

Subject: Neonatal Hypoglycemia

REVISION DATE: Jan 2015,12/2011, 02/2009,
11, 2007, 07/2007,04/2001, 04/1999

REPLACES: NSY: Hypoglycemia Protocol

WRITTEN: March 1998

SUPERSEDES DATE: 12/2011

This guideline is used to assist staff in identifying and preventing hypoglycemia, as well as treating neonates with hypoglycemia. This guideline applies to all medical and nursing staff.

Purpose: The goal of this guideline is to aid staff in identifying infants at risk for hypoglycemia and to prevent neurological damage to the neonate by maintaining infant's blood glucose of > 40mg/dL.

Summary of Changes: References/content updated to reflect most current standards of practice.

1. References:

- 1.1. American Academy of Pediatrics (2011). Postnatal glucose homeostasis in late-preterm and term infants. *Pediatrics* 127(3)575-579.
- 1.2. Lippincott, Williams, & Wilkins (2012). Glucose management, neonatal. Retrieved from <http://procedures.lww.com/lmp/view.do?pId=1145920&s=p&fromSearch=true&searchQuery=glucose+neonatal>.
- 1.3. Lippincott, Williams, & Wilkins (2013). Blood glucose monitoring, neonate. Retrieved from <http://procedures.lww.com/lmp/view.do?pId=950919&s=p&fromSearch=true&searchQuery=glucose+neonatal>.
2. Wright, N., & Marinelli, K.A. (2014). AMB clinical protocol #1: Guidelines for blood glucose monitoring and treatment of hypoglycemia in term and late-preterm neonates, revised 2014. *Breastfeeding Medicine* 9(4), 173-179. doi: 10.1089/bfm.2014.9986

2. Responsibilities:

- 2.1. Credentialed delivering provider.
 - 2.1.1. Manage and assume responsibility for patient care administered.
 - 2.1.2. Place appropriate medical orders in patient's Electronic Health Record (EHR)

based on comprehensive patient assessment.

2.2. Nurse:

2.2.1. Provide recognized nursing standard of care to patients in coordination with provider's orders.

2.2.2. Acknowledge and carry-out all provider orders in the (EHR).

2.2.3. Report all assessment findings out of expected range to provider.

3. General

3.1. There is no specific plasma glucose concentration or duration of hypoglycemia that can predict permanent neurologic injury, or a specific concentration that is associated with clinical signs of hypoglycemia in infants. Therefore, while there is no evidenced based specific limit for treatment and screening, the AAP (2011) supports initiating treatment at $\leq 40\text{mg/dL}$ for all "at-risk" or symptomatic infants.

3.3. The AAP does not recommend routine screening and monitoring of blood glucose in healthy term newborns after a normal pregnancy and delivery (2011).

3.4. Blood glucose screening of the asymptomatic "at-risk infant" should be performed within the first hour of birth and continued through multiple feed-fast cycles (AAP, 2011).

3.5. Any infants showing clinical manifestations of hypoglycemia should have blood glucose measured immediately (AAP, 2011).

4. "At-Risk" infants, as defined by the AAP (2011) include:

- Infants who are small for gestational age (<2500gm per ANMC guidelines)
- Infants who are large for gestational age (> 4300 gm. per ANMC guidelines)
- Infants who were born to mothers who have diabetes
- Late preterm infants (34-36.6/7 weeks gestation)

4.1. Other Risk Factors include

- Maternal medication use including terbutaline, beta blockers, and oral diabetic agents
- Polycythemia
- Infection
- Respiratory stress and hypoxia

5. Standards of Practice/Guidelines for Care:

5.1. Review the mother's chart prior to delivery for health history, including diabetic health history, medications taken during pregnancy, and estimated gestational age of infant.

5.2. Obtain a capillary blood glucose on all infants identified as “at risk” per The American Academy of Pediatrics and ANMC guidelines within 60-90 minutes of life.

5.2.1. “At-Risk” infants, as defined by the AAP (2011) and ANMC Guidelines include:

- Small for gestational age (<2500 gm.)
- Large for gestational age (> 4300 gm.)
- Diabetic mother
- < 37 weeks gestation
- Maternal Terbutaline (within the last 5 days) or Beta-Blocker use
- Apgar < 5 at 5 minutes of life

5.3 Assess the newborn at delivery and at each newborn vital sign assessment for signs and symptoms of hypoglycemia. **Obtain capillary blood glucose on all infants presenting with signs of hypoglycemia immediately.**

5.3.1. Signs of hypoglycemia include (AAP, 2011):

- Jitteriness
- Cyanosis
- Seizures
- Apneic episodes
- Tachypnea
- Weak or high-pitched cry
- Decreased muscle tone
- Lethargy
- Poor feeding
- Eye rolling
- Exaggerated Moro reflex
- Temperature instability

5.4. If glucose monitoring is required:

5.4.1. Explain the procedure to the parents or guardians.

5.4.2. Wash hands and put on gloves.

5.4.3. Confirm the infant’s identity using at least two patient identifiers. Promote comfort and reduce pain (e.g. pacifier, breast milk, skin to skin, swaddle, sucrose solution).

5.4.4. Infant’s heel should be warmed prior to drawing capillary samples as venous stasis may cause an underestimation of the actual blood glucose value.

5.4.5. Clean the heel stick site with an antiseptic pad and allow the site to dry. Perform a heel stick puncture with the infant lancing device (0.85mm incision depth or 1.0mm incision depth depending on infant's gestational age and size) and apply blood to the test strip.

5.4.5.1. Glucose reagent strips should be used primarily as a screening method. Laboratory confirmation or serum glucose values should be performed when test strip values are abnormal or suspicious.

5.4.5.1.1. Due to the significant risk to the patient if treatment is delayed, interventions should be initiated if hypoglycemia is suspected by test strip or clinical symptoms, even if the laboratory confirmation is not available.

5.4.6. Briefly apply pressure to the puncture site with a gauze pad, dress the site with a small adhesive bandage.

5.4.7. Follow ANMC Newborn Nursery Neonatal Hypoglycemia Protocol, Appendix 1 and 2 to determine course of action based on newborn's blood glucose result and age in hours.

5.4.8. If infant is symptomatic and blood glucose is <40, initiate feeding immediately.

5.4.8.1. If infant is breastfeeding, assist with feeding and assess for infant latch and swallow.

5.4.8.2. Monitor blood glucose 30 minutes after feeding. Follow Neonatal Hypoglycemia Protocol, Appendix 1 and 2 to determine course of action based on results and age in hours.

5.4.9. Document within the Electronic Health Record (EHR) with **every** blood glucose check:

5.4.9.1. Glucose Result

5.4.9.2. Reason for glucose check (protocol versus change in condition)

5.4.9.3. Preprandial/postprandial (time of last feed)

5.4.9.4. Infant vital signs

5.4.9.5. Signs and symptoms of hypoglycemia

5.4.9.6. Feeding ability of the newborn

5.4.9.7. RN to Provider communication

5.4.9.8. Additional observations as needed

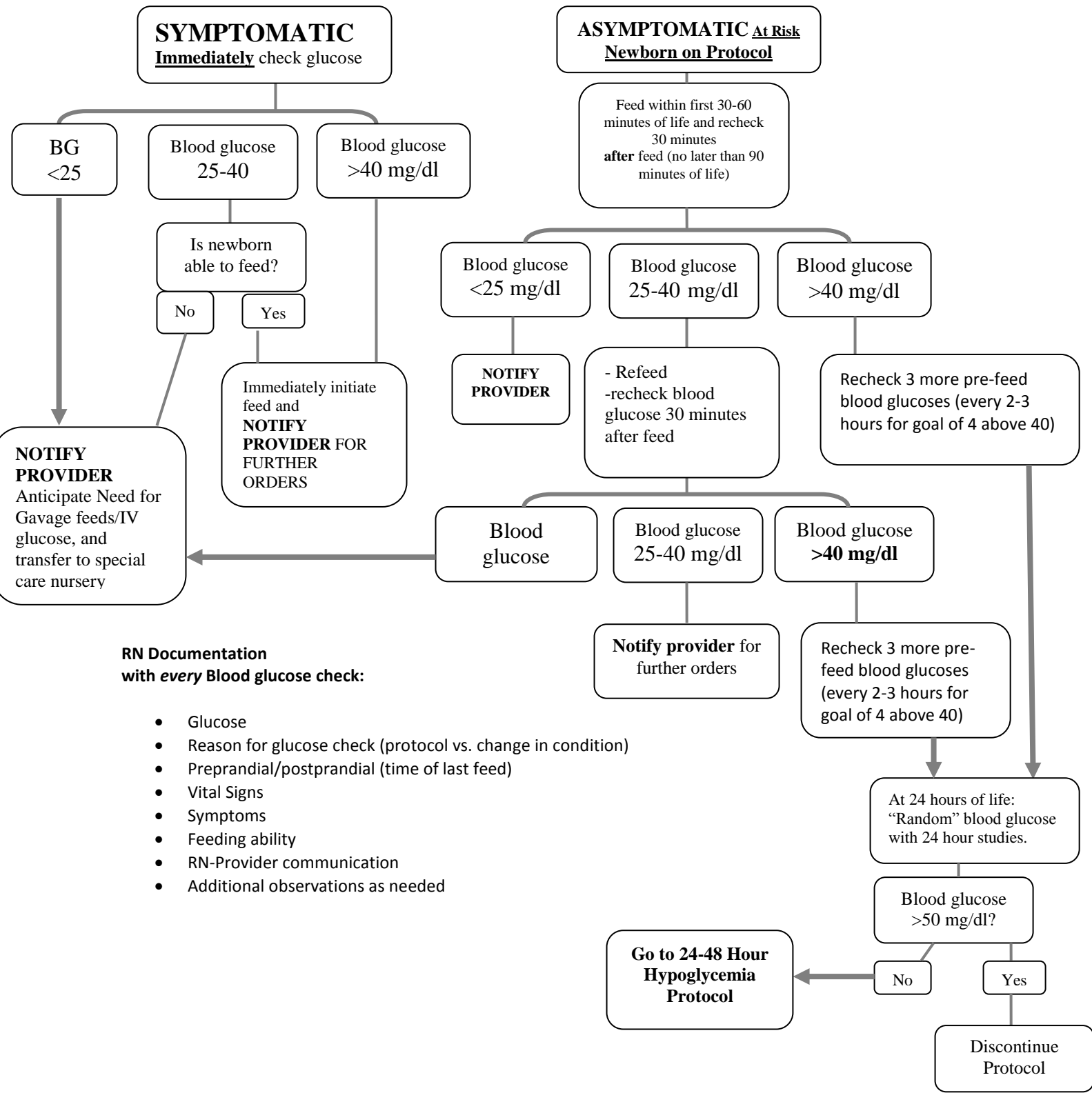
- 5.5. At risk infants must be fed within the first hour of life and screened 30 minutes after the feeding, no later than within 90 minutes of life (AAP, 2011).
- 5.6. Late preterm infants and infants who are small for gestational age should be fed every 2 to 3 hours (AAP, 2011).
- 5.7. Assess the infant for signs and symptoms of hypoglycemia at a minimum with each vital sign.
 - 5.7.1. Focused assessment should be paid to neurological signs and symptoms as avoidance and treatment of cerebral energy deficiency is principal concern (Lippincott, 2012).
- 5.8. If poor glucose control is documented, the provider must be certain that the infant can maintain normal glucose concentrations on a routine diet for an extended period (through at least 3 feed-fast periods) before discharge (AAP, 2011).
- 5.9. Provide caregivers with at-risk infants with educational materials on neonatal hypoglycemia.
 - 5.9.1. Assess caregiver's understanding of frequency of feedings
 - 5.9.2. Assess caregiver's understanding of signs and symptoms of hypoglycemia
 - 5.9.3. Assess caregiver's understanding of need to call before a feed to obtain blood glucose.
 - 5.9.4. Document caregiver teaching in patient's EMR.

6. Notify the provider immediately for the following:

- 6.1. Symptomatic newborn – at any age in hours.
- 6.2. Asymptomatic newborn, in the **first 24 hours of life**, with blood glucose $\leq 40\text{mg/dL}$ 30 minutes after feeding.
- 6.3. Asymptomatic newborn, in the **first 24 hours of life**, with blood glucose $< 25\text{mg/dL}$.
- 6.4. Asymptomatic newborn, **after the first 24 hours of life**, with blood glucose $\leq 40\text{mg/dL}$.

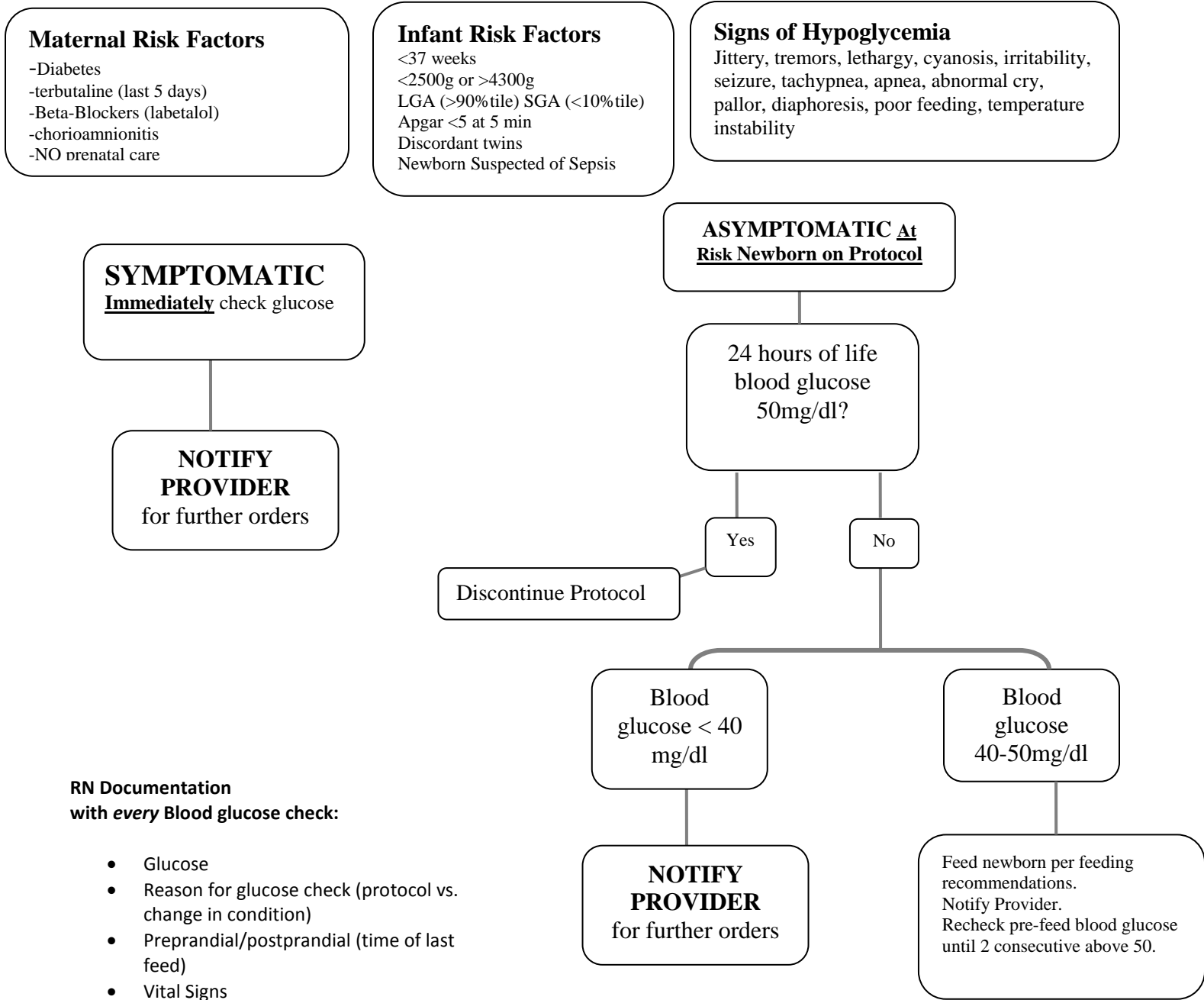
Appendix 1: Newborn Hypoglycemia Protocol (First 24 hours of Life)
ANMC Mother-Baby Unit – Newborn Hypoglycemia Protocol (First 24 hours of Life)

<p>Maternal Risk Factors</p> <ul style="list-style-type: none"> -Diabetes -terbutaline (last 5 days) -Beta-Blockers (labetalol) -chorioamnionitis/maternal infection -NO prenatal Care 	<p>Infant Risk Factors</p> <ul style="list-style-type: none"> <37 weeks or >42 weeks <2500g or >4300g LGA (>90%tile) SGA (<10%tile) Apgar <5 at 5 min Discordant twins Newborn Suspected of Sepsis 	<p>Signs of Hypoglycemia</p> <p>Jittery, tremors, lethargy, cyanosis, irritability, seizure, tachypnea, apnea, abnormal cry, pallor, diaphoresis, poor feeding, temperature instability</p>
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- RN Documentation with every Blood glucose check:**
- Glucose
 - Reason for glucose check (protocol vs. change in condition)
 - Preprandial/postprandial (time of last feed)
 - Vital Signs
 - Symptoms
 - Feeding ability
 - RN-Provider communication
 - Additional observations as needed

Appendix 2: Newborn Hypoglycemia Protocol (After 24 hours of Life) ANMC Mother-Baby Unit – Newborn Hypoglycemia Protocol (After 24 hours of Life)



Maternal Risk Factors

- Diabetes
- terbutaline (last 5 days)
- Beta-Blockers (labetalol)
- chorioamnionitis
- NO prenatal care

Infant Risk Factors

- <37 weeks
- <2500g or >4300g
- LGA (>90%tile) SGA (<10%tile)
- Apgar <5 at 5 min
- Discordant twins
- Newborn Suspected of Sepsis

Signs of Hypoglycemia

Jittery, tremors, lethargy, cyanosis, irritability, seizure, tachypnea, apnea, abnormal cry, pallor, diaphoresis, poor feeding, temperature instability

SYMPTOMATIC

Immediately check glucose

NOTIFY PROVIDER
for further orders

ASYMPTOMATIC At Risk Newborn on Protocol

24 hours of life
blood glucose
50mg/dl?

Yes

No

Discontinue Protocol

Blood glucose < 40 mg/dl

NOTIFY PROVIDER
for further orders

Blood glucose 40-50mg/dl

Feed newborn per feeding recommendations.
Notify Provider.
Recheck pre-feed blood glucose until 2 consecutive above 50.

RN Documentation with every Blood glucose check:

- Glucose
- Reason for glucose check (protocol vs. change in condition)
- Preprandial/postprandial (time of last feed)
- Vital Signs
- Symptoms
- Feeding ability
- RN-Provider communication
- Additional observations as needed