Data-Driven Quality Improvement to Evaluate and Address Nosocomial Infection in the NICU

Ashraf Kharrat, Angela Neish, Janet MacAlpine, Collette Pryce-Jones, Gillian Chan, Rosemary Altobelli, Nastaran Ostad, Yenge Diambomba, Amish Jain
on behalf of the Nosocomial Infection Task Force

Mount Sinai Hospital
Sinai Health System
Joseph & Wolf Lebovic Health Complex

Background

- Sepsis continues to be a major contributor to morbidity and mortality in the NICU.
- Increased mortality and long-term neurodevelopmental impairments in infants with sepsis.
- Rising rates of nosocomial infection (NI) at Mount Sinai Hospital's (MSH) NICU over recent years.

Aim Statement

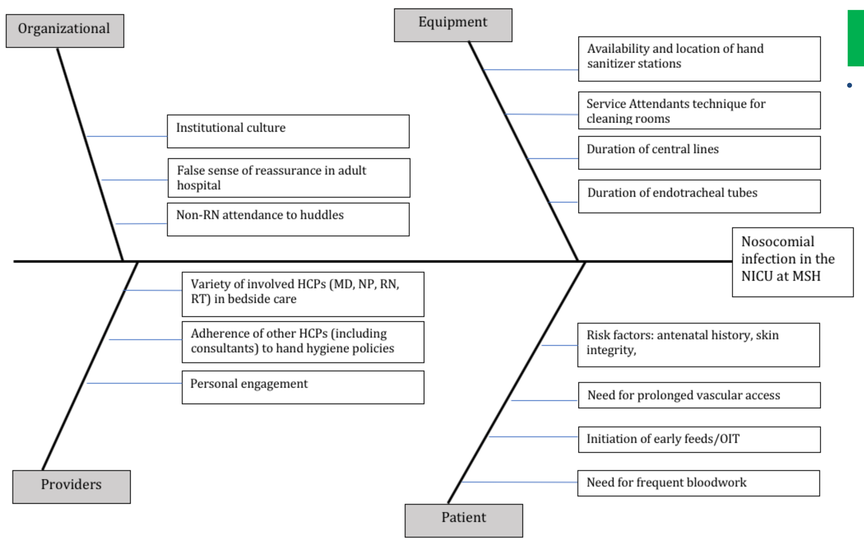
To reduce the rate of CLABSIs in the NICU from 22% to 18% by December 2023

To reduce the rate of non-CLABSIs in the NICU from 8% to 6% by December 2023

Process Outline

- We employed several strategies to obtain both qualitative and quantitative data to explore the causes of rising NI rates, including reviews of index cases and safety reports, and surveying front-line staff.
- A multidisciplinary Nosocomial Infection Task Force was created to engage all key stakeholders.

Root Cause Analysis



Implementation Strategy

Hand Hygiene

Hand hygiene is a key component of infection prevention! Hand hygiene through either washing hands with soap and water or using an alcohol based hand sanitizer (push down fully on plunger) must be performed before entry into key clinical areas and performance of procedures including IV or NG insertions.

- Moment 1A: Perform hand hygiene every time **before entering patient room**.
- Moment 1B: Perform hand hygiene every time **before entering baby space**.
- Moment 2: Perform hand hygiene every time **before an aseptic procedure**.
- Moment 3: Perform hand hygiene every time **after bodily fluid exposure**.
- Moment 4: Perform hand hygiene every time **after contact** with immediate care environment.

Proper hand hygiene and following routine practices will prevent the spread of organisms. If a patient is positive for an antibiotic-resistant organism such as MRSA or ESBL, the only way to break the chain of spread beyond baby space is proper hand hygiene and cleaning of equipment.

Umbilical Line Care

RN Routine Cord Care Protocol:
Starting on the day of umbilical line insertion, perform Cord Care **once per 12 hour shift.**

- Perform hand hygiene and don clean gloves.
- Place the pre-cut 4x4 sterile non-woven drain sponge at the base of the cord.
- Using a 2% chlorhexidine gluconate with 70% isopropyl alcohol swab stick, gently cleanse the umbilical stump and the catheter insertion site, ensuring alcohol does not pool on the skin of the abdomen.
- If pooling occurs, immediately use sterile gauze with sterile water to cleanse skin.
- Document procedure under Umbilicus Assessment > Cord Care Protocol.

MD/NP Umbilical Line Repositioning:

- Perform hand hygiene, don **sterile gloves**, and perform Cord Care prior to repositioning to the desired length.

Line Access Tips

Scrub the Hub

For all line access or medication administration, **Scrub the Hub** must be done:

- Scrub the hub for 30s, allowing 5-10s to dry.
- Once the hub is scrubbed, do not set it back down.

If the hub has been contaminated after the initial scrub, scrub again for 30s, allowing 5-10s to dry.

Clean gloves must be used for all IV line access. All central and peripheral line access must be performed using **clean** gloves. This includes all of the following:

- Intermittent medication administration
- Initiation of new continuous IV infusions
- Initiation of PIV
- Administration of RSI meds
- Flushing ports
- Performing line changes (clean gloves for the clean portion, and sterile gloves for the sterile portion)
- As a reminder, Scrub the Hub must be performed every time (scrub for 30 seconds, let dry for 5-10 seconds).

PICC Management

What should my PICC dressing look like?

- The wings should be secured flush with the skin. Any lifting of the wings can compromise the integrity of the Tegaderm and of the PICC itself.
- Steri-Strips are place in sequential fashion to stabilize the external catheter, hub, and wings.
- StatSeal is placed **only** over the insertion site.
- StatSeal in any other area must be cleaned off prior to application of Tegaderm.
- Tegaderm protects the entire PICC site an all of its components. It is imperative that the PICC inserter ensures the Tegaderm does **not** create a circumferential dressing.
- When the PICC is inserted at or near a mobile area, such as a joint, the inserter should thoughtfully consider placement of the Tegaderm so that movement does not rub and lift the edge of the dressing, compromising its integrity.

PICC dressings should be:

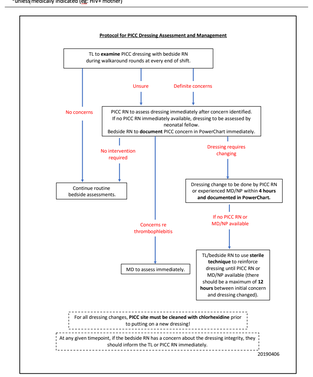
- Dry and intact
- Free of lifting or peeling
- Free of excessive dried blood or drainage under the dressing
- Secure, with no potential for slipping or malposition
- Applied without wrapping around the entire limb (circumferential dressings can lead to edema)

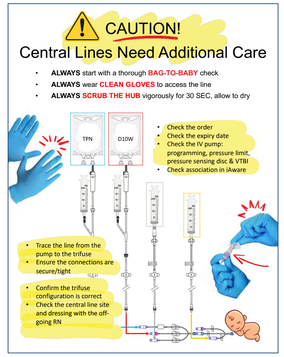
Please escalate concerns about PICC dressings immediately; see the **PICC Management Algorithm** for more details.

Bathing Policy — *denotes new initiative*

	Term Infants (Greater or equal to 34 0/7 weeks)	Preterm Infants (26 0/7 to 33 6/7 weeks)	Extreme Preterm Infants (Less than 25 6/7 weeks)
Initial bath	After **24 HOL***	Sponge bathing may start after **72 HOL***	Sponge bathing may start after **DOL 14***
Cleanser	Hospital-provided cleanser	Warm sterile water ONLY. Once infant reaches **DOL 14**, may then use hospital-provided **fragrance free** cleanser.	Warm sterile water ONLY. Once infant reaches **DOL 14 and greater than 25 6/7 weeks**, may then use hospital-provided **fragrance free** cleanser.
Tub bathing	Yes.	No; infant must be greater than or equal to **34 weeks PMA or has maintained stable temperature in a cot/crib for greater than 24 hours.**	No; infant must be greater than or equal to **34 weeks PMA or has maintained stable temperature in a cot/crib for greater than 24 hours.**
Sponge bathing	Yes.	Yes; in warmed incubator with sterile 4x4 non-woven gauze.	Yes; in warmed incubator with sterile 4x4 non-woven gauze.
Frequency	Maximum every other day.	Maximum every four days until infant reaches 34 weeks PMA then can be every other day.	Maximum every four days until infant reaches 34 weeks PMA then can be every other day.

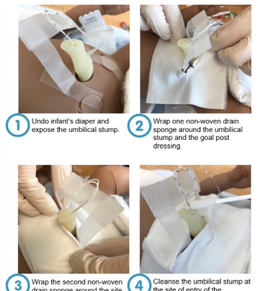
*unless(medically indicated (eg: HIV+ mother)





Family Engagement

- More visible physical indicators in the NICU to engage families.
  - Inclusion of families in Patient Safety Week activities.
- Conversations with families by the Quality Team to encourage family participation in infection prevention.



PDSA Cycles

- To date, PDSA cycles have incorporated various education strategies to ensure all of the MSH NICU workforce is up-to-date regarding key messaging (challenges: large workforce, rotating staff including residents/fellows). Qualitative assessments of education/workforce awareness are employed by specific members of the NI Task Force.

Email info bulletins (incl. Summer NI Series)

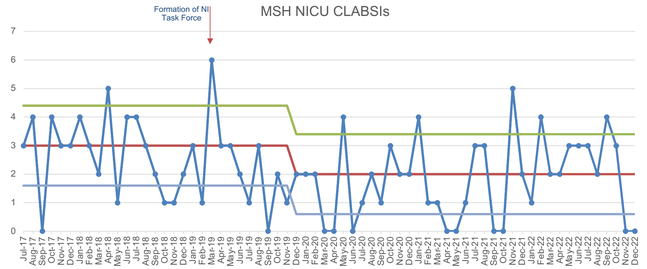
Targeted education sessions

Unit-wide 'roadshows'

Quality multidisciplinary huddles

Quality Champions

Evaluation



- Monthly review of all NI cases by Quality Manager.
- Detailed review of all cases by MD + Quality Manager.
- Cases presented at Morbidity Rounds.

Still significant month to month variation in # of cases.
Biggest impact has been on PICC-related infections.
No differences in infection risk seen in central vs low-lying UVCs x 4 years.
Cord Care did not have a significant impact on umbilical line associated infections.
CONS is the #1 pathogen seen in our NICU → currently all CONS cases are treated.

Next Steps

Continue re-enforcement of current messaging

New Umbilical and PICC dressings

Skin care in ELBW