

## CARE OF THE LATE PRETERM INFANT: PEARLS & PITFALLS

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### DISCLOSURES

Relevant financial relationships

- Salaried professor at East Carolina University
- Director for the Center for Neonatal Nursing Education, LLC
- Co-Editor & contributing author of fetal/neonatal physiology text
- Associate Editor for Continuing Education, Neonatal Network
- Author of neonatal nurse practitioner test preparation text
- Receives honoraria for CE courses/seminars

### LEARNING OUTCOME

Recognize the unique physiologic challenges imposed upon the late preterm (LPT) infant during the transition to extrauterine life in order to encourage nursing risk assessments, early identification of the at-risk infant, and timely intervention.

### EPIDEMIOLOGY

Approximately 3.9 million births occur in the USA (per annum)

Birth = most common cause for hospitalization

Birth hospitalizations are SHORT (too short!)

- Vaginal birth = 24hrs (common), 36hrs (less common), or 48hrs (rare)
- Cesarean birth = 48hrs (common), 72hrs (less common), 96hrs (rare)

**Birth rate: United States, 2006-2016**  
Rate per 1,000 women 15-44 years

Year	Rate per 1,000 women 15-44 years
2006	94.7
2007	94.7
2008	94.7
2009	94.7
2010	94.7
2011	94.7
2012	94.7
2013	94.7
2014	94.7
2015	94.7
2016	94.7

Source: National Center for Health Statistics. Fetal mortality data. J.C. Gorman Bureau. Population estimates based on bridge race categories followed by the National Center for Health Statistics. Revised. December, 2, 2018. from www.npcdhhs.org/performance

### LATE PRETERM BIRTHS

LPT births = ~70% of all infants born prematurely

Hospital costs are 10x higher than for term infants

- Costs attributed to → birth hospitalization & hospital readmission

Early identification of the at-risk LPT infant is critical to reduce the risk for injury & avoid hospital readmission

**Figure 1- Percentage of preterm infants by gestational age**

Gestational Age	Percentage
<28 weeks	6%
28-31 weeks	10%
32-33 weeks	13%
34-36 weeks	71%

### RISK FACTORS

**IN AN AVERAGE WEEK IN NORTH CAROLINA**

**2,322** babies are born

**242** babies are born preterm

**167** babies are born late preterm

**43** babies are born very preterm

Statewide: 9.1

- Higher than NC Rate of 10.1 (83)
- Between MOD 2020 goal of 8.1 and NC Rate (46)
- Suppressed (1) \*\*

### COSTS

- Preterm birth = \$26 billion (annually)
- Reasons: physiologic immaturity, temperature instability, respiratory disorders, feeding issues, hypoglycemia, & jaundice.

#### COST OF PRETERM BIRTH IN THE UNITED STATES (2005)

Category	Medical Cost (Dollars)
Medical cost of preterm birth	32,258.0
Medical cost of term birth	3,225.0

Source: Institute of Medicine, 2007. *Preterm Birth: Causes, Consequences, and Prevention*. National Academy Press, Washington, DC. Published and unpublished analyses. Retrieved September 2, 2019, from [www.nationalacademies.org/preterm](http://www.nationalacademies.org/preterm).

### UNINTENDED HOSPITAL READMISSIONS

- Key quality indicator in the USA
- Of interest to several agencies: Federal Gov't, Medicaid, and Children's Health Insurance Program Reauthorization

### UNINTENDED HOSPITAL READMISSIONS

LPT infants 2x more likely to be readmitted (compared to term babies)

Most common indications for readmission: feeding problems/hypoglycemia, jaundice

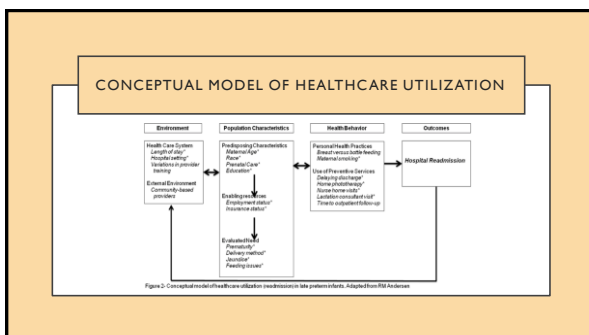
	Week 1	Week 2	Week 3	Week 4
Total n = 1,028 (%)	2,028 (195)	2,048 (195)	2,068 (195)	2,088 (195)
Feeding problem, n = 2,170 (%)	1,057 (48)	1,067 (48)	1,077 (48)	1,087 (48)
Respiratory distress, n = 1,152 (%)	582 (27)	587 (27)	592 (27)	597 (27)
Risk out status, n = 1,158 (%)	587 (27)	592 (27)	597 (27)	602 (27)
Isolation, n = 1,124 (%)	562 (25)	567 (25)	572 (25)	577 (25)

Gestational Age Category	n (%)	Readmission Rate per 1,000
Late Preterm (34-36 wks)	19,361 (8.4)	54.8*
Early Term (37-38 wks)	64,178 (31.8)	20.3*
Term 39-42 wks	180,144 (88.8)	14.8
Total births	2,063,114	17.9

\* P < .001 compared with term readmission rate per 1,000

### READMISSION RISK FACTORS

- First-born child
- Exclusive breastfeeding
- Postpartum complications
- Public insurance
- Length of stay



### LPT INFANTS ARE **NOT** HEALTHY NEWBORNS

- Majority of LPT infants are cared for in a healthy newborn setting
- LPT infants may not receive necessary scrutiny/monitoring for issues of prematurity when treated in a healthy newborn setting
- Issues?
  - Inadequate hydration/feeding
  - Jaundice
  - Readiness for discharge to home (currently remains qualitative)

### THE CLINICAL ASSESSMENT

NICU Admission (%) per LPT gestational age at birth (weeks)

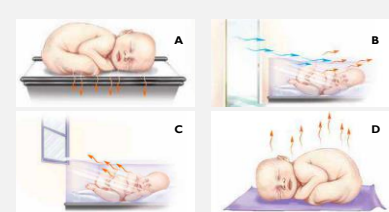
- 34 weeks = 50%
- 35 weeks = 15%
- 36 weeks = 8%

*Late preterm neonates have a higher risk for respiratory morbidities, hypoglycemia, temperature instability, hyperbilirubinemia, and feeding difficulties when compared to their term counterparts – Malley et al (2010)*

What do we know now?

- LPT infants are the fastest growing subset of babies
- LPT infants are not healthy term newborns
- Mother-baby RNs must understand the physiologic challenges that LPT infants face
- Most IBCLCs and Mother-Baby RNs do not receive accredited lactation/physiology coursework prior to engaging in direct patient care

### MECHANISMS OF HEAT LOSS



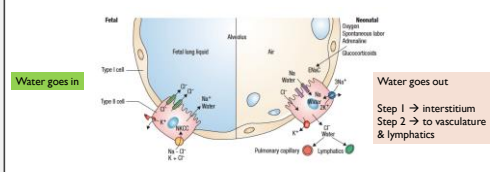
- Convection
- Radiation
- Evaporation
- Conduction

### THERMOREGULATORY PROBLEMS: COLD STRESS

- Immature Epidermal Barrier
- Higher Skin Surface Area to BW
- Need for additional NRP (delay in skin-to-skin)
- Radiant losses (temperature of delivery room)
- Evaporative losses (wet skin)
- Conductive losses (when radiant warmer bed is not pre-warmed)
- Convective losses (unswaddled while family looking at baby & air blowing from A/C vent)

INCREASES THE RISK FOR HYPOGLYCEMIA!

### PULMONARY PHYSIOLOGY



Water goes in


Water goes out

Step 1 → interstitium  
Step 2 → to vasculature & lymphatics

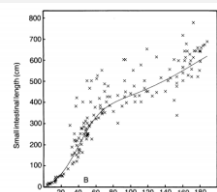
Source: Jnah & Trembath, 2019

### PULMONARY PROBLEMS

- Transient Tachypnea of the Newborn
- Respiratory Distress Syndrome
- Pulmonary Hypertension
- Respiratory Failure



### GASTROINTESTINAL PHYSIOLOGY



Age (weeks gestational age)	Average Length (cm)
20	125
30	200
term	275
1 year postnatal	380
5 years	450
10 years	500
20 years	575

Weaver LT, Austin S & Cole TJ. (1991). Small intestinal length: a factor essential for gut adaptation. *Gut*, 32.

### GI PROBLEMS: FEEDING PROBLEMS & DEHYDRATION

- Immature suck/swallow reflex
- Reduced stamina
- Immature peristaltic function
- Immature sphincter control

### METABOLIC/ENDOCRINE PHYSIOLOGY: GLUCOSE METABOLISM



### POSTNATAL GLUCOSE METABOLISM

↑ Catecholamines → stimulates glucagon secretion → stimulates immediate glycogenolysis

↑ Catecholamines → stimulates glucagon & FFA secretion → enzymes accumulate over next 4-6 hrs → onset of gluconeogenesis

**TABLE 10.4 The Four Major Carbohydrate Metabolic Pathways**

Metabolic Pathway	Major Function
Glycogenesis	Synthesis of glycogen
★ Glycogenolysis	Breakdown of glycogen → glucose
Glycolysis	Breakdown of glucose → pyruvate
★ Gluconeogenesis	Synthesis of non-carbohydrate sources (pyruvate, lactate, amino acids) → glucose

### MET/ENDO PROBLEM: HYPOGLYCEMIA

**Hypoglycemia:** Clinical hypoglycemia is defined as a plasma glucose concentration low enough to cause symptoms and/or signs of impaired brain function. **LFT infants are 2-3x more likely to develop hypoglycemia!**

**Section 3. Management of Neonates, Infants, and Children with a Persistent Hypoglycemia Disorder**

**A.1.** For neonates with a suspected congenital hypoglycemia disorder and older infants and children with a suspected hypoglycemia disorder, we recommend that the goal of treatment be to maintain a PG concentration  $>70$  mg/dL (3.9 mmol/L; GRADE 1++).

**A.2.** For high-risk neonates without a suspected congenital hypoglycemia disorder, we suggest the goal of treatment be to maintain a PG concentration  $>70$  mg/dL ( $>3.9$  mmol/L) for those aged  $<48$  hours and  $>60$  mg/dL ( $>3.3$  mmol/L) for those aged  $>48$  hours. (GRADE 2++)

**A.3.** We recommend an individualized approach to management with treatment tailored to the specific disorder, taking into account patient, family, and provider preferences. (Integrated best practice statement)

#### Screening and Management of Postnatal Glucose Homeostasis in Late Preterm and Term SGA, EMWL/GA Infants

(pg 1) (Table 3). <sup>1</sup>PG = plasma glucose; <sup>2</sup>SGA = small for gestational age; <sup>3</sup>EMWL = extremely low weight for length; <sup>4</sup>GA = gestational age.

**Symptomatic and  $<40$  mg/dL  $\rightarrow$  IV glucose**

**ASYMPTOMATIC:**

**0 to 4 hours of age:** **PG < 40 mg/dL** (2.2 mmol/L) **1 hour**  
 Breast glucose  $> 30$  mg/dL after 1 hour  
 Breast  $< 30$  mg/dL  $\rightarrow$  feed  
 If not breast  $< 30$  mg/dL, **Feed and check in 1 hour**

**4 to 24 hours of age:** **PG  $< 40$  mg/dL** **2 hours**  
 Breast glucose  $> 30$  mg/dL after 2 hours  
 Breast  $< 30$  mg/dL  $\rightarrow$  feed  
 If not breast  $< 30$  mg/dL, **Feed and check in 1 hour**

**PG  $< 40$  mg/dL** **1 hour**  
 Breast  $> 30$  mg/dL  $\rightarrow$  feed  
 Breast  $< 30$  mg/dL  $\rightarrow$  feed  
 If not breast  $< 30$  mg/dL, **Feed and check in 1 hour**

**PG  $< 40$  mg/dL** **2 hours**  
 Breast  $> 30$  mg/dL  $\rightarrow$  feed  
 Breast  $< 30$  mg/dL  $\rightarrow$  feed  
 If not breast  $< 30$  mg/dL, **Feed and check in 1 hour**

**Target glucose ranges  $> 48$  hours after birth by gestational age:**

**1** Gestate Age  $< 20$  weeks: Serum PG  $> 25$  mg/dL and  $> 1.4$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**2** Gestate Age  $> 20$  weeks: Serum PG  $> 30$  mg/dL and  $> 1.7$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**3** Gestate Age  $> 20$  weeks: Serum PG  $> 35$  mg/dL and  $> 1.9$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**4** Gestate Age  $> 20$  weeks: Serum PG  $> 40$  mg/dL and  $> 2.2$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**5** Gestate Age  $> 20$  weeks: Serum PG  $> 45$  mg/dL and  $> 2.5$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**6** Gestate Age  $> 20$  weeks: Serum PG  $> 50$  mg/dL and  $> 2.8$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**7** Gestate Age  $> 20$  weeks: Serum PG  $> 55$  mg/dL and  $> 3.1$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**8** Gestate Age  $> 20$  weeks: Serum PG  $> 60$  mg/dL and  $> 3.3$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**9** Gestate Age  $> 20$  weeks: Serum PG  $> 65$  mg/dL and  $> 3.6$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**10** Gestate Age  $> 20$  weeks: Serum PG  $> 70$  mg/dL and  $> 3.9$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**11** Gestate Age  $> 20$  weeks: Serum PG  $> 75$  mg/dL and  $> 4.2$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**12** Gestate Age  $> 20$  weeks: Serum PG  $> 80$  mg/dL and  $> 4.5$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**13** Gestate Age  $> 20$  weeks: Serum PG  $> 85$  mg/dL and  $> 4.8$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**14** Gestate Age  $> 20$  weeks: Serum PG  $> 90$  mg/dL and  $> 5.1$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**15** Gestate Age  $> 20$  weeks: Serum PG  $> 95$  mg/dL and  $> 5.4$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**16** Gestate Age  $> 20$  weeks: Serum PG  $> 100$  mg/dL and  $> 5.8$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**17** Gestate Age  $> 20$  weeks: Serum PG  $> 105$  mg/dL and  $> 6.1$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**18** Gestate Age  $> 20$  weeks: Serum PG  $> 110$  mg/dL and  $> 6.5$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**19** Gestate Age  $> 20$  weeks: Serum PG  $> 115$  mg/dL and  $> 6.9$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**20** Gestate Age  $> 20$  weeks: Serum PG  $> 120$  mg/dL and  $> 7.3$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**21** Gestate Age  $> 20$  weeks: Serum PG  $> 125$  mg/dL and  $> 7.7$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**22** Gestate Age  $> 20$  weeks: Serum PG  $> 130$  mg/dL and  $> 8.1$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**23** Gestate Age  $> 20$  weeks: Serum PG  $> 135$  mg/dL and  $> 8.5$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**24** Gestate Age  $> 20$  weeks: Serum PG  $> 140$  mg/dL and  $> 8.9$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**25** Gestate Age  $> 20$  weeks: Serum PG  $> 145$  mg/dL and  $> 9.3$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**26** Gestate Age  $> 20$  weeks: Serum PG  $> 150$  mg/dL and  $> 9.7$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**27** Gestate Age  $> 20$  weeks: Serum PG  $> 155$  mg/dL and  $> 10.1$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**28** Gestate Age  $> 20$  weeks: Serum PG  $> 160$  mg/dL and  $> 10.5$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**29** Gestate Age  $> 20$  weeks: Serum PG  $> 165$  mg/dL and  $> 10.9$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**30** Gestate Age  $> 20$  weeks: Serum PG  $> 170$  mg/dL and  $> 11.3$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**31** Gestate Age  $> 20$  weeks: Serum PG  $> 175$  mg/dL and  $> 11.7$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**32** Gestate Age  $> 20$  weeks: Serum PG  $> 180$  mg/dL and  $> 12.1$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**33** Gestate Age  $> 20$  weeks: Serum PG  $> 185$  mg/dL and  $> 12.5$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**34** Gestate Age  $> 20$  weeks: Serum PG  $> 190$  mg/dL and  $> 12.9$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**35** Gestate Age  $> 20$  weeks: Serum PG  $> 195$  mg/dL and  $> 13.3$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**36** Gestate Age  $> 20$  weeks: Serum PG  $> 200$  mg/dL and  $> 13.7$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**37** Gestate Age  $> 20$  weeks: Serum PG  $> 205$  mg/dL and  $> 14.1$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**38** Gestate Age  $> 20$  weeks: Serum PG  $> 210$  mg/dL and  $> 14.5$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**39** Gestate Age  $> 20$  weeks: Serum PG  $> 215$  mg/dL and  $> 14.9$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**40** Gestate Age  $> 20$  weeks: Serum PG  $> 220$  mg/dL and  $> 15.3$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**41** Gestate Age  $> 20$  weeks: Serum PG  $> 225$  mg/dL and  $> 15.7$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**42** Gestate Age  $> 20$  weeks: Serum PG  $> 230$  mg/dL and  $> 16.1$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**43** Gestate Age  $> 20$  weeks: Serum PG  $> 235$  mg/dL and  $> 16.5$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**44** Gestate Age  $> 20$  weeks: Serum PG  $> 240$  mg/dL and  $> 16.9$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

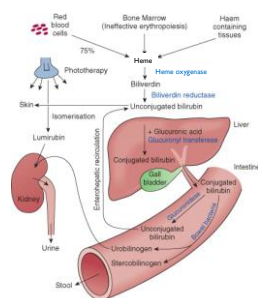
**45** Gestate Age  $> 20$  weeks: Serum PG  $> 245$  mg/dL and  $> 17.3$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**46** Gestate Age  $> 20$  weeks: Serum PG  $> 250$  mg/dL and  $> 17.7$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**47** Gestate Age  $> 20$  weeks: Serum PG  $> 255$  mg/dL and  $> 18.1$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

**48** Gestate Age  $> 20$  weeks: Serum PG  $> 260$  mg/dL and  $> 18.5$  mmol/L per hr  $> 30$  -  $< 40$  mg/dL per hr. Advise parent glucose level  $> 40$  mg/dL.

### HEMATOLOGIC PHYSIOLOGY: BILIRUBIN




### HEME PROBLEM: HYPERBILIRUBINEMIA


- Decreased suck/swallow & breast feeding proficiency (dehydration)
- Decreased serum albumin levels
- Decreased BBB protection (neuronal protective mechanisms)
- Decreased serum bilirubin binding capacity

### NURSING CARE GUIDELINES


#### THERMOREGULATION



Dry the baby



Hat & KC or Swaddle





If baby is cold... →

1. Check/fix ambient temperature
2. Ensure baby swaddled, wrap each blanket separately
3. If still cold after steps #1 and #2, rewarm under radiant heat & check glucose!

### NURSING CARE GUIDELINES

#### RESPIRATORY FUNCTION





### NURSING CARE GUIDELINES

#### FEEDING & GLUCOSE MONITORING

Supplementation of breast feeding is needed until:

- Onset of lactogenesis and maternal milk supply is abundant.
- LPT infant can feed effectively without tiring, **and** the
- LPT infant is maintaining/gaining weight

GA (weeks)	Kcal/kg/d	Protein/kg/d	Sample feeding volume q3 (34 weeks, 2kg)
34-36	120	3.1	30ml q3hrs
37-38	115	2.5	28ml q3hrs

### NURSING CARE GUIDELINES

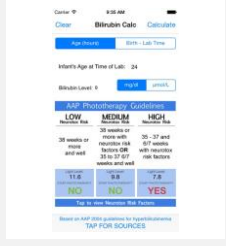
	34 - 34 6/7 weeks	35 - 35 6/7 weeks	36 - 36 6/7 weeks
<b>DEFINITIONS</b>	AGA = 10thiles ASA = 10thiles	AGA = 10thiles (10th - 90th) ASA = 10thiles	AGA = 10thiles (10th - 90th) ASA = 10thiles
<b>ASSESSMENT</b>	<ul style="list-style-type: none"> <li>• Clinical criteria based on:                             <ul style="list-style-type: none"> <li>• Calorie of gain rate of mother</li> <li>• Stage and color</li> </ul> </li> <li>• Abdominal assessment</li> <li>• Lactation success (milkability)</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical criteria based on:                             <ul style="list-style-type: none"> <li>• Calorie of gain rate of mother</li> <li>• Stage and color</li> </ul> </li> <li>• Abdominal assessment</li> <li>• Lactation success (milkability)</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical criteria based on:                             <ul style="list-style-type: none"> <li>• Calorie of gain rate of mother</li> <li>• Stage and color</li> </ul> </li> <li>• Abdominal assessment</li> <li>• Lactation success (milkability)</li> </ul>
<b>REASSESSING SUPPLEMENTATION</b>	<ul style="list-style-type: none"> <li>• DAY 1: Initiate breastfeeding without supplemental, supportive skin-to-skin &amp; oral care until feeding time</li> <li>• Day 2: Supplement ALL infants</li> </ul>	<ul style="list-style-type: none"> <li>• DAY 1: Initiate breastfeeding without supplemental, supportive skin-to-skin &amp; oral care until feeding time</li> <li>• Supplement if:                             <ul style="list-style-type: none"> <li>• Poor infant feeding cues</li> <li>• Abnormal, varying, or no feeding</li> <li>• Poor weight gain</li> <li>• No AGA, color change, facies to AGA, or AGA color change</li> <li>• Hypoglycemia (&lt;45 mg/dl)</li> <li>• Hypernatremia (serum Na &gt; 160)</li> <li>• Weight loss &gt;5% in 24hrs</li> <li>• Weight loss &gt;5% in 48hrs</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• DAY 1: Initiate breastfeeding without supplemental, supportive skin-to-skin &amp; oral care until feeding time</li> <li>• Supplement if:                             <ul style="list-style-type: none"> <li>• Poor infant feeding cues</li> <li>• Abnormal, varying, or no feeding</li> <li>• Poor weight gain</li> <li>• No AGA, color change</li> <li>• Hypoglycemia (&lt;45 mg/dl)</li> <li>• Hypernatremia (serum Na &gt; 160)</li> <li>• Weight loss &gt;5% in 24hrs</li> <li>• Weight loss &gt;5% in 48hrs</li> </ul> </li> </ul>
<b>METHOD OF SUPPLEMENTATION</b>	<ul style="list-style-type: none"> <li>• May include supplemental nursing system (SNS), finger feeding, PPI, bottle feeding, cup feeding, syringe or orogastric tube (OGT)</li> <li>• In AGA, or gestational age less than 34 weeks, or ASA less than 10thiles, use finger feeding &amp; oral care</li> </ul>	<ul style="list-style-type: none"> <li>• May include supplemental nursing system (SNS), finger feeding, PPI, bottle feeding, cup feeding, syringe or orogastric tube (OGT)</li> <li>• In AGA, or gestational age less than 34 weeks, or ASA less than 10thiles, use finger feeding &amp; oral care</li> </ul>	<ul style="list-style-type: none"> <li>• May include supplemental nursing system (SNS), finger feeding, PPI, bottle feeding, cup feeding, syringe or orogastric tube (OGT)</li> <li>• In AGA, or gestational age less than 34 weeks, or ASA less than 10thiles, use finger feeding &amp; oral care</li> </ul>
<b>RESPONSIBLE NURSE SUPPLEMENTATION</b>	<ul style="list-style-type: none"> <li>• 50% require pump breast</li> <li>• 50% have feeding problems</li> <li>• Full feeds by &lt;10 days of life</li> </ul>	<ul style="list-style-type: none"> <li>• 50% require pump breast</li> <li>• 50% have feeding problems</li> <li>• Full feeds by &lt;10 days of life</li> </ul>	<ul style="list-style-type: none"> <li>• 50% require pump breast</li> <li>• 50% have feeding problems</li> <li>• Full feeds by &lt;10 days of life</li> </ul>

### NURSING CARE GUIDELINES

#### HYPERBILIRUBINEMIA MONITORING

Step 1: Assign neurotoxicity risk

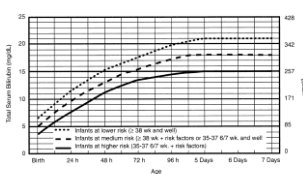
Risk factors = isoimmune hemolytic disease, G6PD deficiency, asphyxia, significant lethargy, temperature instability, sepsis, acidosis, or albumin <3g/dL



### NURSING CARE GUIDELINES

#### HYPERBILIRUBINEMIA MONITORING

Step 2: Plot bilirubin result and assess for phototherapy requirement

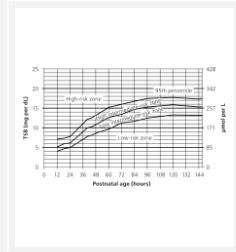


• Low bilirubin risk: Do not submit direct reading or unverified definition.  
 • High bilirubin: Additional neurotoxic disease, G6PD deficiency, asphyxia, significant lethargy, temperature instability, acidosis, acidosis, or albumin <3g/dL, maternal.  
 • Plot and initiate 36-37.5°C on core (axial) T88 until in monitor and the monitor risk line. If in position to improve or meet T88 until in monitor and the monitor risk line and at higher T88 until in monitor and the monitor risk line.  
 • It is an option to provide conventional phototherapy in hospital or at home at T88 levels 2.5 mg/dL (10-150 nmol/L) below those shown and have phototherapy initiated until bilirubin drops to the risk line.

### NURSING CARE GUIDELINES

#### HYPERBILIRUBINEMIA MONITORING

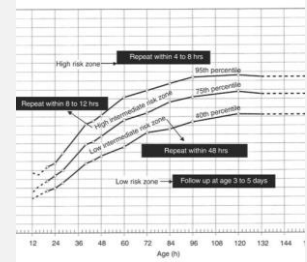
Step 3: Plot bilirubin result and assess hour-specific risk



### NURSING CARE GUIDELINES

#### HYPERBILIRUBINEMIA MONITORING

Step 4: Determine timeframe for repeat (follow-up) bilirubin check



### CONCLUDING THOUGHTS

What do we need in the future?

- Hospital-based continuing education led by an expert instructor with **population-specific** advanced practice education and training
- Nursing awareness and advocacy
- Judicious use of short-term supplementation for LPT infants (and term infants) with clinical risks/indicators of dehydration
- Benefits for treating LPT infants as PRETERM infants: early identification of jaundice, dehydration, poor growth, delayed transition, need for longer inpatient stay, reduced hospital readmission rate, reduced unintended morbidities (dehydration-induced hypoglycemia and jaundice, cognitive impairment, etc.)

### QUESTIONS?

Contact me!

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[APNConsult@gmail.com](mailto:APNConsult@gmail.com)