

MilkTracker National Trends Report

National Trends in Human Milk and Infant Formula Management in the Hospital Setting

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Jakayla Maher, BSN, RN, RNC-NIC, MilkTracker Operations Manager
Carrie Petras, RD, CSPCC, LD, Clinical Specialist & Lead Dietitian
Jaylee Hilliard, MSN, RN, NEA-BC, CPXP, VP of Clinical Strategy

Executive Brief

A review of clinical assessments conducted across 50+ U.S. hospitals in 2025 uncovered that across U.S. neonatal and pediatric environments, infant and pediatric feeding workflows are rapidly evolving from visually dependent, paper-based processes to standardized, technology-enabled systems. The cross-site analyses found consistent, high-impact patterns across the full feeding management cycle (receipt, storage, preparation, administration, transport, and discharge), spanning small community/special care nurseries through large regional neonatal centers, and including both centralized and mixed/decentralized preparation models.

Multi-site patterns emerged, including growing adoption of barcode safeguards for human milk, traceability blind spots for formula and additives, a shift toward centralized preparation and precision measurement, and heightened attention to discharge reconciliation and recall readiness. These themes apply across NICUs, mother-baby units, and pediatric acute and critical care settings, with adaptations tailored to each unit's specific needs and local layout, staffing, and preparation model.

Leaders are increasingly approaching feeding processes with the same rigor as medication workflows, acknowledging their cross-departmental nature and the number of critical handoffs involved.

Six Trends Leaders Should Prioritize Now

- 1. Close the two-tiered safety gap:** applying comparable verification and traceability rigor to human milk, donor milk, formula, and additives.
- 2. Lot-level traceability as an executive expectation:** improving recall readiness, documentation, and rapid patient identification for donor milk, formula, fortifiers, and modular additives.
- 3. Precision nutrition:** moving away from household measuring tools (scoops, teaspoons) toward gram-scale measurement and automated, standardized recipe calculations.
- 4. Alignment preparation and environmental controls:** reducing interruptions, improving aseptic practices, and standardizing output through dedicated spaces, tools, and clear role ownership.
- 5. Use data to drive reliability and learning:** trending verification compliance, near-miss interceptions, waste, and selected outcome-adjacent metrics (e.g., mother's own milk at discharge).
- 6. Enterprise standardization beyond the NICU:** aligning minimum verification, measurement accuracy, and traceability expectations across all settings where infant or pediatric nutrition is prepared or administered (NICU, postpartum, pediatrics, PICU/CVICU, and transfer/discharge workflows).

This report summarizes these themes in a neutral, actionable format to support readiness planning and cross-unit standardization.

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Operational and Patient Safety Implications

Infant and pediatric feeding is a high-stakes clinical process that spans nursing, lactation, providers, nutrition, nutrition labs, pharmacy, supply chain, informatics, infection prevention, and quality. When safeguards are applied inconsistently across product types, preventable errors become more likely, and root-cause analysis becomes significantly more difficult.

From a health-system leadership perspective, feeding reliability intersects with three priorities:

- Patient safety and prevention of misadministration or wrong-product exposure.
- Regulatory and audit readiness, including the ability to demonstrate two-identifier verification and traceability.
- Workforce protection and operational resilience: reducing cognitive load, preventing workarounds driven by missing infrastructure, and supporting consistent documentation and learning.

Language note on workforce protection: While no software can guarantee outcomes, high-reliability workflows can minimize dependence on memory, manual transcription, and visually similar products, and establish a defensible, searchable record of actions taken at each step.

How These Trends Were Identified

Findings in this report were synthesized from de-identified clinical assessments and a gap analyses for feeding safety, including workflow observations and implementation readiness, conducted across 50+ hospitals in the United States during 2025. The assessment cohort included a wide range of unit sizes, acuity levels, and physical layouts (open-bay, pod-based neighborhoods, private-room corridor designs, and loop layouts). These characteristics materially influence workflow design, hardware placement, and the likelihood of workarounds when systems are not built for the environment.

The MilkTracker clinical assessment approach codes themes across the whole workflow and classifies them into: (1) observed strengths; (2) recurring vulnerabilities; and (3) enabling conditions required to standardize practice. This report intentionally avoids naming individual organizations and presents themes in the aggregate.

In addition to published literature, this paper incorporates practice-based evidence from the 2025 MilkTracker Onsite Assessments and Gap Analyses, as well as aggregated observations from clinical specialists supporting implementation across varied neonatal and pediatric environments. Insights were synthesized from structured assessment tools and field notes, recurring themes identified during onboarding and optimization, and cross-site comparisons of workflow and adoption patterns. Findings are presented as implementation learnings rather than causal clinical outcome claims and are intended to complement, not replace, peer-reviewed evidence; applicability may vary based on local preparation model, staffing, EHR configuration, and physical layout.

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Cohort Overview:

Characteristic	Observed variation in assessment cohort (descriptive)
Unit size	Small community/special care nurseries (<=10 beds) through large regional neonatal centers (50+ beds).
Acuity levels	Levels II-IV, primarily Level II and Level III nurseries; the subset included pediatric acute care and pediatric critical care environments.
Physical layouts	Open-bay, pod-based neighborhoods, private-room corridor layouts, and loop ("race track") configurations.
Preparation model	Centralized (dedicated milk lab or prep room) and mixed or decentralized models, more common outside the NICU.

Implementation implication: unit layout and preparation model should drive hardware placement, role design, and exception planning.

Excellence is not size-dependent. Across the assessment cohort, high-reliability feeding practices were observed in both small community nurseries and large regional or academic centers. Notably, some lower-volume units demonstrated exceptional consistency in core best practices, such as clear receipt workflows, disciplined labeling standards, and standardized preparation approaches, despite fewer beds and fewer dedicated resources. **This reinforces an important takeaway for leaders: reliability is achievable across diverse environments when ownership, policies, and workflows are explicitly designed and reinforced.**

National Trends Across the Feeding Management Cycle

The most consistent insight across sites is that feeding reliability is only as strong as its weakest handoff. Leading organizations treat feeding management as an end-to-end system with defined decision points, standardized verification, and a purpose-built environment for preparation. The following sections summarize trends by workflow phase, with an additional subsection focused on pediatric and critical care settings.

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Figure 1. Preparation Model Distribution by Percentage

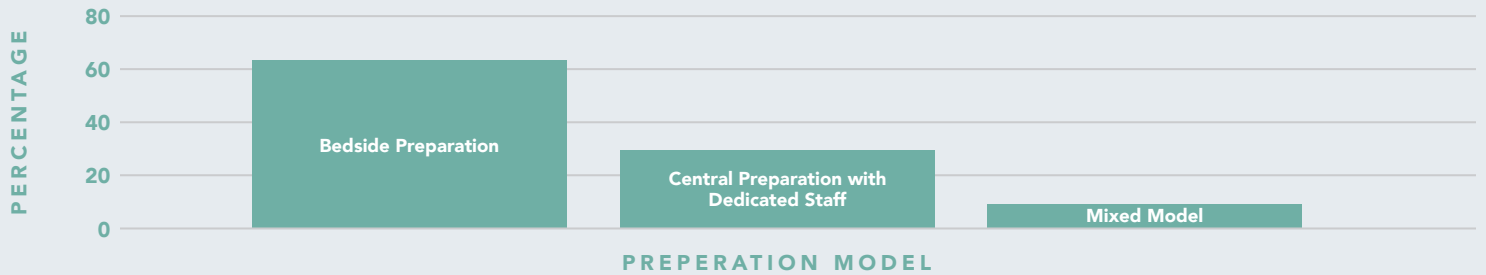


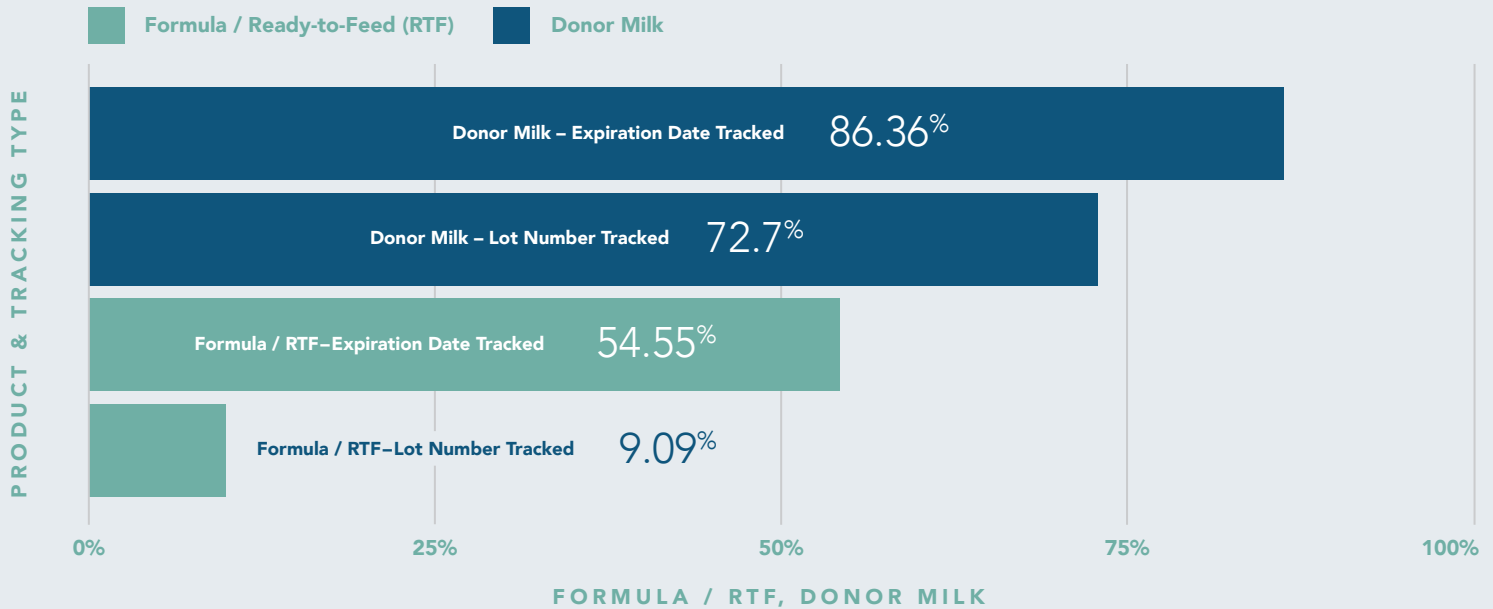
Table 1. Summary Matrix of Feeding Safety Gaps (De-identified)

Category	Observed Current-State Gap	Clinical and Operational Impact	Leadership Decision Levers
Traceability	Formula and additive lot numbers are not consistently captured at the patient level.	Delayed or incomplete response during recalls; increased reliance on manual chart review and uncertainty when identifying affected current and discharged patients.	Standardize lot number capture at receipt and preparation; assign clear ownership; monitor and trend compliance.
Verification Equity	Human milk workflows typically include stronger, multi-step verification than formula and additives, resulting in uneven safeguards.	Inconsistent risk mitigation across product types; reduced ability to intercept wrong-product errors for formula and additives.	Establish minimum verification standards across all product types; align policy and training; reduce exceptions and workarounds.
Precision	Powdered products are often prepared using household scoops and manual calculations.	Variability in caloric density and recipe drift; elevated clinical risk for infants with narrow nutrition tolerances.	Require gram-scale measurement; standardize recipes and naming conventions; deploy recipe calculation tools; validate staff competency.
Infection Prevention	Preparation spaces frequently lack defined clean and dirty zones, physical barriers, and consistent sanitation practices.	Increased cross-contamination risk in a high-acuity population; rework, waste, and avoidable staff time burden.	Define physical zoning standards; align disinfectants with nutrition-prep surfaces; implement physical controls; audit compliance.
EHR Order Clarity	Feeding orders rely on free text or are difficult to locate, requiring manual transcription into preparation tools.	Higher likelihood of misinterpretation, delays, and transcription errors; inconsistent fortification and execution.	Standardize order sets; reduce free-text usage; establish additive libraries; pursue EHR integration where feasible.
Discharge and Transport Controls	Reconciliation at discharge or transfer is often incomplete; milk may be left behind or moved without reliable scan-out.	Loss of expressed milk; wrong-parent risk; gaps in documentation and erosion of caregiver trust.	Implement standardized reconciliation workflows; position scanners at storage locations; define handoff accountability.

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Figure 2. Lot and Expiration Tracking by Product Type



Collection and Receipt: Creating Traceability at Receiving

What leading programs are doing:

- Initiate lactation education and labeling process workflows early; make receipt and storage processes explicit and consistent.
- Use barcoded labels and positive verification at receipt to prevent a cascade of identification errors downstream.
- Reduce bottlenecks by extending appropriate intake access to trained roles beyond bedside nursing (e.g., unit clerks, lactation, milk technicians), with clear competency and accountability.

Common gaps seen across sites:

- Inconsistent verification when milk is brought from home (scanning is delayed or omitted).
- Handwritten labels and paper logs introduce illegibility and transcription risk.
- Incomplete capture of lot and expiration details for formula and modular additives at receipt.

Leadership Takeaway:

Receipt serves as the first line of defense. When identity and traceability are not established at receiving, downstream safeguards must rely on manual compensations.

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Storage and Inventory: Moving from Physical Counts to Reliable Virtual Inventory

What leading programs are doing:

- Design patient-specific storage with clear two-identifier labeling and physical separation to prevent bottle migration.
- Establish real-time visibility into inventory to reduce freezer door openings and shift-to-shift physical counts.
- Implement centralized temperature monitoring and define standardized response procedures for temperature variables, including contingency plans for power interruptions.

Common gaps seen across sites:

- Manual paper temperature logs with limited audit utility and weak trend detection.
- Inconsistent workflows for isolation or special handling (labeling, segregation, cleaning).
- Inventory inaccuracy in mixed manual/digital systems (duplicate entries, untracked bottles).

Leadership Takeaway:

Inventory reliability affects both safety and efficiency. When staff cannot trust the virtual inventory, they revert to manual counts, and exceptions proliferate.

Preparation: From Household Tools to Clinical Precision

What leading programs are doing:

- Shift preparation from bedside to centralized milk labs or dedicated prep rooms, with defined access control.
- Use calibrated gram scales (0.1 g or 0.01 g as appropriate for additive accuracy) to reduce variability in caloric density and micronutrient delivery.
- Strengthen environmental controls: clean/dirty zoning, splash mitigation near sinks, food-safe surface sanitation protocols, and standardized PPE.

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Common gaps seen across sites:

- Bedside or high-traffic preparation environments where soiled items may be handled nearby, increasing aseptic risk.
- Use of household scoops, imprecise scales, and manual math increases recipe variability.
- Labeling inconsistencies (e.g., dating on lids instead of containers) that increase look-alike mix-up risk.

Leadership Takeaway:

Preparation combines multiple ingredients, calculations, and infection prevention requirements. It is consistently one of the highest-risk phases and benefits from standardization and environmental design.

Administration: Beyond Two-Person Sign-Off

What leading programs are doing:

- Use point-of-care barcode verification as the final safety gate to confirm the right patient, the right product, and the right order.
- Align administration verification with active provider orders and standardized recipes to reduce wrong-calorie and wrong-additive delivery.
- Standardize warming and handling processes, favoring patient-dedicated equipment to reduce wrong-bottle selection.

Common gaps seen across sites:

- Reliance on manual two-person checks that are time-consuming and variably applied, especially during peak workload.
- Shared warming devices and unlabeled/shared liners that increase wrong-bottle selection risk.
- Workarounds when order information is challenging to locate or interpret in the EHR.

Leadership Takeaway:

High-reliability administration workflows reduce reliance on memory and visual similarity, and they support defensible documentation of verification.

Operational Trend: Warming Equipment and Shared-Device Risk

Across sites, warming practices generally fall into two categories: waterless commercial warmers and multi-well warming stations. A consistent risk theme is the shared-device workflow, in which bottles or liners are not clearly assigned to a specific patient, increasing the risk of selecting the wrong bottle. Best practices include using patient-specific warmers when feasible, assigning patient-specific liners, applying clear labeling, and following a defined liner-replacement schedule aligned with manufacturer instructions and infection-prevention policies.

Leadership Takeaway: Replace manual warming methods (e.g., cups or pitchers of warm water) with standardized warming devices and policies to reduce variability and the risk of contamination.

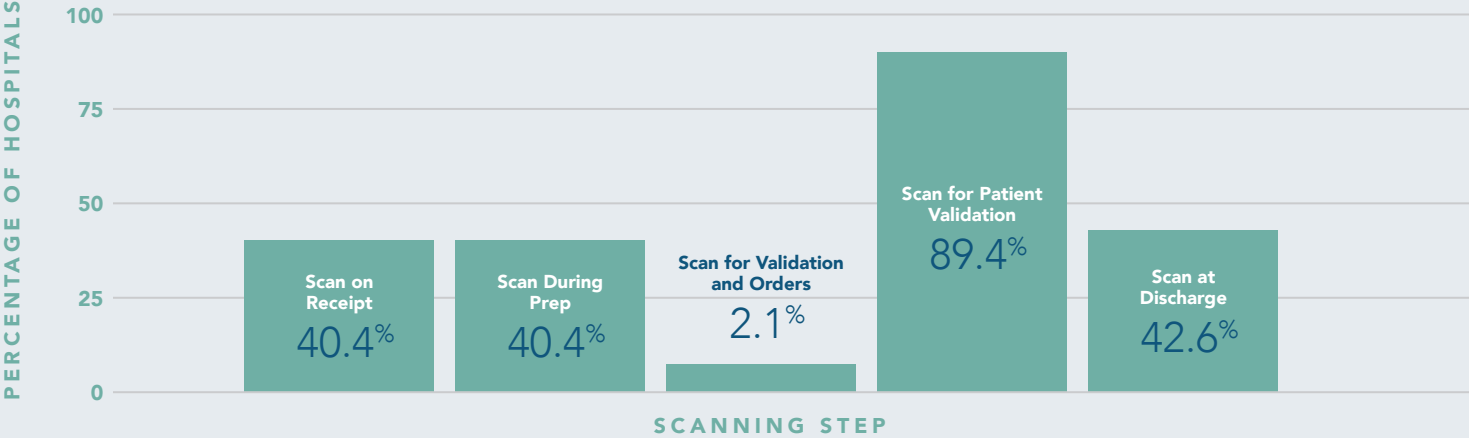
Operational Trend: Preparation Windows (12-hour vs 24-hour)

Across sites, preparation windows are commonly organized around shift structure. Many programs are prepared in 12-hour increments, which can decrease waste when orders are updated daily, while centralized labs may batch 24-hour volumes for efficiency and then aliquot into unit doses. Leaders should standardize preparation windows based on human milk handling limits, staffing model, and waste reduction goals.

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Figure 3. Percentage of Hospitals Scanning at Each Process Step



Discharge and Transport: Preventing Lost Milk and Closing the Loop

What leading programs are doing:

- Implement a scan-out or reconciliation workflow to verify that all inventory follows the infant across transitions (transfer, discharge, readmission).
- Place scanners and supplies near storage locations to make reconciliation feasible at the point of handoff.
- Standardize parent-facing discharge handoff steps, including inventory review and documentation.

Common gaps seen across sites:

- Milk left behind due to missing reconciliation workflows.
- Inconsistent verification when sending milk home or transferring between units.
- Traceability breakdown for formula, donor milk, and additives when products leave the unit.

Leadership Takeaway:

Leaders increasingly treat discharge reconciliation as both a family safety step and an operational step: it reduces waste, improves trust, and strengthens recall response.

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Reporting and Analytics: From “Did We Scan?” to “What Did We Learn?”

What leading programs are doing:

- Trend verification compliance by stage (receipt, prep, administration, discharge), by unit type and by shift.
- Use near-miss interceptions as learning signals (expired product prevented, wrong patient prevented, recipe mismatch prevented) and close the loop through QI.
- Include selected outcome-adjacent metrics that leaders commonly request (e.g., mother’s own milk at discharge), while avoiding inappropriate causal attribution.

Common gaps seen across sites:

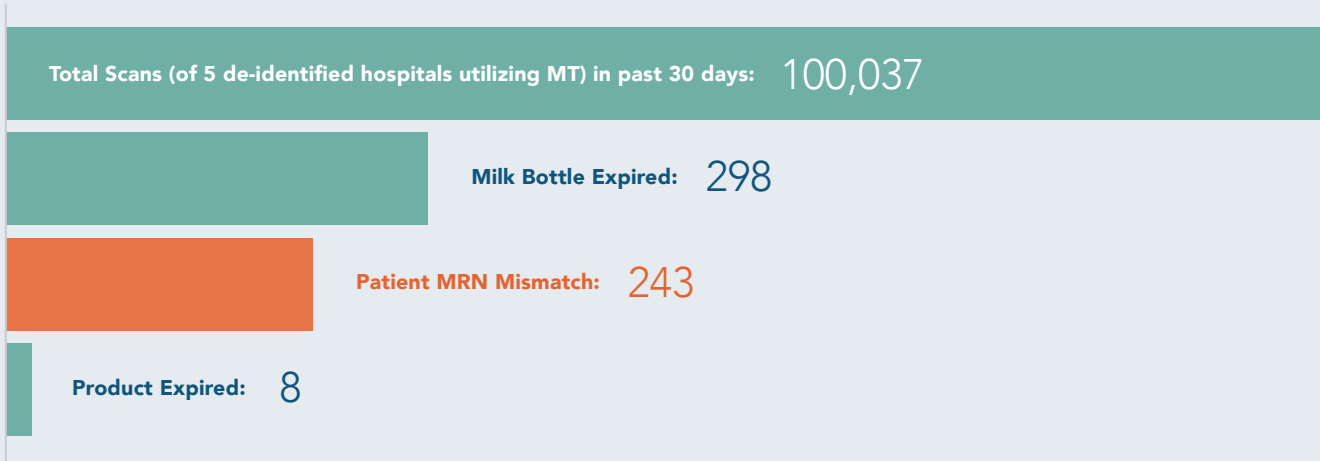
- Metrics limited to retrospective audits rather than actionable, near-real-time reliability signals.
- Undercounting of near misses due to unclear definitions or a lack of a non-punitive reporting culture.
- Difficulty aligning dashboards across NICU and pediatric units when workflows and prep models differ.

Leadership Takeaway:

The goal is a stable set of measures that support local improvement and executive governance without creating measurement burden.

Figure 4. MilkTracker in Action: Near miss interceptors by type

In a recent 30-day sample across five de-identified hospitals, MilkTracker supported **100,037** scans and intercepted **549** near misses in the categories shown. The most common was expired milk bottles and patient MRN mismatches.



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Trend Spotlight: Family Partnership and Inventory Transparency

Across assessments, a growing theme is the intentional inclusion of families in nutrition workflows. Hospitals are increasingly exploring parent-facing visibility into milk inventory, labeling steps, and expected “next actions” (e.g., when to bring additional milk). This trend aligns with family centered care principles while also reducing operational friction when designed with clear guardrails.

High-performing approaches use technology to reduce staff burden rather than add steps. Examples include parent self-service label printing in controlled workflows, clear policies for at-home expressed milk intake, and structured communication about storage, expiration, and discharge reconciliation. When implemented thoughtfully, transparency can reduce anxiety, decrease avoidable calls to the unit, and strengthen trust in the nutrition program.

Leadership considerations: define which information is appropriate for parent-facing communication, establish escalation pathways for questions or discrepancies, and ensure that parent-facing materials are aligned with existing clinical verification and documentation practices. Leaders should also assess the unit’s current communication workflows and digital readiness to understand how well they support Family Integrated Care (FiCare) objectives. This assessment can help identify gaps, reduce unintended burden on staff, and ensure that communication practices are consistent, reliable, and supportive of safe, team-based care.

Pediatric and Critical Care Environments: Similar Stakes, Different Failure Modes

In pediatric and critical care units, formula preparation and administration are frequently decentralized and may rely on mixed responsibility models and variable infrastructure. As a result, enterprise leaders increasingly define system-wide minimum safety standards (for labeling, measurement accuracy, expiration, lot capture, and verification), while allowing unit-specific adaptations based on acuity, layout, and staffing.

While NICU programs more often use centralized preparation due to high human milk fortification volume and acuity, pediatric acute care, PICU, and CVICU settings frequently operate with more decentralized models (unit kitchens, nourishment rooms, bedside mixing, or par-level stocked formula). These differences increase the likelihood of variation in lot capture, expiration dating, and verification steps unless explicitly standardized.

Emerging Trend: Antenatal Pumping and Pre-delivery Milk

Multiple sites reported an increase in families arriving with pre-delivery expressed milk (often colostrum). This creates unique intake and labeling challenges because the infant may not yet have an established patient identifier. Without a defined protocol, units may rely on temporary handwritten labels or ask families to take milk home, increasing the risk of loss and frustration.

Leadership actions to standardize:

- Define a policy for receipt and storage of antenatal milk, including accountability for acceptance and storage location.
- Establish a safe labeling approach that bridges maternal identification to infant identifiers once available, with a straightforward re-label workflow.
- Clarify staff roles and family instructions to avoid ad hoc decisions at admission.

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Leading system-wide programs define minimum verification points and traceability expectations across all units, then adapt the workflow to the environment.

Common adaptations include:

- Clear ownership for pediatric nourishment rooms (cleaning protocols, access control, temperature monitoring, and stocking).
- Standardized workflow for formula and additive lot and expiration capture when products bypass a central milk room.
- Hardware placement plans tailored to layout (private-room corridors vs pods vs open bays) to reduce dead zones and workarounds.
- Transfer-ready reconciliation processes that work for frequent transport (imaging, OR, inter-facility transfer).

CASE STUDY:

Closing the “Two-Tiered” Safety Gap in Infant Feeding

BACKGROUND

- **Facility Type:** Large academic medical center with a Level III/IV NICU and associated pediatric units (PICU/Pediatric Medical-Surgical).
- **Operational Model:** Mixed model.
 - **NICU:** Utilizes a centralized preparation room with dedicated milk technicians for human milk (HM) and complex formulas.
 - **Pediatrics/PICU:** Relies primarily on bedside nursing for feed preparation (RTF and powder mixing).
- **EHR Integration:** Uses a major EHR with a legacy scanning system for human milk, but no integrated solution for formula products.

BASELINE PATTERN (OBSERVATIONS)

- **Traceability Gap:** While donor milk (DM) lot numbers were manually logged or tracked via legacy software, formula lot numbers were not captured at the patient level.
- **Observation:** Formula inventory was managed by materials management using “par levels” or “visual checks” for each material. If a recall occurred, the hospital knew it had purchased the affected lot, but could not identify which specific infant(s) had consumed it.
- **Verification Inequity:** A distinct two-tiered safety standard existed.
 - **Human Milk:** Required barcode scanning and/or dual-nurse verification to ensure the right milk reached the right patient.
 - **Formula/Additives:** Ready-to-Feed (RTF) bottles and additives (e.g., HMF, liquid protein) were not scanned prior to administration. Nurses manually validated these products visually and did not track lot information per patient.
- **Discharge Reconciliation Failure:** The discharge process lacked a forced verification step.
 - **Observation:** Nurses described the discharge milk reconciliation process as “hoping they remember it” or a simple visual check.
 - **Impact:** This resulted in frequent instances of milk being left behind in unit freezers after discharge, leading to waste and patient dissatisfaction.

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INTERVENTION (STANDARDIZATION STEPS)

To address these gaps, the health system replaced disjointed workflows with a single, standardized feeding management platform:

- **Universal Scanning Protocol:** Implemented one standard workflow for all feeding types. Staff are now required to scan every bottle – whether it contains mother’s milk, donor milk, or formula against the patient’s wristband and the patient’s feeding order. This eliminated the “two-tiered” risk profile.
- **Point-of-Care Lot Capture:** Lot number capture for formula and additives at the point of prep or administration was required. This automatically links specific formula lots to the patient’s electronic record, eliminating the need for manual logbooks.
- **Required Barcode Scanning at Discharge:** A formal “Scan-Out” workflow was implemented at discharge. The system now requires the nurse to scan the patient’s wristband and all remaining inventory of bottles to send home with the family. This verifies that physical inventory matches digital records and that all milk is being sent to the correct patient.

RESULTS

- **Recall Readiness:**
 - *Baseline:* Estimating patient exposure to a recalled formula lot required 4+ hours of manual chart review.
 - *Post-Implementation:* A report identifying every patient who received a specific lot number can be generated in roughly 5 minutes, ensuring immediate clinical response.
- **Safety Parity:**
 - Achieved parity in verification rigor. A bottle of formula now faces the same safety gates (right patient, right feed contents, right expiration) as human milk, eliminating the “lower safety standard” for formula-fed infants.
- **Stewardship & Waste Reduction:**
 - By mandating the “Scan-Out” process, the volume of milk left behind in freezers post-discharge was reduced significantly, improving patient trust and reducing the labor required to destroy abandoned milk.

Conclusion: Safe Passage for Patients and Protected Practice for Teams

Across sites, national patterns point to a clear direction: standardization and end-to-end verification. When feeding workflows are treated as a system, with consistent safeguards for human milk, donor milk, formula, and additives, organizations can reduce preventable risk and improve staff confidence.

For patients, the goal is safe passage through every handoff: the right product for the right patient, prepared and administered as ordered, with integrity preserved from receipt to discharge. For teams, the goal is a defensible practice environment that reduces manual workarounds, supports consistent documentation, and enables rapid learning from near misses without relying on memory or paper binders.

A consistent observation across sites is that organizational size is not a reliable predictor of feeding safety performance. Some smaller nurseries demonstrated exemplary adherence to best practices and clear ownership of workflows. At the same time, some larger, more complex environments faced predictable challenges related to scale – multiple handoffs, distributed storage locations, higher staff turnover, and competing operational demands.

The implication is not comparative; rather, it is actionable: high-reliability feeding management is feasible in any setting when leaders standardize decisions, reduce variation, and invest in the infrastructure and training needed to sustain consistent practice.

Our exclusive 90-Day Implementation Guide will help get you started.

Just schedule a quick 30-minute call to review the plan and how MilkTracker makes the process easy. [Click Here to Schedule a Call](#)