Hutt Valley District Health Board
Midwife, RM B
Obstetrician, Dr C

A Report by the
Deputy Health and Disability Commissioner

(Case 17HDC01547)

Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

Contents

Executive summary

1. This report concerns Hutt Valley District Health Board's (Hutt Valley DHB's) systems and processes, and the actions of an obstetrician and a midwife during a woman's labour and the birth of her baby in hospital. The baby was born by emergency Caesarean section. The Deputy Commissioner found both the DHB and the obstetrician in breach of the Code of Rights. She commented on the need for Hutt Valley DHB to ensure that it has in place appropriate staffing levels, policies that provide sufficient guidance, and equipment in good working order, so that staff are supported adequately to provide safe care.

2. The woman went into spontaneous labour when she was pregnant at term with her first baby. Cardiotocography (CTG) monitoring was commenced initially but was discontinued for three hours while she laboured in the birthing pool. After the midwife recorded a low fetal heart rate, CTG monitoring was restarted and obstetrics staff were consulted. The CTG trace showed a hypervariable fetal heart rate, but appeared to return to normal while the obstetrician was present.

3. The obstetrician decided not to proceed to a Caesarean section but instead allowed the woman more time to push. The CTG then deteriorated, and the midwife called the obstetrician back. The baby was delivered by emergency Caesarean section. The baby suffered severe brain damage due to oxygen deprivation and, tragically, passed away at six days of age.

Further information

4. In November 2018, Hutt Valley DHB commissioned an independent external review of its maternity services. The review identified several areas of risk that threatened the safety of the service, including a severe staff shortage, and made a number of recommendations. In June 2019, Hutt Valley DHB accepted the majority of these recommendations.

Findings

5. The Deputy Commissioner found Hutt Valley DHB in breach of Right 4(1) of the Code. In her view, a number of failings by Hutt Valley DHB and its staff represented a pattern of poor care. The Deputy Commissioner also found the obstetrician in breach of Right 4(1). The Deputy Commissioner was critical that the obstetrician did not adopt a more cautious approach and proceed to a Caesarean section when she first reviewed the woman.

6. The Deputy Commissioner was also critical that the midwife did not take regular observations while the woman was in the birthing pool, and for the delay in calling the obstetrician back.

Recommendations

7. The Deputy Commissioner recommended that Hutt Valley DHB report back to HDC on the amendments to its clinical procedures and implementation of the recommendations made in the external review; consider amending its policy on fetal scalp blood lactate testing; and provide a written apology.

8. The Deputy Commissioner recommended that the obstetrician provide HDC with a reflective statement on her learnings from this case and how she has educated staff about these, and provide a written apology.

Complaint and investigation

9. The Health and Disability Commissioner (HDC) received a complaint about the care provided to Mrs A during her labour and the birth of her daughter, Baby A — in particular, the care provided by RM B and obstetrician Dr C.[1] The following issues were identified for investigation:

- *Whether Hutt Valley District Health Board provided Mrs A with an appropriate standard of care in 2016.*
- *Whether RM B provided Mrs A with an appropriate standard of care in 2016.*
- *Whether Dr C provided Mrs A with an appropriate standard of care in 2016.*

10. This report is the opinion of Rose Wall, Deputy Commissioner, and is made in accordance with the power delegated to her by the Commissioner.

11. The parties directly involved in the investigation were:

Mrs A	Consumer
Mr A	Consumer's husband
RM B	Provider/self-employed registered midwife
Dr C	Provider/obstetrician
Hutt Valley District Health Board (DHB)	Provider

12. Further information was received from:

RM D	Self-employed registered midwife/ lead maternity carer (LMC)
Dr E	Obstetric registrar
RM F	DHB-employed registered midwife
Accident Compensation Corporation (ACC)	

Also mentioned in this report:

RM G	Midwife
Dr H	Senior House Officer (SHO)
Dr I	Senior Medical Officer paediatrician

[1] Complaints about RM B and Dr C were referred to the Commissioner by the Midwifery Council of New Zealand and the Medical Council of New Zealand (respectively) under section 64 of the Health Practitioners Competence Assurance Act 2003.

Dr J	Neonatologist
Dr K	Obstetrician and gynaecologist
Dr L	SHO

13. Independent expert advice was obtained from Registered Midwife (RM) Emma Farmer (**Appendix A**) and from obstetrician Dr Cindy Farquhar (**Appendix B**).

Information gathered during investigation

Introduction

14. Mrs A, 35 years old at the time of the events, became pregnant with her first child after undergoing in vitro fertilisation (IVF) treatment.[2] Mrs A booked RM D to be her LMC.

15. RM D worked with a group of midwives, including RM B. RM D told HDC that each midwife had a caseload of three to five women per month, and they worked on a roster with one weekend off per month. The midwife who is first on call for the weekend responds to urgent call-outs for the group and provides cover for the midwife who is having a rostered weekend off.

Antenatal care

16. Mrs A had her first booking appointment with RM D at approximately 10 weeks' gestation. Her pregnancy proceeded normally during her first trimester.

17. At 18+5 weeks' gestation, Mrs A and her husband, Mr A, went to the Emergency Department (ED) at the public hospital after Mrs A experienced dark brown vaginal discharge but no accompanying pain. She was discharged from hospital after examinations revealed nothing abnormal and no signs of an impending miscarriage.

18. At her next antenatal appointment, RM D documented that Mrs A had experienced no further bleeding since her visit to the ED. Mrs A's pregnancy proceeded normally during the rest of her second trimester.

19. At 40+1 weeks' gestation, Mrs A contacted RM D after experiencing extremely itchy feet overnight.[3] They met at the delivery suite later that morning. RM D commenced cardiotocography[4] (CTG) monitoring of the fetal heart rate (FHR) at 10.30am, took blood samples, and undertook a urinalysis. RM D discontinued CTG monitoring at 11am, after noting that overall there was a normal trace. RM D discussed Mrs A's blood test results with obstetric registrar Dr E, who was happy for Mrs A to go home.

[2] Medical techniques used to assist a woman to become pregnant.
[3] Itching on the soles of the feet can be a sign of a liver condition called obstetric cholestasis.
[4] Cardiotocography (CTG) monitoring is the combined monitoring of the baby's heartbeat in utero and the mother's uterine contractions. This allows for an interpretation of the fetal heart rate either alone or in relation to the contractions, and may be used to assist with the identification of fetal well-being and/or distress.

20. At 41 weeks' gestation, Mrs A met with RM D for a post-dates assessment at the Maternity Assessment Unit. RM D performed CTG monitoring of the FHR and noted an overall normal trace. She discussed induction of labour with Mr and Mrs A and documented that an induction had been booked.

Admission to hospital

21. Mrs A told HDC that her waters broke at about 6.30am the following day. Contractions began shortly thereafter. At 3.45pm, Mrs A was admitted to the delivery suite, where she met RM B. RM D told HDC that she took her rostered weekend off. RM B was the rostered on-call midwife for that weekend, and was the back-up LMC for Mrs A.

22. In the delivery suite, RM B recorded Mrs A's labour history and performed abdominal palpation and a vaginal examination (VE) with consent. RM B recorded that Mrs A's cervix was 5cm dilated and fully effaced,[5] and that the baby's head was in the right occipito posterior (ROP) position,[6] with the presenting part at station –1, or one centimetre above the ischial spines.[7] RM B recorded the FHR as 160[8] beats per minute (bpm) with no decelerations detected. She told HDC that she commenced CTG monitoring at 3.57pm to assess fetal well-being because 160bpm was "the higher end of the normal FHR range".

23. At 4.05pm, RM B recorded Mrs A's temperature, pulse, and blood pressure.

24. At 4.35pm, RM B recorded the FHR as 155bpm, with variability of 10bpm, accelerations to 175bpm, and small variable decelerations to 140bpm with a quick recovery to baseline. She noted: "Overall normal trace. Appears to be a sleepy trace in the last 10 mins." RM B told HDC that between 4.29pm and 4.45pm, she interpreted the CTG as showing a sleepy trace with reduced variability and shallow variable decelerations, but that she incorrectly documented that it was a normal trace. However, she said that she did not have concerns about fetal well-being at this time.

25. At 5.05pm, RM B documented: "Baby has woken up! FHR 140bpm, variability 10bpm+, accelerations ↑ 155bpm, 0 [decelerations], contractions 4:10 x 60 seconds. Overall normal trace."

26. At 5.14pm, RM B documented: "On CTG again — standing." RM B told HDC that the CTG was discontinued temporarily when Mrs A went to the toilet at 5.10pm. At 5.15pm, Mrs A had vomited 350ml and wanted a bath. RM B said that at this time Mrs A was distressed and moving frequently. RM B stated:

> "The CTG wasn't picking up the FHR well and [Mrs A] was becoming distressed as her labour was progressing quickly. [Mrs A] asked to go into the bath and given the

[5] Thinned or stretched.
[6] The back of the baby's head is faced towards the mother's spine. This is a common malpresentation with the potential to cause a slower or obstructed labour.
[7] "Station" is an assessment that determines the descent of the fetal head through the woman's pelvis, using the ischial spines as an anatomical mark. The station is measured in centimetres above (negative) or below (positive) the ischial spines.
[8] A normal fetal heart rate is between 110–160bpm.

previous normal trace between 1645hrs and 1710hrs and otherwise normal pregnancy, except for IVF treatment initially, I felt it was reasonable at this time to discontinue the CTG and commence intermittent auscultation. The CTG between 1714hrs and 1719hrs reflects frequent maternal movement and distress, vomiting and consequent loss of contact due to these factors. Again, I acknowledge I might more clearly have documented this in [Mrs A's] maternity record."

Monitoring in birthing pool

27. Hutt Valley DHB's "Water Birth — Caring for women who wish to labour and birth in Water Policy" (the Water Birth Policy) provides (emphasis in original):

"**Observations/fluid**

- Baseline observations: temperature, pulse, blood pressure and fetal auscultation need to be taken and documented prior to entering the pool then as per protocol for monitoring maternal wellbeing and FHR.
- Maternal temperature and pool temperature need to be taken hourly."

28. RM B began filling the birthing pool at 5.15pm. CTG monitoring was discontinued at 5.19pm, and Mrs A entered the pool at 5.25pm. RM B did not record Mrs A's temperature, or the temperature of the birthing pool, at this time.

29. RM B then monitored the FHR by intermittent auscultation. The RANZCOG[9] Guideline on Intrapartum Fetal Surveillance (2014) (the RANZCOG Guideline) sets out the standard for intermittent auscultation, and recommends that FHR auscultation in labour should be undertaken and documented:

- every 15–30 minutes in the active phase of the first stage of labour; and
- after each contraction or at least every five minutes in the active second stage of labour; and that
- each auscultation episode should commence toward the end of a contraction and be continued for at least 30–60 seconds after the contraction has finished.

30. At 5.40pm, RM B auscultated the FHR using a Doppler[10] fetal monitor, and recorded it as 150bpm with no decelerations heard. RM B told HDC that she listened to the FHR for one minute immediately following a contraction each time she auscultated the FHR.

31. At 6.05pm, RM B recorded the FHR as 165bpm with no decelerations heard. She noted that Mrs A's contractions were intensifying.

32. At 6.25pm, RM B recorded the FHR as 160bpm with no audible decelerations.

[9] Royal Australian and New Zealand College of Obstetricians and Gynaecologists.
[10] A Doppler is a hand-held ultrasound transducer used to detect the FHR.

33. At 6.55pm, RM B recorded the FHR as 160bpm with no detected decelerations. She also noted that Mrs A was feeling an intense "pushy feeling", and that RM B advised Mrs A "to do as her body tells her".

34. At 7.02pm, RM B noted that Mrs A was not sure whether or not to get out of the bath, and whether or not to push. A VE was undertaken, and RM B noted that Mrs A was 9cm dilated, and also documented: "vertex @ –1 ↑ spines — station 0." Mrs A decided to stay in the birthing pool.

35. At 7.30pm, RM B performed another VE with consent. She noted that Mrs A's cervix had dilated further and that there was a "very small anterior lip felt — only 2–3mm". RM B advised Mrs A not to push unless she felt "an overwhelming urge". The FHR was documented as 160bpm with no decelerations.

36. At 7.55pm, RM B documented the FHR as 155bpm with no decelerations, and that Mrs A's contractions were three every ten minutes. At 8.05pm, RM B documented the FHR as 155bpm with no decelerations. She noted that Mrs A was pushing with each contraction, and suggested undertaking another VE "to make sure the anterior lip [was] out of the way".

37. At 8.12pm, RM B documented the FHR as 150bpm.

Emergency bell

38. RM B told HDC that at 8.20pm she performed a VE and noted that Mrs A was fully dilated. After performing the VE, RM B heard the FHR at 80bpm, and immediately asked Mrs A to move to the bed. RM B recommenced CTG monitoring and rang the emergency bell. She said that she was concerned about fetal well-being at that point, and she remained concerned throughout the CTG monitoring.

39. At 8.24pm, Dr E, RM F, and RM G responded to the emergency bell. RM F documented the FHR as 135bpm and the maternal pulse as 100 at 8.24pm, but noted that the FHR had been 112bpm earlier. She also noted that it was difficult to differentiate the FHR from the maternal pulse.

40. Dr E did not document contemporaneously, but wrote retrospective notes the following morning. She recorded that she interpreted the CTG as showing a baseline that was difficult to determine, increased variability, and four contractions every ten minutes.

41. RM B told HDC that Dr E applied a fetal scalp electrode[11] (FSE) "to obtain a readable CTG". RM F and RM G then left the room. Dr E told HDC that she and RM B placed Mrs A in the left lateral position.

42. At 8.33pm, RM B recorded that Mrs A was "pushing well". RM B recorded the FHR as 97bpm, and noted that the trace was "difficult to interpret". RM B directed Mrs A to push, and explained to HDC that at the time she "considered the baby needed to be born as

[11] A device that is placed directly on the fetus in utero to monitor the FHR.

soon as possible" and that "[t]he only way this could happen at that point was by maternal effort".

43. RM B told HDC that by 8.35pm she "had significant concerns about the fetal wellbeing given the very unusual CTG trace" and she "requested a fetal blood sample be taken". She stated: "[T]he Consultant Obstetrician who could do the fetal blood sample was not on site and was called again at my request to attend [Mrs A] at 2044hrs".

Call to obstetrician

44. Dr C told HDC that she was working as the on-call obstetrics and gynaecology consultant. She said that at approximately 8.44pm, she was called at home by Dr E regarding "concerns on interpreting the CTG for [Mrs A's] baby". Dr E told HDC that Dr C advised her to "place an intravenous (IV) line, take bloods for a full blood count, group and hold and commence IV fluids, and to stop [Mrs A] from pushing". In response to the provisional opinion, Mr and Mrs A told HDC that they were not informed of Dr C's advice for Mrs A to stop pushing.

45. At 8.44pm, RM B documented that the CTG was recovering but "still hard to interpret". She noted that a VE was performed and that Mrs A was fully dilated with the baby's head at the level of the ischial spines, or station 0. However, Dr E recorded retrospectively that the baby's head was higher at "–2/–1 [station –1/–2]".

46. Dr E told HDC that a few minutes after her initial call to Dr C at 8.44pm, Dr C "made the decision to come in to assess the situation herself". Dr C told HDC: "[Dr E was] concerned that there were further decelerations on the CTG and she wanted me to [be] present."

47. At 8.48pm, Dr E placed an IV line to administer fluids to Mrs A. At 8.57pm, Dr E performed a VE, and RM B noted: "[B]aby still above spines." Dr E recorded retrospectively that the baby's head was at "station –1". She noted that she explained to Mrs A that the "baby [was] not low enough to deliver vaginally" and that "[i]f [there was] ongoing fetal distress [she] may require LSCS[12]".

48. At 9pm, a midwife administered Mrs A 150mg of ranitidine.[13]

Review by Dr C

49. Dr C documented her notes retrospectively at 11.50pm that night. She recorded that on her arrival at 9.10pm, Mrs A was 10cm dilated and the FHR was around 150bpm, with variability greater than 10bpm. Dr C noted: "[N]on hypoxic[14] on review 20 min prior — hypervariable FHR[15]. In room 15 mins CTG had improved." Dr C documented that she

[12] Lower segment Caesarean section.
[13] A medication that reduces stomach acid.
[14] "Non-hypoxic" indicates adequate levels of oxygen in the tissues and cells of the body.
[15] The RANZCOG Guideline defines normal FHR variability as 6–25bpm.

performed a VE at 9.25pm and that the baby was at station 0, deflexed,[16] and in the OP position.

50. Dr C told HDC that she reviewed the CTG taken at 8.21pm and "found it hard to interpret … [but] realised that something abnormal had occurred", so initially she offered Mrs A a Caesarean section. However, while "the baby was not in the ideal position", Mrs A was "contracting very well and the LMCs looking after her felt that she was making adequate progress". Dr C said that therefore she offered Mrs A more time to push, and Mrs A agreed with this option. Dr C said that at this stage, she "interpreted the CTG as non-reassuring but not hypoxic because it had returned to [the] baseline rate". Retrospectively, Dr C recorded that RM F was "keen for [Mrs A] to try standing → squatting to see if further descent of fetal head".

51. RM B told HDC that she remained concerned about fetal well-being at this point, but was unsure how to interpret the trace, as she had "never seen hypervariability before". She said that she had asked Dr C if they could take a fetal blood sample (FBS)[17] to assess fetal well-being, but this was not done. Dr C told HDC:

> "[I did not undertake an FBS because] the CTG I reviewed at 2110 identified that it was abnormal but non-hypoxic as the baseline rate had been maintained at 145 beats per minute. I felt that this was acceptable for a second stage of labour CTG. We had introduced lactate monitoring for FBS in the unit, however at the time we were experiencing problems with the graduation of the machines and I felt that the CTG trace, at the time, was non-hypoxic and I therefore deferred performing a FBS."

52. Dr E recorded retrospectively that at the time of Dr C's review, Mrs A was having four contractions every ten minutes. Dr E told HDC that a discussion took place between Mr and Mrs A, RM B, and RM F about the mode of delivery, including a potential instrumental delivery[18] or a Caesarean section. However, Dr E noted:

> "[RM F] was in the room with [RM B] at 2130 and [RM F] was very keen for the patient to try different positions, and demonstrated squatting positions to those in the room, to see if [Mrs A] could achieve a vaginal delivery."

53. Dr C told HDC that RM F was "very positive that a normal vaginal delivery could be accomplished and was keen to give [Mrs A] a chance at achieving this". In response to the provisional opinion, Mr and Mrs A told HDC that they observed that Dr C did not seem comfortable with RM B wanting to continue with vaginal delivery, but that Dr C accepted this recommendation.

54. Two independent reviews of the CTG noted that between 8.24pm and 9.10pm the CTG showed marked hypervariability and frequent contractions of five to six every ten minutes (reviews of the CTG are discussed further below).

[16] The baby's neck and head were extended upwards.
[17] A sample of blood from the fetal scalp.
[18] Delivery using forceps or a vacuum cup to achieve a vaginal birth.

55. Dr E's retrospective notes record the plan made following Dr C's review as: "[A]llow 20 mins further pushing as CTG has normalised, however will likely require LSCS if head still high." Dr C told HDC that "[t]he plan was … to reassess around 2145", but this was not documented in the clinical notes. In response to the provisional opinion, RM B stated that no specific time was indicated for the reassessment.

56. RM B also told HDC:

> "I anticipated that [Dr C] would take [Mrs A] to theatre for an instrumental birth or emergency caesarean section once she was present. However, following her review at 2110hrs she offered [Mrs A] a further 30 minutes of active pushing. I was reassured by this offer, and the ACMM [RM F] was very encouraging that [Mrs A] should try pushing in different positions, so I was further reassured that the CTG trace was acceptable to continue labouring."

57. RM F told HDC: "[Dr C] was happy for [RM B] and myself to assist [Mrs A] with mobilising to encourage baby's head to descend."

Dr C and Dr E leave delivery suite

58. Dr E told HDC that she and Dr C left the room at about 9.35pm. Dr E stated:

> "[T]he CTG appeared to have improved over the prior 15–20mins but hypervariability[19] previously noted, with a plan to review in 20–30 minutes … We requested the midwife contact us with any further deterioration in the fetal heart rate pattern in the interim."

59. In response to the provisional opinion, RM B told HDC that Dr C and Dr E did not leave the room until 9.40pm at the earliest. She added that Dr C said that she would be "just in the office".

60. Dr C told HDC:

> "I verbalised my concern on the previous non-reassuring CTG tracing and my intention to return within 15 minutes to check on her progress. As per normal protocol, I expected that I would be contacted as soon as there were any concerns, in particular because the LMCs knew that I wasn't happy with the previous CTG trace. There is an on call phone and all obstetricians' numbers are available in the delivery suite."

61. At 9.30pm, RM F documented that she assisted Mrs A to change position to kneeling over the back of the bed. RM F recorded the FHR as 135bpm and noted that Mrs A was pushing with each contraction.

62. At 9.50pm, RM F documented that Mrs A was on the toilet with the CTG running on battery. RM F recorded the FHR as 136bpm. She told HDC that she left the room, possibly

[19] Above the normal range of FHR beat-to-beat variability (6–25bpm).

after 9.50pm (although she does not recall exactly), to prepare a lactate trolley if needed as RM B had asked about a lactate.

FHR deterioration

63. At 9.55pm, RM B recorded:

> "FHR 125bpm, late [decelerations] on trace — ↓95bpm but with the same large variability as before — 35bpm. Contractions continue 4–5:10[20]."

64. RM B told HDC:

> "[In retrospect] it is clear that the CTG deteriorated from approximately [9.35pm]. However at the time this seemed to be a return to the trace we had seen previously, which [Dr C] had sighted and signed off on."

65. RM B said that she did not consider the CTG trace to be normal or reassuring at the time. She stated that at about 9.55pm the CTG "clearly showed late decelerations which were starting to not return to baseline". She told HDC:

> "I left the room to go to the office and locate [Dr C], only to find the Delivery Suite office empty. I returned to [Mrs A's] room, checked the CTG again and felt panicked as I needed to be with [Mrs A], but wanted to get help. In retrospect I should have rung the emergency bell again at this time, and this resulted in a small delay in getting [Dr C] back to the room. I paged and spoke to [Dr E] at approx. 2203hrs who said she and [Dr C] were on their way up from ED."

66. At 10.03pm, RM B recorded: "[FHR] 100bpm, late [decelerations], not recovering. Paged [obstetrics and gynaecology team]."

Reassessment by Dr C and Dr E

67. Dr E told HDC that after leaving Mrs A's room, she and Dr C received a call from the Emergency Department about a gynaecology admission. Dr E stated: "[Dr C] accompanied me to ED to review this patient as we felt that she may require operative intervention."

68. Dr E received the page from RM B while in the ED, although she was unable to confirm the time it was received. Dr E told HDC that Dr C spoke with RM B, who informed Dr C that the FHR was showing "late decelerations not recovering". Dr E said that they immediately returned to assess Mrs A.

69. Dr C stated: "I had anticipated that the review in ED would be around 15 minutes but it took longer than anticipated." She said that RM B's page was received at 10.05pm, and that they returned immediately. Dr C assessed the CTG and noted that it was "clearly pathological and a Category 1 Caesarean section[21] was initiated immediately".

[20] Four to five contractions every ten minutes.

[21] In New Zealand, Caesarean sections are classified into different categories according to urgency. Category 1 refers to an immediate threat to the life of the woman or the baby.

Emergency Caesarean section

70. Dr C told HDC that Mrs A was transferred to the emergency theatre in the left lateral position. Dr C noted: "Labour ward staff were minimal and given the urgency of delivery I pushed the bed there myself." She stated: "[N]o intrapartum tocolysis[22] for resuscitation was initiated as this was not routine practice at [the hospital] at the time of this case and no guideline, or medication was available."

71. RM B told HDC: "Although a DHB midwife was not present going to theatre with [Mrs A], this did not impact on her care as I remained with her providing care."

72. Dr E told HDC that Mrs A arrived in theatre at 10.20pm. Dr E documented retrospectively that the paediatrics team was notified, but not who notified the team. The risks of Caesarean section were discussed with Mrs A, and she gave verbal consent to the procedure. She was given a general anaesthetic, and the Caesarean section was performed at 10.33pm.

73. Baby A was delivered in a poor condition at 10.34pm. Her Apgar[23] scores were 3 at 1 minute, 4 at 5 minutes, and 4 at 10 minutes.

Resuscitation

74. Senior House Officer (SHO)[24] Dr H was present at Baby A's birth and began resuscitating her immediately following delivery. Dr H documented retrospectively that Baby A had an oxygen saturation level of 60% at three minutes of age. He recorded that her saturation levels improved, as did her heart rate and skin colour, from five minutes of age. Dr H's notes also record that a Senior Medical Officer paediatrician, Dr I, was called when Baby A was approximately 15 minutes old, at about 10.48pm.

75. Dr H asked for a SCBU[25] nurse to attend, but no nurses were available because it was "in the middle of handover". Dr H documented the results of the cord blood gas analysis,[26] and noted that he was comfortable to continue resuscitating Baby A until Dr I arrived.

76. At 11pm, approximately 30 minutes after Baby A's birth, Dr I and SHO Dr L arrived. Dr H recorded that at this point, Baby A's oxygen saturation levels were "high 80s, low 90s", and that Dr L took over resuscitation. Dr I documented retrospectively that she rang a neonatologist, Dr J, from another DHB (DHB2), who advised that they should attempt to intubate Baby A.

[22] The use of medication to relax the uterus to reduce the stress on the baby caused by contractions.
[23] Scoring system that describes the baby's condition immediately following birth, based on the baby's colour, heart rate, reflex irritability, muscle tone, and respiration.
[24] SHOs are qualified doctors who typically have completed at least one year of employment post-graduation.
[25] Special Care Baby Unit.
[26] Venous pH — 6.6, lactate — 22.0mmol/L. Arterial pH — 6.56, lactate — 24.0mmol/L. Normal ranges: venous pH — 7.35–7.45, lactate 0.5–1.6; arterial pH — 7.35–7.45, lactate — 0.5–1.6mmol/L.

77. The first intubation attempt took place at 11.08pm. Dr I's retrospective notes record that this intubation attempt, and a second intubation attempt, were unsuccessful "due to strong cough reflex". RM B recorded contemporaneously that Baby A was taking spontaneous shallow breaths.

78. Dr H recorded that Dr J arrived approximately 50 minutes after Baby A's birth. Dr J attempted to intubate Baby A but was unsuccessful, so it was decided that Baby A would be managed on a CPAP[27] machine. Baby A was transferred to SCBU accompanied by Mr A. Dr I documented that further capillary blood gases showed "continuing profound metabolic acidosis". Baby A was transferred to DHB 2's neonatal team at approximately 2.30am.

79. About eight hours after her birth, Baby A developed seizure activity. When she was six days old, an MRI scan revealed widespread and severe damage to her brain. In the circumstances, with Mr and Mrs A's agreement, the decision was made to withdraw intensive care and, tragically, Baby A passed away.

Further information

Clinical advice for ACC

80. ACC obtained external clinical advice on these events from an obstetrician and a midwife.

81. ACC's obstetrician advisor noted that the CTG that commenced at 8.21pm showed increased variability of 25–30bpm, an undulating baseline of around 155–160bpm, deep variable decelerations to 80bpm that lasted for two minutes, and a contraction frequency of six in ten minutes. In the obstetrician advisor's view, at this time the CTG was "very abnormal". The obstetrician advisor considered that at 9.40pm, the CTG showed increased variability, and at 9.50pm, the CTG showed a progressive bradycardia[28] with late variable decelerations and a progressive loss of variability.

82. ACC's midwife advisor noted that the CTG was non-reassuring from 8.30pm until 9.10pm, and it improved slightly when Dr C was present. The midwife advisor considered that the CTG deteriorated markedly from 9.35pm and never recovered, but noted that it was difficult to ascertain a baseline until 9.50pm, when the CTG showed a falling baseline.

Hutt Valley DHB

<u>Policies and training</u>

83. Hutt Valley DHB's Electronic Fetal Monitoring Policy (the CTG Policy) provides:

> "**Intrapartum**
>
> …
>
> - When an abnormal fetal heart rate is obtained the practitioner should:
>
> …
>
> - Improve blood flow (repositioning the mother)

[27] Continuous positive airway pressure (a technique used to assist breathing by pumping a steady flow of air through the nose to prevent the narrowing or collapse of air passages or to help the lungs to expand).
[28] Abnormally slow heart rate.

- Reduce uterine contractions (stopping a syntocinon infusion, with or without administration of tocolytics). Refer to Management of Acute Uterine hyperstimulation policy

- Action taken will depend on the clinical scenario. This includes
  - Fetal blood sampling
  - Expediting delivery (Operative vaginal or LSCS).
- Delivery should be expedited when
  - There is clear evidence of sustained fetal compromise
  - CTG abnormalities are of a degree requiring further assessment, but FBS is contraindicated, clinically inappropriate or not feasible …
- The LMC has the professional responsibility to advise the core midwives/obstetric team of the day if she suspects an abnormal CTG and to consult including activating the Emergency call system.

…

- Anyone who views a trace should document they have done so, write their opinion on the trace and any further action that is required."

84. Hutt Valley DHB's Management of Acute Uterine Hyperstimulation Policy (the MAUH Policy) defines uterine hyperstimulation as including the presence of more than five active labour contractions in ten minutes, leading to an abnormal CTG. Where uterine hyperstimulation is present alongside an abnormal FHR pattern, the MAUH Policy requires the following steps be taken:

"
- Instigate emergency management
- Change maternal position to left lateral
- Hydrate the woman
- Observe for improvement in the foetal heart rate and uterine activity"

85. The MAUH Policy also requires consideration of a fetal scalp lactate test if significant FHR abnormalities are present.

86. The RANZCOG Guideline definition of uterine hyperstimulation includes where the woman experiences more than five active labour contractions in ten minutes, along with the presence of FHR abnormalities. The Guideline suggests that treatment of uterine hyperstimulation with tocolytics may improve the acid–base status of the fetus, and recommends that maternity care providers should be familiar with, and have a protocol for, acute tocolysis (relevant to the level of service) in the event that uterine hyperstimulation occurs. The Guideline also recommends that where there are more than five active labour contractions in ten minutes, without fetal heart rate abnormalities, appropriate management should include continuous CTG.

87. Hutt Valley DHB's protocol (the CAT1 Protocol) for Category 1 Caesarean sections (CAT1s) requires that 777[29] be called once the decision is made to proceed to a CAT1. The ACMM or coordinating midwife is to contact the theatre coordinator and paediatrician, and the ACMM or coordinating midwife may recommend the level of paediatric support required. The CAT1 Protocol refers to the paediatric SMO being involved in resuscitation, but does not provide guidance on whether the paediatric SMO should be called to attend a CAT1. The CAT1 Protocol also does not refer to intrapartum tocolysis.

Training

88. Hutt Valley DHB runs three to four PROMPT[30] courses and one face-to-face Fetal Surveillance Education Programme (FSEP) every year. Hutt Valley DHB told HDC that it also pays for the online FSEP training provided by RANZCOG for all staff involved in births, and encourages those staff members to participate.

Incident review

89. In Hutt Valley DHB's incident review completed following the events, it was noted that "a triple seven was not activated [when the CAT1 was initiated] so the appropriate people were not at the emergency section". The incident review also noted:

> "On the night in question the unit was very busy, there was a shortness of midwifery staff. The ACMM had worked as the ACMM for the AM and then for the PM was working as a Core RM. … There was not really a clear person in charge who could oversee and coordinate services efficiently. This could be because of the lack of actual staff on the floor and the confusion around the ACMM working as a midwife …"

90. The review suggested that the role of ACMM be strengthened to enhance clinical and general oversight of the maternity unit.

Changes made

91. Hutt Valley DHB told HDC that in 2018 it established a new theatre midwifery team, made up of midwives who have been trained and oriented in theatre practices. It has increased the role of ACMM, and is recruiting extra staff to ensure that there is an ACMM on every shift. Hutt Valley DHB has also implemented a CTG summary sticker and CTG interpretation card to aid staff in interpreting and documenting CTGs.

92. Hutt Valley DHB told HDC that it will also develop and/or update clinical practice guidelines and policies to reflect the following:

- The presence of a paediatrician (registrar or SMO) to support appropriate and immediate neonatal care (including resuscitation) at all CAT1s.
- Mandatory use of partograms in labour.
- Consideration of the use of tocolytics for uterine hyperstimulation as an addition to the MAUH Policy.

[29] 777 is the emergency number clinicians are to call in an emergency.
[30] Practical Obstetric Multi-Professional Training.

- FBS lactate testing to be used in established labour where the CTG is abnormal, to identify fetal status and the level of hypoxia if continuation of labour is being considered.
- An abnormal CTG to be acted upon with appropriate management and escalation, and clear documentation of the CTG trace to be made hourly when a trace is abnormal, including a description of the trace (baseline, variability, activity, and any abnormal features such as decelerations), with any person who reviews a CTG trace to document directly onto the CTG.
- Where the CTG is not a continuous reading, segments must be numbered.
- The Water Birth Policy to be updated to require birthing pool temperature to be recorded every half hour during the second stage of labour.
- LMC access policy to require LMCs to follow DHB guidelines and participate in quality activities such as perinatal mortality and morbidity review.

93. In November 2018, Hutt Valley DHB commissioned an independent external review of its maternity services. The review identified several areas of risk that threatened the safety of the service, including a severe staff shortage, and made a number of recommendations. In June 2019, Hutt Valley DHB accepted the majority of these recommendations.

RM B

94. RM B told HDC that since these events she has voluntarily completed the RANZCOG CTG course yearly. She stated:

> "[I]f the same circumstances occurred, I will be able to interpret the CTG more accurately and would escalate my concerns if not happy with the response from the obstetric staff.
>
> Further research as to frequency of observations for normal labour and when women are using water immersion during labour has prompted me to change my practice. I am now more aware of the potential for hyperthermia during water immersion for labour and birth for mother and baby and will more carefully observe water and maternal temperatures."

Dr C

95. Dr C told HDC:

> "In hindsight over 3 years of reviewing the case and attending two FSEP courses, I have come to realise that the marked hypervariability on a CTG trace indicates the likelihood of a … neurological insult. This was not widely known or publicised at the time of these events. It was not until my attendance at the FSEP course in 2017 that this was emphasised, with more robust detail and examples of CTGs. From these courses, I am now aware that hypervariability is known to have an association with fetal hypoxia. Hence looking back, and if faced with the same circumstances as existed at 2110 when I arrived, I would proceed with an emergency Caesarean section.

> Since the incident, I have become more conscious of the need to have clear instructions documented or understood for any women that we are consulted about at the delivery suite."

96. Dr C sought an opinion from obstetrician and gynaecologist Dr K. Dr K advised:

> "The CTG tracing [from 8.24pm] was clearly abnormal. The significance of the abnormality was appreciated and the plan was clearly communicated that delivery should be expedited if spontaneous delivery had not occurred within 20 minutes. … I believe that decision is reasonable even in the circumstances of the CTG abnormality that had been observed, provided that there remains continuous monitoring and urgent recall of the obstetrician in the presence of any further abnormality.
>
> … By 2134 the fetal heart shows progressive deterioration. At that point, the midwives attending the patient should have urgently called the Obstetric team."

Responses to provisional opinion

97. Mr and Mrs A, RM B, Dr C, and Hutt Valley DHB were given an opportunity to respond to relevant sections of the provisional opinion. Where appropriate, changes have been incorporated into the report.

98. Mr and Mrs A told HDC that they do not recall a discussion of an initial offer of a Caesarean section, and "can only recall a Caesarean section being discussed once [Mrs A] was in serious trouble, at approximately 2200". They further stated:

> "It appears to us that the LMC [RM B], along with [RM F], had a mind-set that a vaginal delivery was still possible and all efforts should be made to have that happen. This was despite the evidence of CTG traces not being reassuring, and [Dr C] saying that she was concerned about that and would return in 15 minutes to check on progress."

99. Hutt Valley DHB accepted the recommendations in the provisional report and told HDC that it sincerely apologises to Mr and Mrs A for the tragic loss of Baby A, and acknowledges that its systems and processes failed to protect her.

100. Dr C told HDC that since these events, she has taken it upon herself to teach staff about the chain of events that occurred and the outcomes. She further stated that she has reflected greatly on this case, and it has changed her mentality and decision-making in the delivery suite.

Opinion: Introductory comment

Intrapartum fetal surveillance

101. Primarily, CTG monitoring during labour is undertaken to assess fetal well-being, and is recommended particularly if there is concern about the fetal response to labour, or some other concern about the labour process that may have an impact on the baby's well-being. CTG monitoring involves continuous recording of the fetal heart rate and the woman's contractions via two separate transducers. The CTG machine provides a paper print-out for interpretation of the baby's well-being, and an assessment of the fetal heart rate in relation to the contraction pattern. Components for assessment include the variability of the heart rate, whether the baseline rate is within normal parameters, whether there are accelerations or decelerations of the fetal heart rate, and the length, timing, and frequency of contractions. The CTG monitoring is always considered within the entire clinical picture.

102. The RANZCOG Guideline provides that the principal aim of intrapartum fetal surveillance is to prevent adverse perinatal outcomes arising from fetal metabolic acidosis/cerebral hypoxia related to labour. However, RANZCOG notes:

> "[M]any factors contribute to the development and severity of an asphyxial injury (e.g. tissue perfusion, tissue substrate availability, the duration and severity of the insult, the fetal condition prior to the insult) such that the relationship between metabolic acidosis and cerebral damage is complex. Therefore, the degree of tissue damage and subsequent injury does not necessarily relate directly to the extent of fetal metabolic acidosis arising during labour. Furthermore, it is clear that most often damage is actually sustained during pregnancy, prior to labour, rather than arising de novo during labour and delivery."

103. The RANZCOG Guideline also states:

> "[I]t is now widely appreciated that the visual interpretation of continuously generated signals from the fetal heart, however derived, is subject to shortcomings in interpretation. Review of cases with poor outcomes repeatedly demonstrate that abnormal CTGs were misinterpreted and the resulting management inappropriate."

104. The interpretation of the CTG is a vital factor in the tragic circumstances of this case. I begin my decision by summarising the varying interpretations of the CTG by the clinicians at the time, and by the various clinical reviewers subsequently.

Interpretations of CTG

105. RM B advised HDC that she had concerns about the CTG from 8.21pm when she rang the emergency bell, and she remained concerned about fetal well-being throughout the rest of the CTG monitoring. When Dr C was present at 9.10pm, RM B said that she was unsure how to interpret the trace as she had "never seen hypervariability before". RM B said that in retrospect it is clear that the CTG deteriorated from 9.35pm onwards. However, she said that at the time, although she did not consider that the trace was normal or reassuring,

she believed that it was a return to the trace seen previously, which Dr C had reviewed. At about 9.55pm, RM B interpreted the CTG as showing late decelerations in the FHR, which were not returning to baseline.

106. Dr C advised HDC that when she reviewed the CTG trace initially, from 8.21pm onwards, she saw variable decelerations that were difficult to interpret. Her retrospective notes recorded that previously the FHR had been hypervariable. Dr C advised HDC that at approximately 9.30pm, she interpreted the CTG as non-reassuring but non-hypoxic, because it had returned to baseline rate, and she was not aware at the time that hypervariability is known to have an association with fetal hypoxia. When she returned to the delivery suite at approximately 10.10pm, she considered the CTG trace to be "clearly pathological".

107. Dr E recorded retrospectively that at the time of her initial review at approximately 8.24pm, she interpreted the CTG as showing a baseline that was difficult to determine, and increased variability. She told HDC that in the 15–20 minutes before she and Dr C left the delivery suite at approximately 9.35pm, the CTG had appeared to improve, but that she and Dr C had noted the previous hypervariability.

108. My midwifery advisor, RM Emma Farmer, noted that the CTG trace was abnormal from 8.24pm, and that between 9.30pm and 9.50pm, it remained "significantly abnormal with persistent hypervariability".

109. My obstetrician advisor, Dr Cindy Farquhar, noted that between 8.24pm and 9.10pm, the CTG showed marked hypervariability (varying by as much as 30–50bpm) for 30 minutes. She also noted that the baseline was less than 100 for approximately 30% of the trace during this period. Dr Farquhar considered that between 9.10pm and 9.35pm, the baseline appeared reassuring with brief dips, and between 9.35pm and 9.55pm, the CTG trace showed "another period of hypervariability for 20 mins with normal baseline then at 2155 a gradual decline began in the baseline to under 100 beats per min which does not recover". Dr Farquhar also noted that "from 2140 onwards there is a pattern of multiple brief decelerations below 100".

110. Dr K considered that the CTG tracing from 8.24pm was clearly abnormal, and that from 9.34pm it showed progressive deterioration.

111. ACC's obstetrics advisor noted that the CTG that commenced at 8.24pm showed "a markedly increased variability (20–35bpm), an undulating baseline of approximately 155–160bpm but with deep variable decelerations to 80bpm". The CTG trace was considered to be "very abnormal" at 8.24pm. The obstetrics advisor considered that at 9.10pm, the CTG still showed greatly increased variability in patches, interspersed with normal variability, with a baseline of 155bpm and no obvious decelerations. At 9.40pm, the CTG showed increased variability. At 9.50pm, when the CTG was changed to one that ran on battery, it showed a progressive bradycardia with late variable decelerations with a gradual loss of variability.

112. ACC's midwifery advisor noted that the CTG was non-reassuring from 8.30pm to 9.10pm. At 9.10pm, the CTG trace improved slightly but remained non-reassuring. The midwifery advisor was of the view that the CTG deteriorated markedly from 9.35pm and never recovered. However, the midwifery advisor noted that it was difficult to ascertain a baseline until 9.50pm, when the CTG showed a falling baseline.

Factual finding on CTG

113. Dr C and Dr E considered that the CTG trace showed hypervariability between approximately 8.20pm and 9.10pm, which is supported by Dr Farquhar's advice and the review by ACC's obstetrics advisor. The clinical advisors largely agree that the CTG improved at least slightly between 9.10pm and 9.30pm, although I note that RM Farmer and ACC's midwifery advisor consider that the trace remained abnormal/non-reassuring.

114. The clinical advisors differ in their opinions about whether there was an ascertainable baseline present in the CTG recording between 9.30pm and 9.40pm. However, all the advisors agree that by 9.50–9.55pm, the CTG showed a deteriorating baseline alongside the hypervariability.

115. In summary, while acknowledging the different interpretations of the CTG at different stages, both at the time of events and from subsequent clinical reviews, I find that the CTG trace showed the following:

- From 8.24pm to 9.10pm it was significantly abnormal, with continuing hypervariability and an unclear baseline;
- From 9.10pm it appeared to improve to some extent;
- From 9.35pm it began to deteriorate progressively; and
- By approximately 9.50–9.55pm, the CTG trace was clearly significantly abnormal.

Interpretation of uterine contractions

116. Dr E retrospectively recorded the contractions as 4:10 at 8.24pm and again at 9.10pm, and RM B recorded the contractions as 4–5:10 at 9.55pm. There was no contemporaneous recording of the rate of contractions between 8.24pm and 9.10pm. Dr C did not document Mrs A's contractions, retrospectively or otherwise.

117. Dr Farquhar noted that between 8.24pm and 9.10pm, the CTG was showing frequent contractions of 5–6 every 10 minutes. ACC's obstetrics advisor also considered that contractions were 6:10 at approximately 8.24pm.

118. According to the MAUH Policy and the RANZCOG Guideline, uterine hyperstimulation is defined as more than five active contractions in ten minutes alongside an abnormal CTG.

119. I recognise that interpretation of a CTG may vary slightly between clinicians. However, I accept Dr Farquhar's advice, and note that her interpretation is supported by ACC's obstetrics advisor. I am therefore satisfied that the CTG showed uterine hyperstimulation from 8.24pm onwards.

Opinion: Hutt Valley DHB — breach

Introduction

120. District health boards are responsible for the operation of the clinical services they provide, and are responsible for any service failures. It is incumbent on all DHBs to support their staff with systems that guide good decision-making and promote a culture of safety. In my view, Hutt Valley DHB did not ensure that its staff were supported adequately to provide safe and appropriate care.

Lack of contemporaneous notes and documented plan

121. Mrs A arrived at the birthing suite after spontaneously going into labour earlier that morning. Her LMC, RM B, commenced CTG monitoring at 3.57pm. CTG monitoring was discontinued at 5.19pm when Mrs A entered the birthing pool. After RM B auscultated the FHR as 80bpm at approximately 8.20pm, CTG monitoring was recommenced.

122. Dr E reviewed Mrs A at 8.24pm after RM B rang the emergency bell. Dr E attached an FSE and spoke to Dr C, who decided to come in from home to review Mrs A. Dr C was present at 9.10pm and, after she reviewed Mrs A and the CTG trace, the decision was made to allow Mrs A another 20–30 minutes of pushing, with further review after that. Dr C and Dr E then left the delivery suite to attend the ED.

123. Neither Dr E nor Dr C contemporaneously documented their assessments, the care they provided, or the plan that was made at approximately 9.30pm. As such, it was not clear who was responsible for ensuring that Mrs A was reviewed after the 20–30 minutes of further pushing. Clear documentation of assessments and plans as they are made is vital to ensure that every clinician involved understands what is required of them. I am critical that this did not happen.

Intrapartum tocolysis

124. My obstetrics advisor, Dr Cindy Farquhar, noted that between 8.24pm and 9.10pm, the CTG was showing frequent contractions of five to six every ten minutes, as well as marked hypervariability. Dr E and RM B placed Mrs A in the left lateral position after Dr E's review at 8.24pm.

125. By 9.55pm, the CTG was showing late decelerations and was not returning to the baseline. Dr C and Dr E were paged and returned to the room. Dr C initiated a CAT1. Mrs A was transferred to theatre, but intrapartum tocolysis for resuscitation was not initiated.

126. Dr Farquhar explained that intrapartum tocolysis can be used to reduce fetal hypoxia in labour. She stated:

> "In [Mrs A's] labour the contractions always were 5–6 in 10 minutes which is a little more frequent than the more usual 3–4 in ten minutes. Reducing the frequency and strength of the contractions when the decision to deliver by CAT1 section by using

GTN[31] spray or similar tocolytic may have allowed the condition of the baby to improve."

127. I accept Dr Farquhar's advice, and I am concerned that consideration was not given to using a tocolytic to reduce Mrs A's contractions. However, I note Dr C's explanation that no intrapartum tocolysis for resuscitation was initiated, as this was not routine practice at the time, and no guideline or medication was available. In my view, the lack of such a guideline and easy access to appropriate medication was a systems failure for which Hutt Valley DHB is responsible.

MAUH Policy — use of tocolytics

128. I note that Dr Farquhar's interpretation of the CTG — that the contractions were five to six every ten minutes between 8.24pm and 9.10pm — differs from the interpretations of the clinicians involved. Dr E retrospectively recorded the contractions as 4:10 at 8.24pm and again at 9.10pm, while RM B recorded the contractions as 4–5:10 at 9.55pm. There was no contemporaneous recording of the rate of contractions between 8.24pm and 9.10pm. ACC's obstetrician advisor considered that at approximately 8.24pm the contractions were 6:10.

129. According to the MAUH Policy and the RANZCOG Guideline, uterine hyperstimulation is considered to be more than five active contractions in ten minutes, alongside an abnormal CTG. Unlike the RANZCOG Guideline, the MAUH Policy at the time did not refer to the use of tocolytics.

130. In my view, by not providing advice on the use of tocolytics, the MAUH Policy did not provide sufficient guidance to clinicians on possible responses to uterine hyperstimulation. However, Hutt Valley DHB is taking steps to address the issue by amending the MAUH Policy to include consideration of the use of tocolytics.

Delay in senior paediatricians attending Baby A's resuscitation

131. Hutt Valley DHB told HDC that 777 was not called when the decision was made for a CAT1 Caesarean section, which meant that the appropriate personnel were not present at Baby A's birth. I am critical that no 777 call was made.

132. Baby A was delivered at 10.34pm in a poor condition and not breathing spontaneously. SHO Dr H was present at Baby A's birth and began resuscitation immediately. SMO Dr I was called when Baby A was approximately 15 minutes old. Dr H documented retrospectively that he asked for a SCBU nurse, but no one was available because it was the middle of a handover.

133. When Baby A was approximately 30 minutes old, Dr I and SHO Dr L arrived. Dr L took over resuscitation from Dr H, and Dr I rang DHB 2 neonatologist Dr J for advice.

[31] Glyceryl trinitrate — a medication that can be used to relax the uterus.

134. Dr Farquhar advised:

> "Appropriate staff who could resuscitate a hypoxic baby should have been present at the time of birth (appropriately skilled doctor or neonatal nurse practitioner). It was clear that this baby was in trouble with a steady reduction in the baseline. This baby needed all the help it could get in the way of a well conducted resuscitation. The SHO was called but most SHOs are not experienced in neonatal resuscitation. … Even after the delivery the SMO was not called for [14] minutes and doesn't arrive until 30 mins after birth. This is an unacceptably long time to wait for neonatal paediatric expertise [to] arrive."

135. I accept Dr Farquhar's advice, and I consider that a senior paediatric or neonatal clinician should have been present at Baby A's birth to ensure that the resuscitation was as well coordinated as possible. I am critical that this did not happen, and that Hutt Valley DHB staff failed to call the SMO as soon as the CAT1 was initiated. However, I note that Hutt Valley DHB is amending its CAT1 Protocol to require the presence of a registrar or SMO paediatrician at all CAT1s.

Minimal staffing and no ACMM rostered

136. In Hutt Valley DHB's incident review, the midwifery director noted that on the evening of these events there was a shortage of midwifery staff working in the maternity unit. There was also no ACMM rostered on at the time, and RM F, who had been working as ACMM during the day, was working in a core midwife role at the time of these events. The incident review further noted that there was no clear person in charge who was overseeing and coordinating services in the unit.

137. The CAT1 Protocol requires the ACMM or coordinating midwife to call paediatrics. It is not clear who called Dr H, as Dr E's note about the paediatrics team being notified did not specify this information.

138. My midwifery advisor, Emma Farmer, noted:

> "The role of the ACMM is to triage care and to support LMCs and staff in the event of emergencies and liaise with the medical staff. It is a pivotal role in busy maternity units and it is a concern that there does not appear to have been anyone undertaking this role during this situation."

139. I agree, and I am critical that Hutt Valley DHB had a shortage of midwifery staff and did not have an ACMM allocated for the shift on the night of Baby A's birth. It is not possible to determine whether having further midwifery staff and an ACMM rostered on to that shift would have resulted in a different outcome for Baby A and her family, but it is nonetheless concerning that these roles were unfilled at the time.

140. The 2018 independent review of Hutt Valley DHB maternity services noted that the ACMM role has enabled a focus on risk assessment, triage, ongoing prioritisation of workload, and identification of clinical risks and management of these risks in a timely manner, including escalation of urgency if required. I note with approval the steps Hutt Valley DHB is taking

to strengthen the role of ACMM, and that in June 2019 Hutt Valley DHB confirmed that the ACMM role over 24 hours has been signed off successfully and is in the process of being recruited.

Issues with fetal blood sampling machine

141. I note Dr C's comment that her decision to defer taking an FBS at her initial review of Mrs A was partly due to the fact that at the time of events there were issues with the graduation of the lactate monitoring machines. It is concerning that Dr C's clinical decision-making was affected by technical issues with Hutt Valley DHB's equipment. It is imperative that DHBs provide staff with all the necessary equipment, in good working order, to enable them to carry out their roles effectively.

Conclusion

142. Hutt Valley DHB had a responsibility to provide services to Mrs A with reasonable care and skill. In my view, it did not do so. I consider that the following failings are attributable to Hutt Valley DHB:

a) Clinicians did not clearly and contemporaneously document the care they provided and the plans they made;

b) There was a lack of guidance on intrapartum tocolysis and easy access to appropriate medication;

c) By not referring to the use of tocolytics, the MAUH Policy did not provide sufficient guidance to clinicians on other possible responses to uterine hyperstimulation;

d) There was a delay in senior paediatricians attending Baby A's birth;

e) At the time of these events, there was minimal midwifery staffing and no ACMM rostered on; and

f) There were issues with the graduation of the lactate monitoring machines.

143. The above failings represent a pattern of poor care. Accordingly, I find that Hutt Valley DHB breached Right 4(1) of the Code of Health and Disability Services Consumers' Rights (the Code).[32]

Opinion: Dr C — breach

Decision not to perform scalp lactate or proceed to Caesarean section at 9.10pm

144. After Mrs A arrived at the birthing suite, RM B commenced CTG monitoring at 3.57pm to assess fetal well-being, as she had auscultated the FHR at 160bpm. CTG monitoring was discontinued at 5.19pm when Mrs A entered the birthing pool. When RM B auscultated

[32] Right 4(1) states: "Every consumer has the right to have services provided with reasonable care and skill."

the FHR as 80bpm at approximately 8.20pm, CTG monitoring was recommenced, and RM B rang the emergency bell.

145. Dr E, along with hospital midwives RM F and RM G, responded to the emergency bell. Dr E applied an FSE owing to difficulties distinguishing the FHR from the maternal pulse. Dr C was the on-call obstetrics and gynaecology consultant in the evening. Dr E rang Dr C at home, and Dr C advised Dr E to place an IV line and commence IV fluids, and take bloods. Dr C then decided to attend the birthing suite to review Mrs A in person.

146. Dr C was present at 9.10pm. She told HDC that she reviewed the CTG from 8.21pm and found it difficult to interpret, but "realised that something abnormal had occurred". Dr C said that initially she offered Mrs A the option of a Caesarean section, but Mrs A was "contracting very well and the LMCs looking after her felt that she was making adequate progress". Dr C offered Mrs A more time to push, and Mrs A agreed with this option. I note that Mr and Mrs A do not recall an initial offer of a Caesarean section, and commented that Dr C did not seem comfortable with continuing to pursue a vaginal delivery.

147. As noted above, I have accepted that the CTG showed uterine hyperstimulation from 8.24pm onwards. I am critical that Dr C appeared not to identify the frequent contractions as uterine hyperstimulation when she identified the CTG as abnormal at 9.10pm.

148. RM B asked Dr C if an FBS could be taken. However, Dr C said that she deferred taking an FBS because she believed that the CTG trace was "abnormal but non-hypoxic as the baseline rate had been maintained at 145 beats per minute". I note that factors that may have influenced this decision were that Dr C was not aware that hypervariability can be an indicator of fetal distress, had not identified uterine hyperstimulation, and was also concerned that there were issues with the graduation of the lactate monitoring machines.

149. In addition, my obstetrics advisor, Dr Farquhar, commented that at the time of Dr C's review of Mrs A at 9.10pm and plan at approximately 9.30pm:

> "It appears that [Dr C] was only taking into consideration the CTG and not the whole picture which was an occipito-posterior (OP) position with the fetal head that was above or at the ischial spines and that [it] was unlikely that a vaginal delivery was going to be achieved within a short time frame."

150. Dr Farquhar advised that although the exaggerated variability seen on the CTG was unusual, "a good rule of thumb is to say if in doubt about the CTG then do a lactate". In Dr Farquhar's view, "earlier resort to a fetal blood sample or CAT1 caesarean section was indicated on the basis of the abnormalities that were present for the large majority of the CTG from [8.20pm] onwards". Dr Farquhar commented that "a fetal scalp sample for lactate at the very least should have been taken at any of these times — [8.35pm, 8.50pm, 9.00pm, 9.20pm, 9.35pm]".

151. I note Dr C's comment that there had been some issues with the lactate testing machines, and I consider that any failure of that equipment is a systems failure that undermined Dr C's ability to provide care to Mrs A, and I have held the DHB responsible for that. However,

I accept Dr Farquhar's advice, and I am critical that Dr C did not adopt a more cautious approach at 9.10pm. If a scalp lactate was not possible, then proceeding to a Caesarean section would have been the appropriate course of action.

Documentation

152. Dr C did not contemporaneously document the care she provided from 9.10pm, or the plan that was made at approximately 9.30pm. As Dr Farquhar commented, it was not clear who was to reassess Mrs A after the 20–30 minutes of further pushing, and what the reassessment would involve. I also note that the CTG Policy requires any person who has viewed a CTG trace to document that they have done so and write their opinion on the trace, and to note any further action that is required. It is vital that action plans are documented clearly to ensure that every clinician involved understands what is required of them.

Conclusion

153. Dr C had a responsibility to provide Mrs A services with reasonable care and skill. Because Dr C did not carry out fetal scalp sampling or proceed to a Caesarean section following her review at 9.10pm, did not identify the uterine hyperstimulation, and did not contemporaneously document the care she provided or the plan she made, I find that she breached Right 4(1) of the Code.

Opinion: RM B — adverse comment

Discontinuation of CTG

154. After Mrs A arrived at the birthing suite, RM B commenced CTG monitoring at 3.57pm to assess fetal well-being, as she had auscultated the FHR at 160bpm. CTG monitoring was continued until 5.10pm, when it was disconnected temporarily for Mrs A to use the toilet. RM B told HDC that between 4.29pm and 4.45pm, she interpreted the CTG as showing a sleepy trace with reduced variability and shallow variable decelerations, but that she incorrectly documented that it was a normal trace. At 5.05pm, RM B documented that the baby had woken up, and that the CTG had shown an "[o]verall normal trace".

155. The CTG was reconnected at 5.14pm for four to five minutes. Mrs A wanted to enter the birthing pool. RM B told HDC that she "felt it was reasonable at this time to discontinue the CTG and commence intermittent auscultation" of the fetal heart rate, given the normal CTG trace between 4.45pm and 5.10pm and that Mrs A's pregnancy was otherwise normal, aside from the initial IVF treatment.

156. My expert midwifery adviser, Emma Farmer, noted that the short segment of CTG trace between 5.14pm and 5.19pm was "un-interpretable and could not be interpreted as normal". She advised:

> "Given that there had been an abnormal period of CTG recording I think being reassured after 22 minutes of more reactive CTG [within the period 4.45pm to 5.10pm] is too short a period. The RANZCOG Fetal surveillance guidelines recommend continuous CTG if there is an abnormal CTG, although there is no guidance around how long this abnormal period is or how long a normal period would need to be to safely revert to intermittent monitoring."

157. I accept RM Farmer's advice. In my view, a more cautious approach that favoured longer CTG monitoring prior to Mrs A entering the birthing pool would have been preferable, in light of the previous abnormal CTG recording. I accept RM Farmer's advice that not continuing the CTG trace would be viewed with mild disapproval from peers.

Failure to take regular observations in birthing pool

158. Mrs A entered the birthing pool at 5.25pm and remained in the pool until approximately 8.20pm, when RM B heard the FHR as 80bpm. At no time during this approximately three-hour period did RM B record Mrs A's temperature or the temperature of the birthing pool.

159. The Water Birth Policy is clear. It requires that baseline observations (temperature, pulse, blood pressure, and fetal auscultation) be taken and documented prior to entering the pool. Thereafter, maternal temperature and pool temperature must be taken hourly.

160. RM Farmer advised that the requirement to take hourly maternal and pool temperatures is "because of the increased risk of maternal hyperthermia and the importance of keeping the pool at a safe temperature". These are important considerations for LMCs when caring for labouring women in birthing pools, and I am critical that RM B failed to take the required observations. I accept RM Farmer's advice that the failure to undertake these observations would be considered a departure from standard care, and would be viewed with moderate disapproval.

Delay in recalling Dr C and Dr E

161. After RM B auscultated the FHR as 80bpm at approximately 8.20pm, she asked Mrs A to move to the bed to recommence CTG monitoring, and then she rang the emergency bell. Dr E, RM F, and RM G attended.

162. Dr E applied an FSE, and then she and RM B placed Mrs A in the left lateral position. RM B told HDC that she had significant concerns about the fetal well-being at that stage, and she requested that an FBS be taken.

163. Dr C arrived at the birthing suite at 9.10pm. After discussing the option of a Caesarean section, Mrs A agreed to more time for pushing. Neither Dr C nor Dr E documented the plan at the time. Dr E's retrospective notes recorded that the plan was for 20 minutes of further pushing. Dr C told HDC that she intended to return within 15 minutes to check on Mrs A's progress.

164. RM B's recollection, however, is that Dr C offered 30 minutes of further pushing. RM B told HDC that she had anticipated that Dr C would take Mrs A to the operating theatre for an

instrumental birth or an emergency Caesarean section. However, when Dr C offered more time for active pushing, RM B said that this reassured her that the CTG trace was acceptable to continue labouring, as did the fact that RM F was "very encouraging that [Mrs A] should try pushing in different positions".

165. There are differing accounts of when Dr C and Dr E left the room, but most likely it was between 9.35pm and 9.40pm. Mrs A continued to push in different positions with encouragement and support from RM B and RM F. At 9.55pm, RM B left the room to look for Dr C and Dr E in the delivery suite office, not knowing that they were in the ED attending to an emergency admission. At 10.03pm, RM B paged Dr E, who returned to the room with Dr C at 10.11pm. At that point, Dr C considered that the CTG was "clearly pathological", and decided to initiate an emergency Caesarean section.

166. As noted above, the CTG began to deteriorate progressively from 9.35pm. In my view, it would have been preferable for RM B to have called Dr C back as soon as the CTG began to deteriorate, although it is not clear whether Dr C was still present when the deterioration began. In mitigation, however, I consider that initially this deterioration did not differ strikingly from the previous hypervariability and unclear baseline seen between 8.24pm and 9.10pm. I also note that there appeared to be a lack of clarity about the plan made with Dr C, which was not documented, that RM F was at times present and providing support between 9.35pm and 9.50pm, and that RM B was unaware that Dr C and Dr E had left the maternity unit to go to ED.

167. I am nonetheless critical that RM B did not call Dr C back earlier. However, I note that it is not possible to determine, and it is not my role to determine, whether that would have avoided the tragic outcome for Baby A.

168. According to the CTG Policy, RM B should have activated the emergency bell when she noted that the CTG was showing late decelerations and was not recovering to the baseline at 9.55pm. I am critical that she did not do so, as this decision resulted in a slight delay in Dr C and Dr E returning. However, in mitigation, I note that there was no ACMM rostered on at the time. As noted by RM Farmer, the role of the ACMM is pivotal in supporting LMCs and staff in the event of emergencies, and in liaising with the medical staff.

Recommendations

169. I recommend that Hutt Valley DHB:

a) Provide a written apology to Mr and Mrs A for the failings identified in this report. The apology is to be sent to HDC within three weeks of the date of this report, for forwarding to Mr and Mrs A.

b) Consider amending its procedure to ensure that a clinician capable of performing a fetal scalp blood lactate test is rostered on for every shift, and ensure that the lactate

testing machine is functioning. Hutt Valley DHB is to update HDC on its consideration of these issues within three months of the date of this report.

c) Provide HDC with evidence that it has made the amendments to its clinical practice guidelines and policies outlined in paragraph 92 above. The evidence is to be provided to HDC within three months of the date of this report.

d) Within three months of the date of this report, provide HDC with a detailed update report on the steps taken to carry out the external reviewers' recommendations, with specific reference to the following recommendations:

- DHB midwifery base staffing levels to be increased significantly.
- Care Capacity Demand Management to be implemented to identify staffing levels in response to demand, occupancy, and acuity.
- The ACMM position to be increased immediately to cover the overnight shift, to provide 24-hour cover.
- Make funding for the Caesarean section midwifery team permanent, and increase the FTE to cover an on-call Caesarean section midwife service out of hours.
- Ensure regular review of clinical guidelines to support evidence-based safe practice.
- Ensure that all clinical staff involved in antenatal and intrapartum care attend the RANZCOG FSEP at least once every three years — this should be mandatory — as well as complete the online package in the intervening years. For LMCs, consider making attendance a condition of their access agreement.
- Undertake an audit of all babies who have been transferred to DHB2 SCBU for cooling.
- Undertake a review of all babies with suspected neonatal encephalopathy, including babies born with an umbilical cord pH of less than 7.0.
- Identify any critical equipment deficiencies and address this immediately.

170. I recommend that Dr C:

a) Provide a written apology to Mr and Mrs A for the failings identified in this report. The apology is to be sent to HDC within three weeks of the date of this report, for forwarding to Mr and Mrs A.

b) Provide a reflective statement detailing her learnings from this case in relation to CTG interpretation, fetal blood sampling, hypervariability, and the use of tocolysis, and the education on these matters that she has provided to maternity staff. This statement is to be sent to HDC within three months of the date of this report.

171. I recommend that the Medical Council of New Zealand consider whether a review of Dr C's competence is warranted.

Follow-up actions

172. A copy of this report with details identifying the parties removed, except Hutt Valley DHB and the experts who advised on this case, will be sent to the Medical Council of New Zealand, which has been advised of Dr C's name.

173. A copy of this report with details identifying the parties removed, except Hutt Valley DHB and the experts who advised on this case, will be sent to the Midwifery Council of New Zealand, which has been advised of RM B's name.

174. A copy of this report with details identifying the parties removed, except Hutt Valley DHB and the experts who advised on this case, will be sent to the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG), the New Zealand College of Midwives, the Ministry of Health, the Health Quality & Safety Commission, the Perinatal and Maternal Mortality Review Committee (PMMRC), and the Neonatal Encephalopathy Taskforce, and placed on the HDC website (www.hdc.org.nz) for educational purposes.

Neonatal Encephalopathy Taskforce

175. The PPMRC has identified that incorrect use and interpretation of intrapartum fetal heart rate monitoring are important contributors to adverse perinatal outcomes, and that providing education and training in areas of critical obstetric care can improve patient outcomes. The PMMRC stated:

> "All practitioners involved in the care of newborn babies are encouraged to participate in regular education and skills updates to maintain their competence and confidence with managing initial neonatal care. This should include fetal surveillance education."

176. However, the Neonatal Encephalopathy Taskforce[33] has stated that despite the PMMRC recommendation, not all practitioners are participating in regular fetal heart rate monitoring education, and there is a need to improve access to fit-for-purpose fetal heart rate monitoring education so as to reduce the incidence and severity of neonatal encephalopathy.

177. One of the action plans for the Neonatal Encephalopathy Taskforce has been to support the development and implementation of a regular standardised interdisciplinary training programme on fetal surveillance for all health professionals involved in intrapartum care, by evaluating:

- The extent of fetal surveillance education programmes in New Zealand;
- The effectiveness of training programmes on fetal surveillance for all health professionals involved in intrapartum care in New Zealand; and

[33] The Neonatal Encephalopathy Taskforce was set up in November 2015 to bring together expert representatives from healthcare providers, clinicians, professional bodies, government agencies (including ACC), and patient advocacy groups to work together to reduce neonatal encephalopathy.

- The logistics of rolling out a national fetal surveillance education programme to all healthcare professionals involved in intrapartum care.

178. I will continue to engage with the Neonatal Encephalopathy Taskforce on these issues and the development of the national fetal surveillance education programme.

Appendix A: Independent advice to the Commissioner

The following expert advice was obtained from RM Emma Farmer:

"I, Emma Farmer, have been asked to provide an opinion to the commissioner on case number C17HDC01547; I have read and agree to follow the Commissioner's Guidelines for independent advisors.

I am a registered midwife and hold a MHSc (Hons) Midwifery. I have worked in a variety of practice settings over a 27 year career and am currently employed as the Head of Division — Midwifery, at Waitematā District Health Board.

I have read the documentation you sent me:

1. [RM B's] response dated 1 November 2017
2. The clinical records for [Mrs A]
3. A copy of the cardiotocograph (CTG) recording
4. Hutt Valley DHB clinical policies for Water birth and Electronic fetal monitoring

You have asked me to provide an opinion on the following matters:

1. The appropriateness of the care provided by [RM B], with consideration of the following:
   a) The adequacy of CTG monitoring and interpretation
   b) The standard of documentation
   c) The standard of observations
   d) The timeliness of obstetric referral
   e) Any other matters you consider warrant comment
2. The appropriateness of the care provided by the Hutt Valley DHB midwives.
3. Any other matters in this case that you consider warrant comment.

Firstly, I would like to acknowledge the deep sadness [Mr and Mrs A] and their family will be experiencing at the tragic loss of [Baby A].

1. Appropriateness of the care provided by [RM B]

a) The adequacy of CTG monitoring and interpretation

[At] 15.47 [RM B] commenced a cardiotocograph (CTG) in response to hearing the fetal heart with a possible baseline of 160 beats per minute (bpm), this would be on the upper limit of normal. The fetal heart initially had a baseline of 150bpm with normal features. From 16.30 there is a period of reduced variability, and three decelerations down to 140bpm. This is a suboptimal trace and it would be expected

that this would be monitored for improvement. At 16.45 the trace changes and we see improved variability and two possibly fleeting decelerations. At 17.10 the CTG is discontinued to allow [Mrs A] to go to the toilet and it is recommenced briefly at 17.14 for 4 minutes before it is discontinued prior to [Mrs A] entering the bath. This short segment of trace is un-interpretable and could not be interpreted as normal. In her statement [RM B] asserts that this trace was un-interpretable as [Mrs A] was standing and vomiting and the connection was poor so she made the decision to discontinue the CTG based on the earlier trace (16.45–17.10). Given that there had been an abnormal period of CTG recording I think being reassured after 22 minutes of more reactive CTG is too short a period. The RANZCOG Fetal surveillance guidelines[1] recommend continuous CTG if there is an abnormal CTG, although there is no guidance around how long this abnormal period is or how long a normal period would need to be to safely revert to intermittent monitoring. Overall I think not continuing the CTG trace would be viewed with mild disapproval from peers.

At 20.21 [RM B] heard a deceleration and recommenced the CTG, she immediately noted that the trace was abnormal and at 20.24 she activated an emergency call. This is an appropriate response to an abnormal CTG trace. She also tries a change of maternal position and a fetal scalp electrode is applied by the RMO in an attempt to achieve a more interpretable trace. As [RM B] recalls at no time after this event was she satisfied with the CTG trace, indicating that she adequately interpreted the trace as abnormal.

b) The standard of documentation

[RM B] makes regular contemporaneous entries in the clinical records during the labour until 22.03. After this time notes are made by the obstetric staff. This is not uncommon when priority shifts to ensuring the delivery of timely clinical care over the documentation. Later [RM B] makes a series of retrospective notes to cover the events where contemporaneous documentation was not possible. This would be considered satisfactory.

c) The standard of observations

[RM B] records the maternal temperature, pulse and blood pressure at 16.05. There are no vital signs recorded after this time in the records. It is usual practice to review vital signs four hourly in labour to check for signs of infection and hypertension. So it would have been expected that another set of observations would be recorded at around 8pm, however at this time [Mrs A] was fully dilated and pushing and it is likely that [RM B] was focused on the birth at this point. The local Hutt Valley DHB Waterbirth Guideline states, 'Maternal and pool temperature need to be taken hourly', this is because of the increased risk of maternal hyperthermia and the importance of keeping the pool at a safe temperature. There is no record of these

[1] RANZCOG, (2014). *Clinical Guidelines: Intrapartum fetal surveillance*. Australia: RANZCOG. www.ranzcog.edu.au

temperatures being recorded, this would be a departure from standard care and would be viewed with moderate disapproval.

d) The timeliness of obstetric referral

At 20.21 [RM B] heard a deceleration and recommenced the CTG, she immediately noted that the trace was abnormal and at 20.24 she activated an emergency call. This is an appropriate referral for an abnormal CTG trace. The call bell was responded to by RMO [Dr E], who attached a fetal scalp electrode and provided oversight from this time.

e) Any other matters you consider warrant comment

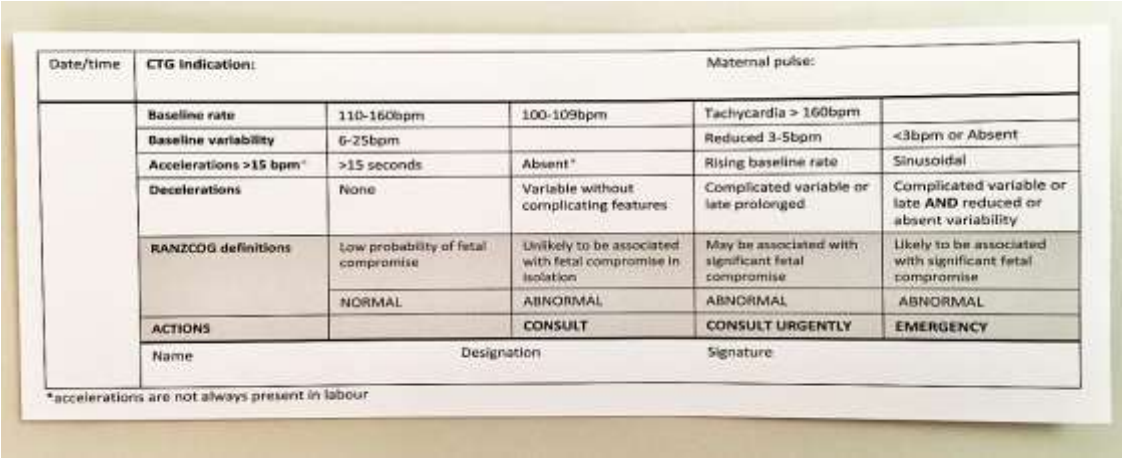
I note that the LMC alone took [Mrs A] to theatre, this is increasingly unusual practice as this is emergency care and it would be usual for the core midwives to provide support during this emergency. It does not appear to have caused significant delay however.

2. The appropriateness of the care provided by the Hutt Valley DHB midwives.

At 20.24 [Dr E], [RM F], and an LMC midwife responded to the emergency bell. [RM F] notes that an FSE has been placed and [Mrs A] is pushing and that she and the other midwife leave the room. Between 21.30 and 21.50 [RM F] again enters the room and provides some support and encouragement with pushing. During this period the CTG trace remains significantly abnormal with persistent hypervariability, however SMO [Dr C] is also present in the room at this time, and it is likely that the staff would be deferring to her for advice. At 22.20 a decision is made to transfer [Mrs A] to theatre for a category one emergency caesarean, it would be usual practice for care from this point to be provided by a staff midwife with the LMC working alongside. It appears that due to a staffing shortage this did not occur. However [Baby A] was born at 22.36, which is within the accepted timeframe for a category one caesarean.

3. Any other matters in this case that you consider warrant comment

One innovation that has been implemented in several DHBs is a CTG summary sticker or stamp, this supports evaluation of the CTG strip and assists clinicians to the appropriate course of action. I note there is no reference to this in the notes and I assume that this was not in use at this time. This may be a useful tool for Hutt Valley DHB to consider adopting.



Date/time	CTG Indication:			Maternal pulse:	
	Baseline rate	110-160bpm	100-109bpm	Tachycardia > 160bpm	
	Baseline variability	6-25bpm		Reduced 3-5bpm	<3bpm or Absent
	Accelerations >15 bpm*	>15 seconds	Absent*	Rising baseline rate	Sinusoidal
	Decelerations	None	Variable without complicating features	Complicated variable or late prolonged	Complicated variable or late **AND** reduced or absent variability
	RANZCOG definitions	Low probability of fetal compromise	Unlikely to be associated with fetal compromise in isolation	May be associated with significant fetal compromise	Likely to be associated with significant fetal compromise
		NORMAL	ABNORMAL	ABNORMAL	ABNORMAL
	ACTIONS		CONSULT	CONSULT URGENTLY	EMERGENCY
	Name		Designation	Signature	

*accelerations are not always present in labour

I also note in the internal review comments that there was not an Associate Clinical Charge Midwife (ACMM) allocated to this shift. The role of the ACMM is to triage care and to support LMCs and staff in the event of emergencies and liaise with the medical staff. It is a pivotal role in busy maternity units and it is a concern that there does not appear to have been anyone undertaking this role during this situation. I would like to endorse the recommendation by [the] Director of Midwifery in her recommendation:

> 'That the role of an ACMM to enhance clinical and general oversight on a shift by shift basis in the maternity unit should be strengthened.'

I hope this advice will assist you in your investigation, please contact me if I can be of further assistance."

The following further advice was obtained from RM Farmer:

"I, Emma Farmer, have been asked to provide a further opinion to the commissioner on case number C17HDC01547; following receipt of the statements from [the] Acting Chief Executive Hutt Valley DHB, [Dr C], [Dr E] and [RM F].

I have read the following documentation:

1. Letter from [the] Acting Chief Executive HVDHB dated 18 February 2019
2. Letter from [Dr C] dated 2 October 2017
3. Letter from [Dr E] dated 10 April 2019
4. Letter from [RM F] dated 26 April 2019
5. Letter from [RM B] dated 15 February 2019

In addition I have also reviewed:

1. The clinical records for [Mrs A]
2. A copy of the cardiotocograph (CTG) recording

You have asked me to consider if I would like to make any changes to my previous opinion.

In response to the question covering 'The timeliness of the obstetric referral' I had provided an opinion based on my understanding that the medical staff had remained in attendance or close attendance from 20.24. It appears that this was not the case and that both [Dr E] and [Dr C] left the maternity unit to attend a patient in the emergency department. [Dr C] in her response suggests that she should have been recalled to the maternity unit earlier. However given that the trace was significantly suboptimal when she left the unit it is very difficult to know at what point [RM B] could or should have made another decision. So in all respects my opinion remains unchanged.

I hope this advice will assist you in your investigation, please contact me if I can be of further assistance."

Appendix B: Independent advice to the Commissioner

The following expert advice was obtained from obstetrician Dr Cindy Farquhar:

> "The background to the case was provided by the HDC. I have also made my own summary.
>
> **Added 14 May 2019** In April 2019 I received another 79 pages including letters from [Dr C] to the NZMC, letters from [Dr E], [RM B], a response letter from the acting CEO of Hutt Valley DHB and a letter from [Dr K], Obstetrician from Hutt Valley DHB. In response to this further information I have made some edits to my letter and used the date and highlights to indicate these corrections and additions.
>
> [Mrs A] was pregnant following an IVF cycle and three years of infertility. Her pregnancy progressed to term and the fetal growth was normal. She was reviewed at [40 weeks and 1 day] by her LMC at the hospital with a mildly elevated BP (135/91) which settled while being reviewed (120/86). Blood tests and urinalysis were normal. A cardiotocogram (CTG) was normal. She went home.
>
> [At 41 weeks] she had an ultrasound which reported normal growth and liquor volume. Estimated fetal weight was 3981g. A plan was made for induction 6 days later.
>
> [The following day] the membranes ruptured at 0700 hours and contractions began. At 1545 hours she was admitted to the delivery suite. The cervix was 5cm dilated.
>
> From the time of her admission to delivery the LMC [RM B] was caring for [Mrs A].
>
> **1550–1710** — CTG was on and initially the baseline heart rate was 150 to 155 with variability present. The contractions were regular and close together with 4–5 in 10 minutes. At 1620 to 1650 there was reduced variability followed by 30 minutes of improved variability and what appears to be a normal CTG (baseline 140, normal variability and accelerations present).
>
> **1710** the CTG was disconnected while [Mrs A] went to bathroom and then recommenced. There is then a section of CTG from 1714 for about 5 mins that was suspicious including a possible brief deceleration. The retrospective LMC notes at this stage suggest this section of trace was interpreted as possibly maternal. At 1725 [Mrs A] went into the bath and remained there until 2024.
>
> **1740 to 2024** the fetal heart was regularly auscultated and was recorded between 150 and 165 on eight occasions until 2024 when a bradycardia was auscultated. At 1902 she was 9cm dilated, station –1. No decelerations were detected until the last recording.
>
> **2024** The emergency bell was rung as a deceleration was heard. There was some uncertainty about whether this deceleration was the maternal or fetal heart rate. [Mrs

A] was transferred from the bath to a bed. The registrar [Dr E] came into the room. [Mrs A] was examined by [Dr E] and found to be fully dilated, station –2/–1 and a fetal scalp electrode was applied and [Mrs A] was placed in the left lateral position. Two midwives, [RM F] (ACMM) and [RM G] (LMC MW) came in to assist. Both midwives left the room shortly afterwards.

2024 to 2033 the CTG had a baseline of 110 with several brief dips down to below 100.

2033 the CTG was described as 'difficult to interpret' with a period of hypervariability and gradual decline of the baseline. Still 5 contractions every 10 minutes. Registrar was present and [Dr C] was called at 2044.

2024 to 2110 the CTG had marked hypervariability (varying by as much as 30 to 50 beats per min) for 30 mins and with a baseline less than 100 for approximately 30 percent of the trace (7cm of 20cm). The contractions were frequent 5–6 every 10 minutes.

2044 [Dr E] (Registrar) contacted [Dr C] (SMO) and asked [Dr C] to attend. Advice given by [Dr C] (by phone as she was at home) to insert IV line, group and hold, CBC and stop pushing. [Dr E] remained in the room. The LMC undertook a VE at 2044 was vertex at spines. Fully dilated. No position given.

Added 14 May 2019 *In my first version of the letter dated 29 August 2018 I was not clear if [Dr C] was in attendance at 2044.* The notes were confusing on this point. The LMC notes say '[Dr C] on her way in' suggesting that she was coming in from outside the hospital. In the retrospective notes [Dr C] has written 'CTG had improved'. [Dr C] described the VE as Station 0, deflexed OP. 1/5 palpable per abdomen. There is no time on the retrospective notes for this VE.

Added 14 May 2019 In [Dr C's] letter of the 2 October 2018 to the MCNZ and which I received in April 2019 I can now read clearly that [Dr C] was at home. The time from the call to arrive in the labour room was 27 mins.

2057 [Dr E] repeated VE: head at station –1, minimal caput, ? occipito posterior position.

2110 Repeat VE by [Dr C] — fully dilated with head at ischial spines and direct occipito posterior position. Plan allow: 20 mins for pushing and then reassess.

2010 to 2135 There was a period where the CTG baseline appears reassuring (140–150) with some brief dips.

Added 14 May 2019 In [Dr C's] letter dated 2 October 2017 the letter says that [Dr C] 'recalls reviewing the CTG from 2021 and found it hard to interpret … and offered a CS.' In the handwritten notes by the midwife with times of 2110 and 2130 and the registrar at 2110 and [Dr C] (including the retrospective notes) there is no mention of

an offer of CS between 2110 and 2130 when [Dr C] was in attendance. [Dr E] has written at 2110 to 2135 that '[Dr C] is in attendance, head is OP @ spines. Allow pushing for 20 mins, will require CS if head is still high.' To summarise I did not find any written notes that suggest that [Dr C] offered a CS or that this offer of CS was declined by the patient.

2135 Added 14 May 2019 [Dr E] is called to ED and [Dr C] decides to go to ED with [Dr E] as the patient was a young woman having a miscarriage and bleeding heavily. About this time [RM B] has written retrospectively in her letter dated 30 October 2017 to the HDC that she suggested a fetal blood sample for lactate be done and that [RM F] actually retrieved the fetal blood sample trolley and brought it into the delivery room. At this point [Dr C] made the 'verbal plan' to try different positions to try and achieve a vaginal delivery.

2135–2255 Another period of hypervariability for 20 mins with normal baseline then at 2155 a gradual decline began in the baseline to under 100 beats per min which does not recover.

2203 there was a further call for registrar and SMO to attend as 'fetal bradycardia and late decels'. It takes eight minutes for [Dr C] to come.

2211 Repeat VE by [Dr C] — no further descent, non reassuring CTG, decision for CAT 1 emergency caesarean section. [Dr C's] contemporaneous handwritten notes are written at 2220.

Patient moved to left lateral position and arrangements for CAT 1 emergency caesarean section are made.

Birth at 2234 The CTG ends at 2225 and the [Baby A] is delivered at 2234 in poor condition with Apgars of 3, 4 and 4 at one, five and ten minutes. The arterial cord gases were pH of 6.56 and lactate >24 mmol/L and venous pH 6.56, lactate 22 mmol/L. Time from decision to delivery is 23 minutes.

There is some confusion in the notes about the time of the arrival of the neonatal paediatrician. The baby needed resuscitation. A SHO was present but couldn't intubate. The call for the SMO was not made until 11 minutes (in the Neonatal Encephalopathy form it says 14 mins) and [Dr I] did not arrive for another 19 minutes. Yet it says in the discharge summary that NICU personnel were not present until 50 minutes of age. Does this mean nursing staff or NICU SMO? Was [Dr I] not the NICU SMO? And in the handwritten notes by the SHO [Dr L] … (?) 'I was present from 30 mins' and 'SMO present from 30 mins' and 'SHO [Dr H] present from delivery'. It was clearly a difficult intubation which was not successful and the baby was started on CPAP and transfer arrangements commenced.

Transfer to [DHB2] NICU for cooling, seizures developed and MRI revealed severe and widespread brain damage and after discussion with her parents, intensive care was withdrawn and [Baby A passed away]. A postmortem showed widespread damage due

to perinatal asphyxia with extensive damage to the cerebral cortex and basal ganglia, her lungs showed massive pulmonary haemorrhage and meconium aspiration. There were bilateral undisplaced fractures of her parietal skull bones. The placenta showed evidence of choriangiosis which is an adaptive response to villous hypoxia.

COMMENTARY

I have been asked to comment on

1. **The reasonableness of the care provided by [Dr C], including the timeliness of the decision to conduct a CS.**

   - *What is the standard of care/accepted practice?*

[Dr C] was slow to make the decision to intervene. There are at several times in the last two hours of the labour where a decision to do either a fetal scalp sample for lactate or CAT1 Caesarean Section could have been made.

From the time the CTG was put after coming out the pool at 2021 until delivery 2234 (2 hours and 12 minutes later) the CTG was mostly suspicious or abnormal according to RANZCOG guidelines. Of this 132 minutes I consider that only approximately 25 minutes could be classified as normal (the segment from 2110 to 2135).

The standard of care is to read the CTG and interpret it according to the guidance. I am attaching the assessment tool and action items from RANZCOG. I consider a fetal scalp sample for lactate at the very least should have been taken at any of these times — 2035, 2050, 2100, 2120, 2135. At approximately 2140 a CAT1 CS should have been arranged as there were multiple brief decelerations and the vertex was too high for an operative delivery. ***Added 14 May 2019*** *The MW should have called [Dr C] or [Dr E] to return to the delivery suite for this CAT1 CS about 5–10 mins after she left the room. It took another 25–30 mins for [Dr C] to come back and assess the patient as she didn't return herself and was not called back.*

RANZCOG CTG assessment tool[1]

CTG finding	**Normal**	**Suspicious**	**Abnormal**
Baseline rate	110–160	100–109	<100 or >160
Variability	5 bpm or more	<5 bpm for 40-90 mins	<5 bpm for ≥90 mins
Accelerations	present	none	none
Decelerations	none	Early decelerations OR single variable deceleration up to 3 mins	Repeated variable or late decelerations OR prolonged deceleration lasting > 3 mins

[1] https://www.ranzcog.edu.au/

Overall opinion	ALL four features normal	ONE suspicious feature	TWO or more suspicious features or ONE or more abnormal features

I am not sure where [Dr C] was at 2044 when she was called to review the patient but she did not arrive until 2111 which is 27 minutes later. At 2[1]11 [Dr C] examined [Mrs A] and reported fully dilated with head at ischial spines and direct occipito posterior (OP) position.

Added 14th May 2019 I now know that [Dr C] was at home and came back to the hospital to assess the patient.

Added 14th May 2019 [Dr E] wrote contemporaneous notes at 2110 that the plan was to allow 20 mins for pushing and then reassess. In [Dr C's] retrospective letter it says. 'Verbal instructions to the LMCs on the monitoring with the aim for delivery within half an hour from 21:30 with active pushing. I verbalised my concerns on the previous non-reassuring CTG tracing and my intention to return within 15mins to check progress.' This did not happen at 2145. It is not clear who was to reassess or what the reassessment would involve. Was it reassess the CTG or was it another vaginal examination? Neither the registrar nor [Dr C] returned until called by the LMC at 2203 and [Dr C] takes eight minutes to come. There are no written notes from [Dr C] until after the delivery.

From 2140 onwards there is a pattern of multiple brief decelerations below 100 and that call could have been made earlier as this many brief decelerations in a short time period was not normal. There is also an exaggerated amount of variability and in the UK NICE guidelines variability > 25 is considered abnormal. This is not in the RANZCOG guidelines. However there was sufficient concern from the number of times the fetal heart was less than 100 to justify a lactate sample to be done. It is approximately 35 mins after the time that [Dr C] had suggested that further reassessment would occur. The plan for reassessment was not followed but it is also not clear who would reassess or what reassessment meant.

Table 2: Action options for clinical care in response to CTG findings

1. Discontinue CTG and commence intermittent auscultation
2. Continue to monitor with continuous CTG and review CTG after short interval +/other measures as indicated e.g. re-position woman, intravenous fluids, stop syntocinon, administer intravenous antibiotics
3. Perform fetal blood sample and clinical plan dependent on result
4. Category one (immediate) delivery either by caesarean section or instrumental delivery dependent on your clinical findings
5. Category two (urgent) delivery either by caesarean section or instrumental delivery dependent on your clinical findings

- *If there has been a departure from the standard of care or accepted practice, how significant a departure do you consider this to be?*

The departure is highly significant as an earlier delivery could have delivered this baby in better condition without such severe birth asphyxia.

It appears that [Dr C] was only taking into consideration the CTG and not the whole picture which was an occipito-posterior (OP) position with the fetal head that was above or at the ischial spines and that [it] was unlikely that a vaginal delivery was going to be achieved within a short time frame.

Once the de[cision] was made to do the CAT1 Caesarean Section the baby may have benefited from intrapartum resuscitation which [Dr C] should have initiated. There is only the mention of putting the patient into the left lateral position but no mention of reducing the impact of the frequent contractions by using GTN or terbutaline which will relax the uterus.

Attendance of a SMO is generally expected to occur within 20 mins. [Dr C] did not arrive until 27 minutes. However, this is not a major issue as there was a further 60–70 minute delay before the decision was made for CS.

- *How would it be viewed by your peers?*

I consider that the majority of my peers would agree with me although I must acknowledge that this is a retrospective view and hindsight bias is possible when interpreting CTGs. However, this guidance is what is taught at the FSEP courses of RANZCOG. I acknowledge that this exaggerated variability is unusual but a good rule of thumb is to say if in doubt about the CTG then do a lactate. Assuming that the lactate was abnormal at approximately 2040 then this baby could have been delivered up to 90 minutes earlier. Additionally I think that most of my peers would consider that achieving a vaginal delivery in the next 60 minutes in a woman with a persistent OP position and a fetal head above or at the ischial spines was very unlikely.

Many DHBs already have an intrapartum resuscitation protocol which includes tocolytics. See below.

- *Recommendations for improvement that may help to prevent a similar occurrence in future.*

Mandatory training and retraining in fetal surveillance for all staff who deliver babies. I have not been told when [Dr C] last attended a FSEP course or similar course.

Added 14th May 2019 I have now been informed that [Dr C] last completed the course in 2015.

SMOs living close to the hospital or staying in the hospital when they are on call so that they are able to respond within 20 mins of being called.

Introduce and implement a policy for intrapartum resuscitation.

2. The reasonableness of the care provided by Hutt Valley DHB?

Delay in arrival of neonatal paediatric SMO. The arrival of the neonatal paediatric SMO was not until 30 minutes after birth. Appropriate staff who could resuscitate a hypoxic baby should have been present at the time of birth (appropriated skilled doctor or neonatal nurse practitioner). It was clear that this baby was in trouble with a steady reduction in the baseline. This baby needed all the help it could get in the way of a well conducted resuscitation. The SHO was called but most SHOs are not experienced in neonatal resuscitation. Did the SHO let the consultant know about the delivery? Even after delivery the SMO was not called for 11 (or was it 14) minutes and doesn't arrive until 30 mins after birth. This is an unacceptably long time to wait for neonatal paediatric expertise to arrive. The fact that the medical or midwifery staff didn't call clinical staff (in this case the SMO) to be present at the delivery or even at 2–3 minutes suggests that they underestimated how unwell this baby was even after birth. Some DHBs have a policy of calling for the most senior neonatologist available to be present at the delivery once the CAT1 section is called for. Hutt DHB should consider this.

No intrapartum resuscitation Intrapartum resuscitation can be used to reduce hypoxia in labour including using glyceryl trinitrate or other rapid acting tocolytic such as terbutaline in labour. In [Mrs A's] labour the contractions always were 5–6 in 10 minutes which is a little more frequent than the more usual 3–4 in ten minutes. Reducing the frequency and strength of the contractions when the decision to deliver by CAT1 section by using GTN spray or similar tocolytic may have allowed the condition of the baby to improve. There are examples of protocols from other DHBs including a suppression of contractions emergency box which contains everything required including GTN spray or similar tocolytics.

Added 14th May 2019 See below section on protocols received from Hutt Valley DHB.

a. What is the standard of care/accepted practice?

- With regard to the resuscitation the standard of care is to have the appropriately trained staff present at the birth who can adequately resuscitate a baby that requires it.
- NICE Guidelines on Intrapartum Care 2017 offer the standard of care for intrapartum resuscitation.

  '1.10.34 If there are any concerns about the baby's wellbeing, be aware of the possible underlying causes and start one or more of the following conservative measures based on an assessment of the most likely cause(s):

  - encourage the woman to mobilise or adopt an alternative position (and to avoid being supine)
  - offer intravenous fluids if the woman is hypotensive
  - reduce contraction frequency by:

- reducing or stopping oxytocin if it is being used and/or
- offering a tocolytic drug (a suggested regimen is subcutaneous terbutaline 0.25 mg). [2017]'

b. If there has been a departure from the standard of care or accepted practice, how significant a departure do you consider this to be?

The baby was born in poor condition. The difficulty with resuscitation was not helpful but may not have made a difference to the final outcome as the baby had very poor gases and lactate at birth.

c. How would it be viewed by your peers?

The delay in having experienced staff to conduct the early part of the resuscitation would likely be considered unacceptable.

d. Recommendations for improvement that may help to prevent a similar occurrence in future. Skill based training for emergencies such as this. There are many courses. Has Hutt done a PROMPT course or similar recently?

Development of protocol for intrapartum resuscitation in labour that would include positioning on left side, use of tocolytics such as GTN or terbutaline and ensuring good hydration.

Added 14 May 2019. I have received the protocol from Hutt Valley DHB for Water Birth and the temperature was not recorded as recommended. Also received the protocol for Emergency Caesarean Section. There is no mention of intrapartum measures such as GTN or terbutaline to stop the contractions for CAT1 CS.

3. Other matters regarding the obstetric care provided to [Mrs A] that you consider warrant comment

a. What is the standard of care/accepted practice?

Monitoring the fetal heart rate while in the water bath: The CTG prior to going into the water bath was preceded by a long segment that appears to be normal (baseline 140, normal variability and accelerations present), then following the patient going to the bathroom, another segment of about 5 mins of CTG which is suspicious (possible deceleration). I consider that it would have been preferable for the CTG to have been continued until the CTG was normal for a longer period (say 10 mins) although I accept it was a normal CTG before this 5 minutes.

At this point [Mrs A] went into the water bath for almost 3 hours and the fetal heart rate was documented eight times as between 150 to 165 until a bradycardia was auscultated. The frequency of auscultation in this labour should have been every 15 mins especially given the possible deceleration in the CTG prior going into the bath. However the recommendation does allow 15 to 30 mins.

NICE 2017 Guideline for Intrapartum Care

'1.10.2 Offer intermittent auscultation of the fetal heart rate to women at low risk of complications in established first stage of labour:

- Use either a Pinard stethoscope or doppler ultrasound.
- Carry out intermittent auscultation immediately after a contraction for at least 1 minute, at least every 15 minutes, and record it as a single rate.
- Record accelerations and decelerations if heard.
- Palpate the maternal pulse hourly, or more often if there are any concerns, to differentiate between the maternal and fetal heartbeats. [2017]'

When it was restarted it was immediately suspicious (baseline 100 initially about 110, with exaggerated or hyper variability followed by several minutes of decelerations (baseline 90), rising to baseline of 140 before dropping again.

Finally I could not find any documentation of the temperature of the water bath or a progress in labour chart (partogram).

LMC midwifery care by [RM B] In the last hour of the labour there was a clear indication that the midwife should have called for the consultant or Registrar to return from 2140 onwards. Although the plan was made to reassess in 20 mins, there was no repeat vaginal examination until 2211. **Added 14 May 2019** *Perhaps this was because it is was not clearly written who should do the reassessment in 20 minutes and [Dr C] gave verbal instructions of 30 mins and [Dr E] wrote a slightly different suggestion of 20mins. Neither were followed.* Only the CTG was assessed at 2130. By 2140 the CTG was again abnormal but no reassessment of the CTG or VE done until LMC called consultant who returned and did the VE at 2211. This is an hour after 'reassess in 20 mins' was written in the notes. The LMC Midwife had good reason to call from 2140 onwards which is 10 minutes after the time written in the notes when reassessment was meant to occur. **Added 14 May 2019** *The letter from the MW describes [Dr C] and [Dr E] were in and out of the room from 2110 to 2140 although [Dr E] wrote at 2110 to reassess in 20 mins. Then they both left the delivery suite and went to ED. It was approximately 2130 hours. The CTG by 2140 was clearly abnormal again and [Dr E] and [Dr C] were not called for another 25 mins or so.*

I would like to acknowledge that the ACMM (I do not know what the acronym stands for but assume this is a senior midwife) has written that this was a busy night on delivery suite. This is always a challenge for busy obstetric units.

Documentation There are three different retrospective notes to consider and try and reconcile. These are written by the LMC MC [RM B], SMO [Dr C] and Registrar [Dr E]. They are all slightly different. It has taken some time to read all the notes and summarise them. There were similar problems with the paediatric notes. Several doctors had challenging writing and didn't identify their role clearly or write their names clearly.

Another problem with the records was the lack of a continuous CTG numbered in segments according to the times. I received 4 pages of CTG, which I had to piece together to sort out the timing. It should have been provided carefully numbered. I have provided the correctly numbered segments in a new attachment but as this is a copy of a copy the quality is not good.

b. If there has been a departure from the standard of care or accepted practice, how significant a departure do you consider this to be?

Monitoring in the water bath
This is not a significant departure as there were periods of normal CTG following coming out of the water bath.

LMC Midwifery care
Not calling for a formal reassessment and VE by the consultant is significant as earlier return of the consultant may have led to the decision for a CAT1 section to have been made 30 minutes earlier which may have led to a different outcome. However it was a shared responsibility. The consultant should not have needed to be called when she knew of the abnormal CTG only an hour earlier. **Added 14 May 2019** *And earlier resort to a fetal blood sample or a CAT1 CS was indicated on the basis of the abnormalities that were present for the large majority of the CTG from 2020 onwards.*

c. How would it be viewed by your peers?

This would be a point of some debate. Perhaps [Dr C] was busy although there is nothing in the notes to say that she was involved with other patients. In my experience whenever there is an abnormal CTG at full dilatation the SMO tends to stay close until the baby is delivered.

Added 14 May 2019. I have now received information that [Dr C] and [Dr E] were called to the ED regarding a young woman having a miscarriage.

d. Recommendations for improvement that may help to prevent a similar occurrence in future.

I have made recommendations above about the interpretation of the CTG.

Clear documentation about who is responsible for an action plan.

Better documentation with clearer writing about the role of the person writing and their names as well as signatures.

Added 14 May 2019. I have reviewed the letter from [Dr K]. I did not find any new information in the letter. This is a review of the case from a senior colleague. The timing in the letter is confusing. [Dr C] did not see the CTG until 2110 not 2040. He suggested it was up to the MW to call [Dr C] back. My view is that the several periods of abnormal CTG from the time the emergency bell was rung at 2020 hours were sufficient justification for a fetal blood sample to be taken or a CAT1 CS. Letters were

also received from [Dr C] to the MCNZ, and further letters from [Dr E] and [RM B]. No major new information was gained from these letters apart from the information that I have highlighted above.

Finally it would have been helpful to know the length of training that the registrar and paediatric SHO had have. That has now been provided to me.

Professor Cynthia Farquhar"