIENT OUTCOME

#### Outcome at time investigation

- Death due to other cause
- Full recovery or full recovery expected
- Infection caused death
- Infection contributed to death
- Ongoing sepsis

### DEVICE OUTCOME

Removed (Please circle) Yes / No Date/ Time: \_\_\_\_\_

If not removed provide reason:

### Step 3

SECTION A – WITHIN 48 HOURS OF INSERTION					
INSERTION DETAILS Batch/Brand/Type			YES	NO	N/A•
Insertion date: ___/___/___      Time inserted: ___: ___					
Was the insertion a guide-wire exchange?					
Batch:                      Brand: <input type="checkbox"/> PICC <input type="checkbox"/> PORT <input type="checkbox"/> Percutaneous CVC <input type="checkbox"/> Tunnelled CVC <input type="checkbox"/> Haemodialysis Catheter <input type="checkbox"/> PIVC					
Were prophylactic antibiotics administered to prevent catheter colonisation or bloodstream infection?					
If the catheter was inserted in an emergency, was the catheter replaced within 48 hours?					
Was an Insertion checklist used? (If no, conduct an observation using it)					
Who inserted the catheter?	Location of catheter insertion	Catheter gauge & lumen number	Site of insertion (also refer Appendix 1)		
<input type="checkbox"/> Consultant	<input type="checkbox"/> Ward _____	_____ g	<input type="checkbox"/> Right <input type="checkbox"/> Left <input type="checkbox"/> Internal jugular vein <input type="checkbox"/> Femoral vein <input type="checkbox"/> Internal Jugular Vein <input type="checkbox"/> Subclavian Vein <input type="checkbox"/> Cephalic Vein <input type="checkbox"/> Basilic Vein <input type="checkbox"/> Dorsum <input type="checkbox"/> Antecubital Fossa <input type="checkbox"/> Other (specify):		
<input type="checkbox"/> Anaesthetist	<input type="checkbox"/> Emergency Department				
<input type="checkbox"/> Registrar	<input type="checkbox"/> Radiology				
<input type="checkbox"/> Resident	<input type="checkbox"/> Anaesthetic Unit /Operating Theatre	_____ lumen/s			
<input type="checkbox"/> Medical Student	<input type="checkbox"/> Other hospital	<input type="checkbox"/> Antimicrobial?			
<input type="checkbox"/> Registered Nurse	<input type="checkbox"/> Emergency Services				
<input type="checkbox"/> IV Service	<input type="checkbox"/> Other				

<input type="checkbox"/> Other	
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**SECTION B – GREATER THAN 48 HOURS AFTER INSERTION**

<b>MAINTENANCE</b>	<b>YES</b>	<b>NO</b>	<b>N/A</b>
Has the catheter site been inspected each shift and the condition documented?			
Was the need for the device reviewed on a daily basis?			
Was post infusion phlebitis observed?			
Are continuous infusions routinely disconnected? If so Why?			
Are administration sets discarded when disconnected?			
If TPN is being administered, is one lumen used exclusively for that use?			
What is the hand hygiene compliance rate in this ward/area?			

**EVENT ANALYSIS**

Have previous similar events been identified in this facility in the last six (6) months (see previous Investigation Checklists)?  Yes  No

What were the critical problems or issues identified in the investigation? For example:

- The condition of the patient \_\_\_\_\_
- The environment \_\_\_\_\_
- Staff knowledge and competency \_\_\_\_\_
- Any treatment \_\_\_\_\_
- Contamination of equipment \_\_\_\_\_
- Procedures or protocols \_\_\_\_\_
- Equipment and supplies \_\_\_\_\_
- Compliance with Standard and Protocols \_\_\_\_\_
- Other \_\_\_\_\_

What were the main contributory factors?

- For each of the most significant critical problems/issues consider: what has contributed to, influenced or caused that problem/issue?
- Identify the main contributory factors which have had the greatest impact on the infection and would help reduce the chances of it happening again.

Use the attached action plan to outline your response:

- Using the checklist note any areas and examples of good practice.
- Develop a list of targeted recommendations/solutions to address each main contributory factor – what control and changes will be implemented to reduce the chances of the infection occurring in the future?
- Communicate and record the results of this investigation through the relevant reporting body(s) in the facility.
- Feedback the examples and areas of good practice to staff.

(National Patient Safety Agency (NHS). Learning through action to reduce infection.

<http://www.npsa.nhs.uk> – Internet access required)

ACTION PLAN				
Recommendations/solutions (what changes need to be made?)	Actions and steps (how will changes be made?)	Person responsible for change (who will be the lead person responsible for ensuring that each step or action happens?)	Milestones (what is the due date for completion of each step or action?)	Date completed

Direct above issues/action to relevant reporting body. Utilise when reviewing Infection Control Management Plan

Outcomes achieved	Reported to

Utilise outcomes during evaluation of Infection Control Management Plan or during accreditation process.

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