NOSOCOMIAL INFECTION (NI) PREVENTION BUNDLE

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EPIQ

MCare CPTBN Canadian Preterm Birth Network

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Grade of Recommendation	Clarity of risk/benefit	Quality of supporting evidence	Implications
1A Strong recommendation High quality evidence	Benefits clearly outweigh risk and burdens, or vice versa.	Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.	Strong recommendations, can apply to most patients in most circumstances without reservation. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
1B Strong recommendation Moderate quality evidence	Benefits clearly outweigh risk and burdens, or vice versa.	Evidence from randomized, controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate.	Strong recommendation and applies to most patients. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
1C Strong recommendation Low quality evidence	Benefits appear to outweigh risk and burdens, or vice versa.	Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.	Strong recommendation and applies to most patients. Some of the evidence base supporting the recommendation is, however, of low quality.
2A Weak recommendation High quality evidence	Benefits closely balanced with risks and burdens.	Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.	Weak recommendation, best action may differ depending on circumstances or patients or societal values.
2B Weak recommendation Moderate quality evidence	Benefits closely balanced with risks and burdens, some uncertainly in the estimates of benefits, risks and burdens.	Evidence from randomized, controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate.	Weak recommendation, alternative approaches likely to be better for some patients under some circumstances.
2C Weak recommendation Low quality evidence	Uncertainty in the estimates of benefits, risks, and burdens; benefits may be closely balanced with risks and burdens.	Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.	Very weak recommendation; other alternatives may be equally reasonable.

Contributors:

Initial Bundle Feb 2015: Dr. Michael Dunn and Stacey Dalgleish, NP, NI Outcome Group

Revised Bundle Feb 2019. Dr. Michael Dunn and Nely Amaral, RN, NI Outcome Group

Revised Bundle Feb 2025: Claire Hamilton MN RN & Dr. Joseph Ting, In collaboration with EPIQ IPAS Outcome Group

Hand Hygiene

#	Intervention	Grade of Recommendation
1	Hand Hygiene (HH) single most effective strategy to reduce NI. Establish HH standards & compliance monitoring as integral component of NI reduction program.	1A
2	Perform critical analysis of workflow in the NICU to identify opportunities to improve HH practices, protocols and staff education.	1C
3	Promote a clothing/jewelry policy that includes bare to the elbows, avoidance of artificial nails, and properly clipped natural (no polish) fingernails (<1/4cm). No watches during patient care.	1C
4	Ensure that all staff have a clear understanding of the moments for hand hygiene and practice with strict adherence.	1C
5	Utilize an institution approved alcohol-based hand rub (ABHR) and ensure that it is used according to directions (volume, skin coverage and contact time). Ensure staff have adequate access to ABHR at all points of care.	1B
6	Establish a culture of safety in which staff and families are empowered to speak up when there are breaches in technique.	1C
7	Perform regular HH audits in the NICU – provide immediate feedback to MDs/staff regarding performance and collate results for regular reporting.	1B
8	Provide hospital-grade skin moisturizing agents that are compatible with alcohol-based hand rub and ensure they are easily accessible for staff use between patient contacts	1C
9	Establish and identify zones around the patient that mandate HH if entered.	1C
10	Active family empowerment may increase HH among Healthcare Workers (HCWs). Provide education to families on the importance of HH and proper technique for HH. Encourage family members to adopt the “bare below elbows” technique when providing care.	1C

Feeding		
#	Intervention	Grade of Recommendation
1	Obtain colostrum from mothers of premature newborns to be given as “Oral Immune Therapy” (OIT)	1C
2	Ensure that mothers/parents of newly born NICU patients begin regular pumping within 6 hours of birth and receive ongoing support to enhance breast milk supply	1B
3	Feed exclusively with mother’s/parent’s human milk	1B
4	Use pasteurized banked human milk if mother’s/parent’s milk is not available	1C
5	Institute minimal enteral feedings on Day 1	1C
6	Utilize standardized feeding guidelines for initiation and advancement of feeds with the goal of reaching 120 ml/kg/day within 7-10 days	1B
7	Use sterile water or non-water-based approaches to defrost or warm expressed breast milk	1C
8	Avoid use of H2 blockers & proton pump inhibitors (PPI) as they may increase risk of bacterial translocation, Late Onset Sepsis (LOS) & Necrotizing Enterocolitis (NEC).	1B

Line Insertion		
#	Intervention	Grade of Recommendation
1	Avoid use of femoral lines	1C
2	Use standardized “line cart” or “line tray” that contains all necessary equipment	1B
3	Use a dedicated line insertion team with standardized training and regular recertification utilizing an accepted evidence-based standard	1A
4	Shield sterile procedure area and restrict traffic during procedure	1C
5	Post signage indicating sterile procedure in progress to ensure that staff coming within one meter of sterile field don mask and cap	1C
6	Employ a checklist for all line insertions	1A
7	Perform audits to assess compliance with accepted insertion procedure	1C
8	Empower staff to “Stop the Line” if they observe any breach in technique	1A
9	Utilize maximal sterile barrier precautions during procedure	1A
10	Double-glove for skin prep and draping – remove outer pair for insertion	1C

Line Insertion		
#	Intervention	Grade of Recommendation
11	Utilize two (2) person sterile technique for line insertion procedure	1C
12	Employ standardized skin antisepsis techniques and guidelines	1C
13	Skin antisepsis should ideally include Chlorhexidine gluconate (CHG) containing product. Ensure full coverage, use sparingly, avoid solutions dripping/pooling and allow to dry completely before penetrating skin. Consider using lower CHG concentrations in Extremely-low Gestational Age (ELGA) infants	1B
14	Employ a clean introducer for each skin break/attempt	1A
15	Restrict attempts to 2 per operator	1C
16	Utilize transparent adhesive dressings for PICCs to allow for direct visualization and prevention of catheter migration.	1B
17	Additional use of Tissue Adhesives may be considered for both PICC and Umbilical Lines as emerging evidence suggests decreases in CLABSI, catheter migration and improved hemostasis.	1B
18	Reduce number of skin breaks from peripheral IV attempts especially in ELGA. Consider adopting a difficult intravenous access (DIVA) tool or algorithms to guide practice	1C

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Line Management and Maintenance

#	Intervention	Grade of Recommendation
1	Critically review insertion site q shift and minimum q 6 hours during shift for dressing integrity and site cleanliness – document in patient record.	1C
2	Dressing changes PRN only, by a dedicated trained team, using a standardized dressing with sterile technique.	1C
3	Employ closed, needleless fluid , medication administration and sampling systems designed and configured to minimize the risk of contamination . Do NOT use open luer or stopcock.	1A
4	Assemble and prime infusion tubing using sterile technique, ideally in a dedicated off-unit space under laminar air flow; this process may also be useful for medication preparation.	1B
5	Perform audits to assess compliance with accepted line assembly and priming procedures.	1B
6	Utilize dedicated line team for connecting new infusion sets.	2C
7	Change line tubing q96hr (AADS & Lipids q 24 hr). Medication tubing should be changed per drug stability/pharmacy set standards for either intermittent or continuous infusions. Blood component tubing is single use only with a maximum infusion time of 4 hours. Maintain a closed system whenever possible.	1B

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Evidence-based Practice for Improving Quality

Line Management and Maintenance

#	Intervention	Grade of Recommendation
8	Add heparin to TPN to a concentration of 0.25 - 0.5 units/mL.	1B
9	"Scrub the Hub" with 70% alcohol (with or without 2% chlorhexidine) for at least 15 seconds and allow surface to dry completely (minimum of 30 seconds) before making any line connections or entries	1A
10	Use sterile or aseptic (+/- non-sterile gloves) no touch technique (ANTT) whenever accessing ports. Maintain a clean working surface.	1C
11	Use prefilled syringes for line flushes (or a closed system).	2C
12	Perform regular line connection / line entry audits.	2C
13	For units with persistent high infection rates, can consider using alcohol disinfectant caps in addition to the "scrub the hub" technique for line access.	2C
14	For units with high rates of fungal infections Consider using prophylactic fluconazole in Extremely-low Birth Weight (ELBW) infants with central catheters in place.	1B

Line Removal

#	Intervention	Grade of Recommendation
1	Consider switching from Umbilical Venous Catheter (UVC) to Peripherally-inserted Central Catheter (PICC) prior to 7 days of age if there is anticipation for longer-term Intravenous (IV) fluids.	1B
2	Evaluate the need for central line access daily.	1B
3	Remove central line when enteral intake reaches 100-120 ml/kg/day unless needed for medications.	1B
4	Convert IV medications to PO once enteral intake reaches 60 mL/kg/day unless PO not available/not indicated.	1C
5	Remove sub-optimally placed UVCs as early as possible and insert a PICC if long-term IV fluids are anticipated.	1B

Education and Documentation

#	Intervention	Grade of Recommendation
1	Target zero Hospital Acquired Infections. Avoid mentality that NI is “unpreventable” by creating goals/focus on Zero NI.	1C
2	Incorporate bundled elements into the Electronic Health Record to promote best practices and enhance accuracy of documentation.	1C
3	Use simulation and videos for education to standardize central line insertions and maintenance processes.	1C

Equipment and Environmental Considerations

#	Intervention	Grade of Recommendation
1	Use single patient use or dedicated equipment (stethoscopes, thermometer, etc.).	1C
2	Ensure robust cleaning routines for multiuse or shared patient equipment.	1C
3	Implement robust and regular environmental cleaning protocols to reduce bioburden including computers/workstations, carts, multi-patient equipment that does not get cleaned in centralized reprocessing (ophthalmoscopes, POCUS, transilluminators etc.).	1C

Review of Infections by Multidisciplinary Team

#	Intervention	Grade of Recommendation
1	Consider any bloodstream infection (BSI) to be an adverse event.	1C
2	Convene a multidisciplinary team consisting of representatives from nursing, medicine, Infection Prevention and Control (IPC) and administration to investigate each BSI.	1C
3	Utilize standardized template to investigate factors possibly contributing to the development of the BSI; trend results to identify potential changes in practice.	1C

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