Best Practices for Infection Prevention and Control in Perinatology

Section 5: Nutrition

Michael S. Dunn, MD, FRCPC
Sunnybrook Health Sciences Centre
Nutrition

• Newborn infants are microbiologically naïve
• Microbiome is established incrementally after birth through acquisition of environmental organisms
• NICU patients are vulnerable to perturbations in this process
  • Exposure to hospital organisms
  • Frequent use of antibiotics
  • Slow introduction and advancement of enteral feedings
• Abnormal microbiome is a risk factor for nosocomial infections and necrotizing enterocolitis
Breast Milk

• Optimal feeding choice for newborns

• Preterm and sick newborns in the NICU may accrue the greatest benefit from breast milk feeding

• Inability to nurse necessitates the use of expressed breast milk

• EBM contains components that convey protection from infections; yet there is also risk of transmitting an infectious agent to newborns via EBM
  • Intrinsic (vertical transmission from mother)
  • Extrinsic (contaminated during collection or handling)
Vertical Transmission Through EBM

- Hepatitis B
- *Hepatitis C*
- HIV
- CMV
- HTLV I/II
- Bacterial Pathogens
  - Staph aureus (including MRSA)
  - GBS
Reducing the Risk of Contamination

Rigorous processes to ensure safe

• Collection
• Storage
• Preparation
• Administration

NB – EBM is a body fluid and should be handled using Routine Practices
EBM Collection

- The mother must receive instruction on EBM collection, the importance of hand hygiene and basic principles of asepsis when expressing and handling breast milk.

- The EBM container must be labelled with the contents, baby’s name, mother’s name, hospital identifier and date/time of collection; it is strongly recommended that pre-printed labels be used.

- Parent education should be documented in the mother’s medical record.

- Sterile, single-use bottles and sterile lids should be used for each pumping session, particularly for neonates or newborns requiring intensive care.
Cleaning and Disinfecting Equipment

• Infant feeding equipment is classified as “semi-critical medical equipment”

• Contamination of breast-pumps, kits or supplies has been reported to cause neonatal infections and outbreaks

• Clear policies/procedures must be in place to ensure that reusable kits and shared equipment is properly disinfected between uses

• Reusable breast pump kits must be cleaned, rinsed and dried between uses by the same mother AND ALSO undergo high-level disinfection between uses by different mothers
Reprocessing Reusable Breast Pump Kits

1. Disassemble reusable components on the mother’s side of the filter membrane.

2. Wash all reusable components (except filter membrane) with detergent, followed by thorough rinsing.

3. If used by multiple mothers, disinfect reusable components with high-level disinfection (e.g., pasteurization).

4. Dry components completely.

5. Rinse the filter with water and air dry between uses (the filter should not come in contact with detergent); replace filter according to manufacturer’s instructions.

6. Discard breast pump tubing and membrane filters that are exposed to breast milk, as they are difficult to clean effectively.
EBM Storage

• Each labelled container, if not used immediately, must also be labelled with the date/time of freezing and date/time of thawing.

• Fresh EBM must remain cold during transport to the hospital (e.g., using coolers or freezer packs).

• Each mother should be assigned a dedicated, labelled freezer container for her baby’s milk.
# Storage Criteria for Newborn Feeds

<table>
<thead>
<tr>
<th>Refrigerator Temperature (4°C)</th>
<th>Room Temperature (20°C)</th>
<th>Maximum Allowable Time</th>
<th>Reference</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshly expressed breast milk (EBM)</td>
<td>✓</td>
<td>4 hours</td>
<td>169</td>
<td>Discard leftover feeds. Do not re-refrigerate leftover feed that has been at room temperature.</td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>48 hours</td>
<td>168</td>
<td>Monitor the temperature of the refrigerator.</td>
</tr>
<tr>
<td>Pasteurized human donor milk</td>
<td>✓</td>
<td>48 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thawed EBM</td>
<td>✓</td>
<td>24 hours</td>
<td>168</td>
<td>Do not re-freeze thawed EBM.</td>
</tr>
<tr>
<td>Prepared feeds (with or without additives)</td>
<td>✓</td>
<td>&lt; 2 hours</td>
<td>168</td>
<td>Do not leave prepared feeds at room temperature. If not used immediately, store prepared feeds at 4°C or lower.</td>
</tr>
<tr>
<td>Frozen EBM</td>
<td></td>
<td>24 hours</td>
<td>168</td>
<td>Freeze EBM within 24 hours of collection</td>
</tr>
<tr>
<td>Frozen (freezer compartment within refrigerator)</td>
<td></td>
<td>2 weeks</td>
<td>168</td>
<td>Freeze EBM within 24 hours of collection.</td>
</tr>
<tr>
<td>Frozen (separate door freezer of refrigerator)</td>
<td></td>
<td>3 months</td>
<td>168</td>
<td>Freeze EBM within 24 hours of collection.</td>
</tr>
<tr>
<td>Frozen (deep freeze)</td>
<td></td>
<td>6 months</td>
<td>168</td>
<td>Freeze EBM within 24 hours of collection.</td>
</tr>
</tbody>
</table>
Thawing and Warming EBM

• Breast milk may be thawed in the refrigerator overnight.

• Breast milk may be thawed or warmed in:
  • waterless electric warmers
  • sterile water.

• Untreated tap water (tap water that has not been treated by filtration and/or ultraviolet light) should not be used for thawing.

• Electric water-filled baths and/or microwave ovens should not be used for thawing or warming breast milk.

• Reusable warming containers, if used, must be dried between uses and cleaned according to a schedule (e.g., daily).
EBM Administration

• Routine Practices (e.g., hand hygiene) should be followed

• Before administering each feeding, there should be a system in place to ensure that the correct EBM is being provided to the correct newborn
  • At a minimum, a double-check mechanism should be used at the time of administration, to avoid errors in administration.
  • In facilities with large numbers of mothers who express milk, consideration should be given to automated systems, such as bar coding with positive patient identification systems (PPIDs) to avoid errors in administration.

• The maximum hang time for continuous feedings is four hours
  • Associated administration sets must be replaced every four hours.
Errors in Administration

• A comprehensive written policy, including disclosure and course of action, should be available in the event of errors involving breast milk administration.

• Viral testing of ‘donor’ and ‘recipient’ mothers should occur as well as recipient testing and administration of post-exposure prophylaxis to the newborn, if indicated.

• In centres where virology results will be available quickly, i.e., within 24-48 hours, the decision may be made not to test the recipient mother unless the donor mother tests positive, at which time the recipient mother would then be tested.
PERINATAL CARE POLICIES AND PROCEDURES MANUAL

SECTION: Infection Prevention and Control

TITLE: Errors in Administration of Expressed Breast Milk (EBM)

PURPOSE
To assess and respond to the possibility of a blood-borne pathogen being transmitted to a newborn if expressed breast milk (EBM) from another newborn’s mother is inadvertently ingested.

POLICY
It is the policy of [facility name] to minimize the risks associated with potential exposure of a newborn to a blood-borne pathogen through accidental ingestion of EBM from someone other than the newborn’s mother.

DEFINITION(S):
- Donor Mother: the mother who expressed the EBM
- Recipient Mother: the mother of the newborn who ingested the EBM
- Recipient Newborn: the newborn who ingests the EBM

PROCEDURE
Human milk is a body fluid capable of transmitting blood-borne pathogens. In the event that a newborn has inadvertently ingested EBM from another newborn’s mother, or it is suspected that this has occurred, the following procedure should be taken:

1. Confirm that the newborn has ingested the wrong EBM.
2. Notify the responsible physician about the event.
3. Complete an incident report with details of the event.
4. Inform the recipient newborn’s parents/guardians of the event as soon as possible. Maintain confidentiality at all times, i.e., do not share donor and recipient parent’s names, ethnic background or underlying medical conditions of newborns.
5. Inform the donor newborn’s parents/guardians of the event as soon as possible.
6. Review donor and recipient mothers’ antenatal sheets for hepatitis B virus (HBV) and human immunodeficiency virus (HIV) status.
7. Obtain consent for testing and document consent in the health record. If recipient and/or donor newborn’s mother refuses testing, document in both newborns’ health records. During the consent process, inform the donor mother that the test results will be released to the recipient mother without disclosure of identity.
Donor Breast Milk

• When a newborn’s mother’s breast milk is not available, the only acceptable human milk alternative is the use of pasteurized human donor milk (PHDM) from an accredited milk bank.

• The only organization currently accrediting milk banks is the Human Milk Banking Association of North America (HMBANA).

• Canadian Paediatric Society’s position statement on Human Milk Banking: http://www.cps.ca/english/statements/N/N10-01.pdf

• EBM must not be acquired directly from an individual other than the infant’s mother, including family members, or through the Internet. Without the rigid donor screening established at accredited milk banks, newborns may be at risk for acquisition of pathogens.

• If a newborn does receive breast milk from someone other than the mother or an accredited milk bank, this should be considered an administration error.
Powdered Infant Formula (PIF)

- For newborns that cannot receive breast milk, commercial infant formula is the recommended alternative.

- Commercially-produced *liquid infant formulas should always be used over powdered infant formula (PIF)*, unless there are *medical contraindications, as liquid preparations are sterile.*

- PIF is not sterile and may be either intrinsically contaminated or become contaminated during preparation. Powdered infant formula should not be used in an NICU setting unless it is needed to provide optimal nutritional support and an equivalent sterile liquid is unavailable.

- PIF has been implicated in outbreaks, particularly with *Enterobacter sakazakii [Chronobacter sakazakii] and Salmonella enterica.* E. sakazakii contamination of PIF can lead to meningitis, necrotizing enterocolitis, cerebral damage, neurological impairment and death. *Preterm and immunocompromised newborns are at greatest risk for infection with E. sakazakii.*
Preparation of Feedings

• In a hospital setting, infant feedings should be prepared in a dedicated, adequately spaced preparation area, not at the bedside.

• Consideration should be given to utilizing dedicated, trained personnel to prepare feeds and incorporate additives under a laminar flow hood.

• Fortifiers and additives should be dispensed in single-dose quantities

• Individual prepared feedings should be appropriately labelled and dispensed in single-dose quantities
Probiotics

- The use of probiotics to prevent necrotizing enterocolitis in preterm neonates has been studied and shows promise.
- At the present time, however, licensed probiotics are not readily available and lack standardization.
Probiotics for the Prevention of Necrotizing Enterocolitis in Preterm Infants

EFFECT ON SEVERE NECROTIZING ENTEROCOLITIS (RELATIVE RISK)

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>Probiotic n/N</th>
<th>no probiotic n/N</th>
<th>RR (fixed) 95% CI</th>
<th>Weight %</th>
<th>RR (fixed) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kitajima 1997</td>
<td>0/45</td>
<td>0/46</td>
<td>Not estimable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dani 2002</td>
<td>4/295</td>
<td>8/290</td>
<td>11.15 [0.15, 1.61]</td>
<td>0.49</td>
<td></td>
</tr>
<tr>
<td>Costalos 2003</td>
<td>5/51</td>
<td>6/36</td>
<td>9.72 [0.19, 1.78]</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Bin Nun 2005</td>
<td>1/72</td>
<td>10/73</td>
<td>0.10 [0.01, 0.77]</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>Lin 2005</td>
<td>2/180</td>
<td>10/187</td>
<td>0.21 [0.05, 0.94]</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>Manzoni 2006</td>
<td>1/39</td>
<td>3/41</td>
<td>4.04 [0.04, 3.23]</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td>Mohan 2006</td>
<td>2/21</td>
<td>1/17</td>
<td>1.62 [0.16, 16.37]</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Stratiki 2007</td>
<td>0/38</td>
<td>3/31</td>
<td>1.62 [0.16, 16.37]</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>Lin 2008</td>
<td>4/217</td>
<td>14/217</td>
<td>19.35 [0.10, 0.85]</td>
<td>0.29</td>
<td></td>
</tr>
<tr>
<td>Samantha 2008</td>
<td>5/91</td>
<td>15/95</td>
<td>0.35 [0.13, 0.92]</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>Rouge 2009</td>
<td>2/45</td>
<td>1/49</td>
<td>2.18 [0.20, 23.21]</td>
<td>0.33</td>
<td></td>
</tr>
</tbody>
</table>

Total (95% CI): 1094 1082 1.32 0.35 [0.23, 0.55]

Total events: 26 (Probiotic), 71 (no probiotic)
Test for heterogeneity: Chi² = 7.66, df = 9 (P = 0.57), I² = 0%
Test for overall effect: Z = 4.64 (P < 0.00001)

Probiotic Supplementation

• The results are promising but remain inconclusive.

• We need to:
  • have a viable commercial product that meets Health Canada approval
  • conduct large trials *with that product* to assess clinically meaningful outcomes (NEC, sepsis, death)
Withholding Breastmilk

<table>
<thead>
<tr>
<th>Infection</th>
<th>Pre-Term Newborns (NICU)</th>
<th>Full-Term Healthy Newborns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast Abscess</td>
<td>- May nurse or provide EBM from the unaffected side.</td>
<td>- May nurse or provide EBM from the unaffected side.</td>
</tr>
<tr>
<td></td>
<td>- Do not nurse or provide EBM from the affected side.</td>
<td>- May nurse or provide EBM from the affected side.</td>
</tr>
<tr>
<td></td>
<td>- If breast abscess is surgically drained, do not nurse or provide EBM from the affected side until 48 hours post drainage.</td>
<td></td>
</tr>
<tr>
<td>Abscess caused by TB</td>
<td>- Do not nurse or provide EBM until infection has been treated.</td>
<td>- Do not nurse or provide EBM until infection has been treated.</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>- Breast feeding should be discussed with a physician. Risk of transmission is low.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Consider abstaining from breast feeding if nipples are cracked and bleeding.</td>
<td></td>
</tr>
<tr>
<td>Herpes Simplex lesions on the breast</td>
<td>- May nurse or provide EBM from the unaffected side.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Use careful hand hygiene and cover lesions that may be exposed to the newborn.</td>
<td></td>
</tr>
<tr>
<td>Human Immunodeficiency Virus (HIV)</td>
<td>- Do not nurse or provide EBM.</td>
<td></td>
</tr>
<tr>
<td>Herpes zoster (shingles) on the breast</td>
<td>- May nurse or provide EBM from the unaffected side.</td>
<td></td>
</tr>
<tr>
<td>Human T-cell Lymphotropic virus Type I/II</td>
<td>- Do not nurse or provide EBM.</td>
<td></td>
</tr>
<tr>
<td>Pulmonary or laryngeal tuberculosis (TB)</td>
<td>- Delay contact with mother for nursing until she has received 2 weeks of effective anti-TB therapy, 3 smear negative sputum specimens and clinical improvement.</td>
<td>- May provide EBM. EBM to be administered to the newborn by someone other than the mother</td>
</tr>
</tbody>
</table>
Recommendations for Nutrition

- *Breast milk is the optimal feeding choice for newborns. Only the mother’s breast milk or milk from an accredited milk bank should be used.* [AI]

- *All health care settings that provide maternal/newborn care should have processes in place for the safe collection, handling, thawing, storage and administration of expressed breast milk.* [AIII]

- *A comprehensive written policy, including disclosure and course of action, should be available in the event of errors involving breast milk administration.* [AIII]

- *Commercially-produced liquid infant formulas should always be used over powdered infant formula, unless there are medical contraindications.* [AII]

- *Fortifiers and additives should be added to infant feeds using aseptic procedures and should be dispensed in single dose quantities.* [AIII]

- *Facilities should have a policy as to which infections require not breastfeeding, withholding of maternal breast milk, separation of mother and her newborn.* [AI]
CLABSI (central line-associated bloodstream infection)

- A surveillance definition relating to a primary BSI in a patient that had a central line within the 48-hour period before the development of the BSI and is not related to an infection at another site.

- Consistent reduction in infection rates related to central venous catheters (CVCs) may be achieved by implementing a program that is multidisciplinary, includes leadership commitment and uses evidence-based recommendations.
Quality Improvement Initiatives to Reduce CLABSI

- A successful QI Program should include
  - education and training of healthcare personnel who insert and maintain CVCs
  - a hand hygiene program
  - surveillance for CLABSI
  - appropriate selection of devices including caps, administration sets and add-on devices, with characteristics that help ensure maintenance of a closed system
  - implementation of central line bundles for care, including:
    - insertion bundle
    - maintenance bundle
    - removal/ replacement bundle
    - audits of practice related to use of bundles.
  - multidisciplinary review of each CVC-related infection
Education and Training

• Health care personnel should be educated regarding
  • Indications for CVCs
  • Insertion procedures
  • Maintenance procedures
  • General IP&C measures to prevent CLABSIs

• Those involved in the insertion and maintenance of CVCs should receive the appropriate training and demonstrate competence.

• Ongoing competence should be assessed periodically through targeted inservices and audits
CLABSI Surveillance

- Surveillance should be conducted by trained individuals, e.g., ICPs, to determine CLABSI rates in the NICU:
  - Express data as the number of central line-associated bloodstream infections (CLABSIs) per 1,000 catheter-days.
  - Stratify CLABSI rates by birth weight category to facilitate comparisons with national and international data.
  - Report CLABSI rates per catheter type or combined for all CVCs.
  - Report CLABSI rates for umbilical catheters separately from other CVC rates.
  - Monitor trends in CLABSI rates to assist in identifying lapses in IPAC practices.
  - Report CLABSI rates back to staff in the NICU.
CLABSI Surveillance

Total CR-BSI in NICU for Q1 09/10 to Q4 11/12 for Combined Birth Weights and Central Lines by Quarters

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Infection Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 09-10</td>
<td>8.17</td>
</tr>
<tr>
<td>Q2 09-10</td>
<td>5.07</td>
</tr>
<tr>
<td>Q3 09-10</td>
<td>14.71</td>
</tr>
<tr>
<td>Q4 09-10</td>
<td>1.13</td>
</tr>
<tr>
<td>Q1 10-11</td>
<td>6.79</td>
</tr>
<tr>
<td>Q2 10-11</td>
<td>6.08</td>
</tr>
<tr>
<td>Q3 10-11</td>
<td>1.34</td>
</tr>
<tr>
<td>Q4 10-11</td>
<td>3.53</td>
</tr>
<tr>
<td>Q1 11-12</td>
<td>2.18</td>
</tr>
<tr>
<td>Q2 11-12</td>
<td>2.80</td>
</tr>
<tr>
<td>Q3 11-12</td>
<td>1.08</td>
</tr>
<tr>
<td>Q4 11-12</td>
<td>5.54</td>
</tr>
</tbody>
</table>
Hand Hygiene

• Routine Practices include optimal hand hygiene.

• When caring for central lines, additional instances for hand hygiene include:
  • before and after palpating catheter insertion sites (note: palpation of the insertion site should not be performed after the application of antiseptic, unless aseptic technique is maintained)
  • before and after inserting, replacing, accessing, repairing, or dressing an intravascular catheter.

• The use of checklists that include hand hygiene for all central line bundles will help ensure consistent practice.
Central Line Bundles

Insertion Bundle

• Use a checklist for all line insertions
• Select optimal site for CVC insertion
• Select the type of CVC based on the intended use
• Use maximal barrier precautions and sterile technique during CVC insertion
• Use 2% chlorhexidine gluconate-containing skin antiseptic for skin preparation (caution – neonates < 28 weeks and < 1 week of age)
• Allow antiseptic to dry before CVC insertion

• Maintenance Bundle
  • CVC hubs/ports
  • CVC site dressings
# NICU Central & Umbilical Line Insertion Checklist

**Line Inserter:** Print Name: __________ Date: __________ Time: __________  
**Checklist Completed by:** __________________ Date: __________ Time: __________

- Without maximal barrier precautions, there is a 2-6 fold increase in infection
- Maximal barrier precautions means, strict compliance with hand hygiene and wearing a cap, mask, sterile gown and sterile gloves
- The checklist is to be completed in real-time (not retrospectively) during every central and umbilical line insertion

<table>
<thead>
<tr>
<th>Catheter Type</th>
<th>UVC</th>
<th>UAC</th>
<th>PICC</th>
</tr>
</thead>
</table>

## Pre-Insertion Preparation

- Identify patient (check nameband)  
- Indications determined (why is the line needed?)  
- No contraindications identified  
  (e.g.: uncontrolled coagulopathy, ongoing bacteremia)  
- PICC's: parent/guardian notified  
  (N/A)  
- PICC information sheet provided  
  (N/A)  
- Sedation/analgesia (see reverse for guide)  
- Catheter size determined  
  (UAC or UVC: ≤1.5 kg: 3.5-Fr; ≥1.5 kg: 5.0-Fr)  
  PICC: Most common: 1.9-2.0 Fr (24-26 gauge)  
  Wt < 1.0 kg: consider 1.2 Fr (27 gauge)  
  Wt > 2.5 kg: consider 2.6-3.0 Fr (20-22 gauge)  
- Assess for single or double lumen catheter  
  (N/A)  
- Length of catheter insertion determined (see reverse)  
- Central line cart  
- Assemble and verify equipment  
- Patient screen used  
  (N/A)  
- Sterile procedure sign posted at room entry  
  (N/A)  
- Inform roommates procedure starting  
  (N/A)  
- *NA-not applicable

### During Procedure

- **Yes** Yes, after reminder  
  - Hand Hygiene: operative antiseptic handwash by those performing & directly assisting in procedure (see reverse)  
  - Zone Traffic: room & patient zone traffic limited to essential personnel  
  - Maximal Barrier Precautions:  
    Person performing & directly assisting (scrubbed): sterile gloves, hat, mask & sterile gown  
    Personnel in patient zone (unscrubbed): hat, mask and non-sterile gown  
  - Skin Antisepsis:  
    Infant’s ≤7 weeks gestation AND ≤48 hours old:  
    Umbilical catheter insertion: sterile water  
    PICC: 2% aqueous chlorhexidine; remove with sterile water at procedure completion  
    All other infants: 2% aqueous chlorhexidine, do not remove with sterile water  
  - Draping: patient fully covered with sterile drape with small opening for insertion site  
  - Sterility maintained (e.g., gloves changed if contaminated)

### Post Procedure

- Sterile technique maintained when dressing applied and IV solutions connected  
- New IV tubing primed and connected to newly inserted catheter

### Documentation

- Documentation of procedure completed

---

Dec 17, 2010
Removal/Replacement Bundle

CVC Removal

• Promptly remove any CVC that is no longer essential

• Remove CVC if the newborn develops signs of phlebitis, infection or if the catheter malfunctions.

• Avoid routine replacement of CVCs as a strategy to prevent infection:  
  • The species of microorganism, the degree and scope of systemic inflammatory response and co-existing morbidities should all be part of the decision-making as to whether to retain or remove any and all catheters.
  • In general, infections with *Staphylococcus aureus*, *Enterococcus sp.*, *Candida sp.* and most Gram-negative organisms require immediate catheter removal.
  • Infections with coagulase-negative staphylococci may be successfully treated with the catheter still in place, unless the blood culture is positive three or more days.

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

• Umbilical artery catheters should be removed as soon as they are no longer needed to monitor the newborn, preferably within 5 days.
Administration Sets

- Configure the tubing consistently
- Maintain a closed system
- Minimize line access
- Use a needle-less device with ideal characteristics to reduce the risk of contamination
- Minimize unnecessary ports
- Minimize number of connections
A Consistent Approach to Line Set-Up

TPN

Heparin
Morphine
Dobutamine
Dopamine

Q96h

Replacement Fluid/Maintenance

Q24

Smart site
T piece
Blue threaded connector
Interlink cap into PICC

Intermittent Meds
Lipids

Change Frequency
- new q line change
- new q 24h
- new each time you access
- new q 96h/with buildwork or if blood remains in can/with line change
Administration Sets

Administration Set Replacement

• Replace administration sets using aseptic technique. Ideally, utilize a dedicated team for connecting new infusion sets.

• Replace administration sets, including secondary sets and add-on devices, no more frequently than at 96-hour intervals, but at least every 7 days, unless CLABSI is suspected or documented.

• Replace tubing used to administer blood, blood products, or lipid emulsions 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 96 hours.

Needleless Intravascular Catheter Systems

• Change needleless components at least as frequently as the administration set.

• Change caps no more frequently than every 96 hours or according to manufacturers’ instruction
Fluid Administration

• Designate one port exclusively for hyperalimentation if a multilumen catheter is used to administer parenteral nutrition.

• Complete the infusion of lipid-containing solutions (e.g., 3-in-1 solutions) within 24 hours of hanging the solution.

• 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 with 24 hours.

• Complete infusions of blood or other blood products within 4 hours of hanging the blood.
Recommendation for Prevention of CVC Infections

- Every NICU should have a quality improvement program for central line-associated bloodstream infection prevention that includes education and training, surveillance, insertion and maintenance bundles, removal and replacement criteria and audits of practice. [AI]