HEALTH & DISABILITY COMMISSIONER
TE TOIHAU HAUORA, HAUĀTANGA

A Decision by the Deputy Health and Disability Commissioner

(Case 21HDC00851)

Contents

Introduction

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

2. The report discusses the care provided to Miss A by Hawke's Bay Fallen Soldiers' Memorial Hospital[1] (Health New Zealand|Te Whatu Ora (Health NZ) Te Matau a Māui Hawke's Bay) during her first pregnancy in 2018.

[1] Formerly known as Hawke's Bay District Health Board. On 1 July 2022, the Pae Ora (Healthy Futures) Act 2022 came into force, which disestablished all district health boards. Their functions and liabilities were merged into Health NZ. All references in this report to Hawke's Bay District Health Board now refer to Health NZ Te Matau a Māui Hawke's Bay.

Names except Health NZ Te Matau a Māui Hawke's Bay, Hawke's Bay Fallen Soldiers' Memorial Hospital, and the clinical advisor have been removed to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

3. The following issue was identified for investigation:

- *Whether Te Whatu Ora|Health New Zealand provided [Miss A] with an appropriate standard of care on [13 Month1[2]] 2018.*

4. The parties directly involved in the investigation were:

Miss A	Consumer/complainant
Health NZ Te Matau a Māui Hawke's Bay	Provider

5. Further information was received from:

Dr B	Obstetrics and gynaecology registrar
Registered Midwife (RM) C	Core midwife
Dr D	Obstetrician and gynaecologist

Background

6. Miss A was 26 years old at the time of these events in 2018 and was pregnant with her first baby. On 13 Month1 2018 (at 29 weeks' gestation) Miss A was being seen by her lead maternity carer (LMC) in the community following a report of decreased fetal movements when a cardiotocography[3] (CTG) scan undertaken by her LMC showed decreased fetal heart rate/decelerations. Miss A was transferred to Hawke's Bay Fallen Soldiers' Memorial Hospital (Hawke's Bay Hospital) urgently via ambulance for further assessment and treatment.

7. On arrival at Hawke's Bay Hospital, Miss A was examined by core midwife RM C,[4] who documented that Miss A's uterus was soft to palpate,[5] and the fundus[6] was equivalent to the fetal gestational age. It was noted that Miss A had been feeling unwell over the previous two days and had had loose bowel motions. RM C commenced a CTG at 2.20pm, and Health NZ told HDC that it was consistent with a gestational age of 29 weeks, with some loss of contact[7] but good variability.

8. The CTG was stopped at 3.05pm by obstetric registrar Dr B. Dr B documented that the CTG monitoring could be removed as it demonstrated good variability, and, despite the periods

[2] The relevant month is referred to as Month1 to protect privacy.
[3] Cardiotocography (CTG) is used during pregnancy to monitor fetal heart rate and uterine contractions. A normal CTG is associated with a low probability of fetal compromise and has the following features: baseline rate of 110–160 beats per minute (bpm), baseline variability of 6–25bpm, accelerations of 15bpm for 15 seconds, and no decelerations. All other CTGs are considered abnormal and require further evaluation, taking into account the full clinical picture.
[4] At the time of these events, RM C had been working at Hawke's Bay Hospital for a few years.
[5] To examine with the hands, by pressing.
[6] The dome-shaped, rounded superior part of the body of the uterus that lies above the opening of the uterine tubes.
[7] Loss of contact occurs when the baby moves outside the ultrasound field of the cardio transducer of the CTG monitor.

of poor contact, the CTG demonstrated no clear decelerations of the fetal heart rate during that period.

9. Dr B undertook a bedside ultrasound scan (USS), which showed the baby's heartbeat and movements (some felt by Miss A, others not) and plenty of liquor.[8]

10. Dr B requested a formal USS in the Radiology Department, and on the request form, ticked the box 'Growth +/- dopplers as indicated'. The formal USS (performed without a Doppler[9]) showed the baby's estimated weight to be above the 50th centile with normal liquor volume.

11. Following the formal USS, Miss A was seen by the Senior Medical Officer (SMO), consultant obstetrician and gynaecologist Dr D.[10] Dr D did not recommence the CTG but reviewed the previous CTG and formal USS and made the plan to '*Allow home. LMC to arrange repeat growth scan in 4 weeks*.'

12. There is no documentation of any advice or written information having been given to Miss A about monitoring the baby's fetal movements on discharge.

Subsequent events

13. Miss A's LMC arranged for a repeat growth scan to be undertaken in two weeks' time (26 Month1). However, prior to this, Miss A stopped feeling fetal movements altogether. Miss A told HDC that despite not having felt fetal movement for three days prior to the scan, she did not present to hospital because the staff had reassured her that everything was fine.

14. At the growth scan on 26 Month1 2018, sadly it was confirmed that baby A was deceased, and she was stillborn on 29 Month1 2018. A post mortem was conducted but a cause of death could not be identified.

15. Health NZ told HDC that Miss A's case was reviewed at a Health NZ Perinatal Morbidity and Mortality Review Committee (PMMRC) meeting, where all stillbirths and neonatal deaths that occur in the unit are discussed by a multidisciplinary team (obstetrics, midwifery, paediatrics, radiology) to review any concerns arising from the death and formulate a plan to mitigate the risk for any subsequent pregnancies.

16. Health NZ told HDC that following these discussions at the PMMRC meeting, at which the results from the tests performed on Miss A and baby A were available, it was decided that nothing would be gained from conducting a formal adverse event investigation into baby A's death. However, Health NZ said that it did recognise that it was important to ensure the consistent use of written information for women who are assessed for reduced fetal movements in pregnancy.

[8] Amniotic fluid.
[9] Doppler ultrasound uses sound waves to detect the movement of blood in vessels. It is used in pregnancy to study blood circulation in the baby, uterus, and placenta.
[10] At the time of these events, Dr D had been employed in the current role for a few years.

Responses to provisional opinion

Miss A

17. Miss A was provided with an opportunity to comment on the 'information gathered' section of the provisional opinion and advised that she is pleased that finally there has been an acknowledgement that things were not done how they should have been.

Health NZ

18. Health NZ was provided with an opportunity to comment on the provisional opinion, and it advised that it accepts the proposed recommendations in principle. However, Health NZ said that it wished to take the opportunity to clarify comments and, in some instances, dispute the information gathered during the investigation. These comments have been incorporated throughout this report where relevant.

Dr D

Dr D was provided with an opportunity to comment on the sections of the provisional opinion that related Dr D. Dr D's comments have been incorporated throughout this report where relevant.

Opinion

Introduction

19. At the outset, I extend my sincere condolences to Miss A, her partner, and their families for the loss of baby A. In considering the care provided to Miss A and baby A, I sought independent clinical advice from an obstetrician and gynaecologist, Dr Sornalatha Vasan.

20. After careful review of the information gathered over the course of this investigation, I have several concerns about the care provided to Miss A on 13 Month1 2018. I acknowledge that multiple staff were involved with Miss A's care on 13 Month1, and, in my view, the responsibility for the deficiencies in care lay with Health NZ, as outlined below.

21. This report focuses on the adequacy of the following four aspects of care:

- CTG monitoring;
- Performance of Dopplers;
- Testing for feto-maternal haemorrhage; and
- Information provided on discharge.

CTG monitoring

22. Miss A arrived at the maternity unit at Hawke's Bay Hospital on 13 Month1 2018 after her LMC performed a CTG in the community and noted a deceleration in fetal heart rate. The CTG had been instigated after Miss A had reported reduced fetal movement.

23. At the maternity unit, RM C commenced a CTG at 2.20pm. Obstetric registrar Dr B documented that there were no clear decelerations in the fetal heart rate (with the limitation of loss of contact), and there was acceptable variability.

24. Miss A told HDC that she was told by staff that because she was 29 weeks pregnant, the monitor could not pick up a baby's heart rate very well when the baby was so young, and instead it could be picking up her own heart rate. She said that they moved the monitor around and told her that possibly her baby had fallen asleep, or the monitor had fallen off.

25. The CTG was stopped at 3.05pm by Dr B, who performed a beside USS that noted a fetal heartbeat and plenty of liquor.[11] Dr B arranged for a formal USS to be performed in the hospital's Radiology Department and ticked on the request form 'Growth +/- dopplers as indicated'. The formal USS (subsequently performed without a Doppler) also noted normal liquor volume and fetal heart rate with growth measurements plotting around the 50th centile.

26. Miss A was discharged by SMO Dr D without further CTG monitoring undertaken prior to discharge. There is no documentation about a need for further monitoring, and Dr D considered that further CTG monitoring was not necessary given the scan findings (as discussed below).

Health NZ's response

27. Health NZ has since accepted that the CTG commenced at 2.20pm was not normal as per the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) definition,[12] given that the CTG trace was of poor quality with areas of loss of contact, which meant that not all features of a normal CTG were present. Health NZ told HDC that such poor quality CTG traces occur more often when undertaking preterm monitoring, especially when the fetus is active. However, despite the CTG not being normal, Health NZ noted that the fetal heart tracing did not indicate a need for urgent delivery, especially given the early gestational age of the fetus.

28. Health NZ said that the monitoring was discontinued at the time so that the medical staff could make an urgent clinical assessment of Miss A's situation, first with a bedside USS to check liquor volume and fetal movements, followed by a formal departmental USS. As the formal USS was to be undertaken in the Radiology Department and transport across the hospital was required, the CTG was not re-commenced after the bedside USS and prior to transfer to the Radiology Department.

29. Health NZ said that in its view, Miss A did not need to be admitted, but it accepted that she required a longer period of monitoring and should have remained in hospital until a normal

[11] Also referred to as amniotic fluid, which is fluid that surrounds the baby in the uterus (womb).

[12] RANZCOG 'Intrapartum Fetal Surveillance' Clinical Guidelines-3rd-Edition 2014. A normal CTG is associated with a low probability of fetal compromise and has the following features: • Baseline rate 110–160bpm. • Baseline variability of 6–25bpm. • Accelerations of 15bpm for 15 seconds. • No decelerations. All other CTGs are by this definition abnormal and require further evaluation taking into account the full clinical picture.

CTG had been demonstrated. Health NZ also accepted that there is a lack of documentation to elicit why the CTG was not repeated after the formal USS was performed.

30. In response to the provisional opinion, Health NZ stated that it accepts the findings and conclusions regarding CTG monitoring.

Dr B's response

31. Dr B agreed that the CTG did not meet the RANZCOG definition of a normal CTG given the lack of accelerations, but, like Health NZ, considered that the CTG trace was not a terminal trace or a trace requiring immediate delivery. Dr B reviewed and acted on the CTG urgently. On entry to the room, Dr B undertook an immediate assessment in response to the CTG, which included an in-person review, a bedside USS, and arranging an urgent and immediate formal USS in the Radiology Department.

32. Dr B said that the decision to remove the CTG was made because it demonstrated acceptable variability and no clear decelerations (with the limitation of some possible loss of contact) and Miss A had noted that fetal movements had returned. Furthermore, obtaining a formal USS required transfer from the delivery suite to the Radiology Department by an orderly, and CTG monitoring is not commonly performed on transfer to the Radiology Department.

Dr D's response

33. After completion of the formal USS, Dr D made the decision to discharge Miss A without a further CTG or additional monitoring. Dr D said that the normal practice would be to look at all aspects of the clinical scenario at that particular time to aid decision-making. Although a CTG gives a 'snapshot' of fetal heart rate pattern at that precise moment in time, it should not be looked at in isolation. Dr D also referred to the NICE recommendations[13] on fetal monitoring and noted that '*foetal heart rate monitoring is a tool to provide guidance on foetal condition, and not a standalone diagnostic tool*'.

34. Dr D felt that the first 25 minutes of the CTG commenced at 2.20pm was a normal CTG for 29 weeks' gestation, and the remainder with loss of contact was due to fetal movement, which Dr B then observed on the bedside scan, picking up a maternal heart rate of 79bpm. Dr D said that the baseline fetal heart rate of 140bpm and the episodes of increased variability are both within normal limits for this gestation. Loss of contact during a continuous CTG is normally due to fetal movement, which was also documented on the Radiology Department scan at 3.58pm, and Dr D felt that this would not be in keeping with signs of developing fetal hypoxia.[14] This was also Miss A's first presentation of reduced fetal movement occurring at the same time as her feeling unwell with loose bowels.

35. There is no documentation about the decision not to re-commence the CTG post the formal USS. However, Dr D told HDC that other factors that would have affected the decision not to place Miss A back on the CTG on returning to the maternity ward at the hospital with a

[13] National Institute for Health and Care Excellence (NICE) www.nice.org.uk.
[14] Occurs when the fetus is deprived of an adequate supply of oxygen.

normal USS scan would have included the acuity of the birthing suite and midwifery availability. Another factor to be considered regarding necessity of admission and further monitoring would be the increased anxiety caused by admission to hospital, away from partner and family, experienced by some women.

36. Dr D said that as this was Miss A's first episode of reduced fetal movements, with no history of recurrent reductions in movements, Miss A could be discharged home after returning from the formal USS. This was on the basis of the normal findings of this USS, fetal movement also being seen earlier on the bedside scan, and the fetal heart baseline rate remaining at 135–140bpm over the course of the afternoon from when Miss A was placed on the CTG by her LMC and then on the CTG in the maternity ward at the hospital, and also the fetal heart rate documented on the USS.

Advice from independent advisor and my opinion

37. My independent advisor, Dr Sornalatha Vasan, stated that the initial CTG recording between 1.05pm and 1.40pm (performed by Miss A's LMC in the community) and the second CTG recording between 2.20pm and 2.50pm at the maternity unit were both abnormal, and fetal hypoxia could not be ruled out.

38. Dr Vasan advised that the CTG monitoring should have been continued at the maternity unit so that further assessment could be undertaken. At 29 weeks, a baby is viable and needs to be monitored and interventions taken if any abnormalities persist.

39. Dr Vasan considered that the CTG should not have been disconnected at 3.05pm; it should have been continued and reviewed. She explained:

> 'Safe practice is not to disconnect CTG when it is very abnormal until normal trace has been obtained unless one is equivocal and doppler was going to add value to management.'

40. I acknowledge Dr Vasan's opinion. However, I accept that Dr B made the decision to discontinue the CTG to perform a bedside USS to check on fetal wellbeing, and then the CTG remained discontinued as Miss A was transferred to the Radiology Department for a formal USS. Noting that a formal USS would add valuable information to help assess fetal wellbeing, I consider that this initial decision to discontinue the CTG was reasonable in the circumstances.

41. However, regarding the decision to discharge Miss A without further CTG monitoring, I note Dr Vasan's advice:

> '[J]ust seeing foetal heart with normal liquor volume is not sufficient to discharge [Miss A] home without performing CTG to ascertain it was normal prior to discharge. Even if the Doppler were normal it was imperative to perform CTG on return from Ultrasound to assess if it was normal. In the presence of normal [ultrasound] and dopplers, if CTG abnormality persisted she needed continuous monitoring, intra uterine resuscitation

> i.e. intra venous fluids ([Miss A] had severe vomiting and diarrhoea prior to admission) and ruling out other maternal conditions which can compromise the foetus.
>
> …
>
> Allowing her to go home without continuing CTG further and close monitoring … was a serious deviation from standard care.'

42. I accept this advice, and I note that Health NZ has accepted that the CTG should have been continued until a normal CTG had been demonstrated. In my view, the CTG was abnormal, and should have been re-commenced until a normal trace had been obtained (or, if a normal trace could not be obtained, until other necessary steps had been identified). I am also critical that there is a lack of documentation to explain why the CTG was not re-commenced after the formal USS.

Dopplers

43. Following a bedside USS, Dr B arranged for a formal USS to be performed in the hospital's Radiology Department and ticked on the request form 'Growth +/- dopplers as indicated'. The formal USS was performed without an umbilical artery Doppler assessment (Dopplers) (to assess blood flow through the placenta and umbilical cord). The formal USS also noted normal liquor volume and fetal heart rate with growth measurements plotting around the 50th centile.

Health NZ's response

44. Health NZ told HDC that Dopplers were not undertaken at the time of the formal USS as this was not indicated (as baby A was not small for her gestational age).[15] Health NZ explained that the PSANZ Guideline (2017 version) (Appendix C)[16] did not recommend routine Dopplers for the assessment of reduced fetal movements; the PSANZ Guideline instead stated that as part of USS, 'placental and fetal Doppler assessment [should be performed], as indicated'. Health NZ's view is that the key indication for Dopplers under the PSANZ guidelines was fetal growth restriction, which did not apply in this case. Health NZ also stated that the Maternal Fetal Medicine Doppler guidelines (NZMFMN)[17] (Appendix E) (which did explicitly state that reduced fetal movement was an indication for Dopplers[18]) were not well socialised at the time and were not consistently standardised across the Radiology Department.

[15] Health NZ stated that umbilical artery Dopplers are not an assessment of fetal wellbeing, rather they are an assessment of placental function. The umbilical artery pulsatility index (UAPI) provides an assessment of the downstream resistance in the placenta and generally will not become abnormal until at least 30% of the placenta is not functioning adequately. This is most often seen in fetal growth restriction or other placental pathology. As such, the indication to do umbilical artery Dopplers would be for fetal growth restriction.
[16] Perinatal Society of Australia and New Zealand (PSANZ) 'Clinical Practice guideline for the care of women with decreased fetal movements' (10 August 2017).
[17] New Zealand Maternal Fetal Medicine Network 'New Zealand Obstetric Doppler Guideline' (October 2015).
[18] Specifically, an umbilical artery pulsatility index (UAPI).

45. Appendix 1 of the Health NZ guideline for reduced fetal movements in pregnancy sets out the high-risk categories for stillbirth and, as noted by Dr Vasan, two of the risk factors (primiparity and smoking) were relevant to Miss A. According to the flowchart for managing reduced fetal movement at the end of this guideline, women who are considered high risk should have a USS performed for growth and liquor volume and it should include Dopplers.[19]

46. Health NZ (incorrectly) told HDC that Miss A did not have relevant risk factors for stillbirth according to its guideline or the PSANZ Guideline [20] and the RCOG 'Reduced Fetal Movements' guideline (Appendix D).[21]

47. Health NZ told HDC that it was important to note that the post-mortem[22] examination of the placenta, which was histologically normal, provides reassurance that had Dopplers been performed they would have been normal. There was no evidence of a fetal-maternal haemorrhage, and the stillbirth was unexplained.

Independent advice

Dr Vasan considered that performing a USS to confirm fetal heartbeat and normal liquor volume only (in other words, without doing Dopplers) does not suffice or reassure fetal wellbeing in the background of decreased fetal movement and abnormal CTG with no uterine contractions.

48. Dr Vasan noted that hypoxia could not be ruled out and stated:

> 'Uteroplacental [insufficiency] [23] leads to foetal growth restriction hypoxia and hypoxaemia. Foetal umbilical artery dopplers … are very important and [the] only means of assessing foetal well-being and ruling out foetal hypoxia antenatally. Foetal doppler abnormalities reflect placental dysfunction.'

49. Dr Vasan said that just doing ultrasound to confirm fetal heartbeat and normal liquor does not suffice or reassure fetal wellbeing in the background of decreased fetal movement and abnormal CTG with no uterine contractions. Dr Vasan considered that optimal management would have involved admitting Miss A for 24 hours of monitoring of the fetal heart rate, which should have included Dopplers. If these results had been normal, Miss A could then have been discharged with clear instructions to report promptly if decreased fetal movement persisted or any other symptoms were noted.

[19] The Health NZ guideline does not specify what type of Doppler.
[20] Health NZ's response referred to the RANZCOG 'Clinical Practice Guideline for the Care of Women with Decreased Fetal Movements', but this is the same as the PSANZ guideline. For ease of reference, it will be referred to as the PSANZ guideline throughout this report.
[21] The RCOG and PSANZ guidelines both state that primiparity and smoking are two risk factors for stillbirth. The PSANZ guideline also states that drug use is a risk factor.
[22] Baby A had a full post mortem with no placental pathology identified and no evidence of a fetal-maternal haemorrhage, and the stillbirth was deemed to be unexplained.
[23] Utero-placental insufficiency is the failure of the placenta to deliver sufficient nutrients to the fetus during pregnancy, and often is a result of insufficient blood flow to the placenta.

Health NZ's response to provisional opinion

50. In response to the provisional opinion, Health NZ stated that while it agrees with the overall findings relating to Dopplers, as outlined above, it referred to discordance across the guidelines in place at the time and not good evidence to support their use, as per the PSANZ guideline 2017. Health NZ accepted that Dopplers are a commonly performed measure for all sonographers undertaking obstetric work, and it is an easy addition to any scan. Health NZ stated that it is important to remember that these events occurred in 2018, which was prior to the change in the PSANZ guidelines to include routine Dopplers.

51. Health NZ advised HDC that umbilical artery pulsatility index (UAPI) is the only type of Doppler that would have been recommended in this case as per the updated PSANZ guideline.[24] Health NZ stated that Dopplers would not have been able to predict or possibly prevent the events that occurred.

52. Health NZ has also said that it had a 'Reduced Fetal Movements in Pregnancy' guideline (Appendix B) in place, which provides advice to staff on the management of women presenting with reduced fetal movements.

53. Health NZ clarified that it was not saying that hypoxia can be ruled out by post mortem, and baby A had none of the placental histopathology that is frequently seen with fetal loss, growth restriction, or even small placental size. Health NZ felt that in the absence of these, it was unlikely that a Doppler, had it been performed, would have been abnormal, but this does not mean it would not have been beneficial for a Doppler to have been done.

Independent advisor's comments in response to Health NZ's response and my opinion

54. Dr Vasan was provided with an opportunity to review Health NZ's response to the provisional opinion. Dr Vasan agreed that Dopplers do not have the ability to predict or prevent stillbirth but remained of the view that Dopplers should have been considered at the time.

55. Dr Vasan concluded that her opinion remains the same, while acknowledging that stillbirth is still an enigma in obstetric practice and continues to challenge obstetricians with little advancement in knowing the cause or prevention.

56. The New Zealand Obstetric Doppler Guideline recommends a USS with Dopplers (UAPI) for investigation of decreased fetal movements. Although Health NZ stated that this guideline was not well socialised at the time, according to its own guideline, because of Miss A's risk factors, a USS with Dopplers should have been performed.

57. I accept that there are differing perspectives on whether Dopplers should have been performed as part of the USS at the time. Having carefully considered this information, I agree with Dr Vasan's conclusion that further investigation was called for in the circumstances to establish fetal wellbeing, and the decision not to undertake a Doppler was

[24] https://stillbirthcre.org.au/wp-content/uploads/2021/03/Element-3_DFM-Clinical-Practice-Guideline-1.pdf

a deviation from accepted management of Miss A's pregnancy at 29 weeks, particularly with the background of decreased fetal movement and an abnormal CTG. I note that it is the UAPI Doppler specifically that was indicated in the circumstances.

58. Dr Vasan has described this as a serious deviation from accepted management. Whilst I acknowledge Dr Vasan's opinion, in my view, the seriousness of not undertaking Dopplers is mitigated by the fact that there are conflicting opinions and a lack of clarity in the guidelines as to when USS should include Dopplers, and which types of Dopplers to include. I am nonetheless critical that UAPI Dopplers were not performed as part of the USS.

59. I note that Dr B referenced Dopplers on the formal USS referral form but did not explicitly state that they were required, and subsequently the radiologist did not perform them. It is unclear to me where responsibility for the decision not to include Dopplers in the USS lies. However, as Health NZ holds overall responsibility for the standard of care provided to Miss A, and noting that Health NZ's response indicated a misunderstanding of its own guideline, I consider it appropriate to hold Health NZ accountable for this failure.

60. Finally, Dr Vasan was critical of Health NZ's comments regarding the findings of the post mortem. She commented:

> 'To collate postmortem findings and conclude that there was no evidence of foetal hypoxia … and [that] Dopplers might have been normal is a dangerous assumption and not safe clinical practice.'

61. I acknowledge Health NZ's response to Dr Vasan's comments on the findings of the post mortem. It is not possible to know whether the Dopplers would have been normal had they been completed at the time, but I recognise that baby A had none of the placental histopathology that one would expect to see if Dopplers (UAPI) were abnormal, which is why Health NZ considered that had they been performed, it is unlikely that they would have been abnormal.

Testing for feto-maternal haemorrhage — Kleihauer test or flow cytometry test

62. During Miss A's time in hospital, no testing for feto-maternal haemorrhage (FMH)[25] was undertaken. The PSANZ guideline (2017) [26] stated: 'Testing for fetal to maternal haemorrhage should be considered in the preliminary investigation of women with [decreased fetal movements].'

[25] Fetal-maternal haemorrhage is the loss of fetal blood cells into the maternal circulation.
[26] PSANZ guideline, 'Clinical Practice guideline for the care of women with decreased fetal movements' (10 August 2017).

Health NZ's response

63. Health NZ told HDC that in most hospitals throughout New Zealand at the time of the first PSANZ guideline in 2017, testing for FMH with a Kleihauer test[27] had not been done routinely on first presentation for reduced fetal movements.

64. Health NZ also stated that flow cytometry[28] was not available in Hawke's Bay Hospital, and any Kleihauer testing undertaken at this time would not have been reported until the next day, essentially making this testing clinically unhelpful.

65. Health NZ noted that the PSANZ guideline in 2019 changed to incorporate testing for FMH being considered in the preliminary investigation of women with decreased fetal movements where FMH is suspected, particularly if there is a history of sustained or recurrent decreased fetal movement. The other method for assessing for FMH would be a MCAPSV;[29] this would also not have been available routinely in the Radiology Department in 2018.

66. In response to the provisional opinion, Health NZ reiterated that testing for FMH with a Kleihauer test would not have been standard practice in 2018 (noting that the PSANZ 2017 guideline was published in August 2017). However, Health NZ accepted that this could have been completed in this case, and the fact that it was not done is a deviation, although in Health NZ's view it would have been gold standard (rather than the accepted standard of care).

Dr D's response to HDC

67. Dr D told HDC that clinically there was no suggestion of FMH in this case, and therefore, a Kleihauer test was not insisted upon, also noting that the 2017 PSANZ guideline stated to *consider* doing a Kleihauer test, not definitely to perform it. Dr D was of the view that a MCAPSV test was a far better indicator of significant FMH and, if there had been concerns about FMH, preferentially this test would have been done, if available.

Independent advice and my opinion

68. Dr Vasan stated that testing for FMH in the form of a Kleihauer test or a flow cytometry test, where feasible, should be considered in the preliminary investigation of women with DFM from 28 weeks' gestation. I note that this advice aligns with the recommendation in the 2017 PSANZ guideline.

69. Dr Vasan also stated that as the CTG results had been abnormal from the time Miss A presented to her LMC, and had been abnormal in hospital until her discharge, a negative Kleihauer would have been reassuring. Dr Vasan advised that although reporting time for a

[27] The Kleihauer test (also known as the Kleihauer-Betke test) is a blood test used to measure the amount of fetal haemoglobin transferred from a fetus to a mother's bloodstream.

[28] Flow cytometry is a technique that can be used to measure the presence of fetal red cells in maternal blood. It is becoming more widely used in routine clinical practice for the measurement of feto-maternal haemorrhage.

[29] Middle cerebral artery peak systolic velocity (MCA-PSV) has emerged as a method of screening for fetal anaemia in at-risk fetuses.

Kleihauer test could be variable, it is important in managing pregnancy at 29 weeks where conservative management is most favoured, owing to fetal prematurity,[30] particularly if there is no imminent threat to fetal survival. Dr Vasan stated that not considering a Kleihauer test was a mild deviation from the accepted standard of care.

70. While I acknowledge that flow cytometry was not available at Hawke's Bay Hospital at the time, the Kleihauer test was available. However, I also acknowledge that the recommendation in the PSANZ 2017 guideline to perform this test was not a firm recommendation, and I accept that there was no suggestion of FMH at the time. In these circumstances, I am not critical that the Kleihauer test was omitted.

Information provided upon discharge and follow-up plans

71. Miss A was seen by Dr D following the ultrasound. Dr D reviewed the CTG and scans and made the plan to '*Allow home. LMC to arrange repeat growth scan in 4 weeks*.'

72. Nobody involved in Miss A's care documented any verbal advice or written information having been given to Miss A about monitoring fetal movements upon discharge.

Health NZ's response

73. Health NZ told HDC that Miss A should have been given clear information on the importance of regular fetal movements, although written information was not provided routinely for reduced fetal movements at the time of Miss A's presentation. Health NZ stated that it is the responsibility of all clinicians involved in care (hospital staff and LMC) to provide appropriate advice regarding fetal movements, and to reiterate the importance of returning for repeat assessment if they have ongoing concerns.

74. In response to the provisional opinion, Health NZ agreed with the findings discussed in this report. Health NZ told HDC that policies and patient information are included in orientation for new staff, and many of the registrars say that they have never been given written information on reduced fetal movements and are surprised to find that this information is available. This remains at issue at a national level despite the change in the region. Health NZ stated that sharing the report with the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (as outlined in paragraph 116 below) will be an important step in disseminating this knowledge.

Dr D's response

75. Dr D told HDC that safety-netting advice about fetal movements and what to look out for was not given to Miss A. Dr D did not consider asking the hospital midwife assigned to look after Miss A to give her written information about fetal movement. Dr D said that because Miss A had been referred in by her midwife with reduced fetal movement, the assumption was that this had already been covered and that Miss A knew what to look out for. Dr D was not aware that Miss A had not received, nor did Dr D instruct that Miss A be given, the information leaflet 'Pregnancy — your baby's movements and what they mean'. Dr D referred to the RCOG guideline, which states that '[c]linicians should be aware that

[30] Preterm is defined as 'babies born alive before 37 weeks of pregnancy are completed'.

instructing women to monitor fetal movement is potentially associated with increased maternal anxiety[31]'.

76. Dr D tried to explain to Miss A about fetal movement patterns at different gestations and times, which is also expressed in the RCOG guideline.[32] Dr D noted that Miss A's concern that she was told that babies move less the bigger they get was an unfortunate misunderstanding of what was being said.

77. Dr D said that usual practice at that time would have been to end the consultation with a reassurance that staff were happy with the investigations such as the scan, and they knew that baby was moving, even though the mother could not feel the movements, but for the woman to come back if she had any concerns.

78. Regarding the decision to arrange for a growth scan in four weeks' time, Dr D noted that the growth scan performed on this admission, with a first episode of reduced fetal movement, had shown all fetal growth parameters to be within normal limits and an EFW[33] just above the 50th centile on the GROW chart. Given Miss A's risk factors for growth restriction (primiparity, smoker, and previous cannabis use), Dr D felt that it was appropriate to recommend a repeat growth scan in four weeks' time to screen for growth restriction, which is the recommended interval between scans for screening for growth restriction. Dr D said that if there had been concerns of suspected growth restriction,[34] a growth scan ideally in three weeks' time would have been requested, as this gives fewer false positive results compared to the two-week interval recommended in the New Zealand Maternal Fetal Medicine Network endorsed Small for Gestational Age/Fetal Growth Restriction guidelines (the SGA/FGR Guidelines).[35]

79. In response to the provisional opinion, Dr D told HDC that the criticism for not repeating the CTG when Miss A had returned from Radiology is accepted, but not the criticism that the growth scan should have been at an earlier interval of two weeks.

80. In summary, Dr D told HDC that the USS did not show fetal growth restriction or compromise, and that combined with the CTG, there was no evidence of fetal hypoxia. Even though the CTG did not fulfil the RANZCOG criteria for 'normal', Dr D did not consider that this should have changed the recommended interval for a growth scan. Reduced fetal

[31] Royal College of Obstetricians and Gynaecologists, 'Reduced Fetal Movements', Green-top guideline, No. 57 (February 2011).
[32] 'From this stage [32 weeks] of gestation, the frequency of fetal movements plateaus until the onset of labour; however, the type of fetal movement may change as pregnancy advances in the third trimester. By term, the average number of generalised movements per hour is 31 (range 16–45), with the longest period between movements ranging from 50 to 75 minutes. Changes in the number and nature of fetal movements as the fetus matures are considered to be a reflection of the normal neurological development of the fetus.
[33] Estimated fetal weight.
[34] Dr D cited the examples of an EFW below the 10th centile on a GROW chart, discrepancy between head circumference and abdominal circumference, or reduced single deepest pocket (a measure of amniotic fluid).
[35] New Zealand Maternal Fetal Medicine Network, 'Small for gestational age and fetal growth restriction in Aotearoa New Zealand. A clinical practice guideline: evidence summaries'.

movement is a risk factor, along with primiparity and smoking, for fetal growth restriction, and therefore it is important to screen for this. However, fetal growth restriction was not diagnosed on the USS performed at the hospital. Dr D stated that in the event that there was fetal growth restriction, then the interval between growth scans should be two weeks or ideally closer to three weeks to reduce inaccuracy. Dr D's view is that when screening for growth restriction, as was the case for Miss A, four weeks is the recommended interval as per the current guidelines.[36]

81. Dr D considered that there was no evidence of hypoxia, and that not fulfilling the RANZCOG criteria for a normal CTG should not change the decision for reducing the scan interval for screening for growth restriction. Dr D stated that CTG assessment alone is not indicative of fetal hypoxia and has to be looked at in context.

82. Dr D reiterated that recommending a follow-up scan at two weeks is not within current guidelines when there is known placental dysfunction, and the recommended time frame is now three weeks to improve the sensitivity and specificity of the scan.

Dr B's response

83. Dr B told HDC that it was routine practice to advise women of the importance of fetal movements and give them verbal 'safety return advice'. This would include telling them that fetal movements are of utmost importance and if their baby is not moving, or not moving in their normal pattern, it is important to contact their midwife. If their midwife is unavailable, they should seek an inpatient review on the same day, and not wait until the morning, or their next appointment.

84. Dr B said that it appeared that no written documentation was available for women at the time (although I note that the information leaflet 'Pregnancy — your baby's movements and what they mean' was available). However, according to Dr B, fetal movements are of utmost importance, and this is stressed to all women prior to their leaving the hospital to ensure that they know to contact their lead maternity carer on the same day if any concerns arise. Dr B stated that there was no reason to believe this would not have been communicated to Miss A prior to her departure from the hospital.

RM C's response

85. RM C told HDC that there was no recollection about having a conversation on reduced fetal movements, and that there was no knowledge about a handout being available on reduced movements. However, RM C said that the CTG was discontinued. When Miss A was discharged, RM C was not around, and as a result, did not have the opportunity to discuss management of reduced fetal movements.

Independent advice and my opinion

86. Dr Vasan stated that Miss A should have been given written information about fetal movements and been advised to return to hospital if she continued to experience decreased fetal movements. As Dr Vasan noted, there is no record that this written or verbal

[36] New Zealand Obstetric Ultrasound Guidelines 2019, Appendix 9.

information was given. Dr Vasan considered that the failure to provide written information about the importance of monitoring fetal movements was a moderate departure from the standard of care.

87. I also note that Health NZ's reduced fetal movement guideline states:

> 'All women should be advised to contact their LMC midwife/GP if they have any concerns about reduced or absent fetal movements and not to wait until the next day to report reduced or absent fetal movements.'

88. Health NZ stated that it is the responsibility of all clinicians involved in care (hospital staff and LMC) to provide appropriate advice regarding fetal movements, and to reiterate the importance of returning for repeat assessment if they have ongoing concerns. I am concerned that assumptions were made by staff that Miss A's LMC had already provided safety-netting advice about fetal movements. Miss A had been admitted to Hawke's Bay Hospital due to concerns about reduced fetal movements, and it was the responsibility of all staff to ensure that appropriate safety-netting advice was given to Miss A when she was discharged, and that this advice was documented.

89. Health NZ accepted that written information was not provided routinely for reduced fetal movements at the time and (based on Dr B's and RM C's evidence) staff were unaware of the written information that was available. While I acknowledge that Health NZ now has a flyer that is to be provided to patients routinely, I am critical that at the time of these events this was not the case, and staff were not made aware that the flyer could be provided to patients.

Decision not to undertake adverse event investigation

90. Health NZ told HDC that following the PMMRC meeting, where results from the tests performed on Miss A and baby A were available, it was felt that nothing would be gained from a formal adverse event investigation into baby A's death.

91. In response to the provisional opinion, Health NZ told HDC that since 2018, there have been changes in the way Health NZ deals with consumer complaints and adverse events within the maternity department and throughout the organisation, and if a similar event were to happen now, an adverse event review would be completed.

92. I acknowledge Health NZ's response and the subsequent changes that have been made since these events. However, I remain critical of the initial decision not to undertake an adverse event review. I consider that an adverse event investigation was warranted to learn from the incident and provide closure for Miss A. I acknowledge that a PMMRC meeting took place, but I consider that this was insufficient to address Miss A's concerns or those of her LMC. I am also concerned that Health NZ predetermined that nothing would be gained from an investigation. As indicated in this report, lessons could have been learned from the events and the tragic outcome for Miss A and her family. Had Health NZ completed its own investigation, it may have identified these issues itself and taken any necessary remedial actions.

Conclusion

93. I have undertaken a thorough assessment of the information gathered in response to the concerns raised and have determined that Health NZ's management of Miss A was substandard in the following areas:

a) The CTG that was commenced on arrival at Hawke's Bay Hospital was abnormal. Miss A should not have been discharged without further CTG monitoring. I am also critical of the lack of documentation to explain why the CTG was not re-commenced after the formal USS was completed.

b) I acknowledge that while international guidance is conflicting, Miss A did not undergo a formal USS with Dopplers in line with Health NZ's policy.

c) I also have concerns that Health NZ did not give women written information about reduced fetal movements at the time.

d) Finally, I am concerned that Health NZ did not undertake an adverse event investigation following this incident.

94. Accordingly, I find that Health NZ breached Right 4(1) of the Code of Health and Disability Services Consumers' Rights.[37]

Dr D — adverse comment

95. Dr Vasan advised that given Miss A's history and her presentation of decreased fetal movements, Miss A was at risk of fetal growth restriction, and a repeat growth scan should have been scheduled for two weeks' time. Dr Vasan considered that advising a repeat growth scan in four weeks' time in the circumstances (abnormal CTG with decreased fetal movements) was a moderate departure from the accepted standard of care.

96. Dr Vasan was provided with an opportunity to review Dr D's response to the provisional opinion. Dr Vasan stated that a timeframe of four weeks for a growth scan would have been acceptable if Dopplers and the CTG were normal. In this case, Dr Vasan felt that there was no attempt made to confirm fetal wellbeing other than a basic USS, which reported normal growth and liquor. Dr Vasan stated that normally grown fetuses can get compromised acutely, and the first sign can be reduced fetal movements, and, in this case, there was a very abnormal CTG. She said that if CTG is considered as an investigation, it is imperative to interpret the findings in the clinical setting and manage appropriately.

97. Dr Vasan advised that not recognising CTG abnormality led to all the reasoning for the subsequent management Miss A received. Dr Vasan did not dispute that if growth on the first presentation of decreased fetal movement was normal, repeating a growth scan in four weeks' time was clinically appropriate, and if there had been evidence of growth restriction, then two to three weeks would be the preferred timeframe to repeat a growth scan. However, given the background of an abnormal CTG and decreased fetal movements, Miss A needed further investigations such as fetal Dopplers to assess fetal wellbeing

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

(discussed above). Dr Vasan stated that given the clinical picture, it is recommended practice to repeat USS in two weeks' time to reassure that there are no further placental concerns, or even earlier if there have been abnormalities in Doppler.

98. I acknowledge Dr D's submission that four weeks is the recommended interval for growth scans for screening for growth restriction. However, the fact remains that the CTG was abnormal, as acknowledged by both Dr Vasan and Health NZ, and I accept Dr Vasan's statement that not recognising that the CTG was abnormal influenced the subsequent management of Miss A. Miss A had risk factors for fetal growth restriction and had presented with reduced fetal movements.[38] In the circumstances, and noting the abnormal CTG, I remain of the view that Dr D should have recommended a growth scan at an earlier two-week interval, and I am concerned that this did not occur.

Treatment on arrival — other comment

99. Miss A said that she was not treated with any urgency when she arrived at Hawke's Bay Hospital, and she is concerned that she was seen by staff who were trainees. Miss A told HDC that staff discussed her care with her mother without consulting her, and she felt disrespected by staff.

100. Health NZ told HDC that there was a 10-minute delay before the CTG was put on after Miss A's arrival at Hawke's Bay Hospital. During that shift, eight other patients were present in the Labour and Birthing Suite, with a Trendcare (patient acuity tool) variance suggesting that RM C and a colleague required nearly nine hours more of resources than was available on that shift. CTG monitoring was performed by RM C. RM C had undertaken fetal surveillance training and was deemed competent to interpret CTGs.

RM C's response

101. RM C told HDC that the maternity unit was incredibly busy at the time of Miss A's arrival. RM C went into the room (close to the end of her morning shift) as requested by the shift co-ordinator with a very limited handover. RM C took a brief history before carrying out observations and palpating Miss A's fundus and assessing her as being equal to the gestational dates. RM C commenced the CTG and gave Miss A the call bell and advised her that the medical team would review her soon and, if she needed anything, to use the buzzer.

102. RM C told HDC that there is a regret over not returning to the room to check on the CTG before the shift ended to make sure it was recording properly and that a more detailed handover had been conducted both at the start and end of the shift.

103. The CTG was also reviewed by Dr B (obstetric registrar) and Dr D (obstetric consultant) as discussed above.

[38] PSANZ guideline, 'Clinical Practice guideline for the care of women with decreased fetal movements' (10 August 2017).

104. The formal ultrasound scan was performed by a trainee sonographer (overseen by a qualified sonographer to ensure that the scan was performed correctly and that all images were accurate).

Opinion

105. I appreciate that this was a very stressful and emotional time for Miss A. However, I consider that she was seen as quickly as possible following her arrival at Hawke's Bay Hospital and that the staff involved in her care had received appropriate training. While I am unable to make a finding on the manner in which she was treated by staff, I accept that this was Miss A's experience at the time, and I encourage staff to reflect on Miss A's comments. I also take this opportunity to remind Health NZ staff of the importance of privacy and consent when discussing care with family members.

Changes made since events

Health NZ

106. Health NZ Te Matau a Māui Hawke's Bay told HDC that since this event, it has made considerable changes to its practice and can say with confidence that if a patient were to present in the same way today, the care they would receive would be different. Health NZ wishes to extend its sincerest condolences to Miss A and her family for the loss of baby A and to assure them that their experience has been a catalyst for change within its service.

107. Health NZ stated that the changes have been brought about as a response to both these events and other adverse events, in conjunction with enhanced resources and the embedding of such practices throughout Aotearoa New Zealand. The changes include the following:

- The maternity service's reduced fetal movement guideline now includes routine umbilical Dopplers rather than only as indicated.
- Written information on reduced fetal movements is now made available to all women who present with reduced fetal movements, to further support verbal safety-netting advice shared with all women. The information provided continues to be updated as better resources for women become available.
- All medical and midwifery staff working in hospital are required to complete an on-line RANZCOG fetal surveillance education programme or the face-to-face programme annually and provide evidence of this — this ensures that all staff are using the same documentation and terminology for CTGs.
- All CTGs now need to be reviewed by a senior midwife on shift.
- CTG interpretation stickers were updated in line with updated RANZCOG terminology to ensure that appropriate descriptions are used consistently and that a normal CTG is truly defined.
- Escalation pathways were reinforced so that care decisions are escalated to the SMO appropriately.

- The introduction of clinical midwifery coordinators on shift 24/7 is being considered.

108. In response to the provisional opinion, Health NZ told HDC that there is a significant gap in access to maternal mental health support and grief counselling for women who have experienced the loss of a baby. Between 2020 and 2022, Health NZ was able to offer the 'Child Birth After Thoughts Service' (CHAT) to women who had experienced loss after a traumatic birth. However, the service was unfunded and delivered using vacant FTE,[39] and subsequently it ceased when a staff member retired.

109. Health NZ told HDC that women in the Hawke's Bay who experience mental health issues and do not have a live baby, currently do not meet the criteria to be seen by maternal mental health. Care needs to be provided by the community or inpatient mental health teams. Health NZ stated that this is due to funding on a national level. Grief counselling is also region specific, and there is no nationally specific approach.

110. Health NZ is aware that currently work with the PMMRC is underway on a national level to develop a national bereavement pathway. As a result, Health NZ supports a recommendation at a national level around the implementation of an adequately funded maternal mental health support and grief counselling service that would support the work being done locally.

Dr D

111. Dr D told HDC that since these events the RANZCOG fetal surveillance education programme had been completed, and this increased awareness of all the written information Health NZ has available for women.

112. Dr D has reflected on how information is communicated to women about what to expect over the course of a pregnancy and makes a point of emphasising that if they have any concerns or questions, to seek advice from their LMC or obstetrician straight away.

RM C

113. RM C told HDC that since these events the personal approach has been changed to make sure that documentation is clear, that better conversations are had with patients, and that women are always given information about fetal movements and what is normal and abnormal and when to advise staff.

[39] Full-time equivalent.

Recommendations

114. I recommend that Health NZ Te Matau a Māui Hawke's Bay:

a) Provide a formal written apology to Miss A and her partner for the deficiencies in care identified in this report. The apology should be sent to HDC, for forwarding to Miss A and her partner, within three weeks of the date of this report.

b) Prepare and present an anonymised case study based on these events for the wider education of medical staff at Hawke's Bay Hospital. The case study should detail the actions taken and decisions made by staff, the results of these actions/decisions, and the appropriate course that should have been taken. Evidence confirming the content and delivery of the presentation, and to whom it has been presented and when, is to be provided to HDC within six months of the date of this report.

c) Provide training to staff on CTG reading and interpretation. Confirmation of training and staff attendance is to be provided to HDC within six months of the date of this report.

d) Provide HDC with an update on the introduction of clinical midwifery coordinators on shift 24/7, as outlined above. The update is to be provided to HDC within six months of the date of this report.

115. I recommend that Health NZ consider developing a process at a national level for providing access to maternal mental health support and grief counselling for women who have experienced the loss of a baby. Health NZ is to provide HDC with details of the consideration of this process, within six months of the date of this report.

Follow-up actions

116. A copy of this report with details identifying the parties removed, except Health NZ Te Matau a Māui Hawke's Bay, Hawke's Bay Fallen Soldiers' Memorial Hospital, and the independent advisor on this case, will be sent to the Royal Australian and New Zealand College of Obstetricians and Gynaecologists and placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

Appendix A: Independent clinical advice to Commissioner

The following clinical advice was obtained from Dr Sornalatha Vasan:

'Complaint: Hawke's Bay District Health Board ref: C21HDC00851

Thank you for asking me to provide advice on this case.

I am a Fellow of the Australian and New Zealand College of Obstetricians and Gynaecologists and am on their Expert Witness Register.

I work as a general O&G Specialist and I am an examiner for RANZCOG and supervisor for ITP trainees in New Zealand.

I have no personal or professional conflict in this case.

I have read the following documents you provided

1. Letter of complaint
2. Hawke's Bay DHB's response dated 28 June 2021
3. Clinical records from Hawke's Bay DHB
4. Midwifery records

Background:
I have not summarised the events of this case as they have been detailed previously. I will detail events surrounding the delivery where required to explain my opinions on the questions asked.

Response to specific questions

You have requested to assess if the care provided to [Miss A] by Hawke's Bay DHB was reasonable in the circumstances, and why.

In particular

Management of the CTG monitoring on 13 [Month1] 2018 at Hawke's Bay Hospital and whether in your opinion, the CTG should have continued, or been repeated at a later time.

[Miss A] was assessed by [Midwife C] at 14.30. Documented as arrived by ambulance with decreased foetal movements. G1 P0 at 29 weeks gestation EDD — 30 [Month3] 2018; Was at LMC ante natal visit for decreased foetal movements. Deceleration of foetal heart to 70bpm. [Miss A] stated she was unwell for past 2 days with large loose stool that morning. On examination uterus soft to palpate; fundus equivalent to dates. CTG commenced at 14.20 and stopped at 14.50.

[Miss A] was brought in an Ambulance urgently due to decreased foetal movements and her LMC had recorded CTG which showed deceleration to 70bpm lasting for 3

minutes. The CTG at 14.20 was not normal. It should have been continued and reviewed by Medical staff urgently and acted upon.

At 15.05 assessed by another doctor

26 years G1 P0, 29 weeks gestation presented via LMC with decreased foetal movement last night and this morning; FM still present. CTG at home, FHR (foetal heart rate)70bpm for 2–3 minutes. No vaginal bleeding or pain/nausea/vomiting.
Loose stool this morning, nil before.
Vaginal discharge with foul smell for few months.
No fevers or urinary symptoms/swelling. No headache or blurry vision.
Mother had PET.
History of anxiety/depression; no known drug allergies.

On examination:
Alert/bright; seemed unstressed; regular Pulse.
CTG — FHR 140, decelerations but 29/40.
Normal anatomy scan previously.

Impression:
Decreased foetal heart now resolved. Chlamydia treated by LMC needs 5 weeks follow up.

Plan:
Formal US
Bloods and IVF
Stop CTG monitoring.
15.30. Reviewed by [O&G Reg Dr B].
G1P0 29 weeks with ? 3 minutes bradycardia.
Saw LMC this morning with decreased foetal movements , previously normal.
Multiple loose stools, nil unwell contact, 1 vomit in ED.

OE
Comfortable, BP 127/77
Abdomen soft, non tender; longitudinal, cephalic 5/5 palpable.
CTG — consistent with 29 weeks some loss of contact, good variability.
Bedside scan: Cephalic, FHR seen; anterior placenta, foetal movements seen, some felt. copious amount of liquor, 6cm pocket.

Impression:
29 weeks, decreased foetal movement, anterior placenta.

Plan:
Formal US at 16.00 hrs.
Bloods pending.
16.35: [Dr D SMO].
US performed. EFW above 50th centile. Normal liquor volume.

Plan:
Allow home. LMC to arrange repeat growth scan in 4 weeks.

[Miss A] should have been given written information "Pregnancy — your Baby's Movements and what they mean" and advised to return to hospital if she continued to experience less foetal movements. No record of this being given.[4]

Two CTG recordings have been provided from DHB.

13 [Month1] 18

1. CTG recording of [Miss A] from 13.05 hrs to 13.40. Maternal pulse not recorded. Basal heart rate difficult to assess ranges from 130 to 145 bpm. No accelerations seen. Deceleration to 70 bpm lasting for 4 minutes seen followed by variable decelerations going up to 80 to 100 bpm. No accelerations seen.

At 29 weeks with no evidence of labour above recording is an abnormal CTG, hypoxia cannot be ruled out. Formal US with doppler is recommended.

2. Another CTG recording from 14.22 to 14.50 in two sections. Poor trace. Maternal heart rate recorded in part of the trace. No contractions noted. Baseline foetal HR ranges from 135 to 145 bpm. Variability difficult to interpret due to poor trace. Variable decelerations seen. No accelerations seen. Abnormal CTG. Foetal hypoxia cannot be ruled out.

CTG needed to be continued longer for further assessment. At 29 weeks foetus is viable and needed to be monitored and interventions needed if abnormality persisted. Abnormal CTG in antenatal period warrants admission and further investigations. Steroids need to [be] considered in the event of persistent abnormality requiring delivery. Formal US with doppler is recommended from 28 weeks gestation — RANZCOG/PSANZ guidelines.

Testing for feto-maternal haemorrhage — Kleihauer test or flow cytometry test, where feasible should be considered in the preliminary investigation of women with DFM from 28 weeks gestation.

Obstetrics doppler guideline — Ministry of Health, NZMFMN 2014a and 2014b respectively

Umbilical artery pulsatility index (UA PI)

Indications:

- Suspected or known SGA fetus
- EFW on customised chart (e.g. GROW) is <10th percentile
- EFW on customised chart is dropping percentiles by ≥30 percent
- AC on the population scan chart is <5th percentile

- Discrepancy (≥30 percent) between the HC and AC percentile with lower AC percentile
- Maternal hypertensive disorders, for example, pre-eclampsia
- **Decreased foetal movements.**

https://www.health.govt.nz/our-work/life-stages/maternity-services/new-zealand-obstetric-ultrasound-guidelines/doppler

HBDHB Reduced foetal movement in pregnancy policy:

Women who report reduced foetal movements in pregnancy are more likely to experience adverse outcomes such as foetal growth restriction, preterm birth, and stillbirth. In high risk women reduced foetal movements precede stillbirth by three days and an absence of foetal movements precede stillbirth by twelve to twenty-four hours (Pearson & Weaver 1976).

Maternal monitoring of foetal movements is a means of screening foetal status. Early recognition followed by assessment and intervention when reduced foetal movements are reported reduces the likelihood of compromise and progression to foetal or neonatal death.

HIGH RISK CATEGORY FOR STILLBIRTH

1. Multiple consultations for reduced foetal movements
2. Known small for gestational age fetus
3. Hypertension
4. Diabetes
5. Extremes of maternal age
6. **Primiparity**
7. **Smoking**
8. Congenital malformation
9. Obesity
10. Poor past obstetric history (stillbirth, SG)

Even in pregnancies that are initially deemed as low risk, DFM is associated with the risk of adverse perinatal outcome, including foetal growth restriction (FGR), preterm birth and stillbirth. RANZCOG/PSANZ guidelines on decreased foetal movements.

[Miss A] was a Primigravida with H/O Cannabis use (HBDHB supplementary maternity information form page 06/06) which makes her high risk for foetal growth restriction, preterm birth and still birth.

At 29 weeks with history of reduced foetal movements and abnormal CTG she needed to be admitted and monitored for a longer period. Doppler assessment to establish foetal wellbeing was indicated.

Allowing her to go home without continuing CTG further and close monitoring (also not providing her enough information to return for further monitoring if symptoms persisted) was a serious deviation from standard care.

REFERENCES:

1.https://www.health.govt.nz/our-work/life-stages/maternity-services/new-zealand-obstetric-ultrasound-guidelines/doppler

2. Reduced Foetal Movements (Green-top Guideline No. 57)

3. Clinical Practice Guideline for the Care of Women with Decreased Foetal Movements October 5, 2016 RANZCOG in partnership with PSANZ

4. HBDHB Decreased foetal movements in pregnancy document.'

'02.08.23

21HDC00851/A — Hawkes Bay — Further advice.

Thank you for asking me to review my previous opinion on the above complaint further to additional responses from DHB and Clinicians.

I have received the following documents from your office for additional response in this complaint.

[Dr B's] response
Statement from [RM C]
[Dr D's] response
Your baby's movement matter — flyer
Reduced foetal movement guideline
[Health NZ] response
[Health NZ] final response
Initial report — 21 HDC00851 — Dr S Vasan

Review these responses, and advise whether they change your initial advice in any way — in particular:

1) Whether the rationale provided for omitting a doppler changes your advice about the failure to undertake a doppler.

2) Noting [Health NZ's] comment about the availability of Keilhauer and flow cytometry tests, and [Dr D's] comment (page 4 of the response) that [Dr D] did not consider these tests to be required, please advise whether you consider the failure to undertake these tests at the time to be a departure from accepted practice and if so, whether this departure can be quantified as mild, moderate or severe.

3) A response to the rationale provided by [Health NZ], [Dr D] and [Dr B] regarding the decision to remove the 14:20pm CTG and whether this changes your initial advice regarding the failure to continue and act upon the CTG.

4) In your initial advice, you advised that [Miss A] should have been given written information "Pregnancy — your Baby's Movements and what they mean" — please advise whether the failure to do so was a departure from accepted practice and if so, whether this departure can be quantified as mild, moderate or severe.

5) Whether [Dr D's] advice on discharge that [Miss A] undergo a repeat growth scan in 4 weeks' time was appropriate.

Background:

[Miss A] was assessed by [Midwife C] at 14.30. 26 yrs. old G1 P0 at 29 weeks gestation—.

Was at LMC ante natal clinic for decreased foetal movements. Deceleration of foetal heart to 70bpm was noted and transferred to hospital via ambulance for further management.

[Miss A] stated she was unwell for past 2 days with large loose stool that morning.

On examination uterus soft to palpate, fundus equivalent to dates. CTG commenced at 14.20 and stopped at 14.50.

CTG recorded between 14.20 and 14.50 was not normal. Please refer to my initial report.

16.35: [Dr D SMO].

US performed. EFW above 50th centile. Normal liquor volume.

Plan:

Allow home. LMC to arrange repeat growth scan in 4 weeks.

Two CTG recordings have been provided from DHB.

CTG recording of [Miss A] from 13.05 hrs to 13.40.

Maternal pulse not recorded. Basal heart rate difficult to assess ranges from 130 to 145 bpm. No accelerations seen. Deceleration to 70 bpm lasting for 4 minutes seen followed by variable decelerations going up to 80 to 100 bpm. No accelerations seen.

At 29 weeks with no evidence of labour above recording is an abnormal CTG, hypoxia cannot be ruled out. Formal US with doppler is recommended.

Another CTG recording from 14.22 to 14.50 in two sections. Poor trace. Maternal heart rate recorded in part of the trace. No contractions noted. Baseline foetal HR ranges from 135 to 145 bpm. Variability difficult to interpret due to poor trace. Variable decelerations seen. No accelerations seen. Abnormal CTG. Foetal hypoxia cannot be ruled out.

CTG needed to be continued longer for further assessment. At 29 weeks foetus is viable and needed to be monitored and interventions needed if abnormality persisted. Abnormal CTG in antenatal period warrants admission and further investigations. Steroids need to be considered in the event of persistent abnormality which may require earlier delivery. Formal US with doppler is recommended from 28 weeks gestation — *RANZCOG/PSANZ guidelines.*

[Health NZ's] final response quotes that

"Umbilical artery Dopplers are not an assessment of foetal wellbeing, rather they are an assessment of placental function. The umbilical artery pulsatile index (UAPI) provides an assessment of the downstream resistance in the placenta and will generally not become abnormal until at least 30% of the placenta is not functioning adequately, this is most often seen in foetal growth restriction or other placental pathology. As such the indication to do Umbilical artery Dopplers would be foetal growth restriction".

Uteroplacental insufficiency leads to foetal growth restriction hypoxia and hypoxaemia. Foetal umbilical artery dopplers, Middle cerebral artery dopplers and Venous ductosus are very important and only means of assessing foetal well-being and ruling out foetal hypoxia antenatally. Foetal doppler abnormalities reflect placental dysfunction.

Late foetal heart rate decelerations are preceded by approximately 2 weeks with Doppler evidence of a nadir in the brain-sparing effect and by a few days with an abrupt increase in impedance in the umbilical arteries.

During the second trimester, severely abnormal venous waveforms can be present for several days before intrauterine death.

(Doppler in Obstetrics (PDF, 16.2 MB) (Nicolaides et al 2002. Arduini D, Rizzo G, Romanini C. Changes of pulsatility index from foetal vessels preceding the onset of late decelerations in growth-retarded foetuses. Obstet Gynecol 1992;79:605–10)

Just doing Ultrasound to confirm foetal heartbeat and normal liquor volume does not suffice or reassure foetal well being in the background of decreased foetal movement and abnormal CTG with no uterine contractions.

[Miss A] needed to have CTG monitoring until normal tracing was recorded with no recurrence of deceleration. Optimal management is admitting her for 24 hours monitoring of foetal heart; Foetal dopplers of umbilical artery and middle cerebral artery and if all normal discharge her with clear information on foetal movement monitoring and to report promptly if decreased foetal movement persisted or any other symptoms were noted.

Most of the DHBs have Ultrasound availability during office hours. If clinical query of foetal hypoxia was raised in radiology request on the background of decreased foetal

movements and serious CTG abnormalities Radiologist will perform doppler as part of foetal biophysical profile to assess foetal wellbeing.

To collate postmortem findings and conclude that there was no evidence of foetal hypoxia (most of the time postmortem findings are inadequate) and dopplers might have been normal is a dangerous assumption and not safe clinical practice.

Not doing dopplers is a serious deviation from accepted management of 29 weeks pregnancy with decreased FM and abnormal CTG.

1. Testing for feto-maternal haemorrhage — Keilhauer test or flow cytometry test, where feasible should be considered in the preliminary investigation of women with DFM from 28 weeks gestation.

After 28 weeks if the mother complained of decreased foetal movement but CTG did not show abnormality and baby was not growth restricted one could consider not doing Keilhauer test at the first presentation. CTG had been abnormal significantly from the time [Miss A] presented to LMC and been in Hospital until discharge. Negative Keilhauer will be reassuring to manage conservatively. Keilhauer is available — not flow cytometry in all DHBs in New Zealand — reporting time could be variable but it is important in managing pregnancy at 29 weeks where conservative management is most favoured due to foetal prematurity if there was no imminent threat to foetal survival. Not considering this in the background of abnormal non stress CTG is a *mild deviation from standard of care.*

2. The decision to remove the 14:20pm CTG whether this changes your initial advice regarding the failure to continue and act upon the CTG.

[Dr B] and [Dr D] have responded that CTG was discontinued for the patient to be transported to Radiology for US. Safe practice is not to disconnect CTG when it is very abnormal until normal trace has been obtained unless one is equivocal and doppler was going to add value to management. In that case just seeing foetal heart with normal liquor volume is not sufficient to discharge her home without performing CTG to ascertain it was normal prior to discharge. Even if Doppler were normal it was imperative to perform CTG on return from Ultrasound to assess if it was normal. In the presence of normal US and dopplers if CTG abnormality persisted she needed continuous monitoring, intra uterine resuscitation i.e. intra venous fluids ([Miss A] had severe vomiting and diarrhoea prior to admission) and ruling out other maternal conditions which can compromise foetus.

Discharging [Miss A] without performing CTG until normal trace was recorded was a serious deviation from standard of care.

3. In your initial advice, you advised that [Miss A] should have been given written information "Pregnancy — your Baby's Movements and what they mean" — please advise whether the failure to do so was a departure from accepted practice and if so, whether this departure can be quantified as mild, moderate or severe.

Pregnant women need to be given clear written information regarding monitoring at home. When [Miss A] presented initially with decreased foetal movements, she was discharged home which could give false reassurance to her even if she continued to have decreased foetal movements.

Failing to give written information on importance and way of monitoring foetal movements was a moderate deviation from standard of care.

4. Whether [Dr D's] advice on discharge that [Miss A] undergo a repeat growth scan in 4 weeks' time was appropriate.

[Miss A] was a primigravida with history of [cannabis] abuse complained of decreased foetal movements. She is at risk of foetal growth retardation. She needed a repeat growth in 2 weeks and if normal could increase surveillance interval.

Advising to repeat scan in 4 weeks under above circumstances (abnormal CTG and decreased foetal movements) was not accepted standard of care — moderate deviation from standard of care.'

Further advice

The following advice was provided by Dr Vasan on 19 September 2024:

'21HDC00851/A — Hawkes Bay — Further advice.

Thank you for asking me to review my previous opinion on the above complaint further to additional responses from DHB and Clinicians.

I have received the following documents from your office for additional response in this complaint.

- [Dr D's] response.
- Health NZ Hawke's Bay with report and attachments.

[Dr D] responded saying CTG recording at 14.20 was normal with loss of contact. [Miss A] was brought in by her midwife urgently in an ambulance after an observation of foetal heart deceleration to significant level when she presented with decreased foetal movements.

CTG provided to me were significantly abnormal and was discontinued for the patient to go for US. No further traces were available until discharge later that day. US reported growth at 50th centile with normal liquor volume and live foetus.

With antenatal (unprovoked) CTG abnormality in the context of decreased foetal movement further monitoring until CTG normalised was mandatory and foetal well-being had to be investigated. If all normalised, she could be discharged with detailed discussion around foetal movement monitoring. If abnormality persisted, she needed

admission with close foetal monitoring until normalised or further doppler investigations to rule out foetal compromise. If doppler were normal and CTG normalised, you can apply normal recommendations for repeat growth in 4 weeks. No attempt was made to confirm foetal well-being other than basic US which reported normal growth and liquor. Normally grown foetuses can get compromised acutely and the first sign can be reduced foetal movements and in this case with very abnormal CTG. If CTG was considered as an investigation it is imperative to interpret the findings in the clinical setting and manage optimally. 29 weeks gestation is quite critical as the foetus is viable but quite premature.

Not recognising CTG abnormality has led to all the reasoning for the management which [Miss A] received. Discontinuing an abnormal CTG and sending patient for US was not a safe move. [Miss A] should have had continuous CTG monitoring and acted on until normalised or appropriately managed if remained abnormal; even delivery if abnormality worsened or life threatening.

CTGs provided for opinion were significantly abnormal and not optimal — [Health NZ] agrees to CTG findings in her final response.

[Dr D] also mentions discussing with an [obstetrician sub-specialist]. The sub-specialist's opinion is that since the growth on the first presentation of decreased FM was normal repeating growth in 4 weeks was clinically appropriate and if there had been evidence of growth restriction then 2–3 weeks would be preferred timeframe to repeat US.

I agree absolutely with that opinion. As a reputed [specialist], they would certainly manage this patient differently with the presentation of [Miss A] in the context of CTG abnormality.

As previously stated normally grown foetus can develop foetal compromise acutely. With acute presentation of decreased foetal movements and significantly abnormal CTG [Miss A] needed to have had further investigations i.e. foetal dopplers to assess foetal well-being. With such an episode it is recommended practice to repeat US in 2 weeks to reassure that there were no further placental concerns or even earlier if there were abnormalities in doppler.

My opinion stays the same.

[Health NZ] has raised concerns around need for Doppler in this context with [Miss A's] presentation.

[Dr Vasan references a 1992 paper on Doppler changes in the growth-restricted fetus to support this statement relating to MCA PI and venous Doppler.]

Late foetal heart rate decelerations are preceded by approximately 2 weeks with Doppler evidence of a nadir in the brain-sparing effect and by a few days with an abrupt increase in impedance in the umbilical arteries.

During the second trimester, severely abnormal venous wave … can be present for several days before intrauterine death.

(Doppler in Obstetrics (PDF, 16.2 MB) (Nicolaides et al 2002. Arduini D, Rizzo G, Romanini C. Changes of pulsatility index from foetal vessels preceding the onset of late decelerations in growth-retarded foetuses. Obstet Gynecol 1992;79:605–10)

I think this gives a false impression of the ability for Doppler to predict and therefore possibly prevent the events that occurred.

Foetal dopplers are performed to detect abnormalities in uteroplacental circulation. Various dysfunctions can lead to abnormal patterns which need to be interpreted within the clinical context and gestation of pregnancy. Doppler does not have the ability to predict or prevent still birth.

CTG, Biophysical profile and Doppler assessment of foetal circulation at Umbilical vessels, middle cerebral vessels, and ductus venosus are the current modalities available and practised in New Zealand and Australia to assess foetal well being when there are concerns. It is the Clinician's clinical judgement in the clinical context to plan investigations to manage patients optimally.

In this clinical context with decreased foetal movement, at 29 weeks gestation and abnormal CTG which was not optimally monitored, [Miss A] needed further CTG monitoring. Also, admission and consideration for steroids and doppler assessment if CTG continued to be abnormal. If Doppler was not available, she needed further continued monitoring until CTG normalised or appropriate management undertaken if remained abnormal. If the unit did not have adequate facilities for investigations or management further escalation to discussion with tertiary Units and multidisciplinary discussion/transfer of management had to be organised.

Even if CTG normalised with further monitoring with this clinical context (as described above) most of the clinicians would advise a further growth scan with Dopplers in 2 weeks with close foetal movement monitoring after having had very abnormal CTG with reduced FM.

In point 47. Dr Vasan states as well as admission, [Miss A] should have had Dopplers for umbilical artery and middle cerebral artery. It is not certain if Dr Vasan means an MCA PI or PSV.

The addition of MCA PI Doppler in this situation is not supported by the PSANZ Reduced Foetal Movement Guideline or the NZ Obstetric Ultrasound Guidelines.

An MCA PSV for foetal anaemia would be considered an appropriate test in the work up for possible foetal anaemia and is discussed the testing for feto-maternal haemorrhage.

MCA PI and CPR are routinely used in late onset growth restriction defined as after 34 weeks gestation by the NZMFM NZ Obstetric Ultrasound Guidelines which was the reference document for foetal growth restriction at the time of the event, however, this protocol is not applicable to a 29-week gestation.

From a practical perspective MCA PSV and Venous Dopplers would not be available routinely outside a specialist unit, as they are not performed as frequently and are more difficult to perform accurately without experience. Even now in 2024 most of these Dopplers in Hawkes Bay would be performed in my specialist scanning clinic and would not be available in an acute setting.

Guidelines and protocols are developed to guide Clinicians to use all available modalities of management in their units considering clinical context when making clinical judgements.

My opinion refers to above Dopplers to be considered if CTG abnormality persisted which would be expected management in most of Maternity Units who manage pregnancy at this gestation i.e. 29 weeks. MCA is not recommended if baseline Dopplers were normal as [Health NZ] describes. I agree with [Health NZ] that Dopplers are not available acutely in all the centres in New Zealand. With abnormal CTG further investigations had to be considered to establish foetal well-being and currently foetal dopplers are well recognised as accepted and required investigation in these circumstances antenatally. One cannot quote guidelines for decreased FM in isolation without considering prolonged CTG abnormality.

If [Miss A] presented with decreased FM and CTG was normal, normal growth scan would be reassuring and could have discharged her home with detailed information regarding Foetal monitoring and to present if had further concerns with FM. Further follow up in clinic with repeat growth in 4 weeks would be acceptable practice.

When [Miss A] presented acutely with decreased FM and CTG was recurrently abnormal with no normal trace discharging her to be followed up in 4 weeks was not the appropriate management. CTG abnormality needed to be monitored until it resolved, if there were concerns and if the unit did not have US or doppler services multidisciplinary discussion with bigger units and appropriate management needed to be considered.

Still birth is still an enigma in Obstetric practice and remains to challenge Obstetricians with little advancement in knowing the cause or prevention.

My opinion stays the same.'

Appendix B: Reduced Fetal Movements in Pregnancy

HAWKE'S BAY DISTRICT HEALTH BOARD	Manual:	Women, Children & Youth Service Policy & Procedure Manual
	Doc No:	WCYS/MATPPM/8081
Reduced Fetal Movements in Pregnancy	Date Issued:	April 2014
	Date Reviewed:	
	Approved:	Obstetrician
	Signature:	
	Page:	1of 6

PURPOSE

To provide advice to staff on the management of women presenting with reduced fetal movements in pregnancy

APPENDIX 1 High risk category for stillbirth
APPENDIX 2 Flow chart of reduced fetal movements

BACKGROUND

Women who report reduced fetal movements in pregnancy are more likely to experience adverse outcomes such as fetal growth restriction, preterm birth, and stillbirth. In high risk women reduced fetal movements precede stillbirth by three days and an absence of fetal movements precede stillbirth by twelve to twenty–four hours (Pearson & Weaver 1976).

PRINCIPLES

- Fetal movements reflect a normally functioning central nervous system and regular fetal movements is an indicator of fetal wellbeing. Decreased fetal movements are an adaptive response to hypoxia when blood is redistributed away from skeletal muscles to the brain, adrenal glands, and heart.
- Fetal movements are assessed by maternal perception alone. These are defined as any discrete kick, flutter, swish, or roll. Women perceive most fetal movements when lying down, fewer when sitting and fewest while standing.
- Further research is needed in the use of Kick charts to ensure their use results in more good than harm. The harm includes maternal anxiety and inconvenience and increased obstetric interventions.
- Maternal monitoring of fetal movements is a means of screening fetal status. Early recognition followed by assessment and intervention when reduced fetal movements are reported reduces the likelihood of compromise and progression to fetal or neonatal death.

SCOPE

HBDHB Obstetricians, Midwives, Lead Maternity Carers, Medical Personnel

ROLES AND RESPONSIBILITIES

- All pregnant women should be provided with verbal and written information regarding normal fetal movements during the antenatal period. LMC Midwives/GP's should emphasise the importance of maternal awareness of fetal movements at every routine antenatal visit.

Names except Health NZ Te Matau a Māui Hawke's Bay, Hawke's Bay Fallen Soldiers' Memorial Hospital, and the clinical advisor have been removed to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

- Information on fetal movements should include a description of the changing patterns of movements as the fetus develops. This would include the normal wake/sleep cycles and factors which may modify the mother's perception of movement's i.e. maternal weight, placental position.

- Written information is available refer "Pregnancy–your Baby's Movements and what they mean".

- All women should be advised to contact their LMC midwife/GP if they have any concerns about reduced or absent fetal movements and not to wait until the next day to report reduced or absent fetal movements.

MANAGEMENT OF REDUCED FETAL MOVEMENTS

- **High risk women** (Those women at risk of stillbirth). Admitted immediately to the maternity unit (See appendix one for high risk category).

- **Low risk women** These women should be advised to lie on their left side and focus on fetal movements for two hours. If ten or more movements are not felt in two hours then admission to the maternity unit is advisable.

ADMISSION PROCEDURES

High Risk Women

- Confirm fetal viability: Auscultate the fetal heart with handheld Doppler
- Exclude fetal compromise: a 20 minute CTG is necessary to exclude fetal compromise. The presence of a normal FHR with accelerations coinciding with fetal movements and the absence of decelerations indicates fetal wellbeing
- Plot symphysis fundal height measurement on GROW chart
- Assessment by Obstetric Registrar: would include ultrasound for fetal growth and amniotic fluid volume
- Current blood pressure and urine dipstick
- A formal scan for assessment of fetal growth, amniotic fluid volume, Dopplers is required in the following circumstances:
  - Any abnormality
  - Second attendance
  - Maternal perception of reduced fetal movements despite a normal CTG

Low Risk Women

- Confirm fetal viability: Auscultate the fetal heart with handheld Doppler
- Exclude fetal compromise: a 20 minute CTG is necessary to exclude fetal compromise
- Exclude small for gestational age fetus: Symphysis fundal height measurement plotted on GROW chart
- Current blood pressure measurement and urine dipstick
- Stillbirth risk factor assessment (See Appendix 1)
- If all are normal then no further action is required

MEASUREMENT CRITERIA

All women identified as high risk with reduced fetal movements should be admitted immediately to [redacted] Admission procedures to confirm fetal viability, to exclude fetal compromise and to assess fetal wellbeing identified in the woman's obstetric records.

All women identified as low risk with reduced fetal movements should be advised regarding admission to [redacted] if ten or more movements are not felt in two hours. Admission procedure to confirm fetal viability, to exclude fetal compromise and to exclude risk factors for SGA and stillbirth identified in the woman's obstetric records.

RELATED DOCUMENTS

WCYS/MATUPPM/8080 Fetal surveillance and Screening in Pregnancy.

REFERENCES

Royal College of Obstetricians and Gynaecologists (2011). Reduced Fetal Movements. *RCOG Green–top guideline No 57*

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Fretts R.C, (2010). Evaluation of decreased fetal movements. Retrieved from Up To Date on 3/1/14.

Heazell .A. E. P Sumathi, & Bhatti N.R (2005). What investigations are appropriate following maternal perception of reduced fetal movements *Journal of Obstetrics and Gynaecology 25 (7), 648-650*

DEFINITION

There is no universally agreed definition of reduced fetal movements. However most women will have felt movements by 20 weeks gestation which plateau at approximately thirty two weeks. There should be NO reduction in the frequency of fetal movements in the late third trimester

Names except Health NZ Te Matau a Māui Hawke's Bay, Hawke's Bay Fallen Soldiers' Memorial Hospital, and the clinical advisor have been removed to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

KEYWORDS

Fetal
Movements
Reduced

For further information please contact Head of Department or Midwifery Consultant

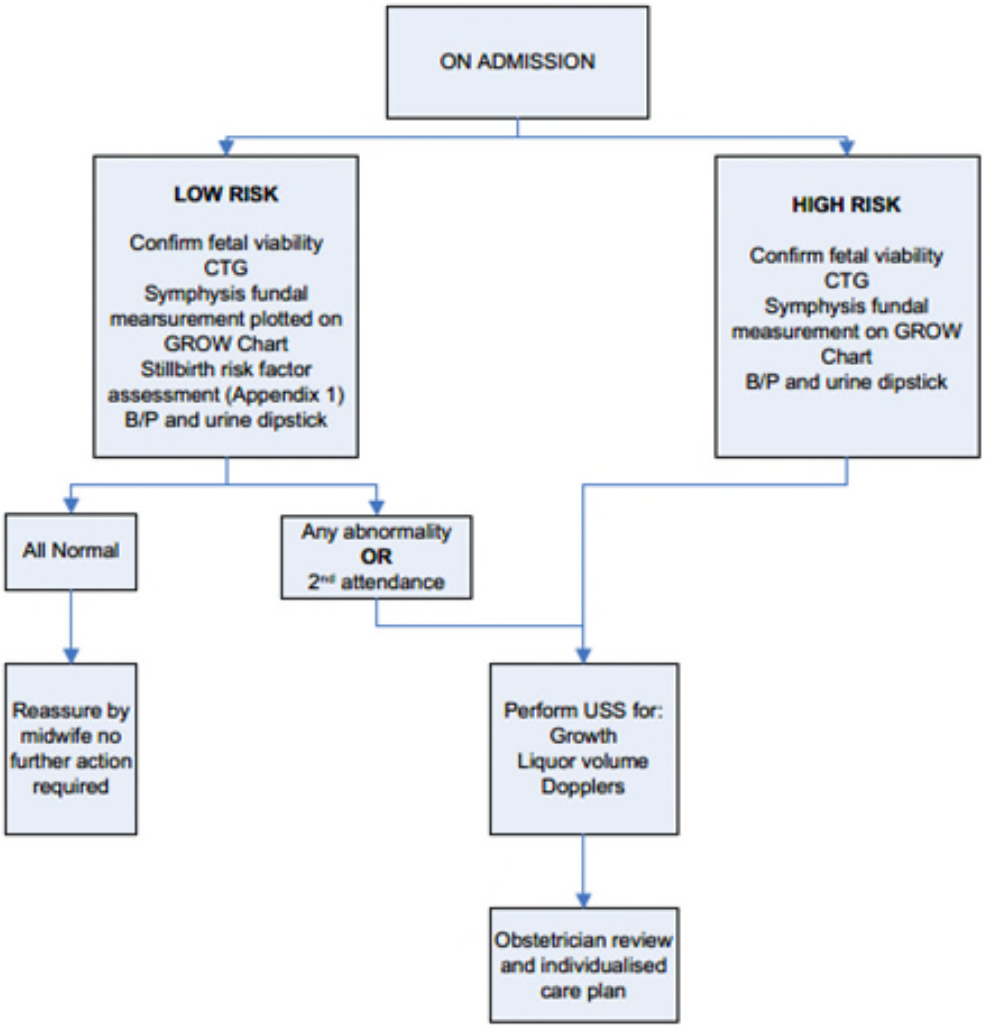
APPENDIX 1

HIGH RISK CATEGORY FOR STILLBIRTH

- Multiple consultations for reduced fetal movements
- Known small for gestational age fetus
- Hypertension
- Diabetes
- Extremes of maternal age
- Primiparity
- Smoking
- Congenital malformation
- Obesity
- Poor past obstetric history (stillbirth, SGA)

APPENDIX 2

REDUCED FETAL MOVEMENT

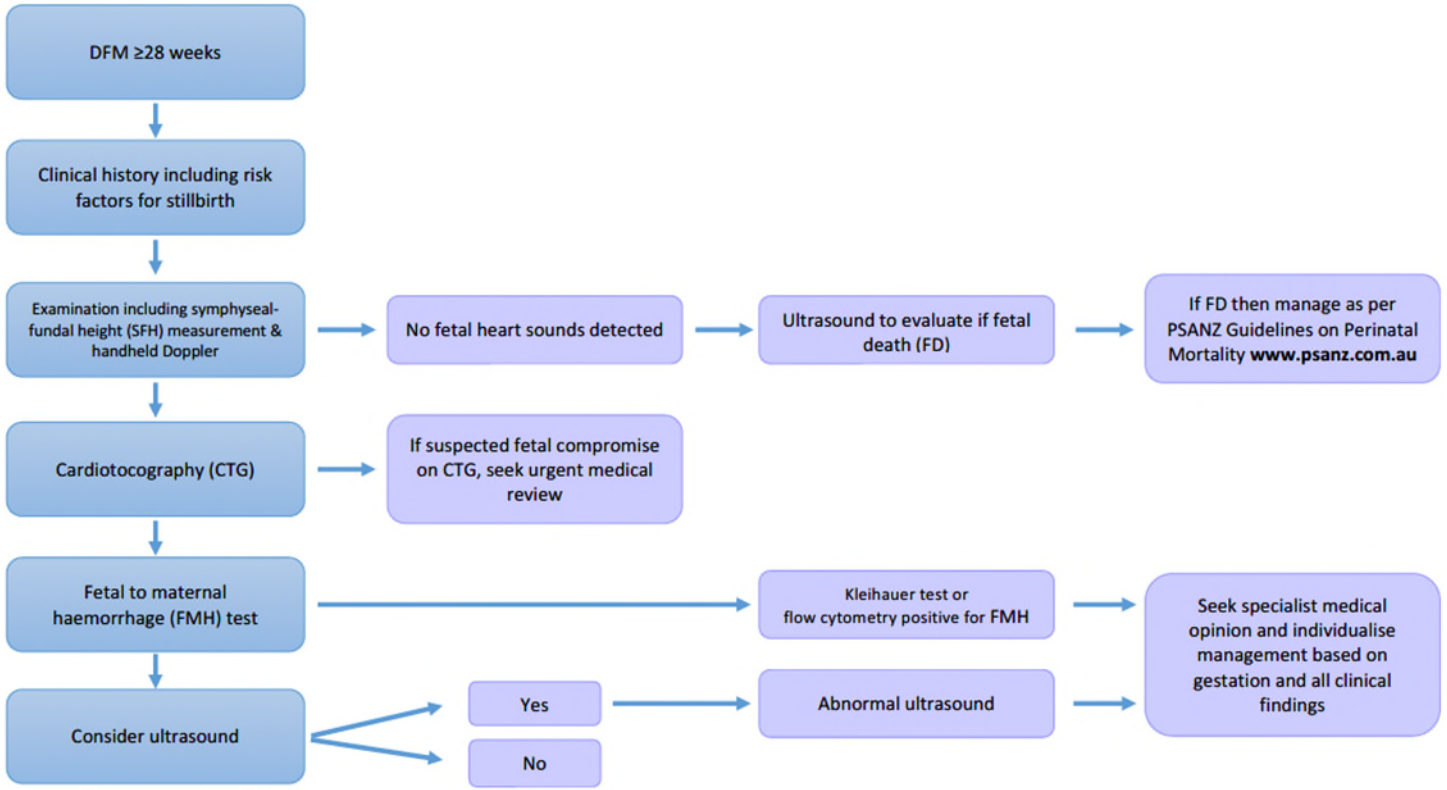


Names except Health NZ Te Matau a Māui Hawke's Bay, Hawke's Bay Fallen Soldiers' Memorial Hospital, and the clinical advisor have been removed to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Appendix C: Perinatal Society of Australia and New Zealand (PSANZ) 'Clinical Practice Guideline for the Care of Women with Decreased Fetal Movements' (10 August 2017)

2.3 Care pathway for women presenting with decreased fetal movements from 28 weeks' gestation

Disclaimer: This algorithm is for general guidance only and is subject to a clinician's expert judgement. The algorithm should not be relied on as a substitute for clinical advice.



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2.4 Clinical practice points for women presenting with decreased fetal movements from 28 weeks' gestation

Advice to pregnant women

- Be aware of baby's movements daily
- Provide PSANZ patient information brochure (https://sanda.psanz.com.au/parent-centre/pregnancy/)
- Women with concerns about decreased or absent fetal movements should be advised to contact their health care provider immediately.
- Women with concerns about decreased or absent fetal movements should be assessed by a health care provider immediately.

Risk factors for stillbirth

- Previous stillbirth
- Fetal growth restriction and Small for gestational age
- Antepartum haemorrhage
- Diabetes
- Hypertension
- Parity of 0 or >3
- Advanced maternal age (>35 years)
- IVF
- Indigenous ethnicity
- Maternal obesity (BMI >25)
- Smoking or illicit drug use
- Low socioeconomic status

Examination

- Abdominal palpation to assess uterine tone & tenderness, fetal lie/presentation
- Symphyseal fundal height (SFH) to be measured in centimetres & plotted on growth chart
- Handheld ultrasound Doppler is recommended, not auscultation with a stethoscope or Pinards.
- Record maternal pulse rate & confirm as different to fetal heart rate.
- Blood pressure and temperature.

CTG

- Perform within 2 hours of presentation
- Perform for at least 20 mins or until satisfactory.
- Use maternal fetal movement recorder during CTG

Ultrasound

- Consider ultrasound within 24 hours.
- Include fetal biometry, amniotic fluid volume, and morphology (if not already performed).
- Placental and fetal Doppler assessment, as indicated.
- The timeframe to perform this investigation will depend on the clinical circumstances and availability of appropriate expertise.

Fetal to maternal haemorrhage

- Perform Kleihauer test or flow cytometry test, where feasible.
- MCA Doppler assessment may be performed where expertise in ultrasonography is available.

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Appendix D: Royal College of Obstetricians & Gynaecologists 'Reduced Fetal Movements' Green-top Guideline No.57 (February 2011)

8. What is the optimal management of women with RFM?

The initial goal of antenatal fetal surveillance in cases of RFM is to exclude fetal death. Subsequent to this, the aim is to exclude fetal compromise and to identify pregnancies at risk of adverse pregnancy outcome while avoiding unnecessary interventions. A large cross-sectional survey revealed wide variations in knowledge and practice among both obstetricians and midwives with regard to management of women presenting with RFM. Although most clinicians recognised the association with fetal growth restriction (FGR), this did not translate into practice as professionals seldom undertook further assessment to identify FGR.[59]

8.1 What should be included in the clinical history?

Upon presenting with RFM, a relevant history should be taken to assess a woman's risk factors for stillbirth and FGR. B

All clinicians should be aware of the potential association of decreased fetal movements with key risk factors such as FGR, small-for-gestational-age (SGA) fetus, placental insufficiency and congenital malformations. ✓

If after discussion with the clinician it is clear that the woman does not have RFM, there are no other risk factors for stillbirth and there is the presence of a fetal heart rate on auscultation, she can be reassured. However, if the woman still has concerns, she should be advised to attend her maternity unit. C

Women noticing a sudden change in fetal activity or in whom other risk factors for stillbirth are identified should report to their maternity unit for further investigation (see section 6.3). ✓

A history of RFM should be taken, including the duration of RFM, whether there has been absence of fetal movements and whether this is the first occasion the woman has perceived RFM. The history must include a comprehensive stillbirth risk evaluation, including a review of the presence of other factors associated with an increased risk of stillbirth, such as multiple consultations for RFM, known FGR, hypertension, diabetes, extremes of maternal age, primiparity, smoking, placental insufficiency, congenital malformation, obesity, racial/ethnic factors, poor past obstetric history (e.g. FGR and stillbirth), genetic factors and issues with access to care. Clinicians should be aware that a woman's risk status is fluid throughout pregnancy and that women should be transferred from low-risk to high-risk care programmes if complications occur.[60] If after discussion with the clinician it is clear that the woman does not have RFM, in the absence of further risk factors and the presence of a normal fetal heart rate on auscultation, there should be no need to follow up with further investigations.

Appendix E: New Zealand Maternal Fetal Medicine Network 'New Zealand Obstetric Doppler Guideline' (revised September 2014)

Umbilical Artery Pulsatility Index (UA PI)

Indications:

- Suspected or known small for gestational age (SGA) fetus
- The estimated fetal weight on the GROW chart is <10th percentile
- The estimated fetal weight on the GROW chart is dropping percentiles by ≥30%
- The abdominal circumference on the population scan chart is < 5th percentile
- Discrepancy (≥30%)between the head and abdominal circumference percentile with lower AC percentile
- Maternal hypertensive disorders e.g. preeclampsia
- Decreased fetal movements

Not indicated:

- Routine screening of normal pregnancies with no maternal or fetal risk factors

How to perform the test:

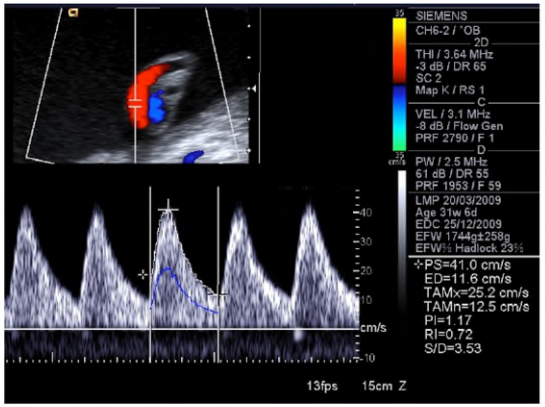
- Perform assessment during fetal quiescence
- Always keep TIb<0.5 if possible or at least <1 by reducing the acoustic output power
- Identify a free loop of umbilical cord on color Doppler
- Use high color PRF to avoid aliasing and conservative gain to avoid color bleeding
- Position the sample volume in a portion of the cord coursing parallel to Doppler beam
- Avoid sampling in such a way that the Doppler beam is directed towards fetal eyes
- Optimise the spectral Doppler baseline, PRF and sweep speed to get a large waveform
- If the EDV is near the baseline, ensure wall filter is sufficiently low to display EDV
- If the PI is within normal range, only sample one of the umbilical arteries
- If the PI is abnormal, sample both umbilical arteries and use the more normal (lower) value
- If the end-diastolic flow is absent or reversed, comment on this finding in the report

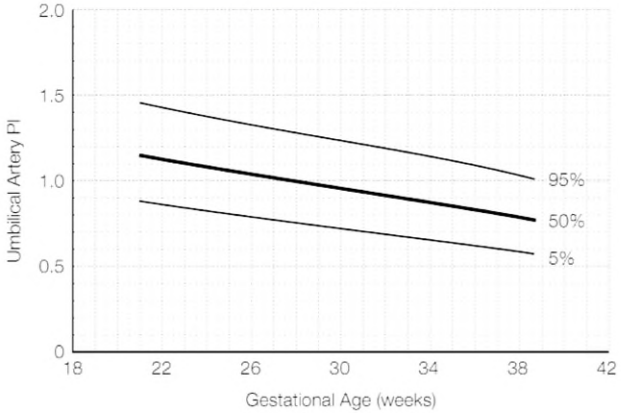
How to interpret the test:

- >95th percentile is abnormal

Common pitfalls:

- Poor Doppler angle and poor optimisation leading to fuzzy waveform which is hard to measure
- End-diastolic flow is not visualised due to high filter setting
- End-diastole is not well visualised when EDV is near baseline because of venous contamination - readjust sampling to avoid capturing adjacent UV





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New Zealand Maternal Fetal Medicine Network

Australasian Society for Ultrasound in Medicine New Zealand Branch

New Zealand Obstetric Doppler Guideline, NZMFMN , revised September 2014, Page 3