I. Purpose:

The purpose of this policy is to minimize the risk of infection associated with intravenous therapy. Major areas of emphasis include:

A. Educating and training health-care providers who insert and maintain catheters;
B. Using maximal sterile barrier precautions during central venous catheter insertion;
C. Using a 2% chlorhexidine preparation for skin antisepsis; and
D. Avoiding routine replacement of central venous catheters as a strategy to prevent infection.

II. General Comments:

Intravenous therapy is occasionally associated with serious septicemia. Although it is unlikely that infusion-related infections can ever be completely eliminated, they can be minimized if hospital personnel adhere to infection control procedures when administering intravenous therapy.

III. Performance Indicators:

Performance indicators for reducing catheter-related bloodstream infections (CRBSI) are

A. Implementation of educational programs that include didactic and interactive components for those who insert and maintain catheters.
B. Use of maximal sterile barrier precautions during catheter placement.
C. Use of chlorhexidine for skin antisepsis and

III. Performance Indicators (cont’d)

D. Catheter discontinuation when the catheter is no longer essential for medical management.

The following guidelines are designed to reduce the infectious complications associated

A. Healthcare worker education and training

1. Educate healthcare workers regarding the indications for intravascular catheter use, proper procedures for the insertion and maintenance of intravascular catheters and appropriate infection control measures to prevent intravascular catheter-related infections.

2. Assess knowledge of and adherence to guidelines periodically for all persons who insert and manage intravascular catheters.

3. Ensure appropriate nursing staff levels in ICU’s to minimize the incidences of CRBSIs.
B. Surveillance

1. Monitor the catheter sites visually or by palpation through the intact dressing on a regular basis, depending on the clinical situation of individual patients. If patients have tenderness at the insertion site, fever without obvious source, or other manifestations suggesting local exit site or bloodstream infection (BSI), the dressing should be removed to allow thorough examination of the site.

2. Encourage patients to report to their health care provider any changes in their catheter site or any new discomfort.

3. Record the operator, date, and time of catheter insertion and removal, and dressing changes on a standardized form such as the daily assessment record.

4. Do not routinely culture catheter tips. Catheter cultures are useful to confirm a catheter as a source of bacteremia, if cultures of catheter tip and peripheral blood cultures reveal the same pathogen. Catheter tip cultures are not useful if the patient is not suspected of having a CRBSI.

III. Performance Indicators (cont’d)

C. Hand Hygiene

1. Observe proper hand hygiene procedures either by washing hands with conventional antiseptic-containing soap and water or with waterless alcohol-based gels or foams. Observe hand hygiene before and after palpating catheter insertion sites, as well as before and after inserting, replacing, accessing, repairing, or dressing an intravascular catheter. Palpation of the insertion site should not be performed after the application of antiseptic, unless aseptic technique is maintained.

D. Aseptic Technique during Catheter Insertion and Care

1. Maintain aseptic technique for the insertion and care of intravascular catheters

2. Wear clean or sterile gloves when inserting an intravascular catheter as required by the Occupational Safety and Health Administration Blood borne Pathogens Standard. Wearing clean gloves rather than sterile gloves is acceptable for the insertion of peripheral intravascular catheters if the access site is not touched after the application of skin antiseptics. Sterile gloves should be worn for the insertion of arterial and central catheters.

3. Wear clean or sterile gloves when changing the dressing on intravascular catheters.
E. Catheter Insertion

1. Do not routinely use arterial or venous cut down procedures as a method to insert catheters

III. Performance Indicators (cont’d)

F. Catheter Site Care

1. Cutaneous antisepsis
   a) Disinfect clean skin with an appropriate antiseptic before catheter insertion and during dressing changes. Although a 2% chlorhexidine-based preparation is preferred, tincture or iodine, an iodophor, or 70% alcohol can be used.
   b) Allow the antiseptic to remain on the insertion site and to air dry before catheter insertion. Allow povidone iodine to remain on the skin for at least 2 minutes or longer if it is not yet dry before insertion.
   c) Do not apply organic solvents (e.g., acetone and ether) to the skin before insertion of catheters or during dressing changes.

G. Catheter-site Dressing regimens

1. Use either sterile gauze or sterile, transparent, semi permeable dressing to cover the catheter site.

2. Tunneled CVC sites that are well healed might not require dressings.

3. If the patient is diaphoretic, or if the site is bleeding or oozing, a gauze dressing is preferable to a transparent, semi-permeable dressing.

4. Replace catheter-site dressings at least every 24 hours for adult and adolescent patients depending on the circumstances of the individual patient. If gauze is under the transparent dressing it will be changed every 24 hours. Transparent dressings will be changed every 72 hours and as needed.

5. The site will be inspected every shift for signs of infection.

6. Do not use topical antibiotic ointment or creams on insertion sites except when using dialysis catheters) because of their potential to promote fungal infections and antimicrobial resistance.
III. Performance Indicators: (cont'd)

7. Do not submerge the catheter under water. Showering should be permitted if precautions can be taken to reduce the likelihood of introducing organisms into the catheter (e.g., if the catheter and connecting device are protected with an impermeable cover during the shower.)

8. NOTE: Critical care will be using 5-7 day long term semi-permeable transparent dressings.

H. Selection and Replacement of intravascular catheters

1. Select the catheter, insertion technique, and insertion site with the lowest risk for complications (infectious and noninfectious) for the anticipated type and duration of IV therapy.

2. Promptly remove any intravascular catheter that is no longer essential.

3. Do not routinely replace central venous or arterial catheters solely for the purposes of reducing the incidence of infection.

4. Replace peripheral venous catheters at least every 72-96 hours in adults to prevent phlebitis. Leave peripheral venous catheters in place in children until IV therapy is completed, unless complications (e.g., phlebitis and infiltration) occur.

5. When adherence to aseptic technique cannot be ensured (i.e., when catheters are inserted during a medical emergency), replace all catheters as soon as possible and after no longer than 48 hours.

6. Use clinical judgment to determine when to replace a catheter that could be a source of infection (e.g., do not routinely replace catheters in patients whose only indication if infection is fever). Do not routinely replace venous catheters in patients who are bacteremic or fungemic if the source of infection is unlikely to be the catheter.

7. Replace any short-term CVC if purulence is observed at the insertion site, which indicates infection.

III. Performance Indicators (cont'd)

8. Replace all central venous catheters (CVCs) of the patient is hemodynamically unstable and CRBSI is suspected.

9. Do not use guide wire techniques to replace catheters in patients suspected of having catheter-related infection.
I. Replacement of administration sets*, needle less systems and parenteral fluids

1. Administration sets
   a) replace administration sets, including secondary sets and add-on devices, no more frequently than at 72-hour intervals, unless catheter-related infection is suspected or documented
   b) Replace tubing used to administer blood, blood products, or lipid emulsions (those combined with amino acids and glucose in a 3-in-1 admixture or infused separately) within 24 hours of initiating the infusion. If the solution contains only dextrose and amino acids, the administration set does not need to be replaced more frequently than every 72 hours.
   c) Replace tubing used to administer propofol infusions every 6 to 12 hours, depending on its use, per the manufacturer’s recommendation.

2. Needleless intravascular devices
   a) Change the needle less components at least as frequently as the administration set on adult patients.
   b) Change caps no more frequently than every 72 hours or according to manufacturer’s recommendations.
   c) Ensure that all components of the system are compatible to minimize leaks and breaks in the system.

   Minimize contamination risk by wiping the access port with an appropriate antiseptic and accessing the port only with sterile devices.

III. Performance Indicators: (cont’d)

3. Parenteral fluids
   a) Complete the infusion of lipid-containing solutions (e.g., 3-in-1 solutions) within 24 hours of changing the solution
   b) Complete the infusion of lipid emulsions alone within 12 hours of hanging the emulsion. If volume considerations require more time; the infusion should be completed within 24 hours.
   c) Complete infusions of blood or other blood products within 4 hours of hanging the blood.

J. Intravenous-injection ports

1. Clean injection ports with 70% alcohol or an iodophor before accessing the system.

2. Cap all stopcocks when not in use

K. Preparation and quality control of IV admixtures
1. Admix all routine parenteral fluids in the pharmacy in a laminar-flow hood using aseptic technique.

2. Do not use any container of parenteral fluid that has visible turbidity, leaks, cracks, or particulate matter or if the manufacturer’s expiration date has passed.

3. Use single-dose vials for parenteral additives or medications when possible.

4. Do not combine the leftover content of single-use vials for later use.

5. If multidose vials are used:
   a) Refrigerate multidose vials after they are opened if recommended by the manufacturer.
   b) Cleanse the access diaphragm of multidose vials with 70% alcohol before inserting a device into the vial.
   c) Use a sterile device to access a multidose vial and avoid touch contamination of the device before penetrating the access diaphragm.
   d) Discard multidose vial if sterility is compromised.

III. Performance Indicators: (cont’d)

L. In-Line Filters

Filters are required to catch precipitants and rubber coring. Do not use filters routinely for infection-control purposes.

M. Prophylactic Antimicrobials

Do not administer intranasal or systemic antimicrobial prophylaxis routinely before insertion or during use of an intravascular catheter to prevent colonization or BSI.

IV. Peripheral Venous Catheters, Including Midline Catheters, in Adult and Pediatric Patients

A. Selection of peripheral catheter

1. Select catheters on the basis of the intended purpose and duration of use, known complications (e.g., phlebitis and infiltration), and experience of individual catheter operators.

2. Avoid the use of steel needles for the administration of fluids and medication that might cause tissue necrosis if extravasation occurs.

3. Use a midline catheter or peripherally inserted central catheter (PICC) when the duration of IV therapy will likely exceed 6 days.
B. Selection of peripheral-catheter insertion site

1. In adults, use an upper-instead of a lower-extremity site for catheter insertion. Replace a catheter inserted in a lower-extremity site to an upper-extremity site as soon as possible.

2. In pediatric patients, the hand, the dorsum of the foot, or the scalp can be used as the catheter insertion site.

3. Replacement of catheter

   a) Evaluate the catheter insertion site daily, by palpation through the dressing to discern tenderness and by inspection if a transparent dressing is in use. Gauze and opaque dressings should not be removed if the patient has no clinical signs of infection. If the patient has local tenderness or other signs of possible CRBSI, an opaque dressing should be removed and the site inspected visually.

   b) Remove peripheral venous catheters if the patient develops signs of phlebitis (e.g., warmth, tenderness, erythema, and palpable venous cord), infection, or a malfunctioning catheter.

   c) In adults, replace short, peripheral venous catheters at least 72-96 hours to reduce the risk for phlebitis. If sites for venous access are limited and no evidence of phlebitis or infection is present, peripheral venous catheters can be left in place for longer periods, although the patient and the insertion sites should be closely monitored.

   d) Do not routinely replace midline catheters to reduce the risk for infection.

   e) In pediatric patients, leave peripheral venous catheters in place until IV therapy is completed, unless a complication (e.g., phlebitis and infiltration) occurs.

C. Catheter and catheter-site care

   Do not routinely apply prophylactic topical antimicrobial or antiseptic ointment or cream to the insertion site of peripheral venous catheters.

V. Central Venous Catheters, Including PICCs, Hemodialysis, and Pulmonary Artery Catheters, in Adult and Pediatric Patients

A. Surveillance

   1. Conduct surveillance in ICUs and other patient populations to determine CRBSI rates, monitor trends in those rates, and assist in identifying lapses in infection-control practices.
2. Express ICU data as the number of catheter-associated BSIs per 1,000 catheter-days for both adults and children and stratify by birth weight categories for neonatal ICUs to facilitate comparisons with national data in comparable patient populations and healthcare settings.

3. Investigate events leading to unexpected life-threatening or fatal outcomes. This includes any process variation for which a recurrence would likely present an adverse outcome.

B. General principles

1. Use a CVC with the minimum number of ports or lumens essential for the management of the patient.

2. Designate personnel who have been trained and exhibit competency in the insertion of catheters to supervise trainees who perform catheter insertion.

General principles (cont’d)

3. Do not use hemodialysis catheters for blood drawing or applications other than hemodialysis except during dialysis or under emergency circumstances.

4. Use povidone-iodine antiseptic ointment at the hemodialysis session only if this ointment does not interact with the material of the hemodialysis catheter per manufacturer’s recommendation.

C. Selection of catheter insertion site

1. Weigh the risk and benefits of placing a device at a recommended site to reduce infectious complications against the risk for mechanical complications (e.g., pneumothorax, subclavian artery puncture, subclavian vein laceration, subclavian vein stenosis, hemothorax, thrombosis, air embolism, and catheter misplacement).

2. Subclavian site (rather than a jugular or a femoral site) in adult patients is preferred to minimize infection risk for nontunneled CVC placement.

V. Central Venous Catheters, Including PICCs, Hemodialysis, and Pulmonary Artery Catheters, in Adult and Pediatric Patients (cont’d)
D. Maximal sterile barrier precautions during catheter insertion

1. Use aseptic technique including the use of a cap, mask, sterile gown, sterile gloves, and a large sterile sheet, for the insertion of CVCs (including PICCs) or guide wire exchange.

2. Use a sterile sleeve to protect pulmonary artery catheters during insertion.

E. Replacement of catheter

1. Do not routinely replace CVCs, PICCs, hemodialysis catheters, or pulmonary artery catheters to prevent catheter-related infections.

2. Do not remove CVCs or PICCs on the basis on fever alone. Use clinical judgment regarding the appropriateness of removing the catheter if infection is evidenced elsewhere or if a noninfectious cause of fever is suspected.

3. Guide wire exchange
   a) Do not use guide wire exchanges routinely for nontunneled catheters to prevent infection
   b) Use a guide wire exchange to replace a malfunctioning nontunneled catheter if no evidence of infection is present.
   c) Use a new set of sterile gloves before handling the new catheter when guide wire exchanges are performed.

F. Catheter and catheter-site care

1. General measures
   a) Designate one port exclusively for hyperalimentation if a multilumen catheter is used to administer parenteral nutrition

2. Antibiotic lock solutions
   a) Do not routinely use antibiotic lock solutions to prevent CRBSI. Use prophylactic antibiotic lock solution only in special circumstances (e.g., in treating a patient with a long-term cuffed or tunneled catheter or port who has a history of multiple CRBSIs despite optimal maximal adherence to aseptic technique).

V. Central Venous Catheters, Including PICCs, Hemodialysis, and Pulmonary Artery Catheters, in Adult and Pediatric Patients (cont’d)

3. Catheter-site dressing regimens
   a) Replace the catheter-site dressing when it becomes damp, loosened, or soiled or when inspection of the site is necessary.
   b) Replace dressings used on short-term CVC sites every 2 days for gauze dressings and at least every 7 days for transparent dressings, except in those pediatric
patients in which the risk for dislodging the catheter outweighs the benefit of changing the dressing.

c) Replace dressings used on tunneled or implanted CVC sites no more than once per week, until the insertion site has healed.

4. Do not use chlorhexidine sponge dressings in neonates aged <7 days or of gestational age <26 weeks.

5. Ensure that catheter-site care is compatible with the catheter material. Use a sterile sleeve for all pulmonary artery catheters.

VI. Additional Recommendations for Peripheral Arterial Catheters and Pressure Monitoring Devices for Adult and Pediatric Patients

A. Selection of pressure monitoring system

1. Use disposable, rather than reusable, transducer assemblies when possible

B. Replacement of catheter and pressure monitoring system

1. Do not routinely replace peripheral arterial catheters to prevent catheter-related infections

2. Replace disposable or reusable transducers at 96-hour intervals. Replace other components of the system (including the tubing, continuous-flush device, and flush solution) at the time the transducer is replaced.

VI. Additional Recommendations for Peripheral Arterial Catheters and Pressure Monitoring Devices for Adult and Pediatric Patients: (cont’d)

C. Care of pressure monitoring systems

1. General measures

   a) Keep all components of the pressure monitoring system (including calibration devices and flush solution) sterile
   b) Minimize the number of manipulations of and entries into the pressure monitoring system. (i.e., one that requires a syringe and stopcock), to maintain the patency of the pressure monitoring catheters.
   c) When the pressure monitoring system is accessed through a diaphragm with an appropriate antiseptic before accessing the system
   d) Do not administer dextrose-containing solutions or parenteral nutrition fluids through the pressure monitoring circuit.

2. Sterilization or disinfection of pressure monitoring systems

   a) Use disposable transducers
   b) Sterilize reusable transducers according to the manufacturer’s
VII. Recommendations for Umbilical Catheters

A. Replacement of catheters

1. Remove and do not replace umbilical artery catheters if any signs of CRBSI, vascular insufficiency, or thrombosis are present.

2. Remove and do not replace umbilical venous catheters if any signs of CRBSI or thrombosis are present

3. Replace umbilical venous catheters only if the catheter malfunctions

B. Catheter-site care

1. Cleanse the umbilical insertion site with an antiseptic before catheter insertion. Avoid tincture of iodine because of the potential effect on the neonatal thyroid. Other iodine-containing products (e.g., povidone-iodine) can be used.

VII. Recommendations for Umbilical Catheters: (cont’d)

2. Do not use topical antibiotic ointment or creams on umbilical catheter insertion sites because of the potential to promote fungal infections and antimicrobial resistance.

3. Add low doses of heparin (0.25 – 1.0 F/ml) to the fluid infused through umbilical arterial catheters.

4. Remove umbilical catheters as soon as possible when no longer needed or when any sign of vascular insufficiency to the lower extremities is observed. Optimally, umbilical artery catheters should not be left in place > 5 days.

5. Umbilical venous catheters should be removed as soon as possible when no longer needed but can be used up to 14 days if managed aseptically.

*Administration sets include the area from the spike of tubing entering the fluid container to the hub of the vascular access device. However, a short extension tube might be connected to the catheter and might be considered a portion of the catheter to facilitate aseptic technique when changing administration sets.

Please refer to “Nurses’ Instruction Sheet for Central Venous Catheter Insertion and Care” and the General Recommendations for Intravascular – Device Use” for quick reference.
ADDENDUM “A”

NURSES’ INSTRUCTION SHEET FOR
CENTRAL VENOUS CATHETER
INSERTION AND CARE

Barrier precautions during catheter insertion:

- An accessory pack (INS No. 6457) containing one sterile gown, one earloop mask, and one extra-large bouffant cap is available to use during the insertion of central lines and is to be present in treatment rooms on the floors.
- Please remind the physician to use sterile technique including the use of a cap, mask, sterile gown, sterile gloves, and a large sterile sheet, for the insertion of central venous catheters or guide wire exchange. This is in the Infection Control Policy!

Cutaneous antisepsis:

- Disinfect clean skin with an appropriate antiseptic before catheter insertion and during dressing changes. Although a 2% chlorhexidine-based preparation is preferred, tincture of iodine can be used.
- Allow the antiseptic to remain on the insertion site and to air dry before catheter insertion

How to Use the Chlorhexidine Applicator:

- Implement maximal barrier protocols
- Using aseptic technique, remove the applicator from its package, assuring its sterility
- Holding the applicator downward, gently squeeze the wings to release the solution
- For dry sites such as the arm or abdomen, scrub the site with the friction pad for a full 30 seconds using a back and forth motion, then allow it to dry. (For moist sites such as the groin, use a back and forth motion to scrub the site for 2 full minutes. Allow to dry.)

- Do not apply organic solvents (e.g., acetone or ether) to the skin before insertion of catheters or during dressing changes.
- Use either sterile gauze or sterile transparent semi-permeable dressing to cover the catheter site.
- Do not use topical antibiotic ointment or creams on insertion sites because of their potential to promote fungal infections and antimicrobial resistance.
- Wipe the catheter hub with 70% alcohol before accessing the system
- Replace catheter site dressings when the device is replaced, when the dressing becomes damp, loosened, or soiled, or when inspection of the site is necessary. Replace dressings more frequently in diaphoretic patients.
ADDENDUM “A” (cont.)

✓ Clean the catheter site with chlorhexidine in a back and forth motion when doing dressing changes.
✓ Place a gauze dressing over the insertion site when transparent dressings are not applicable such as in excessive bleeding.

ADDENDUM “B”
GENERAL RECOMMENDATIONS FOR INTRAVASCULAR-DEVICE USE

✓ Wash hands before and after palpating, inserting, replacing, or dressing any intravascular device.
✓ Wear gloves when inserting an intravascular device or when changing the dressings on intravascular devices.
✓ When tincture of iodine is used for skin antisepsis before catheter insertion, it should be removed with alcohol.
✓ Do not palpate the insertion site after the skin has been cleansed with the antiseptic (this does not apply to maximum barrier precautions during which the operator is working in a sterile field).
✓ Replace catheter-site dressings when the device is removed or replaced, or when the dressing becomes damp, loosened, or soiled. Change dressings more frequently in diaphoretic patients.
✓ Replace any extension tubing when the vascular device is replaced.
✓ Replace IV tubing, including piggyback tubing and stopcocks at 72-hour intervals.
✓ Replace tubing used to administer blood, blood products, or lipid emulsions within 24 hours of hanging the fluid.
✓ Clean injection ports with 70% alcohol before accessing the system.
✓ Check all containers of parenteral fluid for visible turbidity, leaks, cracks, particulate matter, and the manufacturer's expiration date before use.
✓ Palpate the catheter insertion site for tenderness daily through the intact dressing.
✓ Visually inspect the catheter site if the patient develops tenderness at the insertion site, fever without obvious source, or symptoms of local or bloodstream infection.
✓ In patients who have large, bulky dressings that prevent palpation of direct visualization of the catheter-insertion site, remove the dressing, and visually inspect the catheter site at least daily, and apply a new dressing.
✓ Record the date and time of catheter insertion in an obvious location near the catheter-insertion site (such as on the dressing).
ADDENDUM “C”

HOW TO USE THE CHLORHEXIDINE PRODUCTS

✓ Hold applicator with sponge tip facing downward and gently squeeze, releasing solution for a controlled flow
✓ Press tip against skin and apply Chlorhexidine solution using back and forth friction scrub for 30 seconds (2 minutes for wet sites).
✓ Allow area to dry