

Document No: 56076

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TITLE: **Screening and Management of Neonatal Hypoglycaemia**

1. Purpose

- To effectively screen and safely manage a neonate at risk of hypoglycaemia.
- To prevent neurological sequelae in neonates at risk of impaired metabolic transition.
- To promote breastfeeding and minimise separation of mother and baby.

Low blood sugar concentrations are linked with brain injury and poor neurodevelopmental outcome. In newborns at risk, hypoglycaemia is most likely to occur in the first 24 hours of life, as the newborn adapts to extra uterine life with the risk declining in subsequent days (up to 72 hours in preterm infants). Altered electrophysiological measurements and poor long-term neurological outcome have been reported in infants with recurrent serum glucose levels <2.6 mmol/L. There is no physiological reason why brain glucose requirements should differ between term and preterm infants, or between the first and subsequent days of life. Hypoglycaemia that presents after the first day of life, or which persists or recurs, may indicate underlying disease.

2. Scope

All Lakes District Health Board. It is the responsibility of the midwife (core or lead maternity carer) to identify and document any risk factors for neonatal hypoglycaemia identified antenatally or found during initial examination or subsequently.

3. Definitions

EBM	Expressed Breast Milk
IV	Intravenous
IUGR	Intrauterine Growth Restriction as defined by gestational age and using GROW customised centile calculator (<10th centile and/or >95th)
SGA	Small for Gestational Age
SCBU	Special Care Baby Unit
UVC	Umbilical Venous Catheter

Hypoglycaemia Blood glucose level <2.6mmol/L (measured on Point of Care Monitor (Hemocue) and/or blood gas analyser).

4. Screening

For Screening and Management of Newborns at Risk of Hypoglycaemia Flow Chart – Refer to Appendix 1

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4.1 Screen all at-risk newborns to ensure appropriate recognition and treatment of hypoglycaemia. At risk newborns are identified in the table following:

Newborns at risk of Hypoglycaemia

- All newborns confirmed as IUGR as defined by gestation and using GROW customised centile calculator (<10th or >95th centiles)
- All newborn babies of diabetic mothers
- All newborns exposed to maternal medications
 - Beta-blocker
 - Sodium Valproate
 - Metformin
- All preterm newborns < 37 weeks
- Any newborns exhibiting/demonstrating the following signs and symptoms:
 - Abnormal feeding behaviour
 - Lethargy
 - Hypotonia (Poor tone)
 - Seizure activity
 - Hypothermia (<36.5°C)
 - Sepsis
 - Increased work of breathing including;
 - Use of respiratory accessory muscles,
 - Apnoea, Tachycardia, Stridor Grunting, Nasal flare, Tracheal tug.
- Severe intrapartum fetal distress
 - pH <7.1
 - Cord Lactate > 5.8 mmol/L
 - Apgar Score < 7 at 5 minutes

5. Monitoring

5.1 When to monitor:

A blood glucose level should be sampled no later than 2 hours after birth for all at risk newborns regardless of feeding, unless signs and symptoms present the need for earlier analysis.

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- 5.2 How to monitor:
In Rotorua Hospital please use the Hemocue Point of care analyser (Located in SCBU). In Taupo Hospital use the Point of care Glucometer, or iSTAT in Taupo Emergency Department.
- 5.3 For information on how to sample blood for glucose level monitoring refer to Appendix 2. For information on how to administer 40% Dextrose Gel refer to Appendix 3.

6. When Can You Stop Screening?

For all newborns at risk of hypoglycaemia demonstrating normal blood glucose concentrations ≥ 2.6 mmol/L discontinue hypoglycaemic screening after 12 hours and three consecutive blood glucose concentrations ≥ 2.6 mmol/L.

For all newborns at risk of hypoglycaemia with a recorded hypoglycaemic episode (< 2.6 mmol/L), monitoring must continue for a minimum of 12 hours and three consecutive blood glucose concentrations ≥ 2.6 mmol/L are achieved and infants are demonstrating well feeding behaviour.

If there remains the presence of signs and symptoms then blood glucose screening should continue until hypoglycaemia is no longer considered to be a risk.

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7. Maintenance of Optimal Serum Glucose Levels

Desired outcome	Recommended Best Practice
Maintenance of optimal serum glucose levels	Immediately after birth the baby should be dried and a hat put on. He/she should be placed in skin-to-skin contact with the mother to provide warmth and to facilitate the initiation of feeding within the first 30 minutes of life. Commence observations and assess necessary breastfeeding support, recognition of feeding cues and signs of effective attachment.
Supplementary feed volumes for the maintenance of optimal serum glucose levels	In the absence of sufficient EBM the use of formula milk as a supplementary feed is medically indicated and should be advised. Day 1 = 40mls/kg/day Day 2 = 60mls/kg/day Day 3 = 75mls/kg/day Day 4 = 90mls/kg/day Day 5 = 120mls/kg/day Day 6 = 150mls/kg/day
Maintain normal body temperature (36.6°C - 37.0°C)	Monitor baby's temperature 4 hourly or more frequently if needed. Maintain the temperature between 36.6-37.0°C. Skin-to-skin contact between mother and baby provides warmth as well as facilitating the initiation of breast feeding. If temperature drops below 36.6°C, apply woollens and wrap well, recheck the temperature at 30 minutes. Consider using an Inditherm heat mattress (refer to EDMS 649211).
Maintaining Lactation	If babies are in SCBU, mothers must be advised to express a minimum of 3 hourly using a double pumping method as breast milk is the safest and nutritionally most appropriate for newborns.
Management of reluctant feeding in infants >37 weeks to maintain optimal serum glucose levels	Referral to the Lactation Consultant must be completed. For Lactation consultant referral form, see Appendix 4. Aim to complete second feed 3-4 hours following birth. Was the second feed completed and did the infant feed effectively? If no, initiate active feeding plan.

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8. Active Feeding Plan

To empower parents of babies at risk of hypoglycaemia to serve as informed partners in their baby's care they should be provided with information that explains why their baby is being monitored, how to assess their baby's general condition and how to assess feeding cues and effective feeding.

Mothers should be provided with clear methods for escalating concerns to the health care team.

Active feeding plan	<p>Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour. Encourage mothers to recognise when their babies are ready to breastfeed, offering help if needed. Encourage the continuation of skin-to-skin contact.</p> <p>Monitor newborns. Observations should be completed no greater than 4 hours apart and more frequently if clinically indicated. Document colour tone, respiratory rate, temperature, alertness, number / consistency wet and dirty nappies.</p> <p>Complete breastfeeding assessment (within 6 hours after birth).</p> <p>Acknowledge, listen and document maternal concerns, provide support.</p> <p>Review feeding plan every 3 hours.</p> <p>Actively encourage breast feeding, offer feeds according to feeding cues at least 8-10 times in 24 hours until feeding is established. Then feed on demand.</p> <p>If breast feeding: express at least 8-10 times in 24 hours.</p> <p>Continue to provide EBM / nutrition and actively support until successfully breastfeeding. Supplementary feeds should be preferably administered via cup for all breast feeding infants.</p> <p>Use nipple shields, teats, lactaid's and pacifiers, where clinically indicated.</p> <p>In the absence of sufficient EBM the use of formula milk as a complimentary feed is medically indicated and should be advised.</p>
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9. Infusion Therapy (SCBU only)

A prolonged blood sugar level of < 2.0mmol/L is considered a neonatal emergency and urgent venous access should be considered. If unable to get peripheral venous access, an Emergency Umbilical Venous Catheter pack can be found in the Emergency Trolley in SCBU.

Hypoglycaemia requiring intravenous therapy should follow the Starship Hypoglycaemia in the Neonate guidelines (as below) and intravenous therapy should be prescribed as per the Newborn Services Clinical Guideline Glucose Calculator.

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Commence 10% dextrose infusion (4-9mg/kg/min)

Formula: Rate (ml/kg/day) / 144x glucose% =mg/kg/min

	Daily Fluid Volume	
	60 ml/kg/day	90 ml/kg/day
10% Dextrose	4.2 mg/kg/min	6.3 mg/kg/min
12.5% Dextrose	5.2 mg/kg/min	7.8 mg/kg/min
15% Dextrose	6.3 mg/kg/min	9.4 mg/kg/min

If BSL < 2.6 mmol/L – increase IV Dextrose solution stepwise until a glucose infusion rate of 9.4 mg/kg/min is reached.

If BSL > 2.6mmol/L Titrate 10% Dextrose solution to maintain Blood Glucose levels between 2.6 - 4 mmol/L. As Blood Glucose level stabilises, commence enteral feeds and titrate.

If BSL remains < 2.6 mmol/L proceed to further investigations.

10. Investigations

Investigations should be completed for any neonate with repeated, severe and persistent episodes of hypoglycaemia, i.e. <2.6 mmol/l, requiring more than 10mg/kg/min of glucose or lasting longer than 1 week (refer to Starship Hypoglycaemia in the Neonate guidelines).

11. References

This guideline is based on:

- Waikato's Screening and initial treatment protocol for babies at risk of hypoglycaemia 2018 -2021
- Starship's Hypoglycaemia in the Neonate guidelines
- Harris DL, Gamble GD, Weston PJ, Harding JE. What happens to blood glucose concentrations after oral treatment for neonatal hypoglycaemia? *J Pediatr.* 2017; 190:136-41.
- Weston PJ, Harris DL, Harding JE. Dextrose gel treatment does not impair subsequent feeding. *Arch Dis Child Fetal Neonatal Ed.* 2017:539-41.

12. Appendices

Appendix 1: Screening and Management of Newborns at Risk of Hypoglycaemia Flow Chart

Appendix 2: How to sample Blood Glucose Levels

Appendix 3: Administration of Dextrose Gel

Appendix 4: Lactation Consultant Assessment and Referral

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13. Related Documents

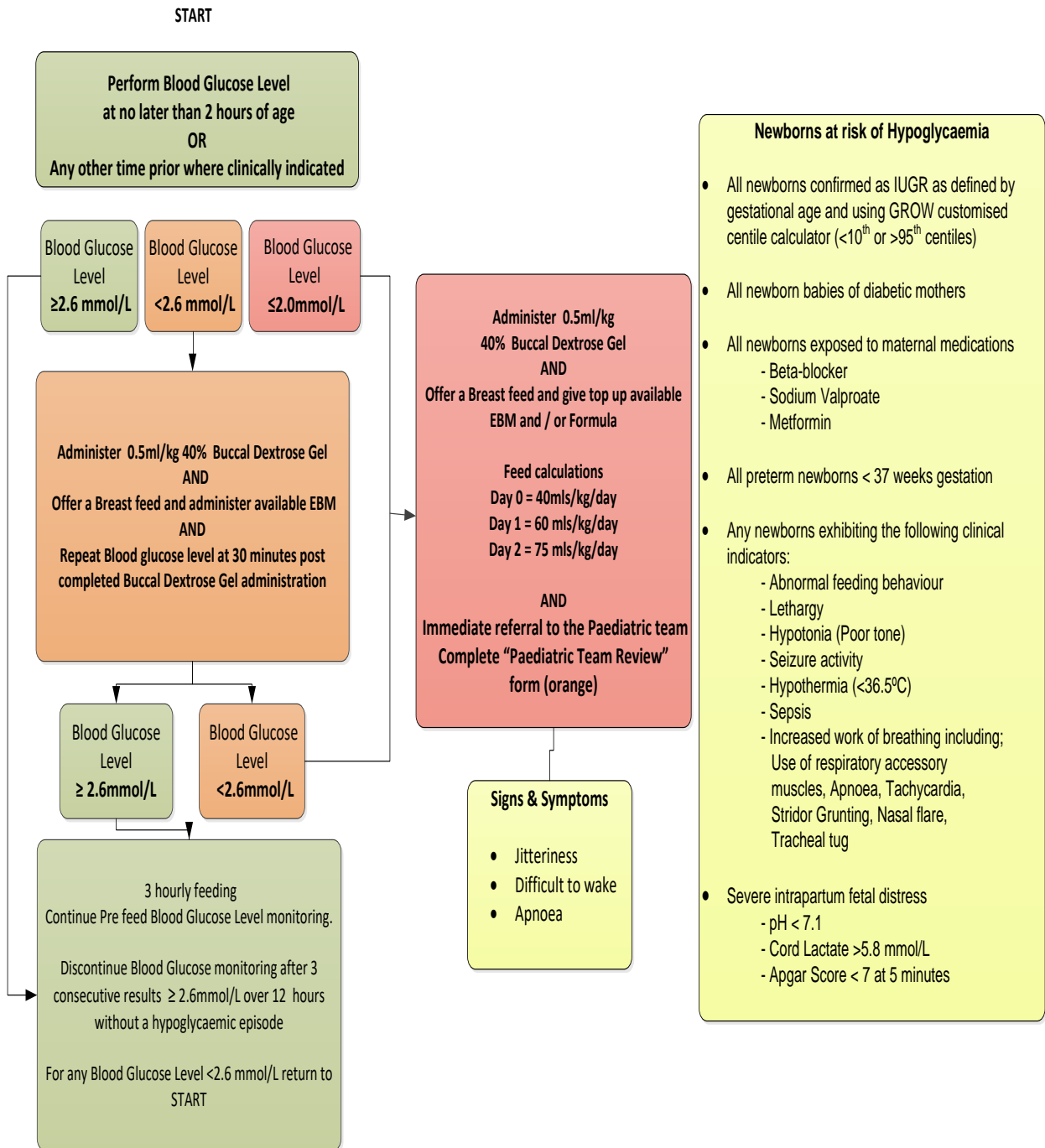
Lactation consultant Referral EDMS:
Clinical Pathway Support of the Unwell Mother
Postnatal Admission- Non-Maternity Ward

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Appendix 1 Screening and Management of Newborns at Risk of Hypoglycaemia

Place newborn's in skin-to-skin contact with their mothers immediately following birth for at least an hour
Encourage mothers to recognise when their babies are ready to feed
All newborn's at risk of hypoglycaemia should be encouraged to feed within 30 minutes after birth
Commence 4 hourly observations and complete a feeding chart
Document colour tone, respiratory rate, temperature, alertness, number/consistency wet and dirty nappies.



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Appendix 2 How to sample Blood Glucose Levels

HemoCue®
Glucose 201/ 201+
Glucose 201 DM

1. Wash hands with soap and water.
2. Dry hands thoroughly.
3. Peel back the adhesive strip on the test strip.
4. Prick the finger with the lancet.
5. Apply a drop of blood to the test strip.
6. Insert the test strip into the meter.
7. Wait for the result to appear on the screen.
8. Remove the test strip and dispose of it safely.

≤40 s

1(2)

1. Peel back the adhesive strip.
2. Prick the finger with the lancet.
3. Apply a drop of blood to the test strip.
4. Insert the test strip into the meter (x5-10).
5. Wait for the result to appear on the screen (x5-10).
6. Remove the test strip and dispose of it safely.

15 min

2(2)

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Orders 800.323.1674
Tech. Support 800.426.7256
Fax (Cust. Srv.) 800.333.7043

CE IVD

HEMOCUE®

900758 140521

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Appendix 3 Administration of Dextrose Gel

Recommended Best Practice

Dextrose gel is first line treatment for hypoglycaemia.

Indication	Management of hypoglycaemia in the first 48 h of life in babies ≥ 35 weeks' gestation with blood glucose concentration < 2.6 mmol/L.
Dose	0.5 ml/kg/dose via buccal route.
Formulation	Dextrose oral gel 40% 50 ml, gluten free. (Preservative: Citric acid) Suspending agent: carboxymethylcellulose sodium).
Administration	<ol style="list-style-type: none"> 1. Draw up dose (0.5 ml/kg) of dextrose 40% gel into an oral syringe. 2. Dry the oral buccal mucosa with gauze swab. 3. Place the dextrose gel onto a gloved finger; massage into the buccal mucosa. 4. Follow treatment with breast or EBM feed, or infant formula, in accordance with maternal wishes.
Storage	Always date and time the dextrose gel container when it is initially opened. Store at room temperature. Do not store in the fridge. Store away from heat, moisture, and light. 40% Dextrose Gel (Optimist Ltd) expires 14 days after opening.

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Appendix 4 Lactation Consultant Assessment

Month: _____



Lactation Referral

REFERRAL DETAILS		MOTHER'S DETAILS: (Label)	
Date Referred:		Name:	
Referred By:		DOB:	NHI:
Referring To:		Address:	
LMC:		Suburb:	
<input type="checkbox"/> Urgent <input type="checkbox"/> Semi <input type="checkbox"/> Non Urgent		City:	
<input type="checkbox"/> Inpatient <input type="checkbox"/> Outpatient		Post Code:	
Ethnicity:		Phone:	
REASON FOR REFERRAL:			
ASSESSMENT DETAILS			
Date of Consultation:			
Age of Baby:			
BF Status:	<input type="checkbox"/> Exclusive	<input type="checkbox"/> Fully	<input type="checkbox"/> Partial <input type="checkbox"/> Artificial
Obstetrician:	FVSQ: <input type="checkbox"/> Yes	<input type="checkbox"/> +ve	<input type="checkbox"/> -ve <input type="checkbox"/> No
GP:			
Smoking Status:	<input type="checkbox"/> Never	<input type="checkbox"/> Current	<input type="checkbox"/> Recently Quit
Current Medication/s:			
Medical Conditions:			
BIRTH DETAILS			
Drugs in Labour:			
Type of Birth:			
Complications:			
Breastfeeding History:			
Number of Children:			
Duration of Breastfeeding:			
MATERNAL ASSESSMENT			
Left Breast / Nipple		Right Breast / Nipple	

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Lactation Referral

B A B Y A S S E S S M E N T	INFANT ASSESSMENT	
	Birth Weight:	INFANT DETAILS: (Label)
	Ethnicity:	Name:
	Gestation at Birth:	DOB: <input type="text"/> NHI: <input type="text"/>
	Apgar's:	Address:
	Centile:	Suburb:
	SCBU Admission: <input type="checkbox"/> Yes <input type="checkbox"/> No	City: <input type="text"/> Post Code: <input type="text"/>
	Reason:	Parent/Guardian Name: <input type="text"/>
		Parent/Guardian Phone: <input type="text"/>
	BIRTH DETAILS	
Skin to Skin: <input type="checkbox"/> Yes <input type="checkbox"/> No Duration: <input type="text"/>		
1 st Breastfeed: <input type="checkbox"/> Assisted <input type="checkbox"/> Self Attached		
COMPLICATIONS		
Physical Exam and Development:		
Oral / Feeding Assessment:		
WEIGHT ASSESSMENT		
Date	Kgs	Comment
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
Outputs	Urine: <input type="text"/>	Stool: <input type="text"/>
Sleeping	Day: <input type="text"/>	Night: <input type="text"/>
Feeding	Length: <input type="text"/>	Frequency: <input type="text"/>
SUMMARY		
<input type="text"/>		
PLAN		
<input type="text"/>		
Follow Up By: <input type="text"/>		
Support Group: <input type="text"/>		
Feedback to Referring Health Care Provider: <input type="text"/>		
Lactation Consultant Signature: <input type="text"/>		
Inpatients email to LC.RefRotoruaHosp@lakesdhb.govt.nz		Outpatients email to Lakes.baby@lakesdhb.govt.nz

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