Prevention of intravascular catheter-related bloodstream infection (CRBSI)

Placement of central venous catheters

- The subclavian site is preferred over either the internal jugular or femoral sites in adult patients in order to reduce the incidence of sepsis and of thrombosis.
- If the patient has chronic kidney disease, consider the internal jugular vein to avoid subclavian vein stenosis.
- In children and in infants there is no preferred venous site to minimise the risk of infection.
- Use ultrasound when possible and when trained operators are available to reduce the time to cannulation, the number of cannulation attempts and the incidence of mechanical complications.
- Use a line with the minimum number of lumens necessary to facilitate management of the patient.
- When adherence to sterile technique cannot be assured, the line must be removed as soon as possible, but within 48 hours.
- An engineered stabilisation device that is designed specifically to control movement at the catheter hub, is recommended, as sutures increase the risk of infection. Standard dressings and tape are not suitable alternatives.
- All lines that are no longer needed should be removed promptly.

Sterile technique for the placement and securing of central venous catheters

- The operator should scrub, as for a surgical procedure, prior to the placement of a central venous catheter.
- Maximal sterile barrier precautions to be used include the use of a cap, mask, sterile gown, sterile gloves and a sterile full body drape.
- For skin decontamination prior to catheter insertion, the application of sterile > 0.5% chlorhexidine gluconate in 70% isopropyl alcohol represents standard of care. If there is a contraindication to the use of chlorhexidine, tincture of iodine, an iodophor or 70% alcohol may be used as alternatives. Caution should be taken to avoid pooling of cleaning solution as this can lead to burns.
- No comparison has been made between using chlorhexidine preparations with alcohol and povidone-iodine in alcohol to prepare clean skin.
- No recommendation can be made for the safety or efficacy of chlorhexidine in infants aged < 2 months.
- The skin antiseptic must be allowed to dry (at least 30 s) prior to performance of the procedure.

Catheter dressing and site management

- Do not use topical antibiotic ointment or creams on insertion sites as they have the potential to promote fungal infections as well as antimicrobial resistance.
- A sterile, transparent semi-permeable polyurethane dressing must be used to cover the site. Sterile gauze and tape may be used as an alternative.
- Sterile gauze should be used if there is any bleeding, exudate or excessive skin moisture that accumulates around the insertion site.
- The dressing must be replaced immediately if there is any sign that it is becoming loose, if there is any soiling, or if any dampness is noted under the dressing or at the insertion site. When replacing the dressing, the skin must be cleaned with antiseptic and allowed to dry before applying the new dressing.
- Gauze dressings must be replaced at least every two days.
- Clear transparent dressings must be replaced at least every seven days.
- Line sites must be monitored daily, especially at the catheter-skin junction site and surrounding area for pain, erythema, swelling or purulence, which may indicate infection, phlebitis, infiltration, or catheter-associated venous thrombosis.

Use of catheters and dressings that have associated antimicrobial activity

- Impregnated sponge-type dressings are only recommended if the central line-associated bloodstream infection (CLABSI) rate is not decreasing despite adherence to basic prevention measures, including education and training. This includes adherence to all of the previously described principles.
- Antimicrobial-impregnated catheters or those with antimicrobial properties may be considered in environments in which the rate of CLABSI is not decreasing, and if lines are likely to remain in place for more than five days.

Management of lines and administration sets

- In patients not receiving blood, blood products or fat emulsions, replace administration sets that are continuously used, including secondary sets and add-on devices, no more frequently than at 96-hour intervals, but at least every seven days.
- Blood product transfusion administration sets and filters should be replaced after the completion of each unit or every four hours. If more than one unit can be infused in four hours, the transfusion set can be used for a four-hour period.
- Administration sets used for intravenous fat emulsions should be replaced every 24 hours or with each new container.
- For continuous IV infusions in the ICU, the tubing, the container and any unused propofol must be discarded after 6–12 hours, as per the manufacturer's recommendations, or when the container is changed.
- When using needleless connectors, use a luer-locking mechanism to ensure a secure connection to the central venous catheter hub or access site.
- When needleless systems are used, a split septum valve may be preferred over some mechanical valves due to increased risk of infection with the mechanical valves.
- Disinfect needleless connectors prior to each entry into the device.
- Use aseptic no-touch technique to change the needleless connector.
- Change the needleless components at least as frequently as the administration set. There is no benefit to changing these more frequently than every 72 hours.
- Needleless connectors and access ports on administration sets must be cleaned with 70% alcohol, tincture of iodine or chlorhexidine, prior to injection or connection.

Placement of peripheral catheters

- Strict hand hygiene must be observed before and after the placement, removal or palpation of the catheter-insertion site.
- Strict hand hygiene is also required before and after accessing or dressing a catheter.
- Clean gloves, rather than sterile gloves, should be used for the insertion of peripheral venous catheters if the access site is not touched after the application of skin antiseptics.
- Sterile gloves should be used for the insertion of arterial and umbilical catheters.
- Clean gloves must be worn when changing the dressings on intravascular catheters.
- Skin preparation with 70% alcohol, tincture of iodine or chlorhexidine is acceptable for peripheral venous catheter insertion.
- The upper extremity should be used for the insertion of venous catheters in adults.
- The upper or lower extremities, or the scalp, may be used as a catheter insertion site in paediatric patients.
- Remove the peripheral catheters if there is any sign of infection or inflammation at the insertion site. This includes redness, tenderness, purulence or obvious thrombophlebitis.

Placement of arterial lines

- The radial or dorsalis pedis site is preferred over the femoral or axillary site to reduce the risk of infection in adults.
- Strict hand hygiene must be observed before and after the placement, removal or palpation of the catheter-insertion site.
- Strict hand hygiene is also required before and after accessing or dressing a catheter.
- Sterile gloves should be used for the insertion of arterial lines.
- Clean gloves must be worn when changing the dressings on intravascular catheters.
- A cleaning solution containing more than 0.5% chlorhexidine in alcohol should be used when inserting arterial catheters.