Purpose:
Registered nurses (RN) may initiate the protocol for Hypoglycemia Management of the Asymptomatic at Risk Infant as outlined in Hypoglycemia Screening section of Well-Baby Standing Order.

Order Type:
Provider-authenticated order to use the protocol.

Population:
All infants are assessed by a RN after birth to determine if they meet criteria for screening and management of postnatal glucose homeostasis.

The infant only needs to meet one of the following criteria to be identified as at risk for asymptomatic hypoglycemia following birth:
- Infant of a diabetic mother (IDM)
- Late-preterm infants (LPI) (34 to 36 6/7 weeks) - regardless of weight
- Small for gestational age (SGA) infants (< 10th %, based on the Fenton Growth Curve)
- Large for gestational age (LGA) infants (> 90th %, based on the Fenton Growth Curve)
- Infants with a family history of a genetic form of hypoglycemia
- Infants with suspected (e.g. microphallus, midline defects) or confirmed congenital syndromes associated with hypoglycemia (e.g. Beckwith-Wiedemann)

Any infant who is believed to be symptomatic for hypoglycemia will be screened and a medical provider notified of findings.
- Clinical signs of hypoglycemia may include jitteriness, cyanosis, seizures, apnea, tachypnea, weak or high-pitched cry, hypotonia, lethargy, poor feeding, and/or eye rolling
- **Any neonate who is symptomatic with a glucose of <40 mg/dL must be admitted immediately to the NICU/Special Care Nursery (SCN) for IV glucose and additional management**
- IV glucose management of an neonate with clinical signs of hypoglycemia should consist of an initial 10% dextrose bolus of 2 ml/kg and/or initiation of a D10 infusion at 40-80 ml/kg/day with follow-up glucose checks to occur frequently until hypoglycemia is resolved

Additional maternal/fetal conditions that may place the infant at risk for hypoglycemia and typically are accompanied by clinical signs include:
- Intrauterine growth restriction
- Perinatal stress
- Acidemia
- Hypoxia-ischemia
- Cold stress
- Sepsis
- Polycythemia
- Inborn errors of metabolism
Protocol:
When a patient is assessed and identified to have a risk for asymptomatic hypoglycemia, as outlined in above criteria, the RN may institute screening based on the risk. The RN follows this protocol:

Birth through 90 minutes of life:
1. Encourage all infants to go skin-to-skin with mother (or parent) as soon as possible after birth.
   a. Skin-to-skin is for both bonding and warmth. This time does not need to be interrupted in the asymptomatic and stable newborn prior to the first feeding being completed.
2. Facilitate and observe a feeding attempt within the first 60 minutes of life.
   a. This may include breast feeding, feeding hand expressed breastmilk via alternative feeding method if unable to latch, and/or feeding infant formula (minimum of 10-15 ml).
3. If breastfeeding is desired but mother is unavailable due to complications or general anesthesia, a support person or RN may feed the infant. The first feed may occur with a minimum of 10-15 mL of infant formula, which can be given via an alternative feeding method. Skin-to-skin and breastfeeding is then established as soon as mother is able.
4. Weigh infant on newborn scale by approximately 60 minutes of life. If feeding is occurring at this point, a weight is obtained and documented no later than 90 minutes of life.
5. Determine if hypoglycemia screening is needed in the asymptomatic infant by assessing if they meet one of the following criteria:
   a. **Weight in relation to gestational age (SGA and LGA)** as plotted on the Fenton Growth Chart. Screening will occur on any infant whose birth weight plots <10th percentile (SGA) or >90th percentile (LGA).
   b. Regardless of weight, screening will occur for **LPI (34 0/7 to 36 6/7 weeks’ GA); IDM; those affected by confirmed or suspected congenital syndromes associated with hypoglycemia or those with a family history of a genetic form of hypoglycemia**.

By 90 minutes of life through the end of screening:
1. If criteria for screening and management of hypoglycemia are met, then the RN initiates the protocol.
2. In following the protocol, staff should attempt to not unnecessarily disrupt the mother-infant relationship and breastfeeding.
3. A heel stick blood glucose is obtained 30 minutes after first feeding is completed or by 90 minutes of life.
   a. If the post-feeding timeline (i.e. 30 minutes post-initial feed or by 90 minutes of life) is not met in the delivery room, the infant should have a glucose level obtained prior to transfer from the labor floor regardless of time due to check.
4. Feeding frequency, blood glucose screening, and hypoglycemia management will occur per algorithm (refer to Figure).
5. Target glucose concentration in the asymptomatic newborn before each feed is ≥40 mg/dL at less than 4 hours of age, ≥45 mg/dL from 4 hours of age up to 24 hours of age, and ≥50 mg/dL from 24 to 48 hours of age.
6. The minimum duration of screening is determined by risk factor (refer to Figure). If an infant has more than one risk factor (e.g. is LGA and LPI!), screen for the longer duration if there is a discrepancy.
7. An order for glucose gel may be placed using the “manage orders” pathway. The glucose gel dose is 0.5 mL/kg administered via the buccal route in accordance with the algorithm in the Figure. NICU/Nursery team is notified per the algorithm or more frequently, if clinically indicated.
   a. No more than 4 *consecutive* doses of dextrose gel will be given
   b. No more than 6 doses of dextrose gel will be given in a 48-hour period.
8. If the newborn is symptomatic at any time and the glucose is <40 mg/dL, the NICU provider will be notified and the newborn will be transferred and admitted to NICU/Special Care Nursery for observation, evaluation, and administration of IV glucose as ordered.
Figure. Hypoglycemia Algorithm for the At-Risk Infant from Birth to 48 Hours of Age
HYPOGLYCEMIA PROTOCOL FOR THE ASYMPTOMATIC AT-RISK INFANT

Infant of a Diabetic Mother (IDM), SGA (<10th %), LGA (>90th %), Late Preterm Infant (LPI) (34 0/7-36 6/7 wks), family history of genetic hypoglycemia, congenital syndromes (e.g. Beckwith-Wiedemann) or dysmorphology suggesting a congenital syndrome associated with hypoglycemia (e.g. microphallus, midline defects)

Birth

Feed within 1 hour of birth;
check glucose 30 min after feed or by 90 minutes of life

Glucose < 25 mg/dL
Admit to NICU/SRC Nursery for IV glucose and further assessment.
Administer dextrose gel and offer feed prior to mandatory transfer.

Glucose 25-29 mg/dL
Page NICU / Nursery (SRC) to directly assess infant and determine, communicate, and document plan.
If decision is to re-feed, administer dextrose gel and re-feed.
Check glucose 30 minutes after feed.

Glucose 30-39 mg/dL
1. Dextrose gel to oral mucosa THEN start additional breast or bottle feed*.
   If breast fed and does not latch well, feed expressed milk or ≥ 10-15 ml of formula
2. Recheck bedside glucose 60 minutes after feeding is completed.
   Page the NICU/Nursery (SRC) team to directly assess if the newborn has completed 2 consecutive cycles and the glucose remains 35-44 mg/dL**.

Glucose ≥ 40 mg/dL
Recheck glucose prior to feeding, but no more frequently than every 2 hours.

Glucose ≥ 45 mg/dL
Recheck glucose prior to feeding, but no more frequently than every 2 hours.

Glucose ≥ 50 mg/dL
Recheck glucose prior to feeding, but no more frequently than every 2 hours.

4 hrs

Feed on demand, minimum every 2-3 hrs

Glucose < 35 mg/dL
Admit to NICU/SRC Nursery for IV glucose and further assessment.
Administer dextrose gel and offer feed prior to mandatory transfer.

Glucose 35-44 mg/dL
1. Dextrose gel to oral mucosa THEN start additional breast or bottle feed*. If breast fed and does not latch well, feed expressed milk or ≥ 10-15 ml of formula
2. Recheck bedside glucose 60 minutes after feeding is completed.
   Page the NICU/Nursery (SRC) team to directly assess if the newborn has completed 2 consecutive cycles and the glucose remains 35-44 mg/dL**.

Glucose ≥ 45 mg/dL
Recheck glucose prior to feeding, but no more frequently than every 2 hours.

24 hrs

Feed on demand, minimum every 2-3 hrs

Glucose < 35 mg/dL
Admit to NICU/SRC Nursery for IV glucose and further assessment.
Administer dextrose gel and offer feed prior to mandatory transfer.

Glucose 35-49 mg/dL
1. Dextrose gel to oral mucosa THEN start additional breast or bottle feed*. If breast fed and does not latch well, feed expressed milk or ≥ 10-15 ml of formula
2. Recheck bedside glucose 60 minutes after feeding is completed.
   Page the NICU/Nursery (SRC) team to directly assess if the newborn has completed 2 consecutive cycles and the glucose remains 35-49 mg/dL**.

Glucose ≥ 50 mg/dL
Recheck glucose prior to feeding, but no more frequently than every 2 hours.

48 hrs

Before discontinuing screening:
LGA infants ≥ 37 wks and IDM infants ≥ 37 wks must be screened for a minimum of 12 hrs
SGA and LPI infants must be screened for a minimum of 24 hrs
AND
Must have ≥ 2 consecutive values ≥45 mg/dl if screening up to 24 hours of age,
OR ≥ 2 consecutive values ≥50 mg/dl if still screening from 24-48 hours of age

*Consider alternate feeding methods for breastfed infants
**A third dose of dextrose gel may be given at this time while NICU provider is en route. No more than 4 consecutive doses of dextrose gel may be given.
No more than 5 doses of dextrose gel may be given in a 48-hour period.
NOTES:

- Normal glucose beyond 48 hours of age is typically >60 mg/dL
- If glucose remains <50 mg/dL after 48 hours of age without a clear etiology, admit to NICU for further evaluation, consider Pediatric Endocrinology consultation, and consider sending the following laboratory studies:
  - Central glucose
  - Insulin level
  - Free fatty acids
  - Hydroxybutyrate
  - Cortisol
  - Growth hormone
- Glucoses should be maintained >70 mg/dL (irrespective of hour of life) in an infant with a confirmed or highly suspected congenital form of persistent hypoglycemia (e.g. inborn errors of metabolism, panhypopituitarism, Beckwith-Wiedemann)
- A 4 to 6 hour fast will be performed prior to discharge for all neonates with a confirmed or highly suspected congenital form of persistent hypoglycemia with the goal of maintaining a glucose level of >60 mg/dL
- A 4 to 6 hour fast may be considered prior to discharge in all other at-risk neonates (e.g. without a confirmed or highly suspected congenital form of persistent hypoglycemia) who remain in this guideline for >48 hours, are difficult to wean from IVF, or at the discretion of the attending physician, with a goal of maintaining a glucose level of >50 mg/dL or >60 mg/dL (to be determined by the attending neonatologist), depending on the duration of the fast, the timing of the fast, and the underlying condition

National Guideline/Evidence for Practice: