

Organization: Peninsula Regional Medical Center
Solution Title: Late Preterm Infant Initiative

Program/Project Description: *What was the problem to be solved? How was it identified? What baseline data existed? What were the goals—how would you know if you were successful?*

The late preterm infant, defined as any infant born between 34.0 and 36.6 weeks gestation, is the fastest growing population of preterm infants globally and account for 9% of the total birth rate in Maryland. In 2010, 99 late preterm infants were born at Peninsula Regional Medical Center, approximately 5% of the total yearly birth volume. Nearly 29% of these infants were admitted to the Neonatal Intensive Care Unit (NICU) and 12.8% were subsequently readmitted to the Pediatric unit for complications related to prematurity. In the past, the late preterm infant has been cohorted with the term infant in the well-newborn nursery. Physiologically however, these newborns present similarly to preterm infants with challenges such as thermoregulatory issues, glucose homeostasis, respiratory compromise, hyperbilirubinemia, feeding intolerance, and infection. The purpose of the Late Preterm Infant Initiative is to improve clinical outcomes and reduce both NICU admissions and Pediatric readmissions for the late preterm infant through the utilization of evidence-based clinical guidelines. An initial goal is to reduce NICU admissions by 10% and Pediatric readmissions within 10 days of birth (to capture those conditions in which interventions after birth can reduce readmission rates) by 5% as compared with 2010 rates.

Process: *What methodology or process was used to develop the Solution?*

A multi-phase approach was used for the creation of this initiative. The initial phase was the development of three, unit-specific data collection tools. Data collection (phase 2) took place over a six month period (January through June 2010) to determine baseline rates of hypothermia, hypoglycemia, respiratory distress, feeding difficulties, phototherapy, excessive weight loss, NICU admissions and Pediatric readmissions (within 10 days of birth). Data was collected from the delivery room, well-newborn nursery and NICU. In phase 3, the data was reviewed and compiled. During the data collection period, 55 late preterm infants were born. Of these, 33% (N=18) were admitted to the NICU for a higher level of care and 11% (N=6) were subsequently readmitted to Pediatrics within 10 days of life for complications associated with prematurity. A large percentage of these infants had low temperatures (62%), low blood sugars (25%), and respiratory distress (25%).

Solution: *What Solution was developed? How was it implemented?*

After analyzing the data collection results, a multidisciplinary team (nursing, medicine, lactation, speech pathology) was formed and developed the Late Preterm Infant Initiative utilizing evidence-based clinical guidelines (phase 4). These guidelines were adapted from the Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN). The team met biweekly. During phase 5, specific components of the initiative were developed including a new policy, late preterm order set, care plan, and infant feeding pathway. Strict discharge criteria for these infants are an essential aspect of the initiative. Thermal stability, stable vital signs, successful feeding, and normal weight loss must be achieved and no late preterm infant will be discharged prior to 48 hours after birth.

Staff education was another critical component of this phase. A four-hour, mandatory education session was held in January 2011 for all Labor & Delivery and Mother/Baby nurses. The curriculum covered background information on the late preterm infant, complications, and outlined the new initiative. Highlights of the class

focused on feeding techniques and assessment, thermoregulation, and glucose stability. Classes were taught by all disciplines within the team. A separate education session was held for ancillary staff who also participate in the care of these infants. Phase 6 required creation of patient education materials to be used prior to delivery and discharge. Parent education will begin in the labor and delivery setting and continue through the postpartum stay. All nurses and ancillary staff caring for these families are able to provide accurate information and assist parents with discharge preparation. During phase 7, input was solicited from the Department of Pediatrics. The order set and policy were reviewed and revised as needed with subsequent approval from the department.

Beginning March 22, 2011, all late preterm infants born at Peninsula Regional Medical Center have been admitted to the Intermediate Care Nursery, a newly-created virtual unit, and cared for with a nurse to patient ratio of 1:3-4 (phase 8). Previously, all newborns aged less than 35 weeks gestation were automatically admitted to NICU and that continues. While the late preterm infants are counted in the NICU census to allow for the level of nursing care necessary, private pediatricians continue to provide the medical management at this time (neonatology still cares for those unassigned). All aspects of the Late Preterm Infant Initiative are implemented for each newborn with customization based on the infant's unique needs. While these infants receive increased surveillance and monitoring for complications, they are only separated from their parents when medically necessary. Rooming-in is encouraged to promote bonding and attachment, improve feeding, and enhance parent education. Late preterm infants are only cared for in the NICU environment if their condition requires a higher level of care.

Measurable Outcomes: *What are the results of implementing the Solution? Provide qualitative and/or quantitative results to data. (Please include graphs, charts, or tools as attachments.)*

Data collection resumed May 1, 2011, using a modified version of the original tool (phase 9). At the time of this submission, 44 late preterm infants have been cared for under the new initiative. Ten of these infants were subsequently admitted to the NICU (22.7%) primarily for feeding intolerance and management of hypoglycemia. No (0%) infants have been readmitted to Pediatrics within 10 days of life.

Sustainability: *What measures are being taken to ensure that results can be sustained and spread?*

The Late Preterm Infant Initiative is now hard-wired into the normal operations of the Women's and Children's Division at Peninsula Regional Medical Center. This is a permanent change in the care of this population of newborns. Data collection will be ongoing and reviewed monthly at the Late Preterm Infant Initiative meeting (phase 10). Problems or concerns identified will be addressed and resolved. Results are shared with all staff in the Women's and Children's Services division through various mechanisms such as staff meetings and bulletin boards. At the completion of the first year of the initiative (March 2012), goals will be reviewed and revised as needed based on the data collection. Aspects of the initiative could be modified or improved based on emerging evidence and organizational trends. Currently our NICU admissions have not significantly decreased, however, the team feels this may actually be a positive finding. Through heightened surveillance, monitoring, and education, the nursing team is identifying problems earlier and intervening sooner. While this may increase NICU admissions, it may prevent further complications and reduce or eliminate subsequent Pediatric readmissions, thus improving both infant mortality and morbidity. In this era of rising healthcare costs and non-reimbursement for preventable readmissions, it behooves nurses and other practitioners to adopt practices that anticipate and prevent possible sequelae related to prematurity.

Role of Collaboration and Leadership: *What role did teamwork and collaboration play in the Solution?*

What partners and participants were involved? Was the organization's leadership engaged and did they share the vision for success? How was leadership support demonstrated?

The Late Preterm Infant Initiative has led to an increased staff awareness of this population, their unique needs, and the challenges they face. This knowledge, coupled with the utilization of evidence-based care, translates into

improved clinical outcomes for the late preterm infant. This initiative has also improved teamwork and communication and has fostered relationships between nursing and other health professionals. The team consisted of members from multiple disciplines including nursing, medicine, lactation support and speech pathology. Members met and communicated regularly. Collaboration among the various disciplines was an integral aspect of the success of this initiative. All input was valuable and encouraged. Nursing leadership was represented by clinical nurse managers of the four involved units; Labor and Delivery, Mother/Baby, NICU, and Pediatrics. The clinical nurse specialists from these areas were also key team members. Also, several clinical resource nurses from each unit were active team members and assisted with many components including data collection and interpretation. Direct patient care staff involvement was extremely beneficial and facilitated a smooth transition. The nursing director for the Women's and Children's division was also actively involved and assisted with organizational and physician engagement. Quality and safety are paramount to Peninsula Regional Medical Center. Innovative programs that address patient safety and high quality patient outcomes are encouraged and endorsed by organization leaders.

Innovation: *What makes this Solution innovative? What are its unique attributes?*

Innovation is demonstrated through the creation of better, more effective processes and ideas. The Late Preterm Infant Initiative primarily incorporates evidence-based guidelines and established best practices into the care of this unique population of newborns. The initiative is innovative as a result of the substantial, positive changes and outcomes we are seeing with these newborns. Instead of taking an incremental approach, such as introducing smaller components gradually over time, the initiative did not formally begin until all aspects were in place and it could be implemented in its entirety. This approach has allowed staff to improve care from pre-delivery through discharge, thereby positively affecting outcomes at multiple points throughout the hospital course. Patient and family-centered care is at the core of the organization, obstetric and newborn nursing, as well as this initiative. Providing care that enhances family bonding, empowers parents, and improves clinical outcomes increases both patient and staff satisfaction. Care providers feel empowered to be able to provide individualized and evidence-based care to this population of newborns. This increases both provider satisfaction and professionalism. The Women's and Children's Services Division is extremely proud of its efforts to improve both the care and outcomes for the late preterm infant.

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LATE PRETERM INFANT INITIATIVE

Peninsula Regional Medical Center
Women's and Children's Services

TEAM PURPLE

- ◉ Regina Kundell, Director, Women's & Children's Services
- ◉ Diane Hitchens, Nurse Manager, NICU & Pediatrics
- ◉ Jennifer Horner, Nurse Manager, Labor & Delivery
- ◉ Beth Fleming, Nurse Manager, Mother/Baby
- ◉ Dr. Kimberly Iafolla, Department of Neonatology
- ◉ Angie Houck, Clinical Coordinator, NICU
- ◉ Jaimi Hall, Clinical Nurse Specialist, Labor & Delivery
- ◉ Nancy Smith, Clinical Coordinator, Pediatrics
- ◉ Sue Robbins, User Analyst, Women's & Children's Services
- ◉ Ellen Pinker, Lactation Specialist, Women's & Children's Services
- ◉ Tina Wehberg, Speech Pathology
- ◉ Janine Bristow, ACN, NICU
- ◉ Lori Morgan, ACN, NICU
- ◉ Karen Layfield, PDRN, Labor & Delivery
- ◉ Renee Windsor, PDRN, Mother/Baby
- ◉ Courtney Powell, ACN, Mother/Baby
- ◉ Leighann Passon, ACN, Mother/Baby
- ◉ Lakeisa Brown, Administrative Assistant, Women's & Children's Services

THE LATE PRETERM INFANT

- Any infant born between 34.0-36.6 weeks gestation
- Increased clinical risks for:
 - Temperature instability
 - Hypoglycemia
 - Hyperbilirubinemia
 - Respiratory distress
 - Infection
 - Feeding difficulties

A POPULATION AT RISK

- In the U.S. the late preterm infant population can be described as unrecognized, underestimated, unpredictable and understudied.
- Late preterm infants have been unrecognized by some practitioners as even being premature; underestimated for morbidity & mortality; unpredictable in their clinical course and timing of presentation and understudied as a high risk population.

BACKGROUND

- In Maryland in 2008, the late preterm infant (LPI) accounted for 9% of total births or 6972 infants
- In 2010, Peninsula Regional Medical Center cared for 99 LPIs (approximately 5% of total births)
- 28.4% of these 99 infants were admitted to the NICU for a higher level of care
- 12.8% of these 99 infants were re-admitted to Pediatrics for problems associated with late preterm birth
- The LPI is at an increased risk for challenges associated with prematurity

PROBLEM IDENTIFICATION

- ◉ A retrospective review of pediatric readmission rates
- ◉ Literature review on most recent evidence
- ◉ Data collection from Labor & Delivery, Newborn Nursery & the Neonatal ICU from the preceding 6 month period (January - June 2010) for infants 35-36.6 weeks* using unit-specific collection tools

SAMPLE COLLECTION TOOL

Labor & delivery Late Preterm PI Study: Newborns 35 weeks and 0 days to 36 weeks 6 day

Patient MR# _____		Gestational Age _____ Birth wgt _____ DOB/time _____			
Sepsis risk factors (circle below): ROM>18hrs, Foul odor, Maternal Temp>38		N/D or C/S Indication for C/S _____			
Positive Group B strep? _____ Mother treated adequately? _____ (antibiotics > 4hrs. before delivery)		Was infant transferred to NICU or NRA early? Reason _____ time _____			
Potential complications		If yes, Actions Taken and/or Outcomes			
Temperature Instability (Temperature < 36.5) L&D Temp 1st _____ 2nd _____	Yes No	Skin-to-skin contact with mother or other support person	Yes	NO	N/A
		Radiant warmer with skin probe attached			
		Temperature taken within 10 minutes after delivery, every 15-30 minutes until >36.5			
		Double wrapped with hat on			
Hypoglycemia (Blood Glucose < 45) Blood Glucose #1 _____ Blood Glucose #2 _____ Breastfed or Bottlefed How much? _____	Yes No	Transferred to NICU for BG<25 or symptomatic			
		Blood glucose obtained 30-60 minutes of birth			
		Early feedings initiated per mother's choice-either by breast or by bottle			
		Blood glucose level rechecked 30 minutes after feeding			
		Infant transferred to NSY for persistent blood glucose below 45 after feeding			
Respiratory Distress Circle type of distress: (apnea, tachypnea-RR>60, cyanosis, persistent retractions, flaring or grunting)	Yes No	Skin to skin with mother or other support person			
		Infant transferred to NSY for tachypnea, mild retractions			
		Infant transferred to NICU with O2 requirement or significant retractions/grunting			

RESULTS (N=55)

Temperature < 36.0 C	34 (62%)
Blood Sugar < 45 mg/dL	14 (25%)
Respiratory Distress	14 (25%)
NICU Admission	18 (33%)
Ventilatory Support	2 (3%)
Feeding Difficulties	19 (35%)
≥ 7% Weight Loss	16 (29%)
Phototherapy	6 (11%)
Pediatric Readmission	6 (11%)

NICU ADMISSIONS (N=18)

Temperature < 36.5 C	11 (61%)
Temperature < 36.0 C	6 (33%)
Blood Sugar < 45 mg/dL	3 (17%)
Blood Sugar < 25 mg/dL	1 (.6%)
Respiratory Distress	9 (50%)
Ventilatory Support	2 (11%)
Feeding Difficulties	8 (44%)
≥ 7% Weight Loss	7 (39%)
Phototherapy	3 (17%)

LPTI INITIATIVE GOALS

- To reduce admissions to the Neonatal Intensive Care Unit (NICU) by 10%
- To reduce re-admissions to the Pediatric Unit within 10 days of birth by 5%
- To improve clinical outcomes for the LPI
- To reduce morbidity and mortality associated with late preterm birth
- To provide an evidence-based clinical guideline for managing the challenges associated with late preterm birth; Adopt AWHONN's *Assessment and Care of the Late Preterm Infant: An Evidence-based Clinical Practice Guideline* (2010)

THE PICO PROCESS

- ◉ Population: Late Preterm Infants
- ◉ Intervention: Risk stratified, Evidence-based treatment program
- ◉ Comparison: Traditional treatment modalities and surveillance
- ◉ Outcome: Reduced hospital readmission rates, need for interventional therapies, and improved clinical outcomes

PICO QUESTION

- Will a risk-stratified, evidence based treatment program reduce NICU admissions and Pediatric re-admissions and improve clinical outcomes for the LPI compared with current practice?

LPTI INITIATIVE HIGHLIGHTS

- ◉ Collaborative process change by leadership, performance improvement, physicians and clinicians
- ◉ Creation of Late Preterm Infant policy
- ◉ Establishment of a late preterm nursery
- ◉ Individualized order set & care plan
- ◉ Structured & personal feeding plan
- ◉ Specific parent education and discharge planning geared to the late preterm infant's needs
- ◉ Education for staff in Women's & Children's Services

LPTI ORDER SET HIGHLIGHTS

- Specific feeding guidelines
- Increased monitoring of vital signs
- Strict I&O
- Strict discharge Criteria
 - Thermal stability for 24° prior to discharge
 - Stable vital signs for 24° prior to discharge
 - 24° of successful feeding
 - Weight loss $\leq 7\%$ in 48°
 - Follow-up w/primary care in 24-48°
 - No discharge prior to 48° after birth

LPTI CRIB CARD

Late Preterm Infant Care Plan

Help me stay warm by:

- ✓ Keeping my hat on at all times
- ✓ Holding me skin-to-skin OR swaddling me in several dry blankets
- ✓ Checking my temperature before each feed
- ✓ Delaying my bath for 4-6 hours until after first feeding and Vital signs stable



My feeding plan:

- Breastfeed me every 2-3 hrs (I need at least 8-10 feedings in 24 hours!)
- My mom double pumps after each feeding for 10-15 minutes
- Also give me breast milk and /or _____
Feed me _____ mL* every ____ hours
- No pacifiers please!
- My mother prefers to bottle feed me _____
Feed me _____ mL* every ____ hours

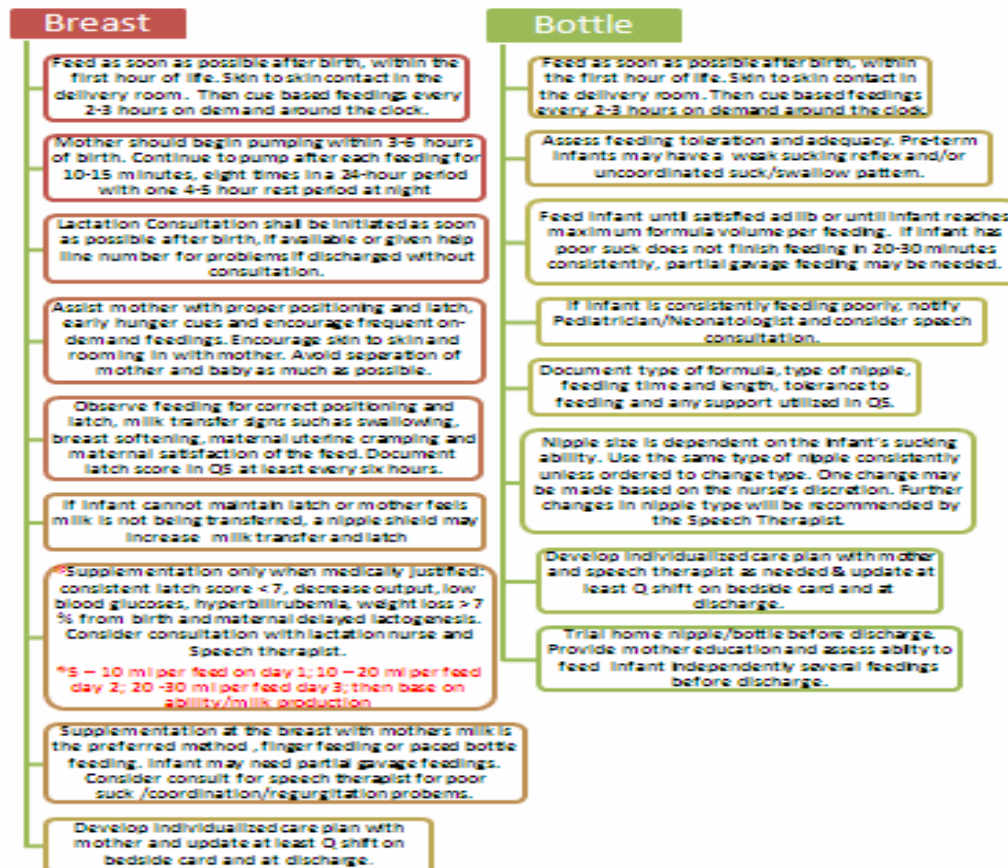
* Day 1: 5-10 ml at each feeding
Day 2: 10-20 ml at each feeding
Day 3: 20-30 ml at each feeding
Then base on ability/milk production

Maintain feeding LOG

See pediatrician within 1-2 days after discharge

LPT FEEDING PATHWAY

Feeding Protocol for the Late Preterm Infant



LPTI PARENT INFORMATION

Congratulations on the Birth of Your New Baby!

Your baby may look like a full-term baby but is really premature.

A late preterm infant is a baby born early at 34 to 37 weeks gestation.

Because your baby was born early, your baby may be at risk for problems/challenges: breathing, feeding, temperature, infection and jaundice.

Below is information to help you know what to expect while in the hospital and how you can help your baby.

In the Delivery Room

Keep your baby warm by holding your baby skin to skin.

Feed your baby in the first hour of life with your feeding choice, either breast or bottle, to prevent low blood sugar.

If you breastfeed and your baby's blood sugar is low, we may need to give your baby some formula.

Mother/Baby Area

Feed your baby at least every 3 hours on demand, either breast or bottle.

The nurse will check your baby's temperature, pulse and respirations before feedings and check your baby's blood sugar before the first 3 feedings.

If breastfeeding, your baby's suck may not be strong enough to stimulate your milk to come in properly. Pumping your breasts after feedings will help your milk production.

Mother/Baby Area

Late Preterm babies may not feed well at first. If your baby has a weak suck, we may need feed your baby with a feeding tube or IV for low blood sugar.

Together we can individualize a feeding care plan. Your nurse will update this feeding plan with you as needed.

It is important to help us keep track of how much your baby is eating, wetting diapers and stooling.

Late Preterm Newborn



The goal is to keep your baby with you as much as possible.

However, if your baby is having breathing difficulties or low blood sugar, we may need to take your baby to the NICU for closer observation.

When is Your Baby Ready to Go Home?

Your baby must be at least 48 hours old

Feeding well for the last 24 hours and has a home feeding plan

Gaining weight or only small amount of weight loss

A normal jaundice lab test

Normal breathing, wet diapers, stooling and temperature for at least 24 hours

Pass the car seat challenge test

Follow-up appointment has been made with pediatrician for 1-3 days after discharge

We would like you to be involved in your baby's plan of care.

Our goal is to provide exceptional family-centered care.

OUTCOMES TO DATE

- The implementation of the LPI process improvement began on March 22, 2011
- 44 LPIs have been cared for using AWHONNs guidelines to date
- 10 Infants have been transferred to NICU for a higher level of care (22.7%)
 - Feeding intolerance
 - hypoglycemia
- Zero infants have been re-admitted to Pediatrics within 10 days of birth

IMPLICATIONS FOR PRACTICE

- ◉ Improved delivery of evidence-based care for the LPI population
- ◉ Improved bonding through the family-centered care model
- ◉ Enhanced interprofessional teamwork
- ◉ Reduced morbidity and mortality
- ◉ Improved clinical outcomes
- ◉ Reduced health care expenditure

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