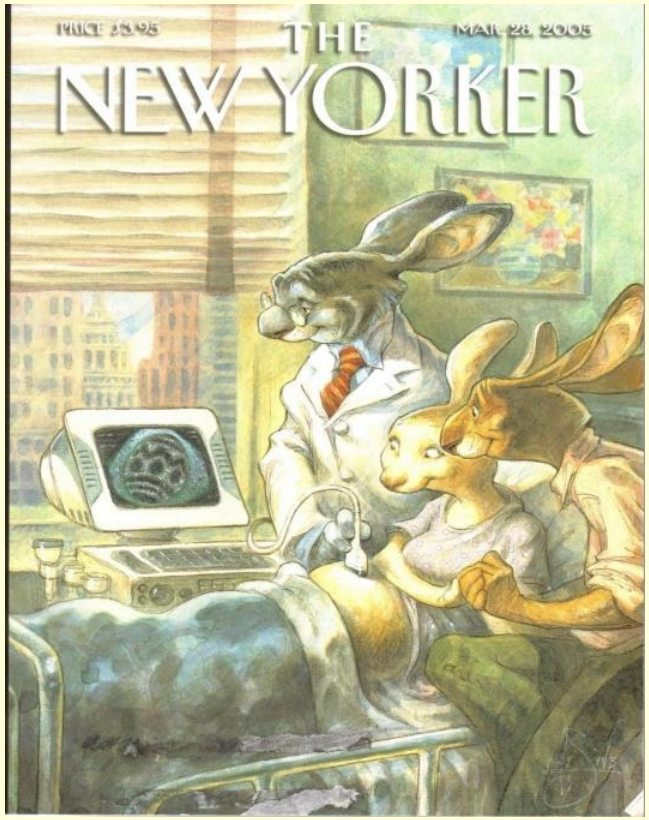

Breastfeeding the Late Preterm Infant (34-37 Weeks)

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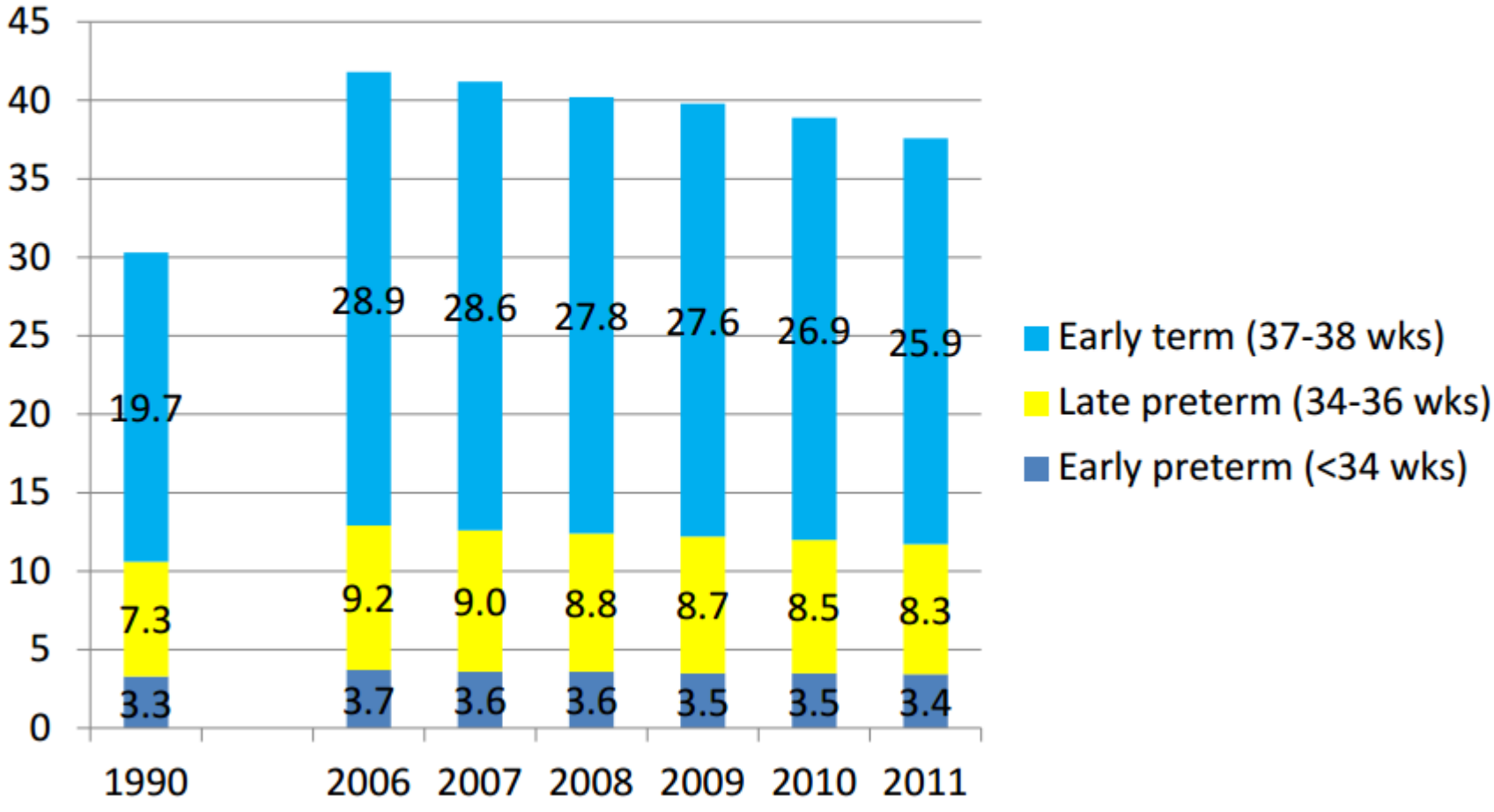
Stats for Late Preterm Infants

- 2011 preterm birth rate dropped to 11.73%
- 2011 late preterm birth rate dropped to 8.28%
- > 477,000 late preterm births/year
- Another 700,000 births each year occur at 37 and 38 weeks of gestation that are called early term infants
- > 30% experience feeding difficulties

Figure 1. Births at <39 weeks of gestation: United States, 1990 and 2006-2011



SOURCE: CDC/NCHS, National Vital Statistics System.

Nomenclature

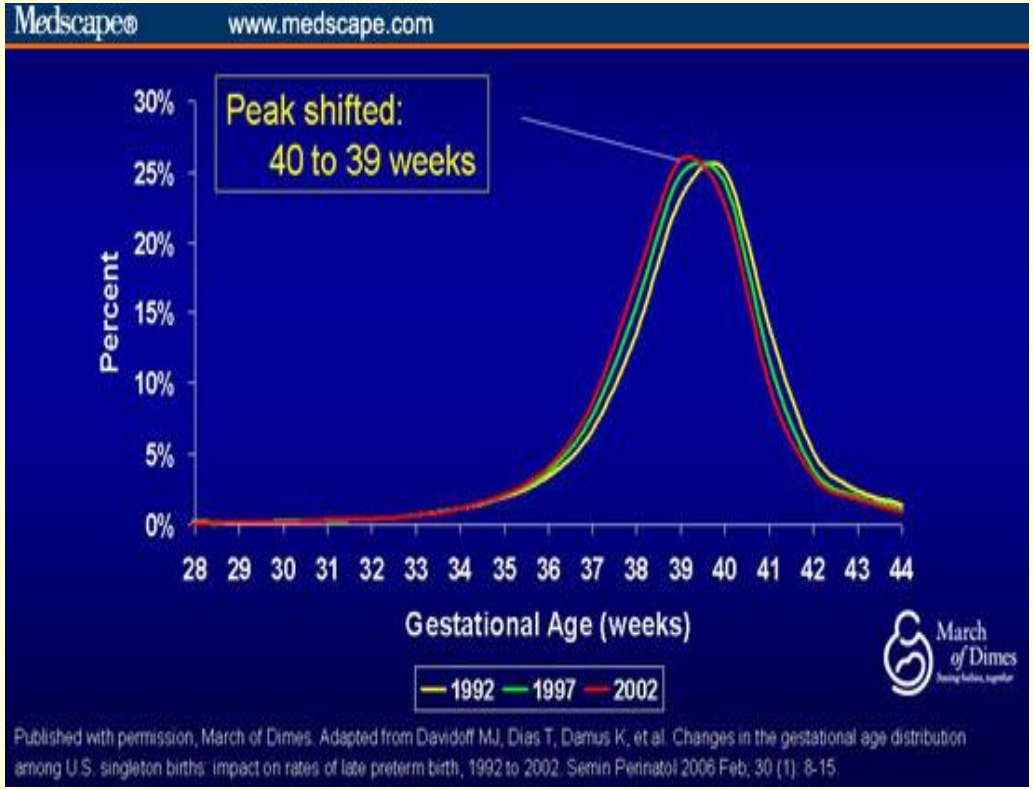
- <34 weeks = preterm
- 34 0/7 to 36 6/7 weeks = late preterm
- 37 0/7 to 38 6/7 weeks = early term
- 39 0/7 to 41 6/7 weeks = term
- 42+ weeks = post term

Not out of the woods yet

- Babies born between 37 weeks and 39 weeks are not exempt from the problems of prematurity
  - 2 to 4-fold risk of complications such as respiratory distress, NICU admission, sepsis, or hospitalization for more than 5 days (Tita et al, 2008).

Falling gestational ages

- Between 1992 and 2002, the most common gestational age of singleton babies born in the United States dropped an entire week, from 40 to 39 weeks (Davidoff et al, 2006).



Late Preterm Infants

- Weight ranges from 3lb 5oz (10th percentile at 34 weeks) to 7lb 13oz (90th percentile at 38 weeks)
- Late preterm babies may look mature but are often functionally immature
- LPI, especially breastfed ones, are 2.2x more likely to be readmitted, especially for jaundice and infection

A population at risk

(Adamkin, 2006; Engle et al, 2007).

- airway instability
- apnea
- bradycardia
- excessive sleepiness
- large weight loss
- dehydration
- feeding difficulties
- weak sucking
- jaundice
- hypoglycemia
- hypothermia
- immature self regulation
- respiratory distress,
- sepsis,
- prolonged formula supplementation,
- hospital readmission,
- breastfeeding failure
- Newborn morbidity rate doubles in infants for each gestational week earlier than 38 weeks

Increased morbidity and mortality

- Newborn morbidity rate doubled in infants for each gestational week earlier than 38 weeks with the risk intensified when an infant was exposed to maternal hypertensive disorders of pregnancy (Shapiro-Mendoza et al (2008)
- Each weekly increase in gestational age is associated with a decreasing risk of death, with infants born at 37, 38, and 42 weeks showing an increase in mortality rates compared with babies born at 40 weeks. (Young et al, 2007).
- LPIs are at a twofold higher risk for sudden infant death syndrome
  - 1.4 cases per 1000 at 33-36 weeks gestation compared with 0.7 per 1000 at >37 weeks gestation (Kramer et al, 2000; Malloy & Freeman, 2000).

Clinical Outcomes of Near Term Infants Wang et al. Pediatrics 2004; 114:372-376

- Compared 90 late preterm (35-37 weeks) and 95 term infants
- Temperature instability
  - 10% in near term, 0% full term
- Respiratory distress
  - 28.9% in near term, 4.2% full term
- Clinically jaundiced
  - 54.4% in near term, 37.9% full term
- Hypoglycemia
  - Seen 3 times as often in near term cohort

Outcome during initial birth hosp.	Late preterm morbidity	Term morbidity	OR (95% CI)
Feeding difficulties	32.2%	7.4%	
Hypoglycemia	15.6%	5.3%	3.3 (1.1-12.2)
Jaundice	54.4%	37.9%	1.95 (1.04-3.67)
Temp. instability	10%	0	
Apnea	4-12%	0	12 (4.5-24.3)
Respiratory distress	3.6-29%	0.6-4.2%	9.2 (2.9-37.8)
IV infusion	26.7%	5.3%	6.5 (2.3-22.9)
Sepsis evaluation	36.7%	12.6%	4 (1.8-9.2)
Mech ventilation	3.4%	0.9%	

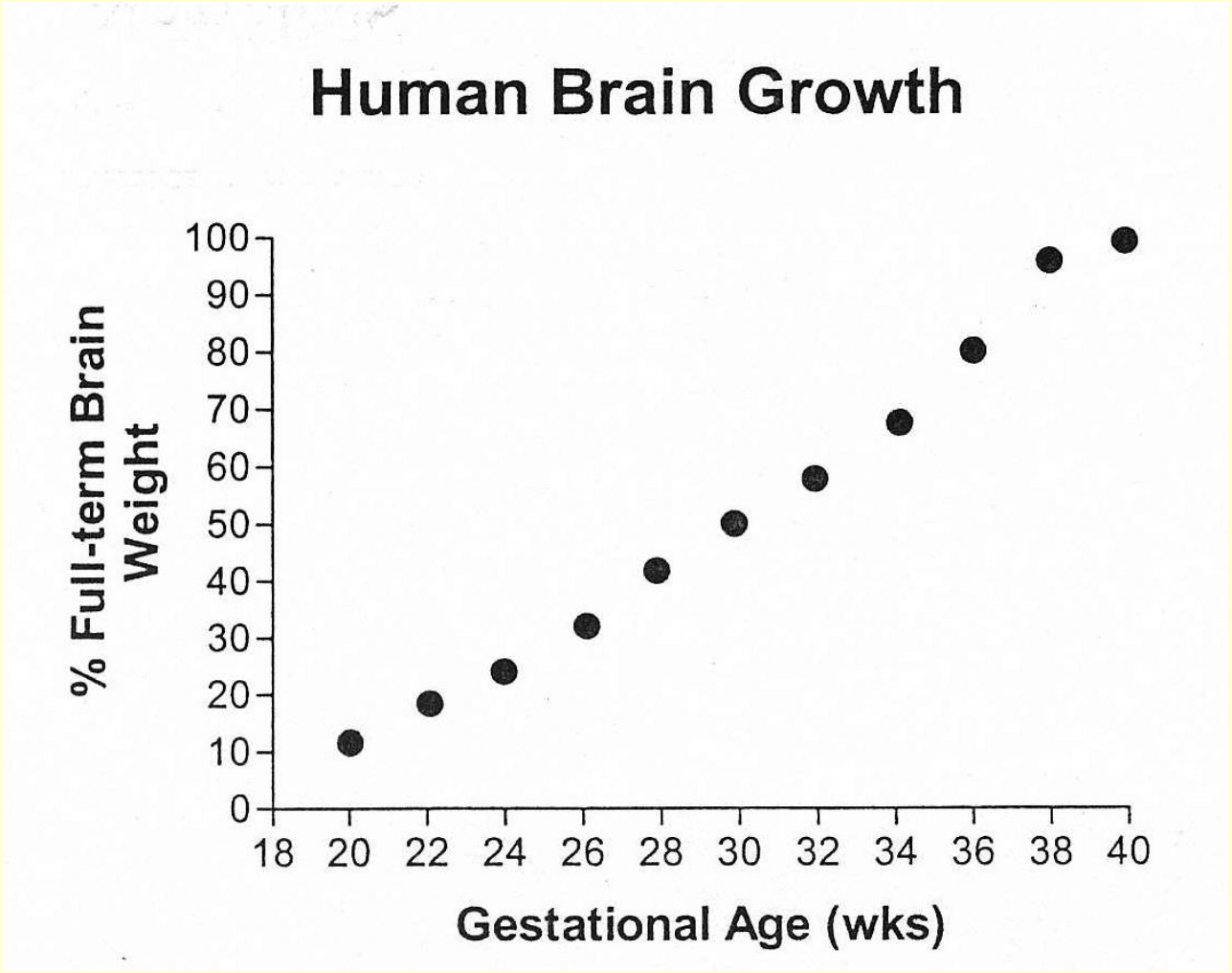
Engle, Tomashek, Wallman & COFN. AAP Clinical Report. Pediatr 2007;120:1390-1401.

Breastmilk protection

- Provision of human milk is important to infants born preterm as these babies have a lower antioxidant capacity.
- May be why they are so vulnerable to diseases and conditions associated with oxidative stress such as necrotizing enterocolitis, chronic lung disease, retinopathy of prematurity, periventricular leukomalacia, and intraventricular hemorrhage.
- Breastmilk is much higher in antioxidant capacity than infant formula and helps neutralize oxidative stress on young babies (Ezaki et al, 2008).

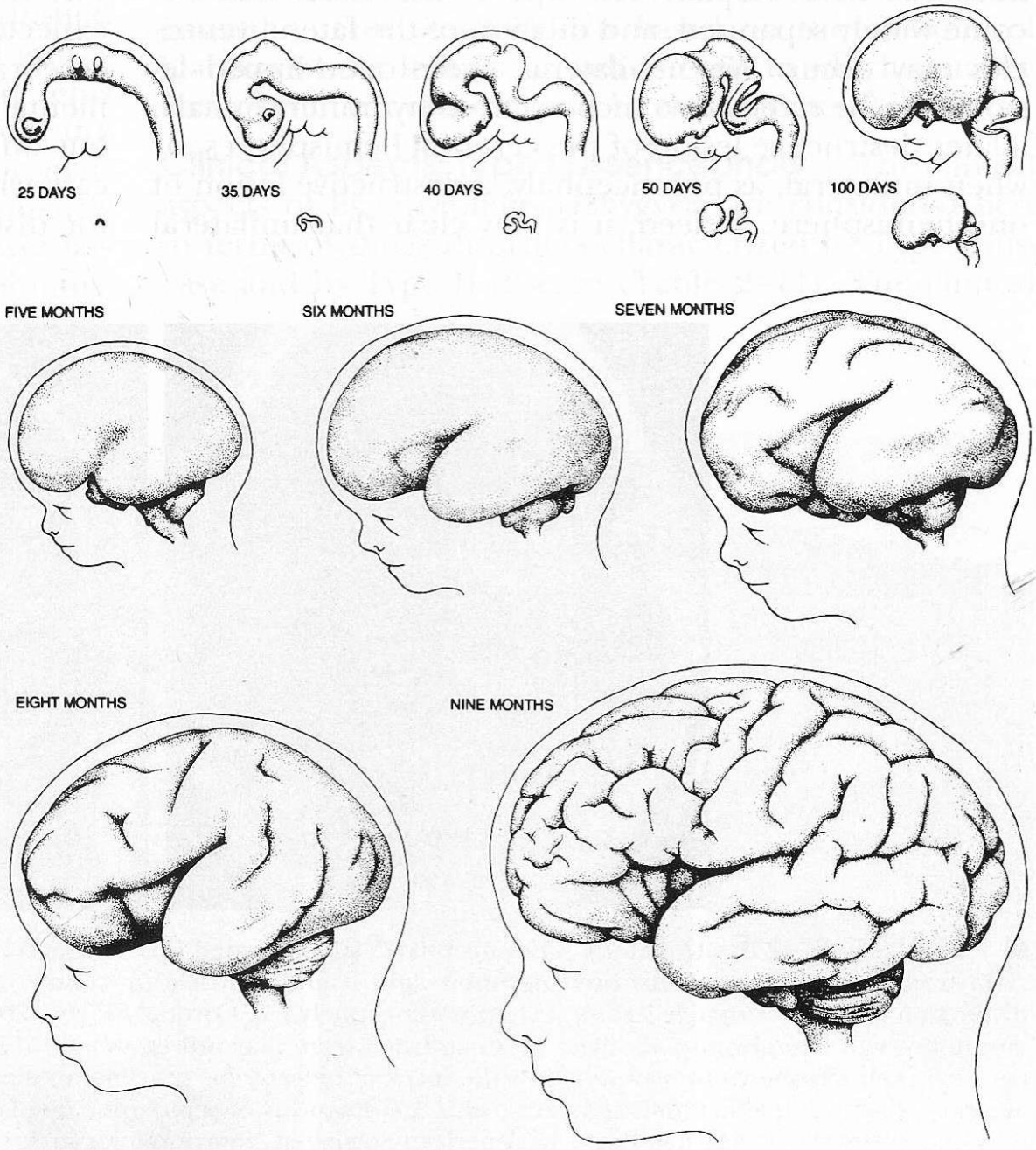
Importance of the last 6 weeks

- Brain weights at 34 and 36 weeks are 65% and 80% of brain weights at term affecting such functions as arousal, sleep-wake behavior, and the coordination of feeding with breathing.
- 1/3 of brain growth occurs in the last 6-8 weeks of gestation
- The immature brainstem adversely impacts upper airway and lung volume control, laryngeal reflexes, and the chemical control of breathing and sleep mechanisms, with 10% of these infants experiencing significant apnea of prematurity (Darnall et al, 2006).



Brain weight at different ages from 20-40 wks gestation. At 34 weeks, the overall brain weight is 65% of term weight.

HC Kinney. Semin Perinatol 2006;30:80-88.



Fetal and Neonatal Brain Development

Volpe, Neurology of the Newborn, 3rd Ed, 1995

A baby's brain at 35 weeks weighs only two-thirds of what it will weigh at 39 to 40 weeks.

35 weeks

39 to 40 weeks

Breastmilk as brain food

- Myelinization is markedly underdeveloped, and neuronal connections and synaptic junctions are not at their full complement
- Breastmilk is a rich source of components designed specifically to promote myelinization and increased development of brain synapses such as sialic acid-containing oligosaccharides
- Formula-fed babies receive only 20% of the sialic acid that a breastfed baby receives and do not synthesize the difference
- Late-preterm birth is associated with subtle deficits in cognitive functioning as early as age 2 years of age.

For every 10-mL/kg per day increase in breast milk ingestion:

- Mental Development Index increased by 0.53 points
- Psychomotor Development Index increased by 0.63 points
- Behavior Rating Scale percentile score increased by 0.82 points
- Likelihood of rehospitalization decreased by 6%
- Infants receiving the most breastmilk would enjoy a 5 point elevation in IQ or conversely, infants fed no breastmilk could experience a 5 point IQ deficit. (Vohr et al (2006)

Immature behaviors

- Diminished muscle tone makes LPIs more prone to positional apnea due to airway obstruction.
- Immature autonomic system may demonstrate exaggerated responses to stressful stimuli with rapid or lower heart rates, abnormal breathing, skin mottling, frequent startling, regurgitation, or simply shutting down.
- Ability to self regulate may be limited and they be irritable, difficult to console, or not very responsive to their parents' overtures.

Neurologic Immaturity

- Immature state regulation
- Difficulty achieving the “latchable” state
- Low tone = poor latch, reduced intake per suck, inadequate milk transfer
- May require more support and positioning adjustments at breast
- Less mature suck pattern

Cardiorespiratory Instability

- Reduced clearance of normal lung fluid (TTN)
  - Especially in elective repeat cesarean without labor
- Large head + decreased tone = positional respiratory instability in some breastfeeding positions and in a car seat
- Increased risk for centrally mediated apnea as central nervous systems are developmentally immature with fewer sulci and gyri in the brain and less myelin.

Temperature Instability

- Poor temperature regulation
- Skin-to-skin care
  - Newborns placed skin-to-skin remain warmer during the first 3 hours following birth compared with newborns swaddled in mother's arms or receiving nursery care (Bystrova et al, 2003)
  - achieve thermoregulation and do so more rapidly than newborns placed under a radiant warmer

It's my birthday, *give me a hug!*

Skin-to-Skin Contact for You and Your Baby

What's "Skin-to-Skin"?
Skin-to-skin means your baby is placed belly-down, directly on your chest, right after she is born. Your care provider dries her off, puts on a hat, and covers her with a warm blanket, and gets her settled on your chest. The first hours of snuggling skin-to-skin let you and your baby get to know each other. They also have important health benefits. If she needs to meet the pediatricians first, or if you deliver by c-section, you can unwrap her and cuddle shortly after birth. Newborns crave skin-to-skin contact, but it's sometimes overwhelming for new moms. It's ok to start slowly as you get to know your baby.

Breastfeeding
Snuggling gives you and your baby the best start for breastfeeding. Eight different research studies have shown that skin-to-skin babies breastfeed better. They also keep nursing an average of six weeks longer. The American Academy of Pediatrics recommends that all breastfeeding babies spend time skin-to-skin right after birth. Keeping your baby skin-to-skin in his first few weeks makes it easy to know when to feed him, especially if he is a little sleepy.

A Smooth Transition
Your chest is the best place for your baby to adjust to life in the outside world. Compared with babies who are swaddled or kept in a crib, skin-to-skin babies stay warmer and calmer, cry less, and have better blood sugars.

Bonding
Skin-to-skin cuddling may affect how you relate with your baby. Researchers have watched mothers and infants in the first few days after birth, and they noticed that skin-to-skin moms touch and cuddle their babies more. Even a year later, skin-to-skin moms snuggled more with their babies during a visit to their pediatrician.

Photo © 2005 Pascale Wowk

Skin-to-Skin Beyond the Delivery Room
Keep cuddling skin-to-skin after you leave the hospital– your baby will stay warm and comfortable on your chest, and the benefits for bonding, soothing, and breastfeeding likely continue well after birth. Skin-to-skin can help keep your baby interested in nursing if he's sleepy. Dads can snuggle, too. Fathers and mothers who hold babies skin-to-skin help keep them calm and cozy.

About the research
Multiple studies over the past 30 years have shown the benefits of skin-to-skin contact. In all the studies described here, mothers were randomly assigned to hold their babies skin-to-skin or see them from a distance. For more information, see GC. Moore, E. Hepworth, J. Bergman, N. Early skin-to-skin contact for mothers and their healthy newborn infants. [Systematic Review] *Cochrane Pregnancy and Childbirth Group Cochrane Database of Systematic Reviews.* 2, 2005.

Massachusetts Breastfeeding Coalition

254 Conant Road, Weston, MA 02493
www.maasbfc.org | © 2005 MBC and Alison Stuebe

Metabolic Instability

- Reduced glycogen and brown fat stores
- Hyperinsulinism may be encountered in infants of diabetic mothers and babies whose mothers are obese and insulin-resistant
- Reduced ketone body compensatory mechanisms especially if given formula which blunts ketone response
- Little energy reserve
- Reduced ability to conjugate and excrete bilirubin
- The more preterm the baby, the longer and more prolonged is meconium passage

Heading off hypoglycemia

- Especially if the mother is diabetic, breastfeeding attempts should occur:
- within 1 hour after birth
- once every hour for the next 3 to 4 hours
- every 2 to 3 hours until 12 hours of age
- at least 8 times each 24 hours in hospital stay
- Frequent breastfeeding is important for late preterm infants who lack stamina and demonstrate inefficient feeding skills.
- Unless swallowing takes place and is documented during these feeding sessions, late preterm infants may actually receive little colostrum, exacerbating hypoglycemia

Delayed lactogenesis II

- Compromises the availability of milk
  - Ineffective suckling further down-regulates milk volume
- Diabetes
- Obesity
- Cesarean delivery
- May see prolonged colostral phase

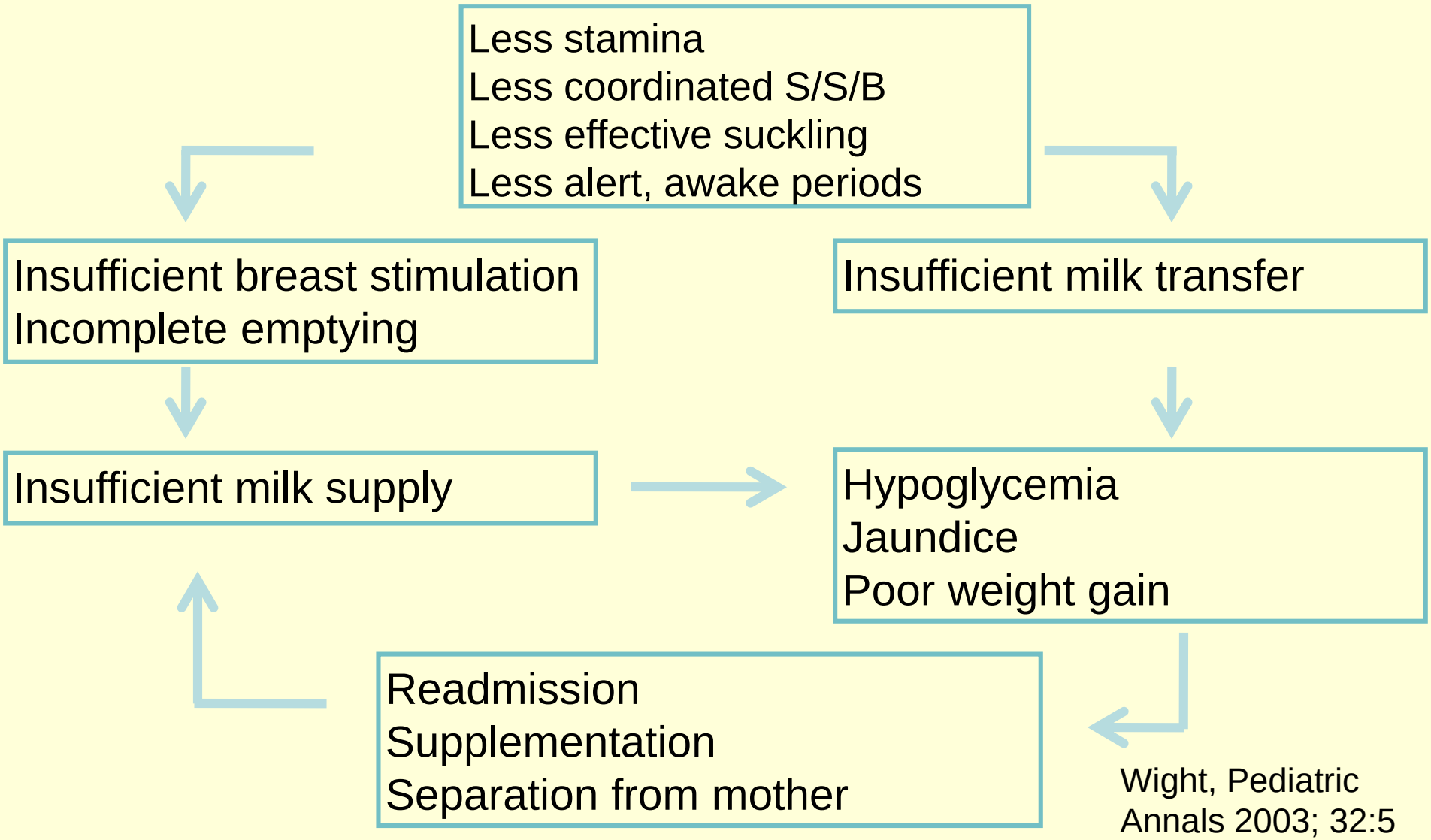
Feeding Problems

- Feeding problems are the predominant reason for delay in discharge
  - Discharge home for near term infants was delayed by suboptimal feeding in nearly 25% of these infants
  - Close attention crucial in avoiding readmission for jaundice and dehydration
  - Ineffective breastfeeding can cause jaundice and jaundice can be a sign of ineffective breastfeeding

Inadequate Milk Intake

- Depressed sucking pressures
  - Baby uses suction to draw nipple into mouth
  - Needs -50 to -60 mm Hg during pauses to keep nipple in mouth; can explain why baby keeps slipping off breast
  - Depends on expression to extract milk
- Tire easily at breast/reduced endurance
- Reduced intake per feed
- Insufficient feeds per 24 hours
- Reduced maternal milk supply
- Disorganized suck
- Long periods of sleep
- Maternal health problems/separation
- Babies do not consume milk from the breast simply because it is there

Breastfeeding Cascade



Wight, Pediatric Annals 2003; 32:5

Geddes et al. Tongue movement and intra-oral vacuum in breastfeeding infants.

Early Human Development, 84, 471-477.

- Vacuum plays an important role in removing milk from the breast
- Intraoral pressure was lower in younger babies
- LPIs may encounter difficulty with sufficient milk transfer as their ability to generate high enough vacuum levels may be compromised by
  - low muscle tone
  - rapid decrease in tone during a feeding
  - poor seal on the breast
  - difficulty in maintaining the nipple in an optimal position.

General breastfeeding plan for LPI

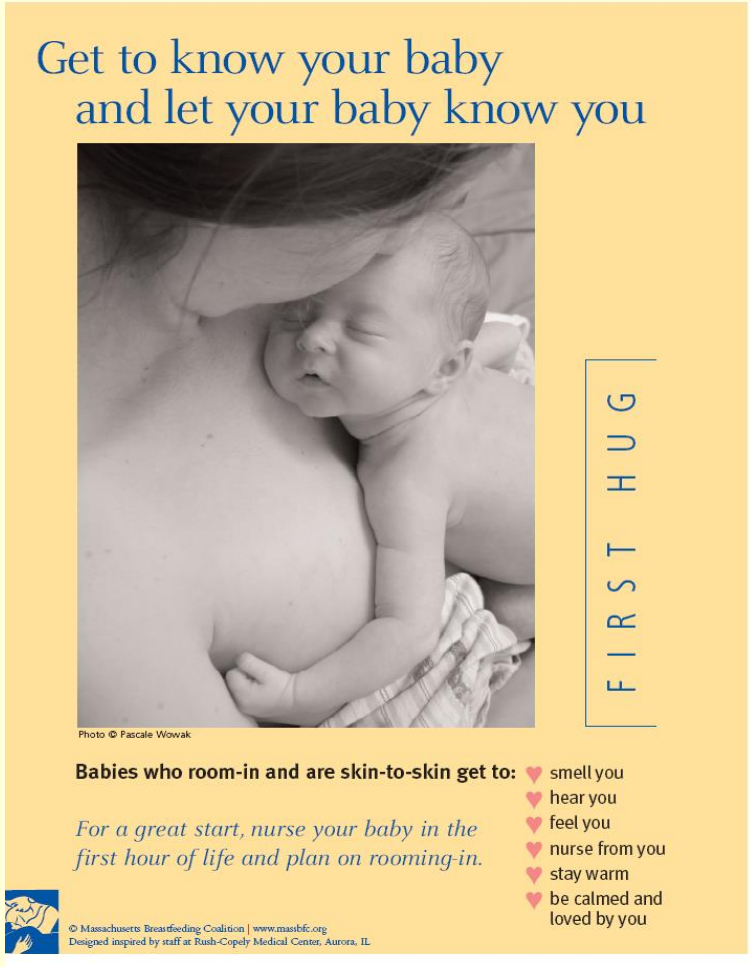
- Place baby skin to skin on your chest
- Watch for rapid eye movements under the eyelids (the baby will wake easily)
- Feed your baby frequently
- Within 1 hour after birth
- Once every hour for the next 3 to 4 hours
- Every 2 to 3 hours until 12 hours of age
- At least 8 times each 24 hours during the hospital stay

Utilize behavioral feeding cues

- Move baby to breast when baby shows feeding cues
  - Sucking movements of the mouth and tongue
  - Rapid eye movements under the eyelids
  - Hand-to-mouth movements
  - Body movements
  - Small sounds

Immediate Postpartum Care

- Skin-to-skin contact
  - Physiologic stability
  - Provides warmth
  - Proximity to breasts
  - Improves oxygenation
  - Decreases crying
  - Does not interrupt initial breast-seeking behaviors
  - Avoids hypoglycemia



Decrease stressors

- Gentle handling, suctioning only if necessary
- Dim lights
- Reduce noise
- Limit visitors
- Avoid separation for routine procedures

Interruptions

Morrison et al. JOGNN 2006; 35:709-716

- Averaged 54 interruptions over a 12 hour period
- Interruptions were frequent, erratic
- Mothers reported feeling rushed when breastfeeding because they were unsure when the next person would enter the room
- Interruptions took precedence over breastfeeding
- Mothers would cease breastfeeding immediately when interruptions occurred
- Mothers had little time to rest, take care of themselves, or feed the infant

Positioning Late Preterm Infants

- Position infant for maximal lung expansion, head slightly extended for open airway
- Assure that the head is stable, in straight alignment with neck and hips

Biological Nurturing-Suzanne Colson

- Any mother/baby behavior at the breast where the baby is in close chest contact with the mother's body contours.
- For the baby, biological nurturing means:
  - Mouthing, licking, smelling, nuzzling, and nesting at the breast
  - Sleeping at the breast
  - Groping and rooting at the breast
  - Latching onto the breast
  - Sucking, swallowing, glugging breast milk through active feeding
- For the mother, biological nurturing means:
  - Holding the baby so that baby's chest is in close contact with a maternal body contour
  - Offering unrestricted access to the breast with as much skin-to-skin contact as mother desires

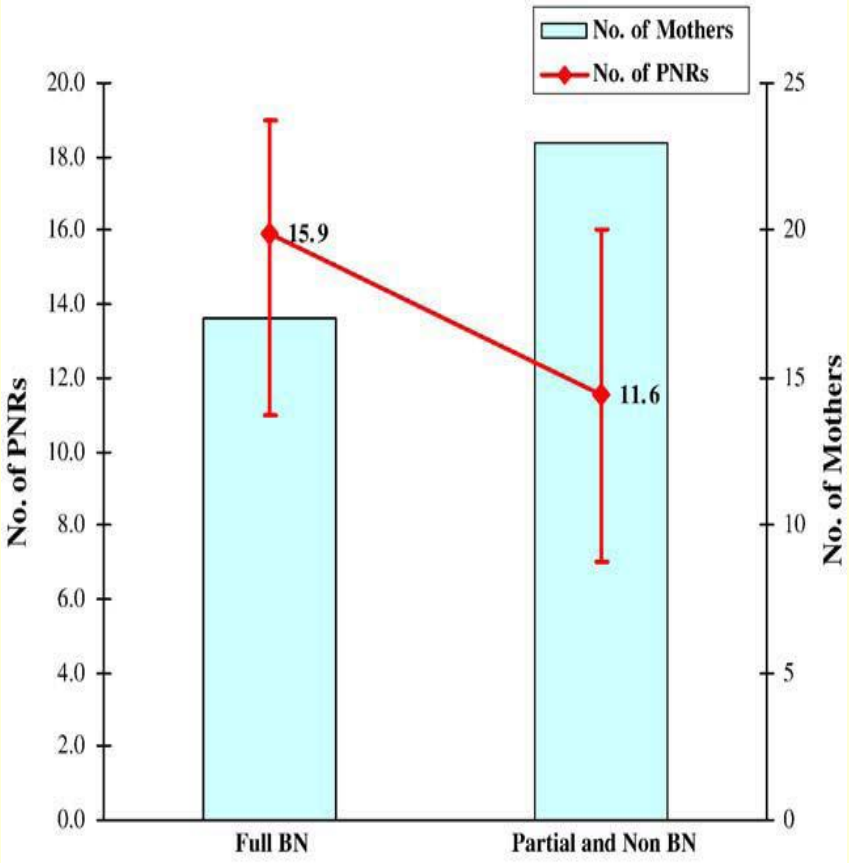
Biological Nurturing

- Extended holding in postures where mother leans back, babies lie prone in close frontal apposition with maternal body contours
- Release primitive neonatal reflex-like movements
- Release of these reflexes aids in breastfeeding

- Primitive neonatal reflexes is a collective name given to >50 unconditioned reflex responses, spontaneous behaviors to environmental stimuli
  - Rooting, sucking, swallowing
  - Head, cheek, tongue, lip reflexes
  - Hand-to-mouth, stepping, crawling

Biological Nurturing

- Greater number of PNRs observed when mothers were in full BN postures
- Changing to full BN postures reduced feeding problems at breast
- Ventral positioning was more physiological than traditional positions for breastfeeding
- Babies often appeared to be asleep but were actively feeding
- Babies may not need to be fully awake for feeding

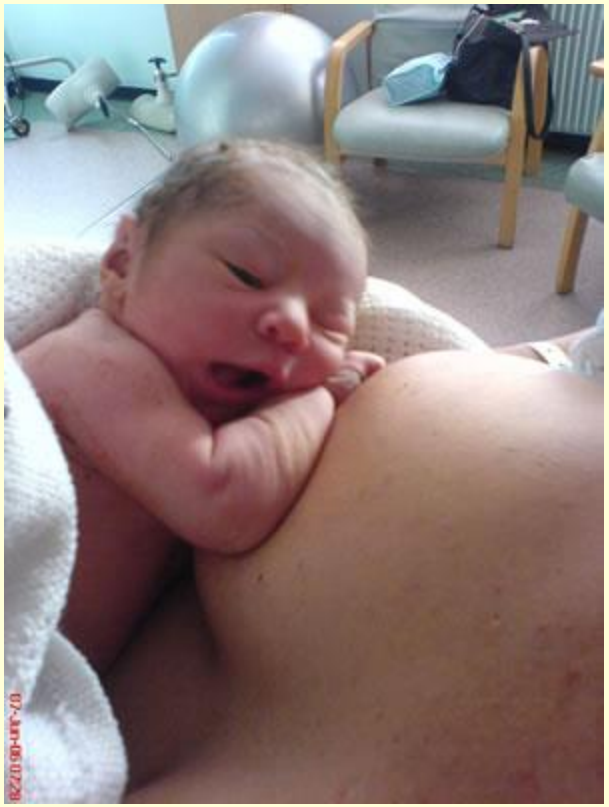


Tilted position

- Tilted position results in better oxygenation, decreased bradycardia and hypoxic episodes, and reduced stomach residuals

Biological Nurturing Effects

- The higher the dose of oxytocin infusion during labor epidurals the lower the oxytocin levels during breastfeeding on day 2 (Jonas et al, 2009)
- Biological nurturing in the 1st 72 h may trigger ↑ peak concentrations of oxytocin earlier



Ineffective Latch

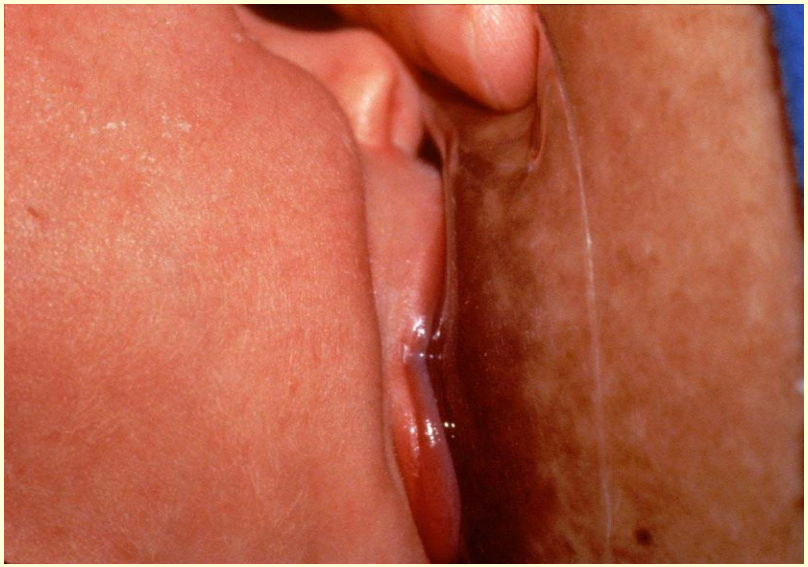
- Low tone
- Does not draw nipple/ areola deep into mouth
- Younger infants exert lower vacuum
- Vacuum is primary force used to remove milk from the breast

Compensate for vulnerabilities

- Assisting with latch
- Skin-to-skin
- Behavioral feeding cues
- Encouraging wide open mouth
- Incentives at the breast
- Nipple tug
- Finger feeding

Helping with Latch

- Nipple shield
  - 20mm size
  - 16mm may be too small and 24mm may be too large
  - Teat height should not exceed distance from infants lips to juncture of hard and soft palate
- Compensates for relatively weak suck
- Properly fitted
- Reverse pressure softening for edematous areola



Alternate Massage/ Breast Compressions

- Breast is massaged and compressed during pauses between sucking bursts
- Creates improved pressure gradient between breast and baby's mouth
- Can increase volume and fat content of feeds

In-hospital feeding plan

Place baby skin to skin on your chest

Watch for rapid eye movements under the eyelids

Feed your baby frequently

- within 1 hour after birth
- once every hour for the next 3 to 4 hours
- every 2 to 3 hours until 12 hours of age
- at least 8 times each 24 hours during the hospital stay

Move baby to breast when baby shows feeding cues

- Sucking movements of the mouth and tongue
- Rapid eye movements under the eyelids
- Hand-to-mouth movements
- Body movements
- Small sounds

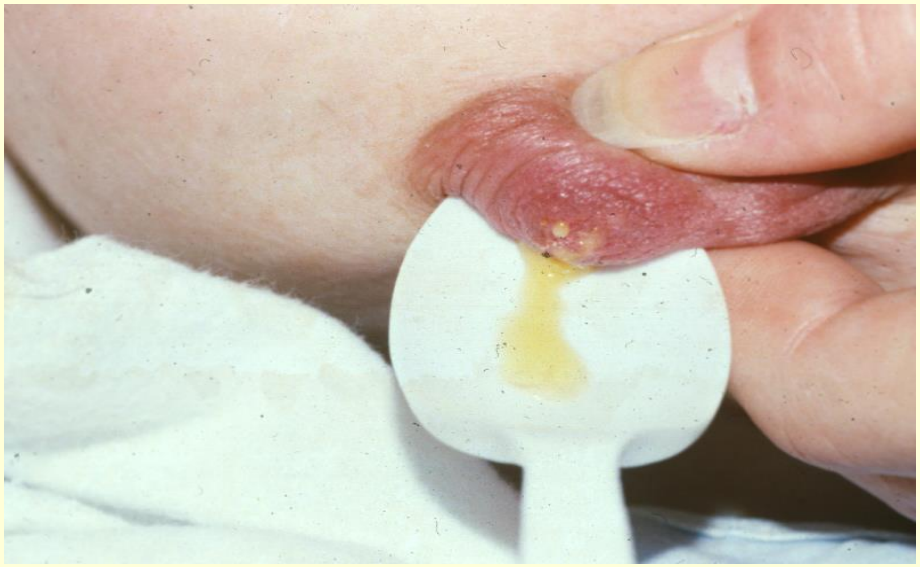
Make sure you know how to tell when your baby is swallowing

- baby's jaw drops and holds for a second
- you hear a "ca" sound
- you feel a drawing action on the areola and see it move towards your baby's mouth
- you hear the baby swallow
- you feel the swallow when you place a finger on the baby's throat
- your nurse hears the swallow when a stethoscope is placed on the baby's throat

Use alternate massage if your baby doesn't swallow after every 1 to 3 sucks.

Massage and squeeze the breast each time she stops between sucks. This helps get more colostrum into her and keeps her sucking longer.

If your baby does not swallow when at the breast, hand express colostrum into a teaspoon and spoon feed 2 teaspoons to your baby using the above guidelines



Improving milk output by more effective breast emptying

- Before milk comes in, hand expression may more effectively remove colostrum
- Once milk comes in, combination of pump vacuum, breast compression, and hand expression may yield more milk

Morton et al. J Perinatology 2009;29:757-764
If separated or baby does not latch

- Begin pumping within first 6 hours
- x8/day for 15 minutes
- Hand express colostrum as frequently as possible in first 3 days
- Use maximum comfortable vacuum

Improving milk output

- Double pump
- Add breast compression while pumping and massage form areas
- When milk flow stops, massage breasts and remove residual milk by pump or hand expression
- Milk volume increased 48%

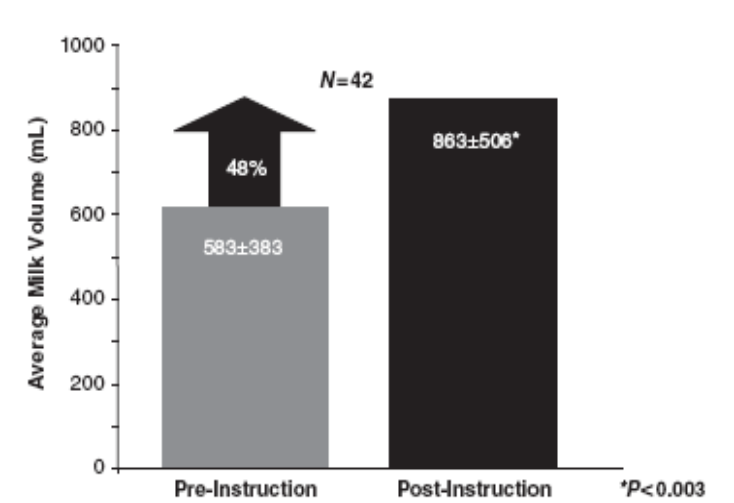
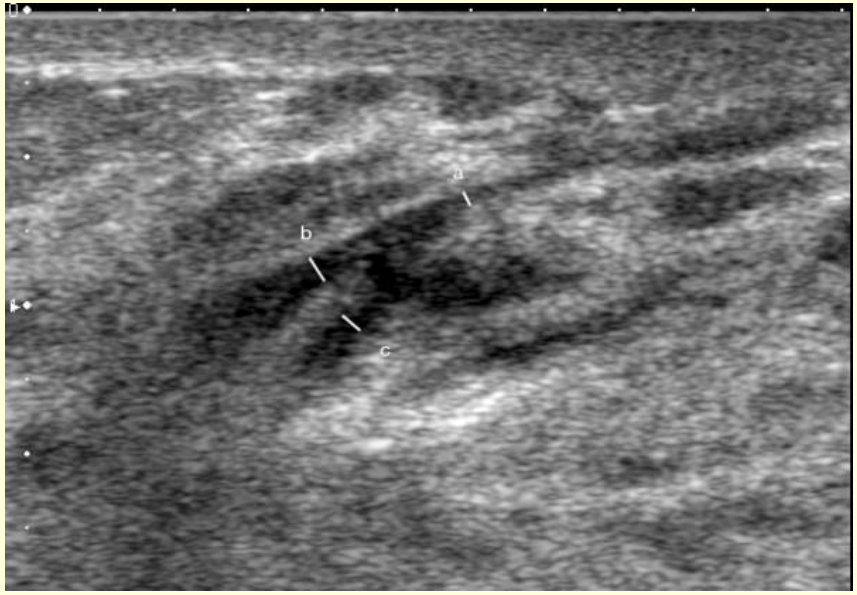


Figure 3 Mean daily volumes (MDV) pre- and postinstruction of hands-on pumping (HOP). In 42 mothers, MDV increased by 48%, comparing each mother's MDV 3 days before her first monitored pumping session (preinstruction) to week 8 (postinstruction) MDV. Data are shown as mean ± s.d. ml.

Triple combination yields more milk

- Removes a greater fraction of milk
- Milk flow reverses when milk ejection finishes
- Breast compression may increase intraductal pressure
- Presents a more efficient pressure gradient
- http://newborns.stanford.edu/Breastfeeding/MaxProduction.html



More effective pumping tips

Parker, et al. J Perinatology 2012 (ahead of print)

- Mothers initiated milk expression within 60 minutes of birth (group 1) or 1 to 6 hours (group 2) following delivery
- Milk volume and timing of lactogenesis stage II was compared between the 2 groups
- Group 1 produced significantly more milk than group 2 during the first 7 days and at week 3
- Group 1 also demonstrated a significantly earlier lactogenesis stage II.

Warming the breasts

- Warming tissues is a known therapeutic intervention that increases local blood flow and metabolism in tissues, facilitating excretion of tissue waste materials and phagocytosis, and enhancing tissue nutrition (Barret et al., 2010).
- Warm compresses have long been recommended to aid the let down reflex.
- Kent et al (2011) found that warmed pump flanges resulted in a larger amount of available milk removal.

Warming the breast

- Yigit et al. (2012) studied whether warming the breast prior to pumping would increase the volume of milk expressed from a warmed breast compared with the other breast which was not warmed.
- Mothers placed a warm compress (40.5C/104.9F) on one breast prior to pumping
- The amount of milk obtained from the warmed breasts was significantly higher than that obtained from the non-warmed breasts
- Warming probably has an enhancing effect on the milk ducts or milk flow, allowing more milk to be pumped, rather than increasing actual breastmilk production.

Properly fitted pump flange

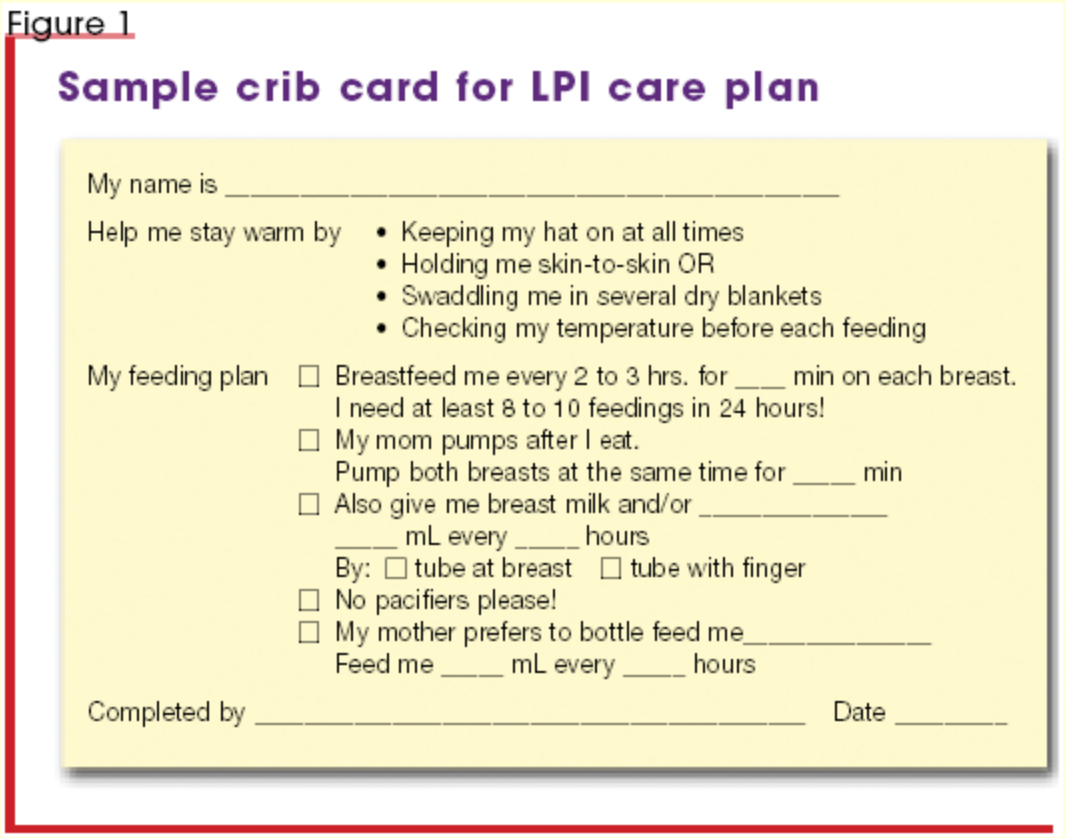
- Nipples swell during pumping
- Standard pump kits provide flanges whose nipple tunnel opening is 24mm to 25mm, but many mothers benefit from a larger opening of 27mm to 30mm

Power Pumping

- First milk ejection releases up to 45% of total volume expressed
- elicit multiple “first” let-downs
  - double pump for 10 minutes, 5-15 minute break, then double pump another 10 minutes

- Tricks the breast into performing several “first” milk ejections
- Mothers who are exclusively or predominantly pumping should target an output of 3500mL/week (500mL/day) by the end of the second week

Figure 1



Sample crib card for LPI care plan

My name is _____

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 feeding

My feeding plan
- ☐ Breastfeed me every 2 to 3 hrs. for ___ min on each breast. I need at least 8 to 10 feedings in 24 hours!
- ☐ My mom pumps after I eat. Pump both breasts at the same time for ____ min
- ☐ Also give me breast milk and/or _____ ____ mL every ____ hours By: ☐ tube at breast ☐ tube with finger
- ☐ No pacifiers please!
- ☐ My mother prefers to bottle feed me_____ Feed me ____ mL every ____ hours

Completed by _____ Date _____

Stellwagen LM, Hubbard E, Wolf A. The late preterm infant: a little baby with big needs. Contemporary Pediatrics November 1, 2007

Breastfeeding Teaching

- Jaw support/Dancer hand position
- Sublingual pressure
- Signs of swallowing
- Monitoring of wet diapers and stooling
- Pre- and post breastfeeding weights

- Criteria for supplementation
- What to supplement
- How to supplement
- How much to supplement
  - 3-5ml/kg/feeding, or
  - 5-10ml per feeding on day 1
  - 10ml-20ml day 2
  - 20ml-30ml day3

Supplementation

- Hand express colostrum into a spoon and spoon feed baby
  - Teaspoon is 5ml
- If using a pump, place the Ameda diaphragm between valve and collection bottle

Figures 2a-c

Methods of supplementation to breastfeeding

Figure a: A 5- or 10-mL syringe containing expressed human milk and/or formula can be attached to a 5 Fr feeding tube, the end of which should be inserted along the infant's palate after she/he has latched properly onto the breast. The syringe should be slowly pushed when the infant sucks.

Figure b: During "cup feeding," the infant is supported in a slightly upright position. A small cup containing supplement is placed at the bottom lip to stimulate mouth opening. The cup is then tilted so that the baby can slowly sip.

Figure c: For "finger feeding," supplement is drawn into a 5- or 10-mL syringe, which is then attached to a 5 Fr feeding tube. The end of the tube should be supported by a gloved finger when introduced into the infant's mouth. As the infant sucks on the finger, the syringe plunger can be slowly pushed.

Stellwagen LM, Hubbard E, Wolf A. The late preterm infant: a little baby with big needs. Contemporary Pediatrics November 1, 2007

Commercial tube feeding devices

Medela

Maternal Concepts

Hazelbaker Finger Feeder

LactAid

Supplementing with a Bottle

- Bottles weaken the masseter muscle and the suck
- Preterm infants frequently remove milk from a bottle, not by exerting vacuum, but by compressing the nipple
- Orthodontic nipples compromise

central grooving of the tongue

If using a bottle to supplement

- Infant may not be able to generate the force necessary to compress and extend an artificial nipple, which forces the tongue down, hindering its movements
- Flow rate should not overwhelm baby
- Orthodontic nipple can produce forward tongue movement & must refill, leaving baby with no milk during some sucking efforts

- Paced bottle-feeding
- Nipple should be soft, pliable, short, rounded
- Choose nipples with a gradual transition from shaft to base
- Infant’s lips should not be stretched too tight, should not gap at the corner, and should not touch the collar on the bottle

Supplementing without stress

- If the infant is holding his breath, looking distressed, sputtering or coughing then the flow needs to be slowed such that a comfortable ratio of sucking to swallowing is seen and the baby inhibits breathing only when swallowing (Wolf & Glass, 2008)

Triple Feeding

- Feed baby at breast
- Supplement with previously pumped milk
  - at breast with tube feeding device
- Pump to remove residual milk

- Baby may not be able to maintain mother's milk supply alone
- Inadequately drained breasts result in
  - Reduced milk supply
  - Milk stasis
  - Engorgement
  - Mastitis

Possible Equipment

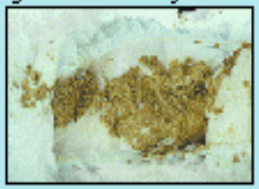
- Electric breast pump, double collection kit, storage bottles
- Tube feeding device
- Nipple shield
  - Small, 20mm size
  - Compensates for weak sucking pressures
- Alternative feeding devices
- Diaper diary
- Non-breast milk supplements
- Car seat that baby can sit in without desaturation
- Pumping log
- Rental scale
  - Helps meet targets for daily intake
  - Eliminates tiring trips for weight checks

Diapers of the Breastfed Baby

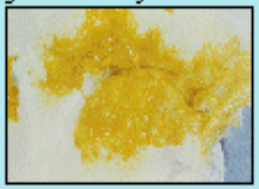
Looking at a baby's poop and pee can help you tell if your baby is getting enough to eat.

The baby's poop should change from black to yellow during the first 5 days after birth.

The baby's first poop is black and sticky.



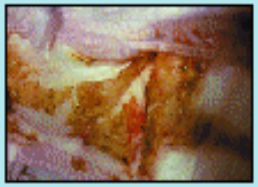
The poop turns green by Day 3 or 4.



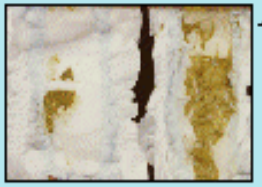
The poop should turn yellow by Day 5.

Poop can look seedy.

Poop can look watery.



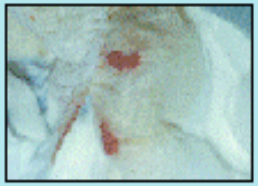
Illness, injury, or allergies can cause blood in poop. Call Doctor.



Babies make some large and some small poops every day.

By Day 5, most breastfed babies make 3 or 4 poopy diapers every day.

Only count poops larger than this.



On Day 1 or 2 some babies have orange or red pee.

By Day 3 or 4, breastfed babies should make 6 wet diapers with pee that looks like clear water.

A wet diaper is as heavy as 3 tablespoons of water.

First Week Diaper Diary

1. Circle the hour closest to when your baby starts breastfeeding.
2. Circle the W when your baby makes a wet diaper.
3. Circle a P when your baby makes a poopy diaper.

Some babies make more diapers than shown on the Diaper Diary.

Sample record for Day Four

Feedings: (12) 1 2 (3) 4 5 (6) 7 (8) 9 (10) 11 Noon (1) (3) (4) (5) 6 7 (8) 9 10 11

Wet Diapers: (W) (W) (W) (W)

Yellow Poops: (P) (P) (P) P

This the baby had nine feedings, four wet diapers, and three poopy diapers. By Day Four, most babies breastfeed 8 to 12 times a day.

Birth Date: _____/_____/_____ Time:_____ AM PM

Birth Weight: _____ Discharge Weight:_____

Baby's Weight at one week: _____

Call your doctor, nurse, midwife, or breastfeeding helper if:

1. Your baby is not making any wet or poopy diapers
2. There is dark colored pee after Day Three
3. There is dark colored poop after Day Five

Day One

Feedings: 12 1 2 3 4 5 6 7 8 9 10 11 Noon 1 2 3 4 5 6 7 8 9 10 11

Wet Diapers: W

Black Tarry Poops: P

Day Two

Feedings: 12 1 2 3 4 5 6 7 8 9 10 11 Noon 1 2 3 4 5 6 7 8 9 10 11

Wet Diapers: W W

Black Tarry Poops: P P

Day Three

Feedings: 12 1 2 3 4 5 6 7 8 9 10 11 Noon 1 2 3 4 5 6 7 8 9 10 11

Wet Diapers: W W W

Green Poops: P P P

Day Four

Feedings: 12 1 2 3 4 5 6 7 8 9 10 11 Noon 1 2 3 4 5 6 7 8 9 10 11

Wet Diapers: W W W W

Yellow Poops: P P P P

Day Five

Feedings: 12 1 2 3 4 5 6 7 8 9 10 11 Noon 1 2 3 4 5 6 7 8 9 10 11

Wet Diapers: W W W W W

Yellow Poops: P P P P

Day Six

Feedings: 12 1 2 3 4 5 6 7 8 9 10 11 Noon 1 2 3 4 5 6 7 8 9 10 11

Wet Diapers: W W W W W W

Yellow Poops: P P P P

Day Seven

Feedings: 12 1 2 3 4 5 6 7 8 9 10 11 Noon 1 2 3 4 5 6 7 8 9 10 11

Wet Diapers: W W W W W W

Yellow Poops: P P P P

For breastfeeding help call: _____

Discharge Criteria

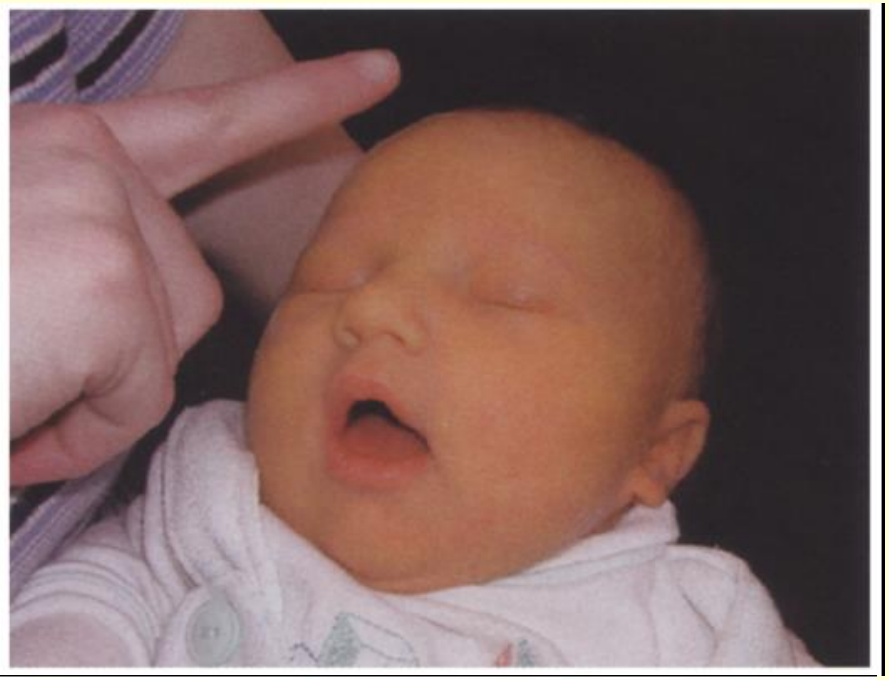
- Temperature stability in an open crib
- Bilirubin stable or decreasing
- Weight stable or increasing
- Evidence of effective milk transfer
- Mother's milk supply initiated
- Anticipatory guidance regarding nipple soreness, lactogenesis II, effective milk transfer, normal weight patterns
- Sleepy non-demanding baby does not indicate that baby is getting enough

Discharge plan

- May do well in hospital but be unable to sustain adequate intake post discharge
- May not have the stamina to engage in complete feedings
- Frequent weight checks
  - May rent scale for in-home use
  - Calculate necessary intake
- Referral to lactation consultant

- Mother decreases pumping after:
- Infant wakes predictably to feed
- Stays awake longer at breast
- Draws nipple further into shield or mouth
- Gains appropriate weight from feeds at breast
- Discontinue nipple shield
- Weight q3 days after each change


Braun
ThermoScan



Stokowski LA. Newborn jaundice. Adv Neonatal Care 2002; 2:115-116

FAMILY TEACHING TOOLBOX
KARIN GRACEY, RNC, MSN, CNNP, COLUMN EDITOR
LAURA A. STOKOWSKI, RN, MS, AUTHOR

NEWBORN JAUNDICE

Identified Risk Factors:

TcB measurement using the BiliChek.

Bilirubin level or TcB

Follow-up bilirubin scheduled

Follow-up appointment

Lactation Resources

Basic Facts About Jaundice

- Jaundice is a yellowish or orange color of the skin. Jaundice is very common. It happens in 2 out of 3 newborns.
- Jaundice is caused by the breakdown of red blood cells. Old red blood cells release a chemical called bilirubin. It is the liver's job to remove bilirubin from the blood so the body can get rid of it. Bilirubin is normally removed from the body in the bowel movements. If it is not removed, bilirubin finds its way to the skin and stays there, causing the yellow color called jaundice.
- Babies are born with extra red blood cells that their bodies don't need anymore. Breaking down all these red blood cells releases a lot of bilirubin. Babies with bruising have extra cells to remove from the body, so they are at higher risk for jaundice.
- It takes a few days for your baby's liver to be ready for the job of removing extra bilirubin from the blood. The liver of a premature baby has an even tougher job of removing bilirubin. Babies born just a few weeks early are more likely to become jaundiced.
- Sometimes a baby's blood type is different from its mother's blood. In this case, the baby's red blood cells are breaking down even faster than usual. Jaundice in these babies often shows up in the first day or two of life.

Risk Factors for Jaundice

- Prematurity (babies born 2 weeks or more before their due date)
- A brother or sister who had jaundice
- Breastfeeding
- Babies with bruising from the birth process
- Babies born with the help of a vacuum

Significance of Jaundice

- Most jaundice in healthy babies is not serious and does not require treatment. It usually gets worse for several days, reaching its peak on the fourth or fifth day of life. After that the yellow color fades a little each day.
- Jaundice can become harmful if the bilirubin level in the baby's blood is too high. Extremely high levels can harm the brain and cause hearing loss.
- The only way to know the bilirubin level is to test the baby's blood. Even if one bilirubin test is normal, your baby's jaundice can still worsen after you go home.
- Parents often ask, "What is a normal bilirubin level?" It depends how old the baby is, and how fast the bilirubin is rising. A level that is considered normal when a baby is 3 days old might be too high at 1 day of age.

doi:10.1053/adnc.2002.32046

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NEWBORN JAUNDICE

Check for jaundice by pressing your fingertip on the baby's forehead, nose, or cheek.

Call your health care provider if your baby looks yellow on the chest or abdomen.

Screeching or a high-pitched cry could be an indication of a high bilirubin level.

Preventing Serious Jaundice
It isn't possible to prevent jaundice completely, but there are some things parents can do to keep jaundice from becoming too serious.

- Keep scheduled follow-up appointments for your baby. Your health care provider will evaluate your baby for jaundice, and may order a bilirubin test.
- Good feeding helps to prevent serious jaundice. Regular feedings of breast milk or formula will encourage bowel movements. When babies do not pass bowel movements, bilirubin that is in the intestines can be recycled back into the blood. Breastfed babies should nurse at least 8 to 10 times a day. More frequent breastfeeding can reduce jaundice.
- If your baby is not nursing well for any reason (such as, your baby is very sleepy, your baby is crying but refusing to suck, or your breasts are engorged), call your health care provider for advice. Do not wait until your follow-up appointment to get help.

Checking for Jaundice

- Take your baby near a window but not in direct sunlight. Press your fingertip on your baby's forehead, nose, or cheek (like you are checking a peach to see if it is ripe). When you take your finger away, the spot where your finger was will look lighter for a few seconds. If this spot looks yellow, that is jaundice.
- Repeat this on the baby's upper chest and tummy area. Jaundice usually starts in the face and spreads downward, toward the feet, as the bilirubin levels gets higher. Check for jaundice in the whites of the eyes.
- If your baby looks yellow on the chest or abdomen, or you feel your baby's jaundice is getting worse, call your health care provider. Ask for a bilirubin test to be done.
- It is important to look for jaundice, but trying to judge how serious jaundice is by looking at the baby is not very accurate, especially when the bilirubin level is high.

What Else to Watch for in a Jaundiced Baby
If your baby is jaundiced, watch for other signs that could mean that the bilirubin level is too high. If any of these are true call your health care provider right away. If your baby is

- Very sleepy and does not wake up for feedings
- Very fussy and does not eat or sleep much at all
- Limp or floppy
- Seems stiff, especially arms or legs
- Arching his/her back or neck
- Screeching or has a high-pitched cry

Treatment for Jaundice

- The most common treatment for jaundice is phototherapy, a special light that changes the bilirubin in the skin into a substance that is easier for the body to excrete.
- Phototherapy is used to keep the bilirubin from rising to a dangerous level. This can take a few days, depending on the cause of the baby's jaundice.
- Phototherapy is done at the hospital, or in some circumstances, in the home.

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Journal of Perinatology (2013) 33, S5–S22

www.nature.com/jp

PRACTICE GUIDELINES

Multidisciplinary guidelines for the care of late preterm infants

RM Phillips, M Goldstein, K Hougland, R Nandyal, A Pizzica, A Santa-Donato, S Staebler, AR Stark, TM Treiger and E Yost, on behalf of The National Perinatal Association

Journal of Perinatology (2013) **33,** S5–S22; doi:10.1038/jp.2013.53

IN-HOSPITAL ASSESSMENT AND CARE

Late preterm infants (LPIs), like all other newborns, should have a qualified healthcare provider assigned to their care during the immediate postpartum recovery period following birth.[7] Late preterm infants may experience delayed or inadequate transition to the extra-uterine environment, so careful consideration of staffing ratios during transition (1–12 h after birth) for this population of infants is necessary.[8] Because of their increased vulnerabilities, LPIs require continued close monitoring throughout the first 24 h after birth. Whenever possible, mother and infant should remain together, rooming in 24-h a day. Frequent, prolonged, skin-to-skin contact should be encouraged to promote optimal physiological stability. All LPIs are at risk for morbidities severe enough to require transition to a higher level of care. If an LPI is transitioned to a higher level of care, special attention should be paid to preparing the mother for going home without her newborn, and she should be monitored closely for signs of postpartum depression and post-traumatic stress disorder in the postpartum period.

	HEALTHCARE TEAM	FAMILY EDUCATION*
STABILITY		
Initial Assessment References: 2, 7, 9, 10, 11, 12, 13, 14, 15	• Establish gestational age (GA) prior to delivery, if possible. • Keep warm and dry, and stimulate per Neonatal Resuscitation Protocol (NRP) guidelines. • Place stable infants skin to skin with mother as soon as possible after delivery and cover with a warm blanket. • Do initial assessment and Apgar scores during infant's skin-to-skin contact with mother if infant remains stable. • After initial stabilization, assess newborn q 30 min until condition has been stable for 2 h, then q 4 h for first 24 h, then q shift until transition/discharge. » Assess respiratory rate (RR), type of respirations, and work of breathing. » Assess heart rate (HR) and rhythm, presence of murmur, distal pulses, and perfusion. » Assess axillary temperature. » Assess tone and activity. » Assess cord stump. • Support uninterrupted skin-to-skin contact by delaying Vitamin K, eye care, and foot and hand prints until after the first breastfeeding or until 1–2 h after birth (Vitamin K and eye prophylaxis can be delayed up to maximum time allowed by hospital protocol if there are no specific risk factors.) • Obtain weight, length, and head circumference after first breastfeeding unless needed to adjust care. » Plot measurements on appropriate preterm growth curve. » Determine if Small for Gestational Age (SGA), Appropriate for Gestational Age (AGA), or Large for Gestational Age (LGA). • Assess with New Ballard Score within 12 h of birth to confirm GA. • Identify maternal risk factors that can affect infant's initial stability (e.g., diabetes, medications, or illicit drugs).	• Communicate risks of late preterm birth (prior to delivery, if possible), explaining that immature organ systems and brain of LPI may lead to complications in the immediate postpartum period (and beyond) that will require close monitoring, including: » Respiratory distress » Hypothermia » Sepsis » Hypoglycemia » Feeding difficulties and dehydration » Hyperbilirubinemia » Developmental, learning, and behavioral challenges. • Stress importance of immediate postpartum skin-to-skin contact with mother to: » Stabilize infant and support optimal transition after birth. » Promote physiological stability in HR, RR, oxygen saturation, temperature, and glucose levels. » Facilitate infant's first breastfeeding.
Reducing Risks of Respiratory Distress References: 2, 7, 13, 14	• Monitor infant's RR and work of breathing closely by visual inspection during first hour after birth. • Maintain skin-to-skin contact if stable to decrease infant stress, optimize respiration and oxygen saturations, and protect from hypothermia-induced apnea.	• Explain LPI's increased risk for respiratory distress and apnea, including: » Immature lung development. » Decreased surfactant level. » Immature control of breathing. » Decreased airway muscle tone leading to decreased ability to protect airway.

http://www.nature.com/jp/journal/v33/n2s/pdf/jp201353a.pdf

Resources

- CPQCC Care and Management of the Late Preterm Infant Toolkit

http://www.cpqcc.org/quality_improvement/qi_toolkits/care_and_management_of_the_late_preterm_infant_toolkit_rev_april_2007

- Protocol #10: Breastfeeding the near-term infant (35 to 37 weeks gestation)

http://www.bfmed.org/Media/Files/Protocols/Protocol%2010%20Revised%20English%206.11.pdf

- Multidisciplinary Guidelines for the Care of Late Preterm Infants

http://www.nationalperinatal.org/lptguidelines/pdf/NPALatePretermGuidelines-11-12.pdf

Resources

- The late preterm infant: A little baby with big needs
- http://health.ucsd.edu/specialties/obgyn/maternity/newborn/nicu/spin/staff/Documents/ContemporaryPediatricsThelatepretermi nfant_AlittlebabywithbigneedsCME.pdf

Helpful handouts for parents

- Contemporary Pediatrics. Guide for parents going home with your late preterm infant http://www.modernmedicine.com/modernmedicine/Parent+Guides/Parent-Guide-Going-home-with-your-late-preterm-inf/ArticleStandard/Article/detail/473739?contextCategoryId=6465
- Late Preterm (Near-Term) Infant: What Parents Need to Know http://www.awhonn.org/awhonn/content.do?name=02_PracticeResources/2C3_Focus_NearTermInfant.htm
- Stokowski LA. Newborn jaundice. Advances in Neonatal Care 2002; 2:115
- The Diaper Diary (for keeping track of output) and Pumping Milk for Your Premature Baby http://www.lactnews.com/