

Missed diagnosis of hypoglycaemia in newborn baby

1. On 8 August 2023, the Health and Disability Commissioner (HDC) received a complaint from Ms A about the care her newborn infant, Baby A, received from Health New Zealand | Te Whatu Ora Lakes District (Health NZ) before Baby A experienced a severe hypoglycaemic episode. Ms A raised concerns about Health NZ's monitoring of Baby A after her birth and a lack of support with breastfeeding at this time, and she has questioned why Baby A's blood glucose levels (BGLs)¹ were not checked earlier.
2. This case highlights the importance of clinical staff effectively screening and safely managing neonates at risk of hypoglycaemia. It also highlights the importance of clinical staff responding to parental concerns, recognising abnormal feeding behaviours, and being alert to and responding appropriately to newborns exhibiting concerning signs and symptoms.

Information gathered

3. In 2023, Ms A (aged 27 years) was pregnant with her second child (G4P1).² Her previous baby was born by elective Caesarean section (C-section) after unsuccessful induction of labour. Ms A remained well, and no concerns were identified. Screening for gestational diabetes via a glucose tolerance test was normal, and ultrasound scans taken over the course of the pregnancy showed normal anatomy and fetal growth. Ms A was under the care of lead maternity carer (LMC), community-based registered midwife (RM) B.
4. On 19 June 2023, RM B referred Ms A to Rotorua Hospital Maternity Unit at 38+5 weeks' gestation with two elevated BGL readings and intermittent headaches. Ms A was diagnosed with pre-eclampsia³ and was commenced on labetalol⁴ with a plan for her to remain in hospital overnight for regular cardiotocograph⁵ monitoring and for delivery when possible, either by induction of labour or C-section.
5. At 7.55am the following morning, an abnormal cardiotocograph was identified and reviewed by the Obstetrics Registrar, who consulted with the Obstetrics Senior Medical Officer regarding the need for intervention. This was discussed with Ms A, and an emergency C-section was arranged. Baby A was born at 9.38am and reviewed by the Paediatric Senior Medical Officer and Neonatal Nurse Practitioner. Clinical documents noted that Baby A's

¹ Blood glucose is the main sugar in the blood and the body's main source of energy. Levels are measured because too much or too little can cause damage and indicate illness.

² In her fourth pregnancy with her second baby.

³ A pregnancy complication categorised by high blood pressure and protein in the urine.

⁴ A beta-blocker to treat high blood pressure.

⁵ A technique to monitor fetal heartbeat and uterine contractions.

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Apgar scores⁶ were 9 at one minute post-birth and 10 at five minutes post-birth. Baby A had a largely normal initial examination.

6. Health NZ told HDC that midwifery staff document the maternal history on the Newborn Record form before the birth to inform the attending paediatric team. Health NZ said that RM B had completed the 'Family and Obstetric History' section of the form but that the form had not been updated to record that Ms A had been administered labetalol the day before.
7. No risk factors for hypoglycaemia⁷ were identified by the neonatal team when Baby A was born. Arterial and venous cord blood samples⁸ were taken from the placenta soon after birth for the purpose of identifying whether there had been any shortage of oxygen and resultant build-up of acid in the womb. Health NZ said there is no evidence that staff viewed these results while still in the operating theatre after the C-section.
8. At 11.10am, Baby A was transferred with Ms A to the postnatal ward for routine midwifery care. Upon transfer to the ward, Ms A and Baby A were cared for by registered nurses (RNs), not RMs. The clinical notes record successful breastfeeding on 20 June, noting 'audible swallows, deep latch.'
9. Health NZ said that electronic tracking of the viewing of the cord blood results shows they were reviewed by a paediatrician at 1.54pm on 20 June; however, the focus was on the blood gas results rather than the BGLs. The results were signed off without the low BGL reading being recognised. In its response to the provisional opinion, Health NZ said that BGLs are not a predictive risk factor for neonatal hypoglycaemia and therefore the usefulness of these results is unknown.
10. At 4.30pm, the RN caring for Baby A and Ms A documented that Ms A raised concerns that 'no one [was] checking on baby.' The RN documented that she reassured Ms A that Baby A was checked in the operating theatre and that another check would be done before discharge. Health NZ said that, at the time, staff had not identified any factors that warranted more frequent observations of Baby A.
11. On 21 June, Ms A began experiencing ongoing difficulty breastfeeding. At 9.15am, the RN documented that Ms A attempted to latch Baby A who took 'several suckles and stops and falls asleep.' Baby A's temperature, heart rate, respiration rate⁹ and oxygen saturation¹⁰ were normal. The RN returned at 9.45am and noted that Baby A was uninterested in feeding and took several suckles then went back to sleep. Clinical notes record that Ms A was

⁶ An assessment used to evaluate the health of a newborn using five criteria: appearance (skin colour), pulse/heart rate, grimace response (reflexes), activity (muscle tone), and respiration (breathing effort).

⁷ Low blood glucose/sugar.

⁸ Blood samples taken from the umbilical cord to provide a practical objective measurement of the neonate's condition at birth. Arterial cord blood provides information on the acid base of the neonate. Venous cord blood reflects both maternal acid-base status and placental function.

⁹ The number of breaths taken per minute.

¹⁰ The amount of oxygen being carried by the red blood cells.

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encouraged to express colostrum,¹¹ which was placed in Baby A's mouth to encourage her to suckle.

12. Baby A was reviewed at 10.15am and given 0.1ml of expressed breastmilk via a syringe and a further 1ml of expressed colostrum via finger feeding. She was again noted to be sleepy. Nursing staff checked Baby A at 1pm and recorded that she was sleeping and uninterested in breastfeeding, so a further 0.1ml of colostrum was expressed and given to her. At 1.35pm, Baby A was given 5ml of formula at the request of Ms A.
13. RM B visited Ms A at Rotorua Hospital at 2.10pm that same day.¹² RM B told HDC that Ms A was concerned that she did not have enough milk supply, and he offered to put through a referral to the lactation consultant. RM B recalls completing the lactation consultant referral, scanning it, and sending it to the lactation consultant service email address that afternoon. The Lactation Service Administrator has no record of having received the referral until it was re-sent by a night shift nurse at 12.10am on 22 June.
14. At 4.25 pm on 21 June, nursing staff reviewed Baby A, and breastfeeding was attempted. She was recorded to have taken only a few suckles, so 1.5ml of formula was given. Baby A's observations were all noted to be within normal range. At 5.20pm, she was checked again and noted to have stable vital signs; she was 'not jittery', and her breathing was not laboured, but she was still not feeding well. At 8pm, Baby A was assessed after a staff shift change. The retrospective clinical notes document that Ms A had raised concerns that Baby A had not been feeding well throughout the day. Attempts to breastfeed were unsuccessful because of Baby A's sleepiness.
15. At 9pm, the RN gave Baby A 20ml of formula via syringe. Clinical documents record that the RN noted Baby A to be 'floppy' and 'jittery'. A BGL test was performed, which showed a reading of 0.0mmol/L.¹³ An emergency call was made to the paediatric team, and Dextrose Gel¹⁴ was given. The on-call Paediatric House Officer reviewed Baby A and noted that she appeared floppy with poor colour, was jittery with seizures, and had poor respiratory effort. The BGL was retested and again showed a reading of 0.0mmol/L.
16. Baby A was transferred to the Special Care Baby Unit at Rotorua Hospital and later the Neonatal Intensive Care Unit at Waikato Hospital for management of severe hypoglycaemia. An MRI¹⁵ performed at Waikato Hospital revealed severe brain damage, likely due to hypoglycaemia.
17. Ms A recalls that she raised concerns with nursing staff several times throughout the day on 21 June, asking for Baby A to be given formula and questioning whether she was underfed because of the difficulties with breastfeeding.

¹¹ The first milk produced after birth; it is rich in nutrients and antibodies that support the newborn's immune system and overall health.

¹² Ms A and Baby A remained under the care of Health NZ.

¹³ Normal range for newborn babies is around 1.5–6mmol/L.

¹⁴ An oral gel used to treat hypoglycaemia.

¹⁵ Magnetic resonance imaging. This is a medical imaging technique that creates detailed images of the organs and tissues inside the body.

18. Health NZ told HDC that clinical responsibility for care of a mother and baby throughout their maternity journey can change and involve multiple parties with different roles. The care of Baby A included involvement from the Maternity/Nursing and Paediatric teams as well as involvement from Ms A's LMC.

Adverse event review

19. Health NZ conducted an adverse event review (AER) after these events and identified several issues that may have impacted the care provided to Baby A, including:
- Ms A's commencement on labetalol was not documented in the Newborn Record or identified as a risk for hypoglycaemia, which meant it was not shared at delivery with the Paediatric staff responsible for planning the ongoing care of Baby A.
 - There were national inconsistencies in the approach to screening neonates following administration of labetalol during pregnancy.
 - Baby A's reluctance to feed and her sleepiness were not identified as potential signs of hypoglycaemia.
 - There was no process for parental concerns to be escalated for Paediatric review, which meant that nursing staff acknowledged and responded to Ms A's concerns but that Baby A did not receive a medical review.
 - There were deficiencies in Health NZ guidance and forms in place at the time, including:
 - There was no specific place on the Newborn Record to prompt staff to document new maternal medical issues or medications administered during pregnancy.
 - The Newborn Observation Chart (NOC) and the Newborn Early Warning System (NEWS) were not in use, which meant there was no prompt or tool available for staff to document, score, and then escalate Baby A's feeding behaviour and sleepiness.
 - The Infant Feeding Record did not prompt staff to assess and record the quality of feeding to enable a change in pattern to be clearly seen or prompt consideration of further action.
 - There were issues with staff availability and training, including:
 - Health NZ's orientation of RNs and RMs on initial breastfeeding/infant feeding did not include assessment of current knowledge about management of an infant with poor feeding, particularly in reference to its Neonatal Hypoglycaemia Guideline.
 - Lack of staff education on the correct process for sending referrals for a lactation consultant.
 - Staffing and capacity issues in paediatrics.
 - Reliance on locums and issues with locum induction and orientation.
20. Health NZ accepted that Baby A 'most likely would not have suffered the brain injury if a blood sugar level had been checked earlier'.

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Relevant Policies

Screening and Management of Neonatal Hypoglycaemia Guideline (Neonatal Hypoglycaemia guideline)

21. The Neonatal Hypoglycaemia Guideline is in place to effectively screen and safely manage neonates at risk of hypoglycaemia. The guideline states that the following criteria indicate a newborn is at risk of hypoglycaemia:

‘All newborns exposed to maternal medications

- Beta-blocker

...

Any newborns exhibiting/demonstrating the following signs and symptoms:

- Abnormal feeding behaviour
- Lethargy
- Hypotonia (poor tone)
- Seizure activity
- Hypothermia
- Sepsis
- Increased work of breathing ...’

22. The guideline states that a BGL should be sampled no later than two hours after birth for all at-risk newborns, regardless of feeding, unless signs and symptoms indicate the need for earlier analysis. Screening should continue for a minimum of 12 hours and until three consecutive BGLs over 2.6mmol/L are achieved and the baby is demonstrating ‘well feeding behaviour.’

Response to provisional opinion

Ms A

23. Ms A was given an opportunity to comment on the ‘information gathered’ section of the provisional opinion, and her comments have been incorporated into the report where relevant.

Health NZ

24. Health NZ was given an opportunity to comment on the provisional opinion, and its comments have been incorporated into the report where relevant.
25. Health NZ said that whilst it always strives for the best possible standard of care, it considers that it ‘took reasonable actions to give effect to the patients’ rights’ and comply with its duties under the [Code of Health and Disability Services Consumers’ Rights (the Code)], on the basis that there were resource constraints/circumstances at the time. It said that it was difficult to implement improvement work due to facility refurbishment, ward relocation and constrained staff resource, in particular the shortage of midwives in the year leading up to this event. Health NZ added that this meant it was unable to release staff for education or introduce the new national NOC (incorporating the NEWS), which was a tool that would have assisted staff in thoroughly assessing a baby, escalating care and recognising early signs of hypoglycaemia.

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26. Health NZ said that various recommendations have been made by the Health NZ National Chief Midwife to address the workforce shortage in the sector, and it continues to participate in national and regional activities and the changes that have been suggested at the various stages of the process.

Opinion: Health NZ — breach

27. As a healthcare provider, Health NZ is responsible for providing services in accordance with the Code. As discussed below, Baby A was at risk of developing hypoglycaemia and was displaying behaviours that warranted screening in accordance with Health NZ policies. However, there were systemic issues at play that meant the relevant policies were not followed, and there were failings in the provision of care that ultimately led to a delayed diagnosis of hypoglycaemia.
28. On 19 June, Ms A was admitted to Rotorua Hospital because of high blood pressure, and she was commenced on a beta-blocker, labetalol. In accordance with the Neonatal Hypoglycaemia Guideline, this meant Baby A was at risk of developing hypoglycaemia, which indicated the need for regular observations and routine BGL monitoring within two hours of birth, the monitoring continuing for at least 12 hours and until three consecutive BGLs showed a result over 2.6mmol/L. However, the fact that Ms A had been commenced on labetalol was not recorded on the Newborn Record form because there was no prompt or designated space for documenting maternal medication, so it was not identified as a risk factor for Baby A. This meant that the paediatric staff did not have this information to hand when they planned the ongoing postnatal care of Baby A, which meant the care plan was for normal newborn care and did not include the need for BSL tests or the tests that should have been undertaken in line with the Neonatal Hypoglycaemia Guideline. Furthermore, though I note there is no consensus on whether abnormal glucose in the cord blood is a predictive risk factor for neonatal hypoglycaemia, the paediatric team were not aware of the low BGL recorded in the sample taken at birth, meaning the relevance of this could not be considered when determining the ongoing care plan of Baby A.
29. There were further missed opportunities to screen Baby A for hypoglycaemia when, at 9.15am on 21 June, she became reluctant to feed and was sleepy after successful breastfeeding the previous day. Routine checks were conducted throughout the day, with each check reporting that Baby A was sleepy and uninterested in feeding. The Neonatal Hypoglycaemia Guideline states that a newborn displaying abnormal feeding behaviour or lethargy should be monitored with hypoglycaemia screening. The RNs caring for Baby A over the course of the day incorrectly assessed these behaviours as normal and failed to recognise poor feeding and sleepiness as a prompt for further investigation, including a BGL.
30. I am also concerned that, although the RNs caring for Ms A responded to her concerns about breastfeeding and whether Baby A was being adequately fed, they did not appropriately escalate the matter, which meant no medical review of Baby A was undertaken. When viewed against the Neonatal Hypoglycaemia Guideline (Appendix A), Baby A was not receiving adequate levels of supplementary formula for the maintenance of optimal glucose

levels.¹⁶ While I note that Ms A's LMC put through a referral to the lactation consultant when visiting her on 21 June, the service did not receive it until a night shift RN re-sent it at 12.10am on 22 June. In my view, this was yet a further missed opportunity to escalate Baby A's care to an appropriate speciality to assist in the management of her declining condition and most likely avert the ensuing outcome.

31. As identified in Health NZ's AER, the above-mentioned failings were contributed to by deficiencies in the forms in place in the service at the time and the NOC and NEWS not being utilised. It identified that the Newborn Record form did not have a dedicated space for staff to document new maternal medication taken during pregnancy, which could have contributed to the failure to identify and record Ms A's commencement on labetalol as a risk factor for Baby A. Noting that the NOC and NEWS were not in use, there was also no guidance or process in place at the time for staff to document, score, and then escalate feeding behaviours and sleepiness; no process for staff to assess and record the quality of feeding to enable a change in pattern to be clearly seen; and there was no policy or guideline in place that required parental concerns to be escalated for medical review.
32. The care of Baby A was multidisciplinary and involved a number of different staff across different teams. As discussed above, staff failed to recognise the risk factors for and signs of hypoglycaemia, which resulted in missed opportunities to conduct BGL tests when Baby A's sudden disinterest in feeding and sleepiness developed.
33. I acknowledge the resource-constrained environment many maternity services, including the Lakes District, were experiencing in 2023. I also accept there has been an increasing reliance on RNs to provide postnatal care in many maternity units in more recent years¹⁷ because of midwife shortages, despite the professional training being different in some respects. This may have had some bearing on the situation that developed for Baby A. In saying that, I also consider Health NZ had a responsibility for ensuring appropriate clinical documentation tools were in place for recording relevant information and clinical staff were orientated to their use.
34. In my view, and supported in part by the findings of the Health NZ AER, the failings that occurred in this case were the result of deficiencies in Health NZ forms, the NOC and NEWS not being implemented, and gaps in staff training and education in relation to neonatal hypoglycaemia. Accordingly, I find Health NZ responsible for the shortcomings in care and find that it breached Right 4(1) of the Code for failing to provide services to Baby A with reasonable care and skill.

External Review of the Maternity Services

35. Health NZ commissioned an external review of its Maternity Service in September 2024 in response to a number of serious adverse events that occurred in the service in 2022/2023 and 2024. The purpose of the external review was to provide information and assurance that the maternity service was fit for purpose. The review highlighted several systemic issues impacting on the care provided to women over this period and reflected the need for

¹⁶ The guidelines state that babies should be supplemented with 60ml/kg/day. Over a 12-hour period on 21 June, Baby A was supplemented with less than 7ml of formula.

¹⁷ As occurred in this case.

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system-wide changes. Actions to remedy these shortcomings, with recommended changes, are in progress. There is an overlap in the introduction of changes specific to Ms A's case and those introduced in response to the external review.

Changes made

36. The AER identified a number of recommendations. Health NZ has advised that, since the events, the following recommendations have been implemented:

- Forms and guidelines at Health NZ have been updated to address the deficiencies identified in the AER, including:
 - The Newborn Record form has been amended to include a specific prompt and place for staff to document information on maternal medical issues and medications taken during the current pregnancy.
 - A new and more robust Infant Feeding Record Form was implemented in August 2023.
 - The laboratory now only reports clinically meaningful or relevant results on cord venous and arterial blood gases to assist with interpretation of results and reduce confusion about abnormal results that are not clinically relevant.
 - The Screening and Management of Neonatal Hypoglycaemia Guideline has been reviewed and updated to list labetalol as an example of a beta-blocker medication and include terms such as 'poor feeding', 'sleepy/lethargic', 'jittery', 'irritable', and 'poor tone/floppy' as indicators for newborns at risk of hypoglycaemia who should be screened in accordance with the guidelines. It has also been updated to include specific guidance on newborns who initially feed well and then become reluctant to feed.
 - The National NOC/NEWS (which prompts the inclusion of parental concerns and directs escalation to medical staff review within 30 minutes) were implemented at all Health NZ maternity facilities, including Lakes District on 16 August 2023, with ongoing auditing of compliance and clinical notes review and education occurring where issues are found. Additional education on the use of the forms has been provided to RNs.
- Further staff training and education has been provided:
 - Nursing and midwifery staff caring for neonates within Maternity Services received education about neonatal hypoglycaemia, with particular focus on effective breastfeeding, the new Infant Feeding Record, and NOC/NEWS to ensure critical thinking and early recognition of deviation from normal newborn feeding and behaviour.
 - Further education for paediatric staff on the new Infant Feeding Record to enable interpretation of nursing/midwifery documentation about feeding behaviour and about the detection and management of neonatal hypoglycaemia.
 - The content of the orientation for new midwives and nurses to the Maternity Service Infant Feeding Education session with the lactation consultant has been amended to include an assessment of knowledge about management of feeding issues,

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information about management of infants with poor feeding initially and over a duration of time, and the content of the Neonatal Hypoglycaemia Guideline, as a first line to inform assessment and how to access this.

- The content of the orientation for paediatric medical staff caring for neonates now includes education, via an e-Learning module, about the detection and management of neonatal hypoglycaemia.
- The lactation consultant now provides ongoing education about the updated Infant Feeding Record. The form is included with all maternity inpatient documentation packs, and each baby is now monitored in relation to their feeding.
- All midwifery and nursing staff are provided with and have access to information about how to access the email address menu for sending lactation referrals via the printer.

37. The external review into Lakes District Midwifery Services included a national recommendation to address the midwifery workforce shortages. This included support for new midwives, streamlining recruitment and retention processes, and implementing courses to support RNs who want to transition to RMs. The Lakes District Chief Medical Officer also wrote to the National Chief Midwife, regarding the national attention required on this matter.

Recommendations and follow-up actions

38. Acknowledging that Health NZ have actively engaged with Ms A's family to discuss the case review and provided apologies to the family, both in person and within the written review, and taking this into account and the changes that Health NZ have already made, I recommend that Health NZ provide a written apology to Ms A and her family for the failings identified in this report. The apology should be provided to HDC, for forwarding to Ms A, within three weeks of the date of this report.
39. Noting the nationwide midwifery workforce shortages and the steps already taken by Health NZ Lakes District to raise this issue at a national level, I will take this opportunity to request an update from Health NZ's National Chief Midwife on measures being taken at a national level to address this issue.
40. A copy of this report with details identifying the parties removed, except Health New Zealand | Te Whatu Ora Lakes District and Rotorua Hospital, will be placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

Rose Wall

Deputy Health and Disability Commissioner

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Appendix A: Lakes District Screening and Management of Neonatal Hypoglycaemia Guideline

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.