MATERNAL CHILD HEALTH
Care Directive

Title:	Neonatal Glucose Monitoring and Management	Number:	CD-MC-010
Sponsor:	Senior Director, Women's and Children's Health Program	Page:	1 of 12
Approved by:	Health Authority Medical Advisory Committee	Approval Date: Effective Date:	Sept. 09, 2020 Nov. 09, 2020
Applies To:	Registered Nurses and Licensed Practical Nurses working in Labour and Delivery, Neonatal Intensive Care Unit (NICU), and Women and Children's Health Units		

Terms capitalized throughout this care directive are defined in Appendix A.

PREAMBLE

This care directive (CD) provides the order for Registered Nurses (RNs) and Licensed Practical Nurses (LPNs) employed in Labour and Delivery, Neonatal Intensive Care Units, and Women and Children's Health Units to monitor infant's blood glucose levels, and for RNs to treat Well "At Risk" Infants.

Note: See Policy Statement #2.1., 2.2. below for information about scope of practice for LPNs.

POLICY STATEMENTS

1. This CD provides RNs with the authority to implement the following care for the Well "At Risk" Infant (See Appendix C):
   1.1. Point of care testing with the glucose meter (See Appendix F).
   1.2. Implementation of the Management of Hypoglycemia Algorithm (see Appendix F).
   1.3. Administration of up to two doses of glucose liquid as per standardized dosing table (see Appendix D) into the infant's buccal mucosa (see Appendix E) as per the Management of Hypoglycemia Algorithm (see Appendix F).

2. The RN is autonomously authorized to determine the appropriateness of the implementation of this CD.

   2.1. The LPN is **not** autonomously authorized to implement this CD and therefore, must collaborate with the RN to determine appropriateness.

   2.2. If implementation is assigned to the LPN, the RN must verify that the LPN has the required competence to perform the intervention(s).

3. This CD **does not** apply to infants that are Unwell/Symptomatic or should not be fed infants.

   3.1. These infants must have individualized monitoring parameters ordered.

4. The physician/midwife must be notified when:

   4.1. Infant's clinical signs and symptoms appear to be different than the Point of Care Testing (POCT).

   4.2. Should not be fed infant is unwell or symptomatic.

   4.3. Infant's glucose is less than 1.8 mmol/L.

   4.4. Infants who have had any two POCT glucose results less than 2.6mmol/L despite treatment as outlined in Management of Hypoglycemia Algorithm (see Appendix F).

5. Infants cared for in Labour and Delivery, Neonatal Intensive Care Units (NICU), and Women and Children's Health Units must be assessed for the need to screen for Hypoglycemia.

   5.1. Infants with clinical signs of Hypoglycemia (symptomatic) are considered to be at higher risk for long-term neurological complications.

      5.1.1. It is critical to measure glucose levels to determine whether the signs disappear with the administration of sufficient glucose. If not, other diagnoses must be considered. (See Appendix B for clinical signs of Hypoglycemia)

> **Note:** Infants (especially preterm) may be Hypoglycemic even though they do not have symptoms.

6. Monitoring for, or treatment of Hypoglycemia does not require the transfer of the infant to any specific location.

7. Verbal consent must be obtained from the parents or guardians.

   7.1. An explanation of the procedure and monitoring guidelines (See Appendix C) must be provided when obtaining consent.

8. Frequent (on demand) breastfeeding must be encouraged for At-Risk Infants, as well as, those who are being formula-fed or supplemented.

   8.1. The volume of formula/supplement must be adjusted based on an infant's size, chronological age, and gestational age.

GUIDING PRINCIPLES

1. Blood glucose levels fall in the immediate period after birth.
   1.1. This physiological decrease is transient. In well infants, glucose levels normalize rapidly thereafter.
   1.2. Monitoring of an Unwell and Well Infant Who Can Feed and Is At Risk For Hypoglycemia it is important to ensure appropriate stabilization of glucose levels.

GUIDELINES

1. Infants should remain skin to skin (refer to IWK-1745 & NSHA MC-NB-001 Skin to Skin Contact (SSC) for Healthy Term Infants) in order to promote early and ongoing stabilization of blood glucose, unless separation is medically required.
   1.1. Whenever an infant requires monitoring of blood glucose, all procedures and treatment should be done while skin to skin and/or breastfeeding in order to decrease pain and stress for the infant.

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RELATED DOCUMENTS

Policies

IWK - 1745 & NSHA MC-NB-001 Skin to Skin Contact (SSC) for Healthy Term Infants

NSHA CL-SR-025 Client Identification.

NSHA IPC-RP-020 Hand Hygiene.

NSHA MC-GA-001, IWK - 1115 Infant Feeding

Brochures

A Parent's Guide to Skin-to-Skin Contact

Checking Blood Glucose of Newborn Babies

APPENDICES

Appendix A: Definitions

Appendix B: Clinical Signs of Hypoglycemia

Appendix C: Well Infants At Risk for Neonatal Hypoglycemia and Screening Instructions

Appendix D: Standardized dosing of oral glucose liquid (Insta-Glucose®)

Appendix E: Instructions for Preparation and Administration of Oral Glucose Liquid

Appendix F: Management of Hypoglycemia Algorithm

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Appendix A: Definitions

Hypoglycemia	Blood glucose level less than 2.6 mmol/L with a desired range of glucose values of 2.6 mmol/L to 6 mmol/L.
Well Infants Who Can Feed And Are At Risk For Hypoglycemia	Includes: Weight <10th percentile Small for gestational age (SGA) Intrauterine growth restriction (IUGR) Weight >90th percentile Large for gestational age (LGA) Infants of diabetic mothers (IDMs) Preterm infants <37 weeks GA All Infants born to mothers on any Labetalol. Late preterm exposure to antenatal steroids Umbilical cord arterial blood gas or infant capillary blood gas pH less than 7.1 and base deficit greater than or equal to 12mmol/L Metabolic conditions (e.g., CPT-1 deficiency, particularly in Inuit infants) Syndromes associated with Hypoglycemia (e.g., Beckwith-Wiedemann)
Unwell Infant	Infants with clinical signs of Hypoglycemia (symptomatic)

Appendix B: Clinical Signs of Hypoglycemia

Clinical Signs of Hypoglycemia
Infants with clinical signs of Hypoglycemia (symptomatic) are considered to be at higher risk for long-term neurological complications. It is critical to measure serum glucose levels to determine whether the signs disappear with the administration of sufficient glucose. If not, other diagnoses must be considered. Infants (especially preterm) may be Hypoglycemic, but they may be asymptomatic. There may be a clustering of episodic, clinical signs that include: • Tremors, jitteriness, seizures, eye rolling, limpness or lethargy • Apneic spells, tachypnea, cyanosis • Abnormal cry (high-pitched or weak) • Poor feeding • Hypothermia or episodes of sweating, sudden pallor • Cardiac arrest

Appendix C: Well Infants at Risk for Neonatal Hypoglycemia and Screening Instructions

Well Infants at Risk for Neonatal Hypoglycemia	Screening Instructions
• Small for gestational age (SGA) **(**See LGA and SGA weight graph below**):** weight less than the 10th percentile. • Preterm: less than 37 weeks gestation. • Intrauterine Growth Restriction (IUGR)	Screen every 3 to 6 hours for 36 hours. Screening may be discontinued after 24 hours in SGA and preterm infants when feeding has been established and blood glucose levels remain at ≥2.6 mmol/L
• Large for gestational age (LGA) **(**See LGA and SGA weight graph below**):** weight more than the 90th percentile. • Infants of Diabetic Mothers (IDM): both gestational and non-gestational diabetics regardless of the use of insulin.	Screen every 3 to 6 hours for 12 hours. Screening can be discontinued after 12 hours in LGA infants and IDMs when blood glucose levels remain ≥2.6 mmol/L,
Infants with a known family history of metabolic conditions associated with Hypoglycemia in the newborn period.	Screening every 3 to 6 hours for 24 hours.
Infants with midline facial defects.	Screen every 3 to 6 hours for 48 hours.
All Infants born to mothers on any Labetalol	Screen every 3 to 6 hours for 36 hours.
Late preterm exposure to antenatal steroids	Screen every 3 to 6 hours for 36 hours.
Umbilical cord arterial blood gas or infant capillary blood gas pH less than 7.1 and base deficit greater than or equal to 12mmol/L	Screen every 3 to 6 hours for 12 hours
Consideration of infants who are polycythemic (hematocrit 65% or higher).	Screen every 6 to 12 hours for 24 hours or until hematocrit is normal.
Note: All Unwell Infants and infants admitted to NICU/special care nursery are at risk for Hypoglycemia.	
Time frames are based on the minimum time of screening. If glucose levels are not within normal limits, screening would continue as per orders.	

LGA and SGA Weight Graph

10th and 90th percentile cut-offs for birthweight at term in Canadian infants				
Gestation (completed weeks)	Birth weight (g)			
	10th percentile		90th percentile	
	Male	Female	Male	Female
37	2,552	2,452	3,665	3,543
38	2,766	2,658	3,877	3,738
39	2,942	2,825	4,049	3,895
40	3,079	2,955	4,200	4,034
41	3,179	3,051	4,328	4,154
42	3,233	3,114	4,433	4,251

Source: Information Adopted from Canadian Paediatric Society. (Nov 2019). The screening and management of newborns at risk for low blood glucose [Position statement].

Appendix D: Standardized Dosing Of Glucose Liquid/Gel 40%

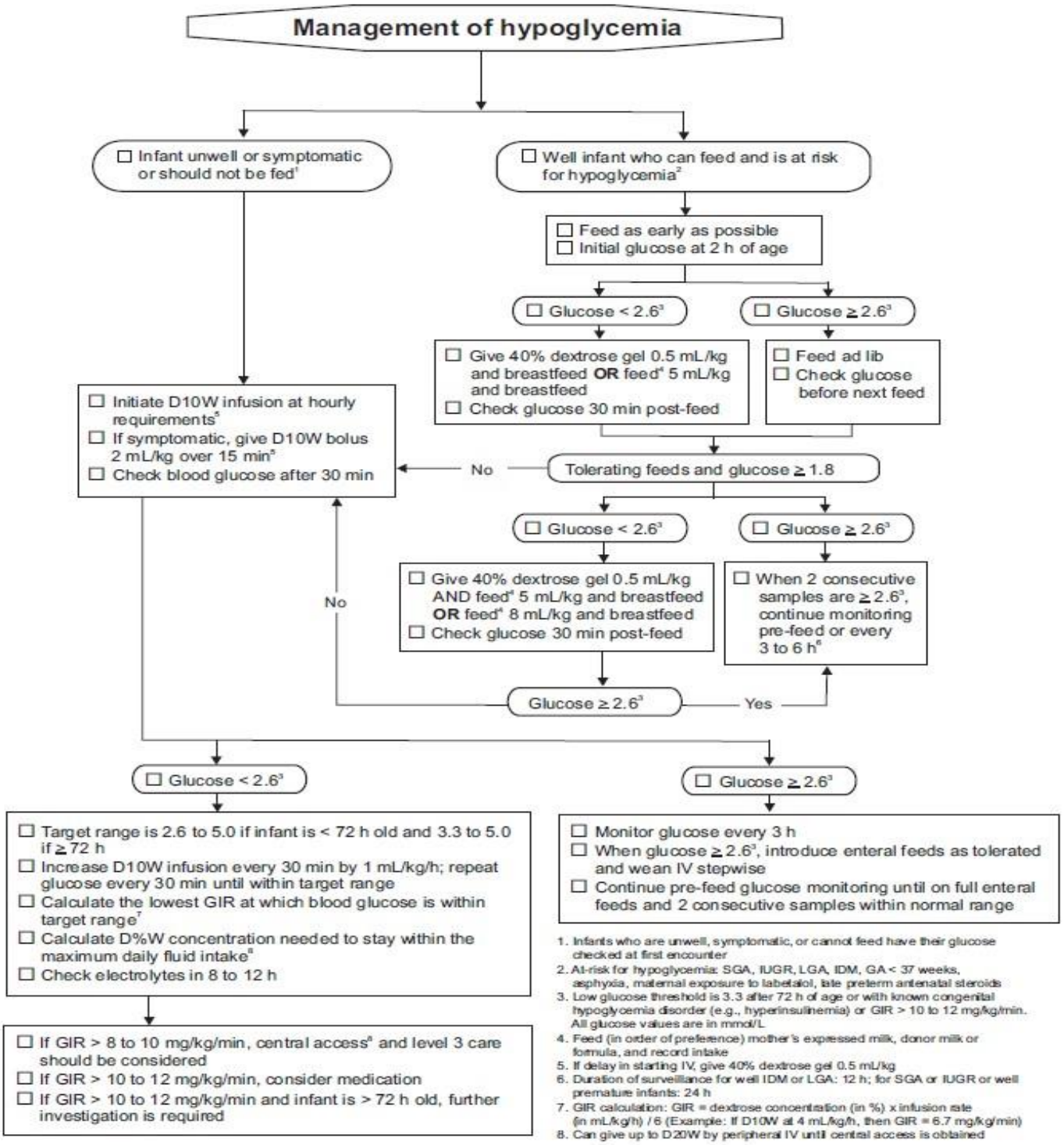
Dosing Formula
Intrabuccal 0.5 mL/kg of 40% dextrose gel

Appendix E: Recommended Procedure for Measuring Glucose Liquid/Gel

1. Obtain a 3 mL oral syringe and remove the plunger.
2. Squirt the glucose liquid/gel into the syringe and replace the plunger.
3. Adjust the liquid volume in the syringe to the appropriate volume (mL) for the dose ordered.
4. Give the dose by squirting approximately half the amount of the liquid into each cheek (buccal mucosa) and rubbing into the infant's cheek.
5. Ensure that infant is re-fed after the dose administered.
6. Once the glucose liquid tube is opened it must be labeled with the infant's label, date, and time opened. It can then be stored in the medication room in its plastic container for up to one hour after it has been opened.

Source: Adopted from IWK - 80.46 Guidelines for Neonatal Glucose Monitoring.

Appendix F: Management of Hypoglycemia



Abbreviations: Ca - calcium, D%W - %age dextrose in water (e.g., D10W = dextrose 10% in water), GA - gestational age, GIR - glucose infusion rate, h - hours, IDM - infants of diabetic mothers, IUGR - intrauterine growth restriction, IV - intravenous, K - potassium, LGA - large for gestational age, min - minutes, Na - sodium, SGA - small for gestational age

Sourced from (with permission to use): Narvey MR, Marks SD; Canadian Paediatric Society, Fetus and Newborn Committee. The screening and management of newborns at risk for low blood glucose: www.cps.ca/en/documents/position/newborns-at-risk-for-low-blood-glucose

District Health Authority Policies Being Replaced

GASHA 2-30 Hypoglycemia Monitoring of Newborns

Version History

Major Revisions (e.g. Standard 4 year review)	**Minor Revisions (e.g. spelling correction, wording changes, etc.)**
New Sept. 09, 2020	**2021-04-19** Made the two following clarifications: **Appendix A:** Definition for Well Infants who Can Feed and Are at Risk for Hypoglycemia was revised: Perinatal Asphyxia was deleted from the definition and '*Umbilical cord arterial blood gas or infant capillary blood gas pH less than 7.1 and base deficit greater than or equal to 12mmol/L'* replaced it for clarification. **Appendix C:** Perinatal Asphyxia was deleted from the table and '*Umbilical cord arterial blood gas or infant capillary blood gas pH less than 7.1 and base deficit greater than or equal to 12mmol/L'* replaced it for clarification.