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# Patient Safety Tip of the Week

# August 1, 2023 Breastmilk Mixup

A newborn was given the wrong breast milk while a patient at a neonatal intensive care unit in a Toronto hospital (O'Shea 2023). The premature infant's father came to visit his daughter at the hospital and found an empty bottle of breast milk in the room. The label on the bottle had another name, not his wife's or daughter's name. A nurse initially denied giving the wrong breast milk, but later acknowledged what happened. A couple days later, the infant girl tested positive for cytomegalovirus (CMV). While it may never be known if the CMV was transmitted from the wrong breastmilk, the case reminds us that breast milk mixups are not uncommon and have the potential to transmit diseases. It, of course, also raises the issue of misidentification issues in newborns.

It's been quite a few years since we addressed this issue. Our November 17, 2009 Patient Safety Tip of the Week "Switched Babies" had an extensive discussion of the risk factors and contributory factors to incidents of both switched babies and breastmilk mixups. In that column we recommended organizations do a FMEA (failure mode and effects analysis) and predicted they would likely find numerous potential vulnerabilities to either error.

In several columns we described cases where mothers were given the wrong newborn infant for breastfeeding (see, for example, our September 2011 What's New in the Patient Safety World column "Another Breastfeeding Mixup" and our Patient Safety Tip of the Week for December 11, 2012 "Breastfeeding Mixup Again"). In those cases, there are typically multiple system issues (that we'll describe later). But the mother's ability to recognize the baby is also an issue. The mother may be tired or may have received sedating drugs. In some cases, the mother has only seen the baby once or twice. The baby may be swaddled and only his/her face showing. The babies often wear similar caps (blue for boys, pink for girls). And if the baby is brought for breastfeeding at night the room may be relatively dark, further impairing recognition of the baby.

In addition to mothers directly breastfeeding the wrong baby, there is the risk of **babies being fed expressed breast milk from the wrong mother**. The Pennsylvania Patient Safety Authority issued a Patient Safety Advisory on Mismanagement of Expressed Breast Milk (PPSA 2007) in 2007. The Pennsylvania Patient Safety Reporting System (PA-PSRS) had received 20 reports of infants being fed another mother's expressed breast milk. They identified risk factors that involved not only identification issues but

also labeling issues, and problems with verification, storage and dispensing. The Advisory has good recommendations on risk reduction strategies and an excellent section on how to respond and manage patients when such exposures do occur, particularly managing the risk for infectious disease transmission. All those recommendations obviously would also apply in cases where infants were directly exposed to breastfeeding by the wrong mother.

In our April 8, 2014 Patient Safety Tip of the Week "FMEA to Avoid Breastmilk Mixups" we discussed an actual FMEA done on breastmilk feeding (Zhang 2014) that provides a good model for organizations to use for their own FMEA on the topic.

Human milk misadministration events occur within the hospital setting with an incidence ranging from 1 error for every 10,000 feeding opportunities to 0.7 errors per month in 1 NICU study conducted over a 10-year period (Madore 2021). They also note that a study (Dougherty 2009) found that more than 75% of human milk misadministration errors happened during evening and night shifts. A 2016 PPSA report on misidentification issues in newborns (Wallace 2016) noted that 7.2% of their reported incidents involved breast milk administration mishaps.

The same principles we apply to medication safety should apply to use of expressed breast milk. First, and foremost, of the tools we should utilize is **barcode scanning**. A short video Barcodes & Breastfeeding in NICU at Sinai Health nicely demonstrates how barcoding is used to help manage breast milk administration at Mt. Sinai Hospital in Toronto, Ontario. Barcode scanning can not only help avoid giving the wrong breast milk to an infant, but also avoid administering expired breast milk or making fortification errors.

An excellent review of "Best Practices for Handling and Administration of Expressed Human Milk and Donor Human Milk for Hospitalized Preterm Infants" (Steele 2018) notes that scanning technology can also assist with monitoring expiration dates and times. Human milk that is beyond its expiration is at greater risk for excessive microbial growth which could be particularly devastating in the critically ill neonate. Steele notes that barcode scanning avoids the errors that often occur with the two-person double check.

Madore and Fisher (Madore 2021), writing on the role of breast milk in infectious disease, note that infectious risks from a single misadministered feeding of human milk are very minimal. Factors to consider in evaluating the risk are the gestational and chronologic age of the infant, the health and infectious status of the donor woman, and the health of the recipient woman. The more common infectious agents that are transmissible via human milk with potential adverse health outcomes include HIV, hepatitis B and C viruses, CMV (cytomeglovirus), Human T-cell lymphotropic virus type I or type II, and viral hemorrhagic fevers (eg, Ebola).

The authors note that, although exposure to another woman's milk can cause a great deal of anxiety and may have a notable nonclinical impact (eg, lack of trust in care team), the

infectious risk to the recipient infant is almost negligible. The authors recommend the following actions: "As soon as the error is recognized, the feeding should be discontinued, and both families should be informed and reassured about the extremely low risk of pathogen transmission. Current CDC recommendations no longer require the donor or recipient mother to undergo serologic tests for HIV or hepatitis B and C, although in high-risk situations this testing may be considered. The costs of any screening should be covered by the institution as part of the risk management and mitigation of error policy. Testing neonates is discouraged, because this practice does not address the theoretic transmission risk. Questions to ask donor mother are expression time and handling of the misadministered breast milk, including the presence of cracked or bleeding nipples, and willingness to share recent infectious disease history and medication use with the other family and the care team. A discussion with the family of the recipient infant should include reassurance of the minimal risk of infectious disease transmission, information about the misadministered milk, and pertinent medical information that the donor mother is willing to share. To the extent feasible, the confidentiality of both mothers must be maintained. Ongoing psychosocial support for the families and staff should be offered, and discussions with the families should be documented per each institution's policy."

Ironically, the CMV in today's index case might have been missed if no testing had been done (keeping in mind that it is unclear whether the CMV resulted from the breastmilk misadministration).

CDC has guidelines on what to do if an infant or child is mistakenly fed another woman's expressed breast milk (CDC 2022). CDC emphasizes that few illnesses are transmitted via breast milk, and in fact, the unique properties of breast milk help protect infants from colds and other typical childhood viruses. Nonetheless, both families need to be notified when there is a milk mix-up, and they should be informed that the risk of transmission of infectious diseases via breast milk is small.

CDC's experts recommend specific actions be taken as soon as possible after this kind of error to prevent adverse health consequences:

- Inform the mother whose breast milk was given to another child, and ask her:
    - When was the breast milk expressed and how was it handled prior to being delivered to the caretaker or facility?
    - Would she be willing to share information about her current medication use, recent infectious disease history, and presence of cracked or bleeding nipples during milk expression with the other family or the child's pediatrician?
- Discuss the event with the parent(s) or guardian(s) of the child who was given another mother's milk:
    - Inform them that their child was given another mother's expressed breast milk.
    - Inform them that the risk of transmission of infectious diseases is small.

- If possible, provide the family with information on when the milk was expressed and how the milk was handled prior to its being delivered to the caretaker.
- Encourage the parent(s) or guardian(s) to notify the child's physician of the situation and share any specific details known.

The CDC guideline goes on to note that a single exposure from breast milk is very unlikely to lead to transmission of HIV or hepatitis C or hepatitis B (though it has recommendations about hepatitis B vaccine based upon the vaccination status of the child). It also notes that, though some medications may be transmitted in breast milk, the risk of adverse effects from a single exposure to a medication through breast milk is very low.

CDC emphasizes that, when a milk mix-up occurs, any decisions about medical management and diagnostic testing of the infant who received another mother's milk should be based on the details of the individual situation and be determined collaboratively between the infant's physician and parent(s) or guardian(s). CDC also notes that sensitivity should be taken with both families to minimize fear and steps should be taken to appropriately manage the situation in a timely manner.

To help prevent milk mix-ups, CDC recommends childcare facilities should review and update their policies and practices for storing and handling breast milk, as well as training (or retraining) all childcare facility staff in safe storage and handling of breast milk. In addition to clearly labeling expressed breast milk with the child's name, some facilities use strategies such as putting different colored rubber bands around the bottles for different infants and using separate bins for each infant's bottles of milk.

Madore and Fisher also recommend that following any incident of misadministration of breastmilk, a root cause analysis (RCA) be performed to identify interventions needed to prevent repeat incidents. Again, our own recommendation is that any facility with a neonatal nursery or NICU should proactively do a FMEA (failure mode and effects analysis) to identify vulnerabilities in your breastmilk management systems (see our April 8, 2014 Patient Safety Tip of the Week "FMEA to Avoid Breastmilk Mixups").

A quality improvement project to decrease human milk errors in the NICU was carried out at Nationwide Children's Hospital (Oza-Frank 2017, Mayhood 2017). They use a barcoding system and scanned errors were identified from the human milk barcode medication administration system. Scanned errors of interest were wrong-milk-to-wrong-infant, expired-milk, or preparation errors. The total number of scanned errors declined from 97.1 per 1,000 bottles in 2009 to 10.8 in 2015, driven primarily by installation of bedside bar-coding scanners and dedicated milk technicians who prepare, store and dispense human milk in a centralized milk room. "At that time the project began, hand-written labels were used to identify milk bottles, nursing staff prepared and administered the milk and the NICU lacked a space to thaw, prepare and warm the bottles. The QI team created a flow chart of the process of collecting, storing and administrating breast milk, examined policies and identified steps where the system failed. The team then

updated and revised the process, which begins with a mother pumping breast milk at home or on site and ends with warming the bottle bedside just prior to feeding. The QI team received approval from Nationwide Children's administration to buy a barcoding system, which includes bedside scanners with 66 possible error codes. After an actual wrong-milk-to-wrong-infant error in 2011, full-time milk technicians were hired and a centralized milk room built."

Of course, by reducing the number of errors scanned, the number of opportunities for overall errors also decreased. Oza-Frank and colleagues felt that the interventions which likely had the greatest impact on reducing the number of scanned errors included installation of bedside (versus centralized) scanners and dedicated staff to handle milk.

Nationwide Children's took it even a few steps further. The barcode system was integrated with the electronic health record, so the milk technicians can now use one computer screen to read a fortification order and verify it with bar coding. That can further reduce milk preparation errors. Also, the milk bank that supplies donated milk to Nationwide Children's began using the same barcode system. This helps nurses to see when the milk was checked in, how long it was stored, and other data needed to ensure donor milk meets the NICU's standards and matches with the right baby. They are also looking at ways to track what happens to the bottle after scanning shows it's expired, to ensure expired milk is properly disposed of and doesn't remain a source of potential error.

There are many other facets of breast milk safety. Caroline Steele's review of "Best Practices for Handling and Administration of Expressed Human Milk and Donor Human Milk for Hospitalized Preterm Infants" (Steele 2018) discusses all the other important considerations in preparation, storage, mixing devices, storage containers, staff issues (including hygiene), additives and fortification. She highly recommends use of both dedicated space and staff for preparation and handling of breast milk. We refer you to her article for details.

Labor and delivery, newborn nurseries, and NICU's also have many unique factors that can lead to newborn misidentification. See below the list of our many columns on the issue of misidentification in newborns.

**Some of our prior columns dealing with misadministration of breastmilk**:

November 17, 2009 "Switched Babies"
September 2011 "Another Breastfeeding Mixup"
December 11, 2012 "Breastfeeding Mixup Again"
April 8, 2014 "FMEA to Avoid Breastmilk Mixups"

**Some of our prior columns related to identification issues in newborns**:
November 17, 2009 "Switched Babies"

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| September 2011 | "Another Breastfeeding Mixup" |
| December 20, 2011 | "Infant Abduction" |
| September 4, 2012 | "More Infant Abductions" |
| December 11, 2012 | "Breastfeeding Mixup Again" |
| April 8, 2014 | "FMEA to Avoid Breastmilk Mixups" |
| August 2015 | "Newborn Name Confusion" |
| January 19, 2016 | "Patient Identification in the Spotlight" |
| July 19, 2016 | "Infants and Wrong Site Surgery" |
| August 1, 2017 | "Progress on Wrong Patient Orders" |
| March 26, 2019 | "Patient Misidentification" |
| September 10, 2019 | "Joint Commission Naming Standard Leaves a Gap" |
| June 16, 2020 | "Tracking Technologies" |

**References**:


O'Shea S. Infant gets sick after being given wrong breast milk in Toronto ICU. Global News (Toronto) 2023; Posted June 27, 2023
https://globalnews.ca/news/9796637/infant-gets-sick-wrong-breast-milk-toronto-icu/

PPSA (Pennsylvania Patient Safety Authority). Mismanagement of Expressed Breast Milk. PA PSRS Patient Saf Advis 2007; 4(2): 46-50
http://patientsafety.pa.gov/ADVISORIES/Pages/200706_46.aspx

Zhang B, LaFleur EA, Ballweg DD, et al. Use of Healthcare Failure Mode and Effect Analysis (HFMEA) to Quantify Risks of the Human Milk Feeding Process. Journal of Nursing Care Quality 2014; 29(1): 30-37
https://journals.lww.com/jncqjournal/Abstract/2014/01000/Use_of_Healthcare_Failure_Mode_and_Effect_Analysis.4.aspx

Madore LS, Fisher DJ. The Role of Breast Milk in Infectious Disease. Clin Perinatol 2021; 48(2): 359-378
https://www.sciencedirect.com/science/article/abs/pii/S009551082100021X?via%3Dihub

Dougherty D, Nash A. Bar Coding from Breast to Baby: A Comprehensive Breast Milk Management System for the NICU. Neonatal Network 2009; 28(5): 321-328 Sep 2009
https://connect.springerpub.com/content/sgrnn/28/5/321

Wallace SC. Newborns Pose Unique Identification Challenges. Pa Patient Saf Advis 2016; 13(2): 42-49

http://patientsafety.pa.gov/ADVISORIES/Pages/201606_42.aspx

Sinai Health. Barcodes & Breastfeeding in NICU at Sinai Health (video). Sinai Health 2023
http://relativestrangers.ca/barcodes-breastfeeding-nicu-at-sinai-health/

Steele C. Best Practices for Handling and Administration of Expressed Human Milk and Donor Human Milk for Hospitalized Preterm Infants. Front Nutr 2018; 3(5): 76
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6129589/

CDC (Centers for Disease Control and Prevention). What to Do if an Infant or Child Is Mistakenly Fed Another Woman's Expressed Breast Milk. CDC last updated March 2022
https://www.cdc.gov/breastfeeding/recommendations/other_mothers_milk.htm

CDC (Centers for Disease Control and Prevention). Proper Storage and Preparation of Breast Milk. CDC last updated April 2023
https://www.cdc.gov/breastfeeding/recommendations/handling_breastmilk.htm

Oza-Frank R, Kachoria R, Dail J, et al.. A quality improvement project to decrease human milk errors in the NICU. Pediatrics 2017; 139(2): e20154451
https://publications.aap.org/pediatrics/article-abstract/139/2/e20154451/60305/A-Quality-Improvement-Project-to-Decrease-Human?redirectedFrom=fulltext

Mayhood K. How a QI Intervention Lowered Breast Milk Errors in a Busy NICU. Pediatrics Nationwide 2017; April 4, 2017
https://pediatricsnationwide.org/2017/04/04/how-a-qi-intervention-lowered-breast-milk-errors-in-a-busy-nicu/

http://www.patientsafetysolutions.com/

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