

# A Retrospective Two Year Study of Breast Milk Error Prevention in the Neonatal Intensive Care Unit

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Timeless Medical Systems' Breast Milk Tracking System, formerly known as MOMS, was instituted at Nationwide Children's Hospital in 2009 after having 8 reported breast milk errors where the wrong milk was fed to the wrong Neonatal Intensive Care Unit (NICU) infant. How many errors would you guess went unreported in the same year? It's probably a lot more than you'd think... The data in the following research study conducted by Nationwide Children's Hospital indicates that they had critical errors in over 5% of all expressed breast milk feedings.

In the first year after our Breast Milk Tracking System was installed at Nationwide Children's Hospital, it stopped:

- The wrong milk from being fed 541 times
- Expired milk from being fed 1,992 times
- 224 fortification errors

The benefits extend beyond those first year wins. The immediate feedback that our system provided the nurses helped improve their compliance to patient safety policy, reducing the error rate from 5.64% to 1.79% in the second year of use. This study was conducted by Nationwide Children's Hospital without any involvement by Timeless Medical Systems or external funding.

## Abstract

**Problem Statement:** The first question – after two years of continuously using the Mother's Own Milk System (MOMS) breastmilk barcoding system by Timeless Medical Systems, have the clinicians become dependent on the system to prevent errors?

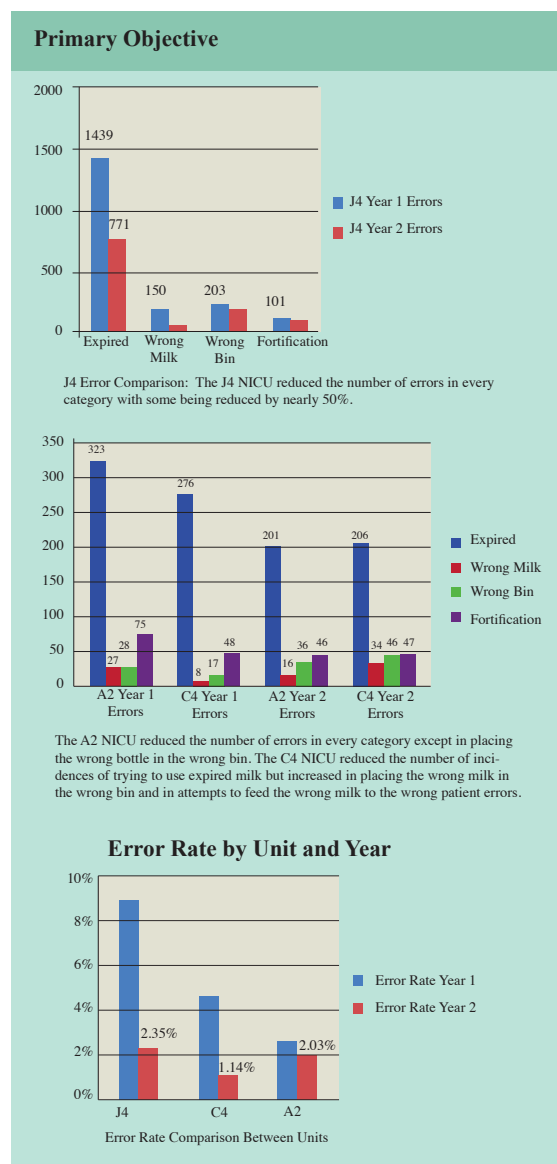
The second question – does having a dedicated milk technician further reduce errors?

**Methods:** Reports from the breastmilk barcoding system's database show how many of four types of critical errors were reported. These error types are: attempting to combine dissimilarly fortified bottles, using expired milk, placing a bottle into a different patient's storage bin and feeding a patient another patient's breastmilk bottle. The total number of bottles fed per unit was used to give an error rate.

**Summary of Results:** Errors have been tracked for two consecutive years with a significant reduction in the error rate on all three units from year one to two. The addition of a milk

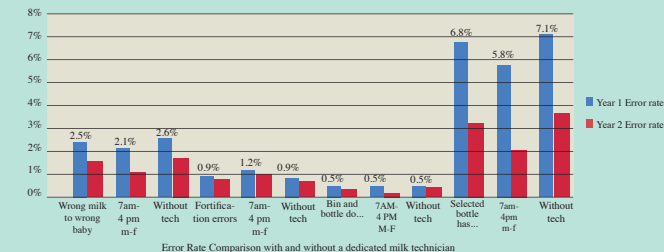
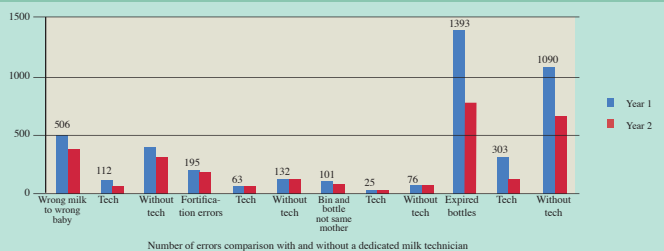
technician accelerated the reduction in the breastmilk error rate in all four categories except fortification errors on the J4 unit.

**Implications and Lessons Learned:** The majority of units that maintain the use of barcoding to manage breastmilk usage in the NICU have continued to improve patient safety by reducing

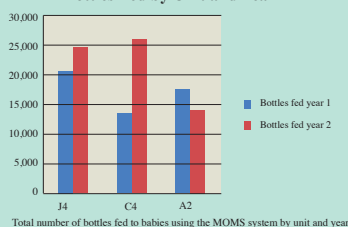


This article was provided by Nationwide Children's Hospital.

## Secondary Objective



## Bottles Fed by Unit and Year



the number of breastmilk errors. In units that combine a milk technician with barcoding, the error rate is even lower than just barcoding alone.

## Purpose

A retrospective analysis to determine the continued effectiveness of implementing a breastmilk barcoding system in the Neonatal Intensive Care Unit (NICU) at Nationwide Children's Hospital (NCH) after two years of continuous use.

## Introduction

Nationwide Children's Hospital is a tertiary care children's hospital. The Neonatal Intensive Care Unit is a 99 bed level 3 unit separated into three distinct units, each with their own focus of patients. All infants admitted to the NICU are received by transport or through the emergency room. Breastmilk barcoding was implemented, within a two month period in 2009, into the three NICUs to eliminate breastmilk errors. A milk tech was added to the J4 unit in August 2009.

## Primary Objective

Did the staff learn from having the system correct them and increase their vigilance when handling breastmilk or did they become more lax and rely on the system to catch errors?

## Secondary Objective

Was there a significant impact on J4's errors by having a milk tech for 40 hours per week?

## Description

Four different critical errors were tracked by unit and by type of error through reports available within the barcoding software. These errors were: attempting to prepare/feed expired milk,

attempting to feed wrong milk to wrong baby, attempting to place another mother's milk in a different baby's storage bin, and wrong fortification errors. Errors were tracked for two consecutive years with a significant reduction in the error rate on two of the three units. These error rates have also been compared to the total number of breastmilk bottles fed on each unit.

Through informal observation of utilization of the barcoding system on the C4 unit, it was discovered that the nursing staff had created work-around thus not using this safety system to its fullest potential. Changes were implemented into the system to prevent these work-arounds. We theorize that the error rate significantly increased as staff attempted and were unable to use work-arounds that they had become accustomed to using.

## Method

Reports were run against the breastmilk barcoding system's (MOMS) database to determine how many of four types of critical errors were reported. The four error types are: attempting to combine dissimilarly fortified bottles, using expired milk, placing a bottle into a different patient's bin, and feeding a patient another patient's bottle. The total number of bottles fed per unit was also pulled from the database to give an error rate. The two time periods being compared are June 2009 through May 2010 and June 2010 through May 2011.

## Findings

Errors have been tracked for two consecutive years with a significant reduction in the error rate on two of the three units from year one to two. Statistical analysis shows that the changes in error rates are not related to changes in the number of bottles fed to patients. The breastmilk error rate was further reduced in all categories except fortification errors on the J4 unit with the addition of a milk tech.

## Summary

From Year 1 to Year 2, the number of scans of expired bottles in the barcoding system was reduced by 40% (from 1,992 to 1,185 bottles) over the three units combined. During this same period, the number of bottles of wrong milk that were attempted to be fed to the wrong baby was reduced by 22% (from 541 to 426 bottles). One unit had an increase in the number of attempts to feed wrong milk to wrong baby. During this time, there were two sets of higher order multiples on this unit. Knowing that in the barcoding system, once milk has been fortified for a particular infant, it cannot be fed to siblings, which staff attempted to do, therefore staff required re-training on how to prepare milk for multiples while conserving the supply.

On the unit with the milk tech, the total number scans of expired bottles during her working hours were reduced by 58% (from 303 to 128 bottles) from the 1st to 2nd year. During this same period, the number of expired bottles that were scanned during her non-working hours were reduced by 40% (from 1,090 to 650 bottles).

## Conclusion

The use of barcoding to manage breastmilk usage in the NICU has continued to improve patient safety by reducing the number of breastmilk errors. In units that combine a milk technician with barcoding, the error rate is even lower than just barcoding alone. This reduction in error rates with a milk tech shows that having a dedicated staff person(s) committed to breastmilk preparation adds to the safety environment and gives an added level of protection to a vulnerable population.