Waikato District Health Board

Consultant Obstetrician, Dr A

A Report by the

Deputy Health and Disability Commissioner

(Case 17HDC00453)

Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

Contents

Executive summary 1
Complaint and investigation 2
Information gathered during investigation 3
Opinion: Introduction 33
Opinion: Waikato DHB — breach 34
Opinion: Dr A 48
Recommendations 53
Follow-up actions 54
Addendum dated 4 December 2020 55
Appendix A: Independent advice to the Commissioner 56
Appendix B: Independent advice to the Commissioner 78

Executive summary

1. This report concerns the care provided to a pregnant woman who presented to a public hospital with abdominal pain. She collapsed 17 hours later and was found to have a ruptured uterus. This case highlights the importance of ensuring adequate senior oversight and planning, and effective communication and co-ordination between teams.

2. The woman presented to the Emergency Department (ED) of the public hospital and was transferred to the care of the Obstetrics team under the management of an obstetrics consultant. Over the course of her admission up until her collapse, her vital signs remained stable, her CTG was reassuring, and her blood results and biochemistry were unremarkable. The main cause for concern was the severity and persistence of her pain.

3. The key issues addressed in the report are the adequacy of obstetric and general surgical reviews and oversight; the failure to establish an effective assessment and management plan in a timely manner; the communication and co-ordination between the Obstetrics and General Surgery teams; and documentation.

Findings

4. The Deputy Commissioner acknowledged the rarity of the situation in which the healthcare providers found themselves, and noted that aspects of the care provided in the developing situation were appropriate and well managed.

5. However, the Deputy Commissioner criticised Waikato DHB for a number of deficiencies in the Obstetrics and General Surgery reviews, including missed opportunities for increased senior oversight, and inadequate documentation of some reviews. The Deputy Commissioner also considered that a lack of effective communication and co-ordination between the Obstetrics and General Surgery teams contributed to a delay in appropriate radiological assessment. Waikato DHB was found to have breached Rights 4(1) and 4(5) of the Code.

6. The Deputy Commissioner was also critical of aspects of the overall management of the woman by the obstetrics consultant.

Recommendations

7. The Deputy Commissioner recommended that Waikato DHB apologise to the woman and her family; report on the two action points identified in its Serious Incident Review Report (SIRR); provide evidence of recent staff training on co-ordination of care, escalation of care, and documentation; use this report as a basis for staff training at Waikato DHB; report back on the implementation of the New Zealand National Maternity Early Warning system (MEWS); and consider the concerns of my expert advisor, Professor Stone, regarding the early discharge to midwifery care in complex cases, and its SIRR process.

8. The Deputy Commissioner recommended that the obstetrics consultant apologise to the woman and her family and attend the Medical Protection Society workshop "Achieving Safer and Reliable Practice".

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Complaint and investigation

9. The Health and Disability Commissioner (HDC) received a complaint from Mrs C about the services provided to her by an obstetrician and gynaecologist, Dr A, and the Waikato District Health Board (DHB). The following issues were identified for investigation:

- *Whether Waikato District Health Board provided Mrs C with an appropriate standard of care in 2016 and 2017.*
- *Whether Dr A provided Mrs C with an appropriate standard of care in 2016 and 2017.*

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

11. The parties directly involved in the investigation were:

Waikato DHB	Provider
Dr A	Obstetrics consultant
Dr B	Obstetrics consultant
Mrs C	Consumer
Dr D	Junior obstetrics registrar
Dr E	Obstetrics house officer
RM F	Core midwife
RM G	Core midwife
Dr H	General surgery consultant
Dr I	Junior general surgery registrar
Dr J	Radiology consultant

12. Also mentioned in this report:

RM K	Midwife
Dr L	Anaesthetic registrar
Dr M	Consultant obstetrician
Dr N	Consultant obstetrician
Dr O	Obstetrician and gynaecologist
Dr P	Obstetrician/ACC advisor

13. Further information was received from the Accident Compensation Corporation (ACC) and the Coroner.

14. Independent expert advice was obtained from an obstetrician, Professor Peter Stone (Appendix A), and a general surgeon, Dr Julian Hayes (Appendix B).

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Information gathered during investigation

Introduction

15. This investigation considers the care provided to Mrs C, aged in her late thirties, and 28 weeks and 5 days pregnant at the time of these events, by Waikato DHB and its staff when she presented to the Emergency Department (ED) on 15 Month6.[1]

Previous medical history

16. Mrs C had a history of severe endometriosis.[2] In 2011, she required surgery for Grade IV[3] endometriosis of the abdomen and diaphragm, during which her right ovary, right fallopian tube, and right kidney and ureter were removed.

17. Previously, Mrs C had had an IVF[4] pregnancy and given birth to a healthy baby.

2016 pregnancy — antenatal care

18. In Month1, Mrs C conceived spontaneously.[5] Her antenatal care was provided by the Waikato DHB community midwives.

19. On 19 Month1, Mrs C had a dating ultrasound scan (USS), which showed a possible cornual pregnancy.[6] The radiologist recommended an obstetric review and a repeat scan at the public hospital.

20. On 20 Month1, a DHB-employed community midwife, Registered Midwife (RM) K, referred Mrs C to an early pregnancy assessment clinic (EPAC) for review by an obstetrician. RM K spoke with the consultants at the public hospital and documented: "[H]appy for EPAC referral and follow-up early next week."

21. That same day, RM K documented that Mrs C had contacted the specialist who had cared for her during her previous IVF pregnancy, and that the specialist had recommended that she present to the ED for follow-up work that day. RM K faxed a referral to the public hospital's ED and spoke with an Obstetrics and Gynaecology registrar. Mrs C presented to the public hospital, where she was reviewed acutely in the EPAC. Mrs C was re-scanned and reviewed by an obstetrician, who considered that it was not a cornual pregnancy and recommended re-scanning.

22. A further scan on 22 Month1 revealed that it was not a cornual pregnancy, but the obstetrician was concerned about the implantation site, and recommended re-scanning.

[1] Relevant months are referred to as Months 1–9 to protect privacy.
[2] A common inflammatory condition where tissue similar to the lining of the uterus (endometrium) is found outside the uterus.
[3] Stage IV is the most severe form of endometriosis and involves deep implants on the pelvic lining and ovaries.
[4] In vitro fertilisation — use of medical techniques to help a woman to become pregnant.
[5] Became pregnant without the use of any medical intervention.
[6] A rare form of ectopic pregnancy (a pregnancy in which the fetus develops outside the uterus).

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Mrs C was re-scanned and told that her baby was growing well, and that there were no issues with the implantation site.

23. Mrs C had a routine nuchal scan[7] on 27 Month2. The report noted the presence of a two-vessel cord[8] (instead of three vessels).

24. On 15 Month3, a community midwife referred Mrs C to EPAC for review in relation to her previous medical history and maternal age.

25. On 8 Month4, Mrs C had a normal anatomy scan, apart from the two-vessel cord, and RM K referred her to EPAC for a review by an obstetrician.

26. On 12 Month5, Mrs C was reviewed by obstetrician and gynaecologist Dr B at the EPAC. Dr B documented in her reporting letter:

> "Summary
>
> (a) G2[9] P1,[10] EDD[11] by dating scan on 3 [Month9], currently 24 weeks.
>
> (b) Referred because of two vessel cord found at the anatomy scan.
>
> (c) Previous history of infertility and endometriosis excision with right nephrectomy[12] and an ovary removed.
>
> (d) Previous pregnancy: IVF. Uncomplicated. Ventouse delivery after induction of labour because of proteinuria, slightly raised urate but no increased blood pressure.
>
> (e) Current pregnancy, unplanned natural conception. On aspirin and calcium."

27. Dr B told HDC that this appointment was a full specialist review. She said that she reviewed Mrs C's history thoroughly and "fully understood and appreciated that her previous surgery was complex and difficult".

28. Dr B stated that at that time, Mrs C was "asymptomatic, her observations were normal and her anatomy and growth scan were also normal". Dr B said that she considered Mrs C's background in depth, and recommended obstetric review and serial growth scans, with the first scan request for four weeks' time.

29. Dr B told HDC that she considers that an earlier review would not have changed Mrs C's management.

---

[7] A prenatal screening scan to detect chromosomal abnormalities.

[8] Typically, an umbilical cord has two arteries and one vein. However, some babies have only one artery and vein. Usually this is an isolated anomaly, but there may be an increased risk of other structural or chromosomal abnormalities.

[9] Gravida 2 — Mrs C's second pregnancy.

[10] Para 1 — the total number of pregnancies carried past 20 weeks' gestation.

[11] Estimated date of delivery.

[12] Removal of a kidney.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

30. Mrs C was referred to the Women's Assessment Unit (WAU) to be monitored for the remainder of her pregnancy.

14 Month6 — call to WAU

31. At 11pm on 14 Month6, Mrs C — at 28 weeks and 6 days' gestation — woke with abdominal pain and diarrhoea. After taking paracetamol 1g she went back to bed but woke an hour later with worse abdominal pain, cramping, and diarrhoea.

32. Mrs C told HDC that she then telephoned the WAU and spoke with a DHB-employed community midwife.

33. At 12.45am, the community midwife recorded that Mrs C had "severe abdo[minal] cramps + diarrhoea" and was advised to attend the hospital for an assessment.

15 Month6

Presentation to WAU 1.30am

34. Mrs C arrived at the WAU at approximately 1.30am. She told HDC that she was greeted by a midwife, who told her that they were very short-staffed but would get the obstetrician to her as soon as possible.

35. At that time, Mrs C was given a bed and was reviewed by a midwife. The midwife took a history, observations (which were normal),[13] and bloods for CBC[14] and CRP,[15] and a cardiotocography (CTG) monitor[16] was attached to check fetal well-being. Mrs C told HDC that she was "so sore" and asked for pain relief, but the midwife told her that she could not have anything except for paracetamol, and that it was too close in time to the previous dose she had taken at home.

36. At 1.45am, the blood results were reported as normal, and included a haemoglobin of 116,[17] WBC of 10.6 (high), [18] neutrophils 8.0 (high),[19] and CRP of 4.[20]

Review by Obstetrics consultant, 3am

37. Mrs C was reviewed by a consultant obstetrician, Dr M, at approximately 3am. At 5.15am, Dr M documented Mrs C's antenatal history and medical history, including her "severe endo[metriosis]" and nephrectomy. He recorded: "[O]nset of contractions, lower

[13] At 1.40am, Mrs C's observations were recorded as pulse 87, blood pressure 120/70, and oxygen saturation 98%.
[14] Complete blood count (used to evaluate overall health).
[15] C-reactive protein (used to check for inflammation).
[16] Cardiotocography is used to monitor the baby's heartbeat in utero and the mother's uterine contractions, if any, to assist with identification of fetal well-being and/or distress.
[17] Reference range is 111–155g/L.
[18] White blood cell count. Reference range is 4–11 x 10^9/L.
[19] The primary white blood cells that respond to bacterial infection. Reference range is 1.9–8 x 10^9/L.
[20] Reference range is 0–5mg/L.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

abdominal pain, 2 episodes of diarrhoea …" Dr M undertook an abdominal examination and a bedside USS, and a fetal fibronectin (fFN)[21] test was performed.

38. Dr M documented his plan to "await fFN, if further diarrhoea send stool sample …".

39. Mrs C told HDC:

> "[Dr M] explained to me that whatever was happening was solely me and not baby related. He then informed me that I would be reviewed by the general surgeons and given a scan as my pain and symptoms suggest that I might have either a twisted bowel or appendicitis."

40. The fFN result showed a low chance of premature delivery.

Overnight midwifery care

41. Nursing notes document that at 5.30am Mrs C was given paracetamol 1g and "tucked up to sleep". However, at 5.45am Mrs C rang the call bell because her "pain [had] returned", and she was given codeine[22] 60mg.

42. There are no entries in the clinical notes between 5.45am and 7.15am.

Midwifery care handover

43. RM G took over Mrs C's midwifery care at 7.15am. RM G told HDC that she introduced herself and a student midwife who was assisting her that day. RM G documented: "[Mrs C] looking a little more comfortable although still experiencing some pain …"

44. At 8am, Dr M handed over Mrs C's care. Dr A, the on-call Obstetrics consultant, told HDC that she was fully occupied in the delivery suite between 8am and her review of Mrs C at 12.50pm. Dr A stated:

> "At the 8am handover the delivery suite was busy, [Dr M] handed [Mrs C] over with instruction to seek a stool sample for a possible inflammatory/infective bowel condition due to her symptoms. His impression then was of no acute obstetric concern which was communicated by him at handover."

45. Mrs C said that at 8.20am she had developed pain when passing urine, and rang the call bell. The student midwife responded. RM G told HDC that she asked the student to obtain a urine sample from Mrs C.

46. Mrs C told HDC that the pain relief she was given was not effective, and her abdominal pain continued to get worse. She stated: "[A]bout an hour later the pain in my abdomen became severe …"

---

[21] Fetal fibronectin (fFN) is a protein produced at the boundary between the amniotic sac (which surrounds the baby) and the lining of the mother's uterus. The level of fFN in vaginal fluid is tested to help to predict the short-term risk of premature delivery.

[22] An opiate used to treat pain.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

47. RM G told HDC that she answered the call bell at 9.30am and documented that Mrs C was "still in pain". RM G said that she palpated Mrs C's abdomen, and at times her pain score was 8.[23] RM G called the Obstetrics registrar to review Mrs C.

48. Mrs C's observations were taken at 9.38am and were normal. RM G recorded the results on the observations chart.

Review by Obstetrics registrar, 10am

49. Mrs C told HDC: "[B]y 10am in the morning the pain in my abdomen was excruciating and all I could do was sob."

50. At 10am, a junior Obstetrics registrar, Dr D, reviewed Mrs C. Dr D documented: "Still having increased pain and writhing in pain … Has some burning sensation. Abdo[minal] pain generalised." Mrs C's observations were recorded as "stable, afebrile, good [fetal movements]". The documented plan was to chase the mid-stream urine, give a Ural sachet,[24] chart Sevredol,[25] discuss pain relief with the anaesthetist, and take a stool culture if Mrs C had any diarrhoea.

51. A Serious Incident Review Report (SIRR) completed following these events noted: "[Mrs C] cannot recall seeing the obstetric registrar." In response to the provisional opinion, Mrs C stated: "The 'review' he did was from a verbal report from the midwife who contacted him to get the [Sevredol] charted."

52. The SIRR noted that "[Dr D] saw [Mrs C] at 10.00 hrs due to increased pain". RM G also told HDC that Dr D reviewed Mrs C at 10am and wrote a plan of care.

Midwifery care, 10.15am to 11.58am

53. At 10.15am, Mrs C was administered Sevredol 10mg. RM G documented that Mrs C was "still in pain". Mrs C said that the Sevredol was ineffective, and she was "left in severe agony for a few more hours without being reviewed again by a doctor despite worsening symptoms".

54. RM G told HDC that at 10.55am she checked on Mrs C and noted that her "pain [was] much worse now and radiating down her leg". RM G said that she checked to see whether the urine test result was back.

55. At 11.15am, RM G checked Mrs C and documented that she was still in pain. RM G told HDC: "I made another call to the Obstetric Registrar to review but they were in theatre. I was advised to call the Obstetric SHO [senior house officer] to review."

56. At 11.35am, RM G performed an internal vaginal examination. She told HDC:

[23] The pain scale is used to rate a patient's pain on a scale of 0 to 10, with 0 being no pain, 1–3 being mild pain, 4–6 being moderate pain, and 7–10 being severe pain.
[24] A urinary alkaliniser.
[25] An opioid analgesic that contains morphine sulphate.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

> "[A]s [Mrs C] was feeling a lot of bowel pressure, I carried out a vaginal examination with consent, to make sure she was not in labour … I was able to obtain enough information to conclude that she was not in active labour and [there were] no cervical changes … [The] SHO [was called] to review."

57. Mrs C was given a further 1g of paracetamol.

Obstetrics SHO review, 11.58am

58. The clinical records note that at 11.58am Mrs C was reviewed by an Obstetrics SHO, Dr E. Dr E documented that Mrs C's pain was located in the right iliac fossa, was severe with some percussion tenderness, and was tender on palpation with some rebound tenderness. Dr E recorded: "In severe pain crying/gripping bedsheets."

59. Dr E queried appendicitis or a bowel obstruction, and planned to repeat bloods urgently, provide further pain relief, and request a General Surgery review. Dr E discussed the plan with the on-call Obstetrics consultant, Dr N. Dr N sighted and signed the CTG.

60. Dr A told HDC that Dr N was "available for back up support on an on-call basis", and that it was "customary for the weekend on-call consultant to attend morning handover and remain on-site to support ward round review until noon".

Repeat blood tests

61. The repeat blood tests for CBC and CRC were received by the laboratory 12.04pm. RM G told HDC that she was at lunch at this time, and her colleague took Mrs C's blood and sent it to the laboratory. RM G said that "at the time [Dr E] still had the clinical notes".

62. Mrs C told HDC that she did not have any bloods taken at lunchtime, and stated: "[E]ither the result was fabricated or someone else's bloods were mislabelled as mine."

63. Mrs C stated that in her view, only six minutes[26] had elapsed from the time Dr E introduced himself to her[27] and the blood sample being sent and receipted by the laboratory. She contends that it is very unlikely that all of the steps that had to occur in-between could have occurred within six minutes.

Midwifery care, 12pm to 12.50pm

64. At 12.10pm, Mrs C's observations were recorded as normal,[28] and her pain score was documented as "≥5".

65. Codeine 60mg was administered at 12.15pm.

---

[26] Mrs C calculates the six minutes from the time between Dr E's entry in the clinical records (11.58am) and the time the laboratory received the sample (12.04pm).

[27] It is not clear exactly what time Dr E commenced his review. RM G documented at 11.35am that the SHO was in attendance, and Dr E documented "11.58am" in the notes. It is not clear whether "11.58am" refers to the start of his examination, or the time at which he began documenting the clinical record.

[28] Her observations were documented as BP 140/75, pulse 77, respirations 11–20, and oxygen saturations 96–100%.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

66. At 12.20pm, Dr E contacted the junior General Surgery registrar, Dr I. Dr E documented that Dr I had agreed to review Mrs C as soon as possible, but had a trauma in the ED to attend to first.

67. RM G said that Dr E had the notes between 11.58am and 12.50pm, and she did not have access to them at this time.

Review by Obstetrics consultant, 12.50pm

68. Dr A said that she finished in the delivery suite operating theatre at 12.48pm and, following an update from Dr E, considered that Mrs C was a priority for senior input because of her significant surgical history.

69. Dr A told HDC that she reviewed Mrs C at 12.50pm. Dr E documented the review in the clinical notes.

70. Dr A told HDC that her impression was a "likely subacute bowel obstruction[29] secondary to intra-abdominal adhesions,[30] with a differential diagnosis of appendicitis[31]". She stated: "[T]he plan at the time was to expedite General Surgical review, anaesthetic review for PCA (patient controlled analgesia)[32] and for continuous fetal monitoring (CTG)."

71. Dr E recorded:

> "[Dr E/Dr A] — consultant O + G team review.
>
> Patient states this is worst pain she's had before …
>
> … crampy pain coming in waves now …
>
> [On examination] [Bowel sounds] [positi]ve sluggish, [iliac fossa[33]] tenderness, percussion tenderness.
>
> Impression 1) ? bowel obstruction 2° adhesions
> 2) ? appendicitis.
>
> Plan 1) Gen[eral] surgery [review]
> 2) IV morphine[34]
> 3) Anaesthetic [review] for PCA
> 4) CTG continuous."

[29] A bowel obstruction occurs when the large or small intestine is partially or totally blocked, preventing food, fluids, and gas from passing normally. Typically it causes severe pain that may wax and wane.
[30] Bands of fibrous scar tissue. Adhesions that partially block the intestine can cause intermittent bouts of crampy abdominal pain.
[31] An inflammation of the appendix, which can cause severe pain in the lower right abdomen.
[32] Pain relief that can be administered by the patient.
[33] The lower abdominal region.
[34] Morphine is documented on the prescription chart but is not signed as having been given.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

72. Dr A stated that immediately following her review, she re-reviewed Mrs C's clinical notes and her laboratory findings.

73. The laboratory reported on the 12.04pm blood results at 12.57pm, and the results were accepted by Dr D at 1pm. The results included haemoglobin 121, WBC 12.3 (high), neutrophils 10.5 (high), and CRP 4.6. Dr A told HDC that the repeated blood results were entirely comparable with the admission bloods, and well within expected normal variation for haemoglobin concentration in an individual during a day. Dr A stated that the blood results were not fabricated, and belonged to Mrs C.

74. In response to the provisional opinion, Mrs C stated:

> "[T]he blood[s] taken at lunchtime have a difference of 5g/L for haemoglobin from the morning bloods and a MCV difference from 93 to 91 which is outside of the 1% allowable reproducibility and validity on the same person throughout the day."

75. An enquiry into the laboratory results shows that Dr A acknowledged Mrs C's fFN result at 1.06pm. Dr A said that at the time, "there was no objective finding to suggest maternal or fetal compromise", and an obstetric cause to account for Mrs C's symptoms was unlikely.

Midwifery care, 1–2pm

76. RM G told HDC that she documented on the CTG at 1pm, 1.07pm, 1.11pm, and 1.30pm.

77. At 1.07pm, 1.11pm, 1.16pm, and 1.20pm RM G recorded that Mrs C's observations were normal.

78. An anaesthetic registrar, Dr L, recorded in the controlled drug register that at 12.30pm he withdrew 100mcg of fentanyl[35] for Mrs C. The CTG print-out contains a note that intravenous (IV) fentanyl was given at 1.01pm and 1.07pm, but the dose is not recorded. Waikato DHB told HDC that it is unable to find documentation within the clinical record that specifies the dose and time at which the fentanyl was administered.[36]

79. At 1.15pm, the PCA was set up and checked.

80. At 1.40pm, Mrs C was reviewed by Dr L and the PCA was connected. At this time, RM G documented: "[Mrs C] very comfortable now has had IV Fentanyl which initially made pain score reduce to 2."

---

[35] An opioid medication used for pain relief.

[36] Waikato DHB told HDC that it located the controlled drug register for the time period in question, and can see that a 100mcg ampoule of fentanyl was signed out at 12.30pm on 15 Month6 for Mrs C by Dr L, the anaesthetic registrar. Waikato DHB said that although Dr L no longer works for Waikato DHB and is not able to be reached for comment, it is highly likely that this was the ampoule used to administer the two doses referred to on the CTG at 1.01pm and 1.07pm, as ampoules with larger doses (500mcg) are required for PCA preparations.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

81. RM G told HDC: "[T]o make [Mrs C] comfortable while we completed the organisation of the PCA, she was given IV Fentanyl by [Dr L]." RM G said that this is why she recorded Mrs C's observations every five minutes between 1.07pm and 1.20pm.

82. It is documented that the PCA was first used at 1.45pm.

83. Mrs C stated that the PCA was effective for only 30–45 minutes before the pain became excruciating and the PCA was no longer effective. Mrs C said that the midwife informed her that she would have to wait for the anaesthetist to come out of theatre before her pain relief could be reviewed.

84. At 1.45pm, RM G recorded that Mrs C's observations were normal and her pain score was 4.

85. RM G told HDC she documented on the CTG at 1.55pm.

First review by junior General Surgery registrar, 2pm

86. At 2pm, RM G documented that Mrs C's observations were normal. At this time, Mrs C was reviewed by a junior surgical registrar, Dr I.

87. Dr I did not document this review in the clinical record at the time, as he was called back to the ED. He documented the review retrospectively at 4.45pm. Dr I's recollection is that it was a very busy day.

88. Dr I reported that when he assessed Mrs C at 2pm, "she was complaining of pain in the right lower quadrant of her abdomen that ha[d] been present since the previous day. The pain was severe and colicky in nature."

89. Dr I documented Mrs C's previous surgical history. He stated that on examination, initially she was pain free, having recently received IV fentanyl. He said that Mrs C's uterus was palpable but non-tender, but she was tender in the right lower quadrant and right flank, with voluntary guarding.

90. Mrs C told HDC:

> "[Dr I] quickly examined my abdomen by pushing down on it causing significant pain that I could barely breathe between sobs and then left the room. He did not tell me what he was thinking, what the plan was, what he thought was wrong with me … I was then left in agony for another two hours without any further vital signs being completed despite [RM F] checking on me regularly."

91. Dr I stated that the clinical picture at this point in time was unclear, and the blood results did not demonstrate the likelihood of an inflammatory intra-abdominal cause.

92. Dr I documented that he discussed Mrs C with a General Surgery consultant, Dr H, and recorded: "As 2 x Bloods [normal] and pain settling, observe for now and consider USS."

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

93. Dr H told HDC that he recommended a repeat USS as Mrs C's initial USS was a limited scan. He said that a CT or MRI was not indicated at that time. Dr H stated that a request for an abdominal USS was made at 4pm, and the USS form filled in by Dr I was received by Radiology at 4.07pm. Dr H said that the delay occurred because Dr I was called away to the ED.

94. Dr I stated that at this point in time there was no indication for an exploratory laparoscopy[37] or laparotomy.[38] He told HDC that he communicated his plan to the Obstetrics team before being called away to the ED.

Midwifery care, 2.10pm

95. At 2.10pm, RM G documented that Mrs C's observations were normal, she was alert and talking, her pain score was 5–6, and she was using the PCA.

96. At 2.20pm, the student midwife documented that Mrs C's observations were normal, she was talking and alert, and her pain score was 7–8, with the pain increasing when her abdomen was palpated.

97. At 2.35pm, RM G documented that Mrs C's observations were normal and her pain score was 8. RM G told HDC that she contacted the anaesthetist, as Mrs C required more pain relief.

98. At 2.45pm, a PCA bolus of 10mcg of fentanyl was prescribed and provided. RM G documented that the CTG showed no accelerations, decelerations, or contractions, and that variability was greater than 66bpm. She also documented that Mrs C's pain had not stopped since the surgical registrar had examined her at 2pm.

99. At 3.10pm, the PCA was checked, and 15ml/150mcg had been given via the PCA.

100. RM G told HDC that she documented on the CTG at 3.15pm.

Midwifery care handover

101. At 3.30pm, RM G handed over the midwifery care of Mrs C to RM F. RM G documented: "[Mrs C] still in significant pain. CTG normal …"

102. RM F told HDC that at the time of taking over Mrs C's care, observations were being taken hourly, and she first took Mrs C's observations at 3.40pm and documented them on the Obstetric Observation Chart.[39] RM F stated:

> "[I]t is not my practice to write them in both places [the notes and chart] unless they deviate from the norm. At all times [Mrs C's] vital observations were normal, except for her pain scores which were elevated. It seemed that her pain scores were elevated in relation to the recent palpation by the surgical registrar, and it was hoped that the pain would settle again."

[37] A surgical procedure to view the pelvis and pelvic organs.
[38] A surgical procedure to explore the abdominal cavity.
[39] Recorded observations were all within normal limits.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

103. At 4pm, RM F documented:

> "[Mrs C] describes the pain as constant 4–5/10, with cramps that are 8–9/10 on top. Feels like it is bowel related, as she feels like she needs to pass a bowel motion and her rectum feels sore. Also experiencing a lot of urinary frequency."

104. At 4.30pm, RM F documented that she had contacted the General Surgery registrar, Dr I, and the anaesthetist, Dr L, who were both in theatre and would attend when able.

Second junior General Surgery registrar review, 4.30pm

105. Dr I reviewed Mrs C at approximately 4.30pm.

106. Dr I stated that Mr C was reluctant for his wife to be re-examined because of the pain she was experiencing, so he (Dr I) explained the need to repeat the examination.

107. Mrs C told HDC:

> "[T]he surgical registrar came back and re-examined my stomach, despite me and my husband asking him not to due to the amount of pain I was in, but he ignored us both and stated he had to examine me. Again he left without saying a word to me about what he thought or was planning."

108. Dr I documented that Mrs C's "pain [was] much worse" and that the abdominal examination was the same as the previous examination. Dr I contacted Dr H. Dr H told HDC that he asked Dr I to speak to the on-call radiologist to discuss the options of USS, CT, and MRI.[40]

109. Dr I stated:

> "I was advised [by the on-call Radiology consultant] that MRI, without an obvious diagnosis of concern to investigate, may be of limited value … [I]t was felt that an ultrasound would be the most appropriate first investigation, which I organised."

110. The clinical records document an unclear impression of the cause of Mrs C's pain, with renal colic,[41] internal hernia,[42] or an obstetric cause noted as possibilities. The plan was for Mrs C to be nil by mouth, to have a USS at 6pm, to be given further pain relief, and for the General Surgery team to be contacted following the USS.

111. Dr H told HDC that the plan was relayed to him by Dr I, and he delayed the start of an operation so that he could attend Mrs C's USS in person.

Midwifery care, 4.40–5.45pm

112. RM F told HDC that she repeated Mrs C's observations at 4.40pm, and these were normal. RM F said that she overlooked documenting these observations as she was busy carrying

[40] Magnetic resonance imaging — a non-invasive radiology scan.
[41] A type of pain experienced when urinary stones block part of the urinary tract.
[42] An internal hernia can cause an intestinal obstruction.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

out tasks to help to relieve Mrs C's pain. RM F said that at this time, Mrs C was "worried something was 'really wrong'", and that the surgical registrar arrived shortly afterwards. RM F documented: "CTG remains normal … writhing around in bed ++." Mrs C declined Entonox,[43] and was administered 1g of paracetamol.

113. RM F said that between 3.40pm and 5pm she discussed Mrs C's care and her worsening pain, including questioning the cause of the pain several times with Dr E, at least twice with Dr D, and with Dr A at 5pm when she came out of theatre. RM F told HDC that she did not document these conversations, as everyone responded that they "were still waiting for the completion of [Mrs C's] general surgical review before they could make any further decisions about her care".

114. Dr A stated:

> "I note there was no clinical entry relating to any attempted conversations with myself about [Mrs C's] condition following my direct review of her at 12.50pm and I do not recall … being asked to re-review [Mrs C] 'between 3.40–5pm', while I was in theatre."

115. RM F said that "around this time it became apparent that despite regular use of the PCA, [Mrs C's] pain was still uncontrolled". RM F told HDC that she called Dr L again at approximately 5pm to check how far away he was, "as the pain was definitely worse than it had been at [4.30pm]".

116. Dr A told HDC that she was in the operating theatre attending to a serious case from 3pm, and that the earliest she came out of theatre was 5.13pm.

117. Dr A stated:

> "From my recollection following my release from theatre well after 5pm, I understood [Mrs C] to have had a positive response to analgesia after being reviewed by the duty anaesthetist, that she remained entirely observationally stable with normal continuous fetal heart-rate monitoring. I understood that she was about to undergo an after-hours ultrasound scan following the general surgical review our team had requested, with considerations of non-obstetric differentials. All of these were again entirely consistent with documented events, observational charts, and reviews that were documented to have taken place.
>
> I would have found her positive response to analgesia reassuring and the plan for scan (instead of exploratory surgery) entirely appropriate for an objectively well mother and fetus. I would not have considered steroids or magnesium sulphate necessary at the time as there was no evidence to suggest delivery at this very preterm gestation was a likely scenario …"

[43] Nitrous oxide gas used for pain relief.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

118. At 5.40pm, Dr L administered an IV bolus of 200mcg fentanyl, and remained with Mrs C for approximately 30 minutes to ensure that the pain relief was effective. The PCA documentation was changed to 20mcg boluses.

119. RM F told HDC:

> "I do understand the frustration that [Mr and Mrs C] were experiencing at this time because I was feeling frustrated too. [Mrs C's] husband did ask several times what the plan was, and unfortunately I could not give him any real updates, despite questioning the obstetric team …"

120. At 5.40pm, RM F documented that the CTG remained normal.

Transfer to Radiology, 5.45pm

121. RM F stated that at 5.45pm Dr I informed her that the scan had been booked for 6pm. At 5.55pm, RM F documented that Mrs C was being transferred to Radiology and that the oxygen tank would be taken as Mrs C's oxygen saturations had dropped to 90%.[44] RM F also recorded that Mrs C had been much more comfortable since being given the fentanyl bolus. The CTG was disconnected.

122. RM F documented in retrospect (at 7.10pm):

> "CTG 1630–1755hrs. Baseline: 130–135bpm. Variability: Normal. Accels: Present. Decels: Nil. UA: Nil. CTG discontinued 25 mins post last bolus of fentanyl. No access following last bolus but variability remained normal."

123. RM F told HDC that despite having requested a bed and oxygen to transfer Mrs C to Radiology, the orderly brought a wheelchair. RM F stated: "[Mrs C] assured me she would be comfortable enough to travel in a wheelchair …"

124. Mrs C said that prior to leaving, she "vomited about 300mls of black coloured water with thin streaks of blood in it", and that Dr I told RM F that he was not worried about it.

125. RM F told HDC that she relayed to Dr I that the vomit was "mostly water, with small greenish-black flakes in it". She does not recall Dr I saying that he was not worried about it, but does recall him being "non-[committal] about it".

126. At 6.05pm, Mrs C's oxygen saturations were documented as 98%, and her pulse was 72bpm.

127. The USS was completed at 6.29pm, and at this time the fetal heart rate (FHR) was recorded as 127bpm.

[44] However, the observation chart records Mrs C's oxygen saturations as above 96% at 5.53pm and 6.05pm.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

128. There is no record of any verbal discussion of the scan results at this time, and Dr H did not document in the clinical notes at this time.[45] A verbal report sometime after 7pm was requested and documented by Dr A as "nil significant".[46] The formal report was received at 9.45pm,[47] and included the comment: "No sonographic abnormality identified to explain patient's symptoms. Vascular structure in the right adnexa[48] adjacent to the cervix is of uncertain significance."

129. Mrs C told HDC that she attempted to pass urine and was unable to, despite pushing, and informed RM F. RM F documented in retrospect that at the end of the USS, Mrs C passed urine with difficulty and was "feeling sore but stable". RM F disconnected the oxygen and transferred Mrs C to a wheelchair.

130. Mrs C told HDC: "[RM F was] very concerned and alarmed at my symptoms at this point." RM F told HDC that she would not describe herself as being "alarmed" by the symptoms, but she was concerned and wanted to speak with the Obstetrics team and recommence monitoring as soon as possible.

131. At 6.30pm, RM F documented Mrs C's oxygen saturations as 100% and her pulse as 78bpm, and that she was feeling nauseated again and was to return to WAU.

132. RM F recorded in retrospect that at 6.38pm Mrs C was "vomiting while returning to WAU — remains watery with small amounts of dark green/black particulate matter". Mrs C said that it was "another 300ml of black coloured water but with larger clots of blood present in it". RM F contacted the General Surgery registrar.

133. Mrs C told HDC:

> "When being wheeled back into the unit I informed [RM F] that 'I didn't feel well, and thought I was dying' … I told my husband and [RM F] I was about to faint."

134. RM F stated that she does recall Mrs C saying that she did not feel well. RM F documented (in retrospect): "[At 6.41pm Mrs C] reported feeling very clammy [and] faint." RM F said that Mrs C did not mention "dying".

Collapse at 6.42pm

135. The clinical record notes that at 6.42pm the staff call bell and emergency bell were activated, as Mrs C had become non-responsive. The anaesthetist, house officer, trainee intern, and additional midwifery staff arrived in the room at 6.43pm. The clinical record

[45] In a response to HDC, Dr H stated that "the ultrasound confirmed abnormality of the uterus with the verbal report suggestive of rupture". However, subsequently this statement was corrected by Waikato DHB. The sonographer told HDC that she "cannot recall with accuracy who was in attendance or the verbal briefing delivered to [Dr H] … [A]ny verbal briefing would have been delivered by someone more senior than her — possibly the Radiology Registrar …" The sonographer thought that the junior Radiology registrar may have been in attendance. However, the registrar cannot recall a discussion with Dr H.

[46] See paragraph 146 below.

[47] See paragraph 159 below.

[48] The region adjoining the uterus that contains the ovary and fallopian tube, as well as associated vessels, ligaments, and connective tissue.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

notes that Mrs C was on the bed and bagging[49] was taking place. Oxygen was being administered, and 2ml of naloxone[50] was given for possible narcosis.

136. The notes record that at 6.45pm Mrs C's pulse was 132bpm and "thready", and that her blood pressure was unable to be heard.

137. At 6.46pm, Mrs C was placed in the recovery position with a wedge. Her oxygen saturations were documented as 99%. Around this time, the CTG recording was recommenced.

138. At 6.46pm, RM F documented: "CTG/FHR ~80bpm." A midwife who responded to the emergency call bell documented in retrospect that at 6.46pm the FHR was 70bpm, and at 6.49pm it was 130bpm.

139. Dr A told HDC that she received a 777 switchboard call to WAU at 6.49pm. Her telephone records from this day confirm that she received a call at this time. It is documented in the clinical record that Dr A arrived at 6.50pm.

140. Dr A reported that the team was working in accordance with the diagnosis of shock secondary to the possibility of a bowel perforation. This was because the previous clinical assessments, recent vomiting of bilious matter,[51] and the impression from the USS as relayed by the midwife had identified no cause for the pain.

141. Waikato DHB reported that the last likely FHR baseline recorded had been 120–130bpm at 6.49pm to 6.51pm, and this was comparable to the previous baseline.

142. Mrs C was transferred to the delivery suite operating theatre and arrived at 6.55pm. The duty anaesthetist from the main theatre, the General Surgery team, and the on-call obstetrician and paediatrician were called.

Resuscitation of Mrs C and delivery of baby

143. At some time between 6.51pm and 6.58pm, the CTG recorded decelerations to 70bpm with a loss of contact. The exact time on the CTG is not able to be determined.

144. Mrs C's pulse was documented on the CTG twice as 120bpm and 119bpm.

145. Dr A told HDC that in addition to fluid resuscitation and inotropic[52] support by the anaesthetic team, simultaneously they inserted an indwelling catheter and an arterial line, and sought a verbal report from the reporting radiologist.

146. Dr A told HDC that she was informed that no free fluid or sonographic abnormality had been identified to account for Mrs C's symptoms, and that a 2.5cm vascular structure of unknown significance adjacent to the cervix had been noted. Dr A documented

[49] Manual ventilation using a bag and mask.
[50] A medication used to block the effects of opioids.
[51] A mixture of particulate matter and mucous that forms in bile.
[52] Used to regulate a patient's heart rate, blood pressure, and the force of contraction of the heart.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

retrospectively at 11.20pm that she had received a verbal USS report saying "nil significant".

147. Dr A stated that at 7.07pm the bedside scan showed recovery and maintenance of the FHR, which was recorded on the CTG as 150bpm. Dr A said that the FHR recovery occurred in correlation with the positive response to Mrs C's resuscitation. While these events took place, the team continued to prepare for a potential laparotomy.

148. At 9.45pm, Dr D documented in retrospect:

> "… Bedside USS by [Dr A] — FHR 150bpm. Checked on CTG — 140bpm but [patient's blood pressure stable] according to Anaesthetic Reg … FHR going down to 70bpm on CTG. So checked with USS → FHR 70–80bpm …"

149. Dr A stated that fetal supports included steroids, which were administered at 7.08pm, a magnesium sulphate bolus administered at 7.10pm, and a bedside USS to check the FHR.

150. Dr A said that at 7.08pm there was a recurrence of the deceleration of the FHR to 70bpm, which was confirmed on the bedside scan, and the response to fluids and blood pressure support for Mrs C also began to diminish. The decision was made to proceed to a midline laparotomy and delivery. Dr A told HDC that at this time Mrs C could register responses to verbal commands. Dr N also arrived in theatre.

151. Dr A told HDC that as soon as they saw a "waning of response to maternal resuscitation … [they] immediately made the call to proceed to exploratory laparotomy and/or delivery".

152. At 7.12pm, the skin was prepared and draped. Dr A told HDC that a HemoCue[53] result showing a significant drop to 60g/L[54] was conveyed to her. She said that this suggested an acute intra-abdominal bleed, and a massive transfusion protocol was activated.

153. At 7.24pm, Baby C was delivered via emergency Caesarean section and passed to the attending Paediatrics team.

154. The operation note documents that following the delivery of Baby C, a uterine rupture was identified 1–2cm below the surgical incision. After attempts to repair the uterus failed, the decision was made to proceed with a subtotal hysterectomy[55]and a left salpingectomy.[56] However, bleeding persisted, and Dr A requested an urgent consultation with a vascular consultant.

155. The registrar for the vascular consultant reported that arterial bleeding points were identified coming from at least three areas of the right internal iliac artery branches. The

[53] HemoCue point-of-care systems give immediate haemoglobin levels and white blood cell count results with laboratory accuracy.
[54] Reference range is 111–155g/L. 60g/L is very low.
[55] An operation to remove the uterus. This was undertaken following extensive efforts to preserve the uterus.
[56] Removal of the left fallopian tube.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

registrar documented that these areas were over-sewn, and that after this there was good control of bleeding.

156. The wound was closed by the Obstetrics team.

157. Dr A stated that there was an estimated blood loss of eight litres, with transfusion of 25 units of blood products.

158. The overall finding documented in the operation report was of a uterine rupture.[57]

USS findings

159. The following USS findings were reported formally at 9.45pm:

> "FINDINGS:
>
> Very tender to scan
> …
>
> Posterior placenta is clear of the os.[58] FHR 127 beats per minute.
>
> [Right iliac fossa] shows normal peristalsis[59] of bowel. No free fluid is seen.
>
> Right adnexa, adjacent to cervix demonstrates a vascular structure with a swirl flow pattern measuring 2.5cm ? nature ? aneurysm.[60]
>
> COMMENT:
>
> No sonographic abnormality identified to explain patient's symptoms.
>
> Vascular structure in the right adnexa adjacent to the cervix is of uncertain significance."

160. Dr A stated that although the word "aneurysm" appears in the report, there is a question mark before it, and the conclusion did not identify an aneurysm. She said that even if the radiographer had identified an aneurysm, the approach would still have been to expedite the laparotomy in the context of acute resuscitation. [61]

Postoperative debriefs and discharge

161. Dr A told HDC that immediately after the operation, while Mrs C was still in theatre recovery, she and Dr N provided Mrs C's family with a debrief of the operative findings, procedures performed, and expected recovery course.

[57] Spontaneous tearing of the uterus during pregnancy or childbirth.
[58] A normal attachment of the placenta.
[59] Wave-like muscle contractions in the oesophagus, stomach, and intestines.
[60] Weakness in part of a vessel wall that allows it to balloon out or widen abnormally.
[61] See addendum dated 4 December 2020.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

162. Mrs C told HDC that Dr A and Dr N came to see her and said that they were amazed that she was alive owing to the amount of internal bleeding in her abdomen. Mrs C said that they informed her that they had no idea what caused her uterus to rupture and tear, and that they had never seen anything like this previously.

163. Mrs C stated:

> "I asked whether the rupture was likely due to [the baby] being implanted [partly] in my muscle layer of my uterus. They told me that they were not sure and that they did not know about this ... I asked if my ultrasound I had just before I collapsed showed anything. I was told it showed nothing … However, the ultrasound report does show that I may have an aneurysm …"

164. On 16 Month6, Dr N and the acute teams reviewed Mrs C and provided a debrief to her and her husband. Dr A was on a rostered day off.

165. Dr A reviewed Mrs C on 17, 18, and 19 Month6.

166. Mrs C remained stable and was discharged to her LMC (Day 5 postoperatively). Waikato DHB said that discharging to midwifery care is in accordance with its usual process.

Pathologist's report

167. On 20 Month7, a Waikato DHB pathologist reported on Mrs C's uterus and left fallopian tube. The conclusion was that the uterus and left fallopian tube had features consistent with adenomyosis.[62]

Baby C

168. Baby C's Apgar[63] scores were 2 at birth, 2 at one minute, and 4 at five minutes of age. Baby C remained in the neonatal intensive care unit (NICU) for 25 days, but passed away on 9 Month7. Her death was referred to the Coroner.

169. A post-mortem examination was carried out on Baby C. The "Provisional Report After Post-Mortem Examination" recorded the direct cause of death as "[h]ypoxic ischaemic brain injury" with an antecedent cause of "[p]erinatal asphyxia[64] [associated with] maternal collapse". The report also noted: "Comment: anatomically normal."

Postoperative meeting, 8 Month8

170. Mrs C was not given a postoperative follow-up appointment until she contacted the Obstetrics and Gynaecology outpatients clinic on 27 Month7. Dr B, the Clinical Director — Obstetrics, told HDC:

---

[62] A condition in which the inner lining of the uterus (the endometrium) breaks through the muscle wall of the uterus, which can cause severe pain and bleeding during periods.

[63] "Apgar" stands for appearance, pulse, grimace, activity, and respiration. The Apgar score is based on a total score of 1 to 10. A score of 2 indicates severe birth asphyxia (the body is deprived of oxygen), and 3–4 indicates moderate birth asphyxia.

[64] A lack of blood flow or gas exchange to or from the fetus in the period immediately before, during, or after the birth process.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

"[Mrs C's] referral was being retained until the investigations — including the post mortem — were finalised. As soon as [Dr A] was notified of [Mrs C's] clinical concerns, she arranged the said appointment …"

171. Dr A told HDC that she was "obligated to ensure her review would not jeopardise any ongoing investigation by the Coroner". However, she sought her own advice and arranged a clinical review with Mrs C.

172. On 8 Month8, Mrs C and her husband met with Dr A and the Clinical Director — Obstetrics. A letter dated 8 Month8 summarising the meeting was sent to Mrs C's community midwife (Baby C's neonatal specialist), and copied to Mrs C on 10 Month9.

173. The reporting letter stated:

"We performed a crash emergency Caesarean section for maternal circulatory collapse. This was a result of assumed spontaneous uterine/vasculature rupture that has further resulted in a subtotal hysterectomy performed for life-saving measures …"

174. Dr A told HDC that at the meeting, she reviewed Mrs C and checked her physical, mental, and general well-being. They also reviewed in detail both the operation note and the histology report of Mrs C's uterus from the laboratory. In relation to the histology report, Dr A stated: "[T]he uterus had findings consistent with adenomyosis and haematoma[65]."

175. Mrs C said that at the meeting she was told that as she became unwell at the weekend there were limited resources, and that most likely her uterus ruptured because of an iliac aneurysm, and she should have been made a priority and had a scan earlier, or taken to theatre to see why she was in so much pain. Mrs C stated that she found a comment by Dr A about still having an ovary and that she could still have children, "distressing and insulting".

176. Mrs C said: "This whole experience has left me completely emotionally and physically drained and distrustful of the medical profession."

177. Dr A told HDC that she felt "absolutely rotten" for having broached the subject of fertility with Mrs C, but said that it was "a difficult albeit relevant and important conversation to have". Dr A stated that she is very sorry for the distress it caused Mrs C.

Further information — Waikato DHB

Staffing levels

178. Waikato DHB reviewed the General Surgery, Obstetrics and Gynaecology, WAU, and Obstetrics and Gynaecology midwives' rosters for the period. Waikato DHB advised that the staffing matrix was normal with the exception of the Delivery Suite overnight on 14 Month6, which had one fewer midwife than usual (an agency nurse was called), and high volumes and high acuity were experienced. On the afternoon and night shifts on 15

[65] A collection of blood outside the vessels.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Month6, there was one fewer midwife than usual in the Delivery Suite, and the acuity in the WAU was high from the morning to evening.

Waikato DHB Serious Incident Review Report (SIRR)

179. The SIRR identified the following as areas for improvement:

a) Despite the surgical registrar informing the Obstetrics team of the proposed plan, the midwife and Mr and Mrs C were not informed at the time of the first surgical review.

b) The Obstetrics and Anaesthesia teams in conjunction did not control Mrs C's pain early enough in the patient care episode.

c) There was a delay in accessing the anaesthetist, as he was busy in the obstetric theatre, which resulted in a delay in getting more pain relief charted.

180. Two action points were identified. The first was for the learnings from the review to be discussed within the Obstetrics, General Surgery, and Anaesthesia multidisciplinary team. The second was to audit the documentation of pain assessments and the effectiveness of pain management.

Dr O's report

181. Waikato DHB obtained an expert opinion from an obstetrician and gynaecologist, Dr O. Dr O considered that aspects of the care could have been managed differently, but that overall, "the care provided was of a standard that would be considered acceptable to the majority of practicing peers".

182. Dr O stated:

> "Spontaneous uterine rupture in women with endometriosis/adenomyosis is a rare complication that is described in a handful of papers in obscure journals … The presentation was atypical with multiple reassuring features both of maternal observation and fetal monitoring … There are factors in care that could have been managed differently eg earlier steroids and more prompt delivery after collapse."

183. Dr O advised that the USS undertaken prior to Mrs C's collapse was still not clear as to diagnosis, and indicated that most likely the final rupture happened just prior to Mrs C's collapse.

184. The following is a summary of Dr O's key points:

- For most of the day, the nature of the pain was difficult to attribute to a specific cause that needed an operation. As there can be serious consequences from operating on pregnant women, it is appropriate to be cautious and avoid surgery unless a surgical problem is fairly certain.
- There is no evidence of Dr D having done a thorough assessment at 10am. Dr O considered that for a woman "writhing in pain", she would have expected a more detailed assessment, discussion with an SMO, and detailed planning.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

- In hindsight, Dr O considered that at the 12.50pm SMO review, additional measures could have been considered, eg, steroids and direct senior contact with the surgical team.
- Another SMO review would have been prudent towards the end of the afternoon (at 4.45pm–5.30pm) in light of Mrs C's worsening pain. At this time, "consideration that laparotomy, and possible resulting preterm birth, may be required for conditions other than preterm labour would have been prudent to prepare for".

185. Dr O considered that from 4.45pm the possible differentials included obstetric emergencies (eg, abruptions, uterine rupture), conditions aggravated by pregnancy (eg, degenerating fibroids,[66] pyelonephritis,[67] rupture of other vessels), and conditions unrelated to pregnancy (eg, appendicitis or a bowel obstruction).

186. Dr O stated that because of the stable observations and nature of the pain on reviews during the day, it was not unreasonable that the staff involved did not have spontaneous uterine rupture featuring in the differential diagnosis.

187. Dr O considered that it was appropriate to undertake an urgent laparotomy and to deliver the baby as soon as possible on arrival in the operating theatre.

Waikato DHB changes to service

188. The Clinical Director — Obstetrics stated:

> "I would like to send my sincere condolences to [Mrs C] and her partner for the loss of [Baby C] and for the traumatic events that they experienced during their time at [the public hospital]."

189. Waikato DHB told HDC that it has completed the following:

a) A multidisciplinary teaching session on uterine rupture;

b) A retrospective audit on obstetric hysterectomies;

c) Reinforcement of the use of the SBARR tool and escalation communication tool with staff;

d) An increase in the number of registrars employed and rostered for the service, with two long-day registrars rostered at the weekends;

e) Implementation of additional midwifery staffing, as well as an increase in the base staffing matrix in WAU and the Delivery Suite; and

f) Employment of four additional Obstetrics and Gynaecology SMOs.

[66] A benign tumour of the uterus that can cause acute pain when it outgrows its blood supply and begins to degenerate.

[67] A sudden and severe kidney infection, typically caused by a bacterial infection.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Further information — ACC clinical advice

190. ACC asked obstetrician Dr P to provide external clinical advice. Dr P's advice considers the link between the care provided to Mrs C and Baby C (in separate reports), and the outcome.

191. Dr P advised that the spontaneous rupture of an unscarred uterus in the antenatal period without labour is very rare. Dr P said that in 34 years of practice she has had only one case. In her opinion, the most likely cause of the uterine rupture was pregnancy-induced changes in adenomyosis in Mrs C's uterus.

192. Dr P noted that Mrs C's uterus showed multiple foci of adenomyosis in the ruptured area, and quoted research suggesting that adenomyosis causes endometriosis deposits to expand and splay the myometrial muscle fibres apart, causing a weakening in the wall. Dr P suspects that the pain Mrs C was experiencing was caused by the stretching apart of the smooth muscle wall of the uterus. Dr P was unable to identify the vascular lesion seen on the USS shortly before Mrs C's collapse, but posited the idea that it could have been blood in a venous plexus bulging through the tear in the muscle wall.

193. Dr P identified six areas of concern:

1. Mrs C was in progressively severe pain for the entire day and required increasing amounts of intravenous opiate analgesia;
2. There was limited involvement by obstetrics consultants;
3. There was a lack of consideration of an obstetric cause despite the presence of uterine activity;[68]
4. There was a lack of administration of steroids and magnesium sulphate in the morning of 15 Month6;
5. There was a possible delay in performing a laparotomy and controlling the bleeding once in the operating theatre; and
6. There was a possible delay in performing a Caesarean section once in the operating theatre.

194. Dr P considers that if a laparotomy had been performed by the mid to late afternoon, it would have revealed changes in the lower part of the uterus that would have suggested imminent rupture.

195. Dr P stated:

"[Mrs C's condition following her collapse] strongly suggested an intra-abdominal bleed — she was tachycardic,[69] hypotensive[70] and required inotropic support.

[68] There was very limited uterine activity, and none was noted after 11.30am.
[69] A faster than normal heart rate.
[70] Low blood pressure.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Maternal hypotension causes fetal hypoxia.[71] It is not clear to me why the decision to do a [Caesarean section] was apparently only made 13 minutes after arrival in theatre."

196. Dr P's overall concern was with the level of involvement by an obstetrics consultant. She stated:

"I believe that [Mrs C's] uterine rupture and need for massive blood transfusion and subtotal hysterectomy was due to the failure of a consultant obstetrician being available to take the lead personally and actively investigate, diagnose and manage [Mrs C's] progressively severe abdominal pain in the morning and afternoon of 15 [Month6]."

197. In relation to Mrs C's antenatal care, Dr P stated:

"I cannot see a direct link between the first ultrasound report and the probabl[e] pathology of an adenomyosis related uterine rupture. Therefore, I do not believe that any other treatment path should have been followed in [Mrs C's] pregnancy prior to her presentation on 15 [Month6]."

198. The ACC report was produced shortly after these events. The purpose of the ACC report was to assess whether or not a "treatment injury" had occurred, and the information relied on by ACC did not include statements directly from the clinicians involved. This is not a criticism of the ACC process, but it is necessary to highlight the purpose and limitations of the ACC report when it is referred to in my opinion. HDC's independent advisors are asked to focus on the accepted standard of care, not the outcome, and they have the benefit of reviewing information obtained over the course of the investigation, which includes statements from the clinicians involved and additional clinical advice. Although I refer to the ACC report in my opinion, in view of the purpose and limitations of the ACC report, I place less weight on its findings.

Further information

Dr A

199. Dr A provided several detailed statements to HDC. A summary of Dr A's statements, including her response to the advice of my expert advisor, Professor Stone, and the ACC reports, is included below.

200. Dr A considers that the eventual cause of Mrs C's collapse was either an exceedingly rare spontaneous rupture of an unscarred, adenomyotic uterus, or the rupture of an equally rare visceral (uterine/cervical) pseudo-aneurysm. Dr A confirmed that the uncertain vascular structure located in the cervical region on USS before Mrs C's collapse was not identified as an aneurysm, but noted that rupture of a visceral artery pseudo-aneurysm carries a high maternal (75%) and fetal (95%) mortality rate.

[71] An inadequate supply of oxygen.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

201. Dr A stated: "The true incidence of uterine rupture of non-labouring uterus without scar was more accurately calculated at 1 in 100,000 births (Zwart, et al., 2009); to put this into context, for our tertiary DHB, we may anticipate encountering one such case in 20–25 years. This diagnosis would be even more remote if including all of the pain presentations in the antenatal period that do not result in birth during the related episode."

202. Dr A told HDC that an obstetric cause was "of course the primary consideration but there were cogent reasons to reasonably exclude this", such as:

> "I. The extreme rarity of uterine/vascular rupture in this context
>
> II. Normal (and repeated) obstetric related investigations, examinations, frequent maternal observations and continuous fetal monitoring
>
> III. Even a supposed exploratory surgery (laparotomy or laparoscopy) before uterine rupture took place, would be very unlikely to provide a reliable identification of [Mrs C's] cause of pain — in fact, there has not been any published example at all in the entire searchable medical literature, describing a surgical diagnosis and treatment of an imminently rupturing unscarred uterus.
>
> IV. No objective evidence of maternal or fetal compromise and/or radiological evidence of rupture. In the context of [Mrs C's] presentation, all of the searchable publications regarding rupture of an unscarred uterus, including all of those referenced by Professor Stone, describe surgical intervention and treatment having been pursued in light of objective evidence of maternal or fetal compromise and/or radiological evidence of rupture. In contrast, [Mrs C] did not have any objective or radiological findings suggestive of uterine rupture until her collapse."

203. In relation to the overall management of Mrs C, Dr A stated that an obstetric cause was the primary consideration, and that multiple investigations were undertaken in the course of work-up and prior to her review at 12.50pm, which included a bedside USS, fFN, vaginal swab, urine dipstick, CBC x 2, biochemistry tests x 2, and continuous CTG monitoring. Dr A said that her assessment of Mrs C included a review of the laboratory results, an examination of Mrs C, and a review of her surgical and antenatal history, including the scan findings.

204. Dr A told HDC:

> "At the time of my assessment of [Mrs C], we had effectively excluded an obstetric cause of pain, having excluded labour, significant bleeding or abruption as likely cause; while we had reassuring evidence of ongoing maternal and fetal objective wellbeing on continuous monitoring and frequent vitals observations.
>
> The pertinent points to note at the time of my assessment of [Mrs C] included her bowel symptoms, noting preceding altered bowel habits, cessation of passing of flatus from 3am, localisation of pain to right lower abdomen; clinical finding consisted of a

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

mild abdominal distention, soft abdomen and uterus and tenderness in right iliac fossa only.

At the time, I did not identify another obstetric cause to account for her subjective symptoms and the clear plan forward was as documented. It was very important to consider non-obstetric causes and good practice in seeking multidisciplinary input including the general surgeons for consideration of other surgical causes and also anaesthetics for assessment of analgesic review.

To be sure to exclude a possibility of an evolving obstetric condition in this context, regardless [of] the extremely remote likelihood of such event, I recommended the most immediate and meaningful means of ongoing obstetric surveillance with continuous fetal monitoring."

205. Dr A stated:

"It was with all of the above information in mind … that I came to the working impression of an unlikely obstetric cause of pain … more likely a possible subacute small bowel obstruction (SBO) secondary to intraabdominal adhesions, with a possible appendicitis also on the differential …"

206. Dr A said that the only reason uterine rupture was not a reasonable consideration was that there was no clinical evidence to support it.

207. Dr A also stated:

"I do not know and would not claim to know what an impending uterine rupture looks like in a pre-labour, unscarred, unruptured uterus.

Given the complete lack of evidence on the topic in the collective medical literature out there, I suspect, not many, if any in the world, does.

With the description of the 2.5cm vasculature near the cervix on scan immediately prior to her collapse, it is likely this was the site of the haematoma where it subsequent[ly] ruptured. With its low position, a view to it prior [to] rupture would likely to have been obscured by the bladder. Even if assuming it could hypothetically be visualized directly in an exploratory surgery before its rupture, I doubt many practicing obstetrician[s] would have determined it to be more than congested pelvic/ uterine vessels, let alone intentionally delivering a very preterm fetus based on this finding and brazenly attempting a repair of the area with engorged vasculature."

208. Dr A disagreed with Professor Stone's suggestion that the haemoglobin variation between Mrs C's two blood tests was outside the expected range. Dr A stated:

"[T]he repeated bloods were entirely consistent with what would be expected from the same person who became mildly more haemo-concentrated (as reflected by the slight increase in haematocrit level), likely from a lessened oral intake during the day,

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

without evidence of a concealed blood loss. All of these minor fluctuations were within expected variations for an individual in a day as well as such fluctuations moved in the 'same direction' (all slightly greater reflecting the slight increase in concentration), which all supports the validity of the test and that they were obtained from the same person."

209. Dr A did not agree that Mrs C was in progressively severe pain, and in response to the provisional opinion stated:

"The ACC reviewer has made repeated claims that '[Mrs C] was in progressively severe pain for the entire day', when in fact, the documented pain score had shown a pattern of fluctuation instead of progression …

Contrary to the reviewer's claim, [Mrs C] did respond to analgesia with Fentanyl PCA following my review at 12.50hr and was documented to be comfortable at 13.40hr.

While her pain scores did increase following the first examination by the general surgical registrar, [Mrs C's] pain also then subsequently settled to a score of (considered normal acceptable range) 0–4 between 1728hr to 1753hrs. This settling of pain appeared to have taken place, near the time of the anaesthetist's administration of PCA bolus and top up.

During her presentation, [Mrs C's] observations were frequently monitored and recorded on standardized Waikato DHB Obstetric Observation Chart with Early Warning Score (EWS) system calculated.

Even during the period of her pain exacerbation (when the obstetric team was occupied in theatre) because of the overall objective stability, her condition in fact did not and would not have triggered further recommended action beyond those performed, according to the EWS algorithm (see observation chart).

I note during the period of her increased pain score in midafternoon before 17.30hr, the obstetric and anaesthetic staff, myself included, were fully occupied managing a complicated emergency caesarean delivery and post-partum haemorrhage; which restricted the anaesthetist's availability to administer PCA bolus during this time.

It is also worth noting Fentanyl is considered an appropriate, if not preferred, choice of opioid analgesia in the antenatal and intrapartum period, compared to conventional pethidine or morphine, due to its comparative fast onset and shorter half-life (O'Donnell, Barnard, & Wright, 2017). Moderate doses of fentanyl are also thought to not mask peritoneal signs in assessment of other abdominal pain causes and its administration often makes examination better tolerated by diminishing discomfort and anxiety (Ansari, 2017)."

210. Dr A disagreed she should have taken a more active role in discussing and planning Mrs C's care with the General Surgery consultant following her review. In response to the provisional opinion, Dr A stated:

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

"It is my customary practice to seek prompt interdisciplinary advice, and I do not hesitate to personally approach specialist-level colleagues myself, where this is indicated.

There was however no objective maternal compromise, nor an indication for imminent surgical intervention, at the time of my assessment and therefore discussion with the General Surgery consultant was not indicated."

211. In relation to the administration of magnesium sulphate and steroids, Dr A referred to the "Antenatal corticosteroids given to women prior to birth to improve fetal, infant, child and adult health: New Zealand and Australian Clinical Practice Guidelines" (the Antenatal Corticosteroids Guidelines). She stated that at 12.50pm, none of the accepted indicators[72] for women at risk of preterm delivery were applicable to Mrs C's situation at the time. Dr A told HDC: "Had an objective pathology become identifiable at the time (which there was none), I would readily have considered their use; this however was not the case."

212. Dr A stated:

"[Fetal supports] became indicated according to the same guideline. During the time when we saw a stabilisation of maternal-fetal condition that I had hoped would last, there was then also an objectively higher probability of proceeding to preterm delivery thus these fetal supports should be considered.

Further, with respect to giving fetal supports such as steroids and magnesium sulphate earlier, prior to [Mrs C's] departure to radiology at 5.50pm, there was no change in an objective indication (as the surgeons did not consider surgery imminent and there was no obstetric deterioration or preterm labour) to consider giving these, according to the same guidelines)."

213. In relation to earlier surgical intervention, Dr A stated:

"Professor Stone's suggestion that an earlier aggressive surgical intervention in this case may have allowed for the reliable identification of the source of pain, before uterine rupture actually took place, is therefore purely speculative. A further decision to deliver (without objective evidence of maternal or fetal compromise) without definitive rupture of uterus or its vasculature would therefore be at best experimental and must be tempered by the very real risks of iatrogenic prematurity."

---

[72] A history of previous preterm birth with additional risk factors(s) for preterm birth; preterm prelabour rupture of membranes; chorioamnionitis; antepartum haemorrhage; multiple pregnancy (twins and higher order) with additional risk factors(s) for preterm birth; diabetes mellitus or gestational diabetes; systemic infection; pregnancy-associated hypertension or pre-eclampsia; intrauterine growth restriction/fetal compromise; ultrasound evidence of cervical shortening/funnelling; positive results of fetal fibronectin test; medically indicated preterm birth.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

214. In relation to her consideration of intraperitoneal (abdominal) bleeding, Dr A stated:

> "There was no clinical, observational, laboratory or even radiological evidence immediately prior to her collapse to suggest intraperitoneal bleeding until her collapse … the more likely and logical explanation … was simply that she did not have a concealed bleed (until her collapse)."

215. In relation to the timeliness of delivering Baby C, Dr A stated that the scrutiny of related actions immediately surrounding Mrs C's collapse must be considered against how the events unfolded where there was an undifferentiated maternal shock without a clear diagnosis at the time.

216. Dr A told HDC that the principal management of shock is to initiate immediate resuscitative therapy while expeditiously identifying an aetiology (cause) to administer definitive therapy to prevent serious complications and death. Dr A said: "Professor Stone does not acknowledge the duration of a positive response to resuscitation seen in both maternal and fetal recordings following the arrival to theatre."

217. Dr A stated:

> "[Mrs C's positive responses to resuscitation] allowed us opportunity to consider the correct causes of [Mrs C's] deterioration, soliciting additional assistance, contacting the radiologist for the ultrasound findings … while simultaneously (but ***not at all*** at the expense of delaying a decision to deliver) facilitating multiple adjuncts in preparation of likely delivery of the fetus."

218. Dr A told HDC that in her view, the decision-to-delivery interval was 16 minutes from scrubbing up and draping to delivery. She stated that this was accounted for by:

> "4 minutes for scrub, paint and drape time[,] 10 minutes for anaesthetic release under GA (a laudable effort considering the swift deterioration to extreme haemodynamic instability and activation of massive transfusion at this time) [and] 2 minutes from knife to skin via previous mid-line laparotomy scar, to the delivery of baby."

219. Dr A said that during the 13 minutes in theatre prior to a decision to deliver, her team actioned the following:

"○ Transferred patient from bed to the operating table

- ○ Fetal heart assessment via direct bedside ultrasound followed by CTG, noting a recovery of fetal heart rate to 140–150 beats per minute.
- ○ Correction of maternal blood pressure and maternal heart rate via resuscitation efforts
- ○ Phoned in
  - Neonatal team
  - Main theatre anaesthetic staff

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

- General surgeons, for suspicion of physiological shock from a perforated viscus (bowel) based on our earlier working diagnosis and [Mrs C's] recent symptoms of vomiting en route from radiology
- Offsite, on-call obstetrician

○ Seeking radiology report, receiving in theatre a verbal report of —

- No contributory cause found, no free fluid intraabdominal
  - normal liquor volume, normal fetal heart rate, normal bowel peristalsis, no intraabdominal free fluid to suggest internal bleeding, a finding of vasculature 2.5cm near cervix of unknown significance

○ Applying and administering

- Additional IV access and further bloods taken
- Resuscitation with IV fluids and inotropic support for presumed physiological shock
- Arterial line
- Indwelling urinary catheter
- IV antibiotics
- Fetal interventions to reduce sequlae of preterm birth
  - Steroid injection for lung maturity
  - Magnesium sulfate for neuroprotection

The moment we saw a waning of response to maternal resuscitation with a return of hypotension and a corresponding fetal heart rate deceleration, we immediately made the call to proceed to exploratory laparotomy and delivery."

220. Dr A stated:

"[T]he precipitating cause that led to the emergency delivery of [Baby C] on 15 [Month6] was extremely rare and catastrophic in nature. It was very traumatic for all involved … Nonetheless we were able to save [Mrs C] and, we thought, [Baby C]. Her death was very sad for all concerned.

I would like to again apologise for having raised the subject of future fertility in our meeting on 8 [Month8] as it clearly upset [Mrs C] greatly. I would also again like to offer my condolences for their loss."

Dr H

221. In relation to the surgical team's assessment of the cause of Mrs C's pain, Dr H stated:

"While it is correct that having had a right nephrectomy, right sided renal colic is less likely, [Dr I's] differential diagnoses of internal hernia (bowel blockage) and obstetric causes were reasonable. In saying this there are very few general surgical conditions that cause severe pain to the point of requiring a fentanyl PCA. Those surgical emergencies that are associated with severe pain such as ischaemic gut are associated

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

with more systemic illness and an inflammatory response as indicated by significant rise in white cell count or CRP.

The classical differential of severe colic is biliary colic, renal colic and pregnancy. These patients report severe pain (10 out of 10) with episodes of being 'well' or more pain free."

222. In relation to the most appropriate form of imaging requested for Mrs C at 4.30pm, Dr H stated:

"On review of [Mrs C], the impression was that the clinical picture did not fit with an obvious general surgical cause and therefore an obstetric cause needed to be excluded. I considered that an ultrasound would be helpful in excluding appendicitis but it could also assess the urinary tract and uterus. Although ultrasound is less sensitive than either CT or MRI, given her normal blood tests the pre-test probability of appendicitis was low. In addition, I considered that an ultrasound would be better performed by a sonographer who would look both at the uterus, but also adjacent organs.

When [Mrs C's] pain increased we discussed with the on-call radiologist our concerns and our wish to expedite her care. I did not consider that [Mrs C] needed to be in theatre immediately, but she did need a diagnosis, and with a diagnosis we could proceed to theatre with the appropriate team (delay our case if required).

The on call radiologist recommended an ultrasound with the plan to proceed to CT or MRI in the adjacent rooms if further information was required …"

223. In relation to the level of senior registrar/consultant input, Dr H stated:

"The history from [Dr I] was thorough and correct. He considered the patient 'stable' and not requiring immediate surgery and we therefore recommended imaging to obtain a diagnosis. Diagnosis would not have been obtained earlier by a more senior registrar or consultant general surgeon."

224. Dr H also stated:

"From the outset I wish to convey my deepest sympathies to [Mr and Mrs C] for the loss of [Baby C]. I can understand that [Mrs C] feels she received a lack of care during her admission, including the management of her pain and communication during the assessments by the surgical registrar. As doctors we strive to provide the best possible care to patients, and it is always disappointing to learn when there are concerns regarding treatment and management of a patient. While of course I wish the outcome had been different, I would like to take this opportunity to reassure [Mrs C] and the HDC that my team and I acted with her and [Baby C's] best interests in mind, at all times and believe that she was managed appropriately and in accordance with the standard of care expected of general surgical matters."

Dr J

225. Radiologist Dr J stated that both ultrasound and MRI are available at the public hospital 24 hours a day.

226. In response to comments by my expert advisor, general surgery consultant Dr Julian Hayes, about the radiological investigations, Dr J said that MRI would have provided further diagnostic information, but he does not consider that it should have been the test performed first.

Responses to provisional opinion

227. Mrs C was provided with an opportunity to comment on the "information gathered" section of my provisional opinion and my proposed factual findings. Mrs C's comments have been incorporated into this report where appropriate.

228. Waikato DHB was provided with an opportunity to comment on my provisional opinion, and had no further comments to make and accepted my proposed recommendations.

229. Dr A was provided with an opportunity to comment on my provisional opinion. Where appropriate, her comments have been incorporated into the report.

230. Dr A submitted:

> "I believe I personally provided [Mrs C] with appropriate obstetrician-level leadership and oversight, to the best of my ability, in the circumstances that prevailed at that time. My care was in accordance with the standard that would be reasonably expected of a consultant obstetrician at a busy tertiary hospital, abiding by evidence-based best practice and principles of safe practice in an environment of resource limitation ..."

231. Dr A stated:

> "Again, I offer my sincerest and deepest sympathy to [Mrs C] and family for their tremendous loss. I hope through the fair conclusion of your review [this] will help them eventually see that I did everything I reasonably could, to preserve [Mrs C] and [Baby C]."

Opinion: Introduction

232. This was a devastating sequence of events for Mrs C and her family and, at the outset, I offer my sincere condolences to them for the loss of Baby C and the harm to Mrs C. I trust that the information set out above provides them with more clarity about the course of events and the care given.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

233. My consideration of the complaint is not to assess whether the actions of any of the healthcare providers who cared for Mrs C caused Baby C's death;[73] rather, my role is to assess whether, with the information available to Mrs C's healthcare providers at the time of events, those providers acted appropriately and in accordance with accepted standards of practice. When retrospectively assessing the care provided, it is important that I make that assessment free from hindsight bias notwithstanding the tragic outcome and loss.

234. I also acknowledge how traumatic these events were for those involved in Mrs C's care, and note that the failure to make an earlier diagnosis is not determinative of a departure from the accepted standard of care. It is accepted by all the obstetric specialists who have commented on the care provided to Mrs C that the spontaneous rupture of an unscarred uterus in a non-labouring woman is extremely rare and, prior to Mrs C's collapse, it was not a diagnosis that would have been considered or made by many clinicians in these circumstances. Similarly, aneurysms of the uterine artery, in particular true aneurysms,[74] are extremely rare.[75] I am therefore also mindful that the situation in which Mrs C's healthcare providers found themselves is extremely rare, and that many aspects of the care provided in the developing situation were well managed.

235. During the course of this investigation, I have received multiple expert advice reports and submissions from the parties involved. I have also considered the advice provided by the ACC advisor. There are clear differences of opinion as to the appropriateness and timeliness of Mrs C's management on 15 Month6. Reconciling these diverse opinions has been time-consuming and complex.

Opinion: Waikato DHB — breach

Introduction

236. Mrs C was admitted to the public hospital at 1.30am on 15 Month6. Her pregnancy was at 28 weeks and 5 days' gestation, and her primary complaint was abdominal pain. Over the course of her admission up until her collapse 17 hours later at 6.42pm, she was attended to regularly by midwifery staff and the Obstetrics and General Surgery teams, but an effective assessment and management plan was not put in place in a timely manner. In my view, inadequate oversight, communication, and co-ordination between these two teams at Waikato DHB contributed to a delay in appropriate radiological assessments, which hindered the planning and delivery of Mrs C's care.

237. I have identified below the main issues on which I will focus. I have considered all of the expert advice and responses in relation to each of these issues.

[73] This report considers the care provided to Mrs C, and does not extend to the care and treatment provided to Baby C from the time of her birth.

[74] Where the artery or vessel weakens and bulges.

[75] Views on where the aneurysm was actually situated and any impact it may have had on the events can now be only speculative and inconclusive.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

238. This section of the report addresses the following:

1. The adequacy of obstetric and general surgical reviews and oversight;
2. The failure to establish an effective assessment and management plan in a timely manner;
3. The communication and co-ordination between the Obstetrics and General Surgery teams;
4. Documentation;
5. Other issues.

Adequacy of Obstetrics and General Surgery reviews and oversight

Obstetrics reviews

239. Mrs C was admitted under the Obstetrics team. The admitting consultant was obstetrician Dr M, who reviewed Mrs C at 3am. Dr M retrospectively documented his plan into the clinical record at 5.15am, which was for bloods, an fFN, a bedside USS, and a stool sample if Mrs C had further diarrhoea. I note that Mrs C was under the impression that she was to be reviewed by the General Surgery team and have a further USS. There is no record of this in the clinical notes, and I would be concerned if this was part of Dr M's plan but was not documented or communicated to the midwifery staff who were caring for Mrs C.

240. Mrs C's care was handed over to Dr A at 8am. Dr A told HDC that between 8am and her review of Mrs C at 12.50pm, she was fully occupied in the Delivery Suite.

241. By 10am, Mrs C's pain had increased, and junior registrar Dr D was called to review her. Dr D documented that Mrs C was "[s]till having increased pain and writhing in pain", and that the plan was to chase the mid-stream urine test results, give a Ural sachet, chart Sevredol, discuss pain relief with the anaesthetist, and take a stool specimen for culture if Mrs C had further diarrhoea. Mrs C stated that the review was done from a verbal report from the midwife. However, I note that Dr D's notes are indicative of an "in person" review (I note some concerns about the quality of this review below), that the SIRR noted that Dr D "saw" Mrs C at 10am, and that RM G told HDC that at 10am Dr D reviewed Mrs C and wrote a plan of care. Relying on the contemporaneous notes made by Dr D, and the SIRR findings and comments by staff, I am satisfied that Dr D did review Mrs C.

242. Dr O considered that for a woman "writhing in pain", she would have expected a more detailed assessment, discussion with an SMO, and detailed planning. I agree, and note that there is no record that Dr D spoke to a consultant following his review, and I am concerned that this did not occur. This was a missed opportunity to have more senior clinician input earlier in the day.

243. The Obstetrics team was contacted again to review Mrs C owing to her increased pain. SHO Dr E attended at 11.58am. Dr E queried appendicitis or a bowel obstruction and planned to repeat bloods urgently, provide further pain relief, and request a General Surgery review. Dr E discussed the plan with the on-call Obstetrics consultant. Dr N's input

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

into Mrs C's care (up until her operation) is evidenced only by his signature on the CTG at this time.

244. I note Mrs C's concern and belief that her blood test was not repeated at this time. In particular, Mrs C states that the timeframe from requesting the test to the laboratory receipting the blood samples was not long enough for this to have occurred. She also raised concerns about the variations between the two results. I have reviewed all the contemporaneous documentation, including RM G's notation that the SHO was in attendance at or around 11.35am, Dr E's plan documented at 11.58am to repeat bloods urgently, the laboratory-stamped receipt of blood samples at 12.04pm, the laboratory's report on the tests at 12.57pm, and Dr D's acceptance of the laboratory report at 1pm. I am unable to determine exactly what time Dr E commenced his review, but accept that his review commenced sometime after 11.35am but before 11.58am. In my view, there was sufficient time for the blood sample to be taken and sent to the laboratory. I also accept that at the time, there was no reason to doubt the validity of the results. I note that Professor Stone and Mrs C disagree with Dr A on whether or not the results were within expected variations for the day, and whether this may or may not suggest that the blood specimen could be from another person. However, having considered all of the available evidence, in particular the contemporaneous documentation, I find it more likely than not that Mrs C's blood test was repeated.

245. Dr A said that she finished in the Delivery Suite operating theatre at 12.48pm and, following an update from Dr E, she deemed Mrs C a priority for senior input owing to her significant surgical history. Dr A said that she reviewed Mrs C at 12.50pm. Dr E was in attendance and documented the review in the clinical record.

246. There was no planned follow-up review by the Obstetrics team following Dr A's review. Instead, the plan was to await the General Surgery review, and Dr A and her team did not review Mrs C again until her collapse. I would be extremely concerned if RM F raised concerns with the Obstetrics team between 3.40pm and 5pm and these concerns went unanswered. Dr A does not recall being asked to re-review Mrs C at this time. The conversations were not documented, and RM F told HDC that this is because everyone responded that they were waiting for the General Surgery review before they could make any decisions about Mrs C's care.

247. I am critical that in the circumstances of Mrs C's pregnancy, unknown diagnosis, and ongoing pain symptoms, no member of the Obstetrics team reviewed Mrs C after 12.50pm until she collapsed.

General Surgery reviews

248. Following Dr E's request at 12.20pm for a General Surgery review, Mrs C was seen by a junior General Surgery registrar, Dr I, at 2pm.

249. Dr I's plan was to observe Mrs C and consider a USS. Dr I said that he communicated his plan to the Obstetrics team before being called back to the ED. However, he did not document this discussion in the clinical record at that time, and did not communicate his

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

plan to RM F or Mrs C and her husband. Dr I's plan was documented only retrospectively at 4.45pm.

250. Dr Hayes advised:

> "I am concerned by the timing of the review, or more specifically the documentation of the timing of the review at 1400hrs, and the progression to a definitive plan … The passing of even a few hours without having a documented plan in place which would lead to delays, can have significant negative outcome in this situation."

251. Following his review at 2pm, Dr I discussed his plan with a General Surgery consultant, Dr H. Dr H told HDC that he recommended to Dr I that a repeat USS be performed. However, the request for a USS was not made until 4.00pm, as Dr I had been called away to an ED emergency.

252. Dr Hayes stated:

> "As there is no documentation of this plan from the initial review and discussion, although the note was written in retrospect, it is impossible to know what was decided at the initial review. It is the lack of documentation of this plan that concerns me, in that if an ultrasound was decided on as the next step, I do not understand why was the ultrasound request not received until 4.07pm."

253. At this stage, there was no documented plan to follow, and no record of which, if any, differential diagnoses were being considered by the General Surgery team. I acknowledge Dr I's documented view that Mrs C's pain was settling, but I am very critical that there was a two-and-a-half-hour gap with no documented plan in place. In addition, as the USS had been decided on at the 2pm review and Dr I could not action the request himself at that time, he should have arranged for another staff member to do so.

254. Dr I reviewed Mrs C again at 4.30pm. At 4.45pm, Dr I documented that no clear cause for Mrs C's pain had been identified, and that renal colic, an internal hernia, or an obstetric cause were possibilities. The plan was for Mrs C to be nil by mouth, to undergo a USS at 6pm, and to receive further pain relief, and for the General Surgery team to be contacted following the USS.

255. Dr Hayes advised that Dr I's assessment was well documented, but he was concerned with Dr I's assessment of the cause of Mrs C's pain, in particular the reference to renal colic in light of Mrs C's previous right nephrectomy (discussed further below).

256. Dr H told HDC that very few General Surgery conditions cause severe pain to the point of requiring a fentanyl PCA. Following the second review of Mrs C at 4.30pm, Dr I spoke to Dr H again, and also discussed imaging with the on-call Radiology consultant. Dr Hayes advised:

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

"[T]he standard of care in this situation would be discussion of the case with a senior colleague, either a senior surgical registrar or consultant at the time of the initial review and documentation of that discussion and an appropriate plan."

257. Dr Hayes concluded:

"[S]enior input was adequate in this situation apart from the fact that the patient was not reviewed in person by either a senior [General Surgery] registrar or the [General Surgery] consultant on call."

258. Dr H disagrees, and stated that a diagnosis would not have been obtained earlier by a more senior registrar or consultant general surgeon.

259. While I am unable to assess whether senior input may or may not have led to an earlier diagnosis, I consider that this was another missed opportunity for senior review of a complex presentation. I accept Dr Hayes' advice, and consider that it was appropriate for Dr I to have sought senior input from Dr H, but I remain concerned that Dr H or another senior colleague did not review Mrs C in person, considering all the circumstances of her presentation.

260. I also note Dr O's view that "towards the end of the afternoon 4.45pm–5.30pm another SMO review would have been prudent in light of [Mrs C's] pain worsening". I agree. Given the uncertainty of Mrs C's presenting complaint, there should have been a low threshold for Dr A, Dr H, or another senior clinician to return to review Mrs C and revaluate the differential diagnoses when Mrs C's condition did not improve. I am critical that this did not occur.

Conclusion

261. Mrs C was reviewed seven times by medical staff over the 17-hour period prior to her collapse. At times, individual reviews were thorough and well documented. However, I am critical of the following aspects of the Obstetrics and General Surgery reviews:

1. There should have been a more detailed assessment, discussion with an SMO, and detailed planning by junior obstetric registrar Dr D at 10.00am. This was a missed opportunity for senior Obstetrics input.
2. Despite Mrs C's ongoing and significant pain, which RM F says she brought to the attention of the Obstetrics team, there was no planned follow-up or record of a review by any of the Obstetrics team after 12.50pm until Dr A was called at 6.50pm following Mrs C's collapse.
3. There was no plan documented in the clinical record by Dr I at 2pm, and the plan he discussed with the Obstetrics team was not communicated to RM F or Mr and Mrs C.
4. Despite having discussed with the SMO at 2pm that a USS was necessary, Dr I did not request the scan until 4.00pm, and it did not take place until 6pm.
5. The inclusion of renal colic in the surgical differential diagnoses, despite Mrs C experiencing right-sided pain and having previously undergone a right nephrectomy.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

6. The missed opportunity for senior General Surgery review following Dr I's initial review at 2pm.
7. The lack of review and revaluation of the differential diagnoses by Dr A, Dr H, or another senior clinician at any time in the afternoon when Mrs C's condition did not improve.

262. I am also concerned that despite regular reviews by the Obstetrics and General Surgery teams, there was a lack of co-ordination of those assessments, and a failure to establish an effective management plan in a timely manner.

Assessment and management plan

Consideration of an obstetric cause

263. During the first half of the day, Mrs C had multiple investigations undertaken to exclude premature labour and other common obstetric causes. The investigations included a bedside USS, fFN, vaginal swab, urine dipstick, two full blood counts and a biochemistry test, as well as continuous CTG monitoring.

264. Dr Hayes advised: "In terms of these investigations [bedside USS, fFN, and two blood tests], they were timely and they are appropriate for the clinical scenario."

265. Dr A told HDC that at the time of her assessment at 12.50pm, they had "effectively excluded an obstetric cause of pain, having excluded labour, significant bleeding or abruption as [a] likely cause …"

266. Professor Stone advised: "[T]he principle is to assume an obstetric cause unless there are very strong cogent reasons not to." He stated:

> "One of the problems was that early on, the possibility of an obstetric cause was excluded conceptually. I am a little surprised at this because an obstetric cause, if not at the top of the list, would always figure in a differential in a pregnancy."

267. Dr A stated that she did not identify another obstetric cause to account for Mrs C's symptoms, and sought multidisciplinary input from the General Surgery team to consider other causes. Dr A's working impression was "unlikely obstetric cause of pain … more likely a possible subacute small bowel obstruction (SBO) secondary to intra-abdominal adhesions, with a possible appendicitis also on the differential".

268. The plan documented in the clinical record following Dr A's assessment of Mrs C was for General Surgery review and a review by an anaesthetist, and for continuous CTG monitoring. Dr A said that she recommended a continuous CTG to "exclude a possibility of an evolving obstetric condition".

269. While acknowledging the actions taken by Dr A's team to exclude an obstetric cause for Mrs C's pain, I accept Professor Stone's view that in a pregnancy, an obstetric cause should continue to feature in the list of differential diagnoses being considered. However, I also

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

note that Dr A requested ongoing CTG recordings and observations to monitor both the maternal and fetal well-being.

Consideration of a non-obstetric cause

270. Following his review at 2pm, Dr I discussed his plan to "observe for now and consider USS" with Dr H. Dr H told HDC that he recommended a repeat USS.

271. At 4.45pm, Dr I documented that a clear diagnosis had not been identified, and that renal colic, internal hernia, or an obstetric cause were being considered. The plan was for Mrs C to be nil by mouth, to undergo a USS at 6pm, to receive further pain relief, and for General Surgery to be contacted following the USS.

272. Dr Hayes was concerned with Dr I's assessment of the cause of the pain, and stated:

> "[W]hile [Mrs C] had had a right nephrectomy, one of the differential diagnoses suggested was of renal colic (versus an internal hernia versus an obstetric cause). Clearly, having had a right nephrectomy renal colic is very unlikely to be the cause of the pain."

273. Dr H stated that it is correct that having had a right nephrectomy, right-sided renal colic is less likely, but he considers that Dr I's differential diagnoses of internal hernia and obstetric causes were reasonable.

274. Dr Hayes stated: "It appears to me that the severity and duration of the recurrent pain that [Mrs C] experienced warranted a more proactive approach than what was taken." I accept Dr Hayes' advice that renal colic was unlikely given Mrs C's clinical history, and am critical that this featured as a differential diagnosis.

Consideration of surgical investigations

275. Dr I told HDC that at his 2pm review there was no indication for an exploratory laparoscopy or laparotomy. At the time of Mrs C's second surgical review at 4.30pm, these procedures were not documented as being considered, but the plan of care did include Mrs C to be nil by mouth in the lead-up to her USS. Dr H told HDC:

> "[At this time,] I did not consider that [Mrs C] needed to be in theatre immediately, but she did need a diagnosis, and with a diagnosis we could proceed to theatre with the appropriate team."

276. Dr Hayes advised:

> "As a general rule, with pregnant patients, because of the risk of general anaesthetic and abdominal surgery precipitating an early delivery, surgery is reserved to where it is absolutely indicated. This would depend on the results of the radiology and correlation with clinical progress in particular.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

> Specifically in this case, where there is a complicated surgical history, and therefore further surgical intervention is likely to be even more complicated and riskier than usual, I do not believe that surgical options should have been explored sooner."

277. Dr O commented: "As there can be serious consequences of operating on women when pregnant it is appropriate to be cautious and avoid surgery unless a surgical problem is fairly certain …" Dr O said that from 4.45pm, the level of pain relief Mrs C required may have prompted reconsideration of whether further imaging or recourse to laparotomy was required for diagnosis.

278. Professor Stone advised:

> "I remain firm that in the situation as presented in the case notes, there would have been justification to perform a laparotomy and given the back up in the level 3 neonatal unit and with adult intensive care also, the risks to [Mrs C] and her baby were manageable.
>
> Of course undertaking laparotomy in pregnancy is a serious decision, but just from the notes it was clear that something was wrong and had not been resolved and the possibility of a less common diagnosis needed to be considered."

279. Professor Stone suggested: "Earlier aggressive surgical intervention in this case may have allowed for the reliable identification of the source of pain, before uterine rupture." Dr P similarly commented: "I believe that it is likely that a laparotomy performed by mid to late afternoon would have revealed changes in the lower part of the uterus that suggested imminent rupture."

280. Dr A disagrees with Professor Stone and Dr P, and considers that this is purely speculative, and would have been very unlikely to provide a reliable identification of Mrs C's cause of pain. Dr A stated:

> "[T]here has not been any published example at all in the entire searchable medical literature, describing a surgical diagnosis and treatment of an imminently rupturing unscarred uterus."

281. I acknowledge the conflicting views on whether or not surgical intervention should have been considered earlier, and the corresponding risk to a pregnant woman and her fetus. I accept Dr Hayes' advice that any surgical plan was dependent on access to appropriate imaging, and I am concerned that there was a delay in requesting and obtaining that imaging. I also acknowledge that even if surgical intervention had occurred earlier, it is not certain that the cause of Mrs C's pain would have been diagnosed. As the appropriate timing for surgical action without adequate radiological assessment is disputed, and is still not clear to me even with the benefit of hindsight, I consider that this issue cannot be resolved by this investigation.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Delay in radiological assessments

282. A bedside USS assessment was undertaken at 3.00am to look for any obvious obstetric cause for Mrs C's pain. Despite the ongoing pain and no agreed diagnosis, no further radiological examination occurred until the USS at 6pm.

283. Dr O's opinion is also that imaging could have been considered earlier at 12.50pm, but that it would have been unlikely to provide a diagnosis in these circumstances. As noted above, I am concerned that the further USS was decided on sometime after 2pm, but the request was not sent until 4.00pm. I acknowledge the pressures and demands on Dr I, as he was called to an emergency in the ED.

284. I am critical of the delay in submitting the request for Mrs C's USS, and that it then took a further two hours for the USS to be performed. As imaging was the next planned diagnostic process for Mrs C when increasing levels of pain relief were required, I am concerned by the lack of urgency exhibited by staff in expediting this.

285. In terms of the imaging modality chosen, Dr H told HDC that he considered that a USS would be helpful in excluding appendicitis, and could also assess the urinary tract and uterus. Dr H and Dr J told HDC that it was possible to proceed directly from USS to MRI if the USS was not diagnostic.

286. Dr Hayes advised:

> "I do not believe a further ultrasound of her abdomen was the most useful investigation in terms of investigating her on-going abdominal pain and would suggest that an urgent MRI should have been requested."

287. Dr Hayes considers that an MRI may have been more definitive in terms of determining the need for urgent surgical intervention. He stated:

> "[M]y suspicion of the likely diagnosis was of small bowel ischaemia secondary to an internal hernia, which was on the differential diagnosis list at the initial review by Dr I. This would have not been diagnosed by an ultrasound scan and would have much more likely been diagnosed by an MRI …"

288. Dr Hayes further advised:

> "I appreciate [Dr J's] point that internationally it is agreed that ultrasound is the first modality of choice whereas MRI may be the primary modality of choice depending on the clinical diagnostic suspicion. Both [Dr H] and [Dr J] point out that it was possible to proceed directly from ultrasound to MRI if the ultrasound had not been diagnostic … However, given this approach, if an ultrasound had been requested at the initial review at 2.30pm instead of after 4pm, I suspect that my responses would have been different."

289. I acknowledge Dr H's explanation for his reasoning behind requesting a USS. I also acknowledge that this modality was also confirmed by the on-call Radiology consultant to

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

whom Dr I spoke. However, I accept Dr Hayes' advice that in light of the delay in obtaining any imaging, an MRI at that time was the more appropriate imaging modality in light of the differentials being considered by the General Surgery team.

290. Putting aside whether or not the most appropriate imaging modality was requested, as noted above, any surgical plan was dependent on the availability of some form of appropriate imaging. As imaging was the appropriate first-line investigation prior to the consideration of exploratory surgery, I am very critical of the delay in requesting and obtaining appropriate imaging. I accept Dr Hayes' advice that "the degree of [Mrs C's] pain and severity of her pain should have provoked more urgency in terms of radiological investigation".

291. Despite the consideration given to the possible causes of Mrs C's pain over many hours, there was a significant delay in carrying out the necessary radiological assessments to confirm or disprove those various differential diagnoses. This meant that an effective management plan was not put in place in a timely manner. I consider that the delay was caused in part by inadequate communication and co-ordination between the General Surgery and Obstetrics teams.

Communication and co-ordination between Obstetrics and General Surgery teams

292. Mrs C remained objectively well throughout the day. Her vital signs remained stable, her CTG was reassuring, and her blood results and biochemistry were unremarkable. The main cause for concern was the severity and persistence of her pain.

293. It is clear from the clinical record and the amount of pain relief prescribed (as recorded in the medication chart) that Mrs C was in a significant amount of pain throughout the day until her collapse. Except for a few short periods when Mrs C was noted to be pain free or that her pain levels had improved (following administration of IV fentanyl and commencement of the PCA), at no point during the day did the pain medication administered result in a sustained improvement.

294. Professor Stone considered that overall, the diagnostic process appeared to be slow. He stated:

> "Admission in the early hours of the morning, surgical review in the afternoon and scan at 1800, over 12 hours from admission, does not seem to reflect the urgency that the pain symptoms would suggest that needed quicker action."

295. Professor Stone advised:

> "[T]his was a difficult presentation and certain investigations tended to put the team 'off the trail'. The scan, the haemoglobin in the morning, the stable vital signs all suggested stability. I accept that this is difficult. But the point was that the pain did not settle and required a diagnostic approach. What would have been appropriate would have been a reappraisal and consideration of diagnostic possibilities as I have discussed. These are very difficult situations for a specialist."

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

296. Professor Stone considers that there were three possible diagnostic reasons for Mrs C's pain:

1. Obstetric catastrophes, including uterine rupture and placental abruption.
2. Conditions aggravated by pregnancy, including degeneration of fibroids, intestinal or adnexal torsion, infections such as acute pyelonephritis, rupture of a visceral artery, rupture of a uterine vessel, or a subacute bowel obstruction (secondary to the previous surgery).
3. Conditions unrelated to pregnancy.

297. Dr O also considered the same groups of diagnostic possibilities. However, unlike Professor Stone, who considered uterine rupture to be a real possibility, Dr O commented:

> "I consider that in this case it is not unreasonable that the staff involved did not have spontaneous uterine rupture featuring on the differential diagnosis on reviews during the day due to the stable observations and nature of the pain."

298. I note that Dr A agrees with Dr O's conclusion, and considers that there was no clinical evidence to support uterine rupture as a reasonable consideration. Dr A advised that an obstetric cause was her primary consideration in relation to the overall management of Mrs C, and that multiple investigations were undertaken in the course of work-up and prior to her review at 12.50pm. Dr A noted that at that time she had effectively excluded an obstetric cause of the pain, having excluded labour, significant bleeding, or abruption as likely causes, and it was therefore important to consider non-obstetric causes while continuing to monitor maternal and fetal well-being carefully.

299. Professor Stone advised:

> "This clearly was a very difficult situation and it was not apparent on admission, what the problem was that was causing the pain. In simple terms I do not see laid out in the notes diagnostic possibilities which could be then worked through and given the severity of the pain, in an expeditious manner."

300. Professor Stone further advised:

> "[Mrs C's] symptoms were out of proportion to the signs and really quite large to almost excessive amounts of pain relief were given for an undiagnosed situation and yet there was no therapeutic plan."

301. I accept that having ruled out premature labour, the presence of a reassuring CTG and otherwise stable observations may have falsely reassured the teams that the speed at which the reviews and investigations were taking place was acceptable. In addition, while I accept that there was no clinical evidence to support uterine rupture as being a reasonable consideration during the day, I agree with Professor Stone that a logical and considered approach should have been taken earlier by both the General Surgery and Obstetrics teams working together closely to identify the cause of such severe pain.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

302. I am very concerned that despite the uncertainty as to whether the pain was being caused by an obstetric or a non-obstetric condition, the only communication between the Obstetrics team and the General Surgery team was via telephone calls between junior staff, which were not well documented.

303. Dr O opined that at the time of Dr A's 12.50pm review, direct senior contact with the surgical team could have been considered. I agree. At this time, Dr A considered that the cause of pain was unlikely to be obstetric. It was essential that this assessment and the reasoning for it was communicated to the surgical team effectively, and I consider that this was a missed opportunity.

304. Had Dr H and Dr A spoken together directly, this difference of opinion could have been identified, and further consideration of the possible differentials could have taken place jointly. I am concerned by this further missed opportunity to co-ordinate Mrs C's care effectively.

305. At the point at which surgical review was requested, the Obstetrics team appeared to judge that the presentation was one best managed by the General Surgery team. There was then a disconnect between the Obstetrics team and the General Surgery team in relation to sharing the differential diagnoses being considered by each team. It appears that the Obstetrics team considered a non-obstetric cause to more likely, but the General Surgery team were less convinced, and still considered an obstetric cause as one of their key differentials. The outcome of this was that neither team took full management responsibility or had the necessary sense of urgency.

306. I consider that inadequate communication and co-ordination between the Obstetrics team and the General Surgery team (in both directions) contributed to the delay in developing an assessment plan and establishing a cause for Mrs C's pain.

Documentation

307. Documentation is a key communication tool between clinicians, critically with a pattern of ongoing assessment, and is essential to good patient care and continuity of care. As noted above, there are several deficiencies in the documentation by staff, specifically the following:

1. Dr E did not document the details of his discussion with Dr N.
2. Dr I did not document his General Surgery plan or his discussion with the Obstetrics team at the time of his 2pm review.
3. Dr I did not document the details of his discussion with the Obstetrics team or the Radiology consultant following his 4.30pm review.
4. RM F did not document any of her telephone calls escalating her concerns to the medical teams.
5. Dr L did not document the time or dose of the IV fentanyl administered at 1.01pm and 1.07pm.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

308. I am concerned that there were several instances where key communications were not documented in the clinical record. A number of significant reviews and conversations were either not documented or were not documented in a timely fashion. This had an impact on the effective planning and co-ordination of Mrs C's care.

Conclusion

309. It is accepted by all the obstetrics specialists who have commented on the care provided to Mrs C that the spontaneous rupture of an unscarred uterus in a non-labouring woman is extremely rare and, prior to Mrs C's actual collapse, it appears that it was not a diagnosis likely to have been considered or made by many clinicians in the circumstances of Mrs C's early presentation and prior to her collapse. Similarly, aneurysms of the uterine artery are extremely rare.

310. I note Professor Stone's advice that while he believes that peers would view the care provided as lacking a clear diagnostic pathway and lacking urgency, he also suspects that some would still consider that the individual steps taken were appropriate, and that there would not be a unanimous view on this.

311. I am mindful that the situation in which Mrs C's healthcare providers found themselves was extremely rare, and that aspects of the care provided in the developing situation were appropriate and well managed. However, I have identified a number of aspects of the care provided by Waikato DHB staff to Mrs C that fell below accepted standards.

312. I am critical of deficiencies identified with the Obstetrics and General Surgery reviews and the missed opportunities for senior oversight of those reviews, and of the inadequate documentation of some of those reviews. I am also critical of the ineffective communication and co-ordination between the Obstetrics and General Surgery teams, which contributed to a delay in appropriate radiological assessment. This led to the failure to establish an effective assessment and management plan in a timely manner for Mrs C's presenting symptoms, which ultimately culminated in Mrs C's collapse.

313. District health boards are responsible for the services they provide, and, accordingly, I find that Waikato DHB failed to provide services to Mrs C with reasonable care and skill, and breached Right 4(1) of the Code of Health and Disability Services Consumers' Rights (the Code). Waikato DHB also failed to ensure co-operation among providers to ensure quality and continuity of services, and breached Right 4(5) of the Code.

Other issues

Antenatal assessment

314. In light of Mrs C's medical history, Professor Stone was critical that Mrs C's first review with a specialist occurred at 24 weeks' gestation. In relation to Dr B's reporting letter from this consultation, Professor Stone stated:

> "The letter does not mention prenatal screening (for aneuploidy), nor the possible cornual ectopic pregnancy and the summary of the previous infertility and the endometriosis is very brief and does not reflect the gravity of the surgery. Whilst the

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

plan included Aspirin and calcium (as preeclampsia-fetal growth restriction prophylaxis) and a growth scan; the summary is in my view rather insufficient."

315. However, Dr B told HDC that she reviewed Mrs C's history thoroughly and "fully understood and appreciated that her previous surgery was complex and difficult …". Dr B's reporting letter records: "Previous history of infertility and endometriosis excision with right nephrectomy and an ovary removed."

316. Dr B considers that an earlier review would not have changed Mrs C's management.

317. I note that Dr O did not have any concerns about Mrs C's antenatal assessments, and Dr P stated:

> "I cannot see a direct link between the first ultrasound report and the probabl[e] pathology of an adenomyosis related uterine rupture. Therefore, I do not believe that any other treatment path should have been followed in [Mrs C's] pregnancy prior to her presentation on 15 [Month6]."

318. In my view, there were no major deficiencies in the antenatal care provided. I accept that Dr B did take into account Mrs C's medical history at this appointment, but acknowledge Professor Stone's advice that more detail could have been included in the reporting letter.

Discharge to midwifery care

319. Mrs C was discharged to her LMC on postoperative Day 5. Waikato DHB said that the discharge to midwifery care was in accordance with its usual process.

320. Professor Stone was critical that Mrs C was transferred to midwifery care too early. He advised:

> "The practice of discharging to midwifery care in such cases is to be deplored. Such patients have undergone major surgery — and in this case suffered the loss of the baby — it seems unbelievable that doctors discharge their responsibilities like this."

321. I acknowledge that discharge to midwifery care at this time was in accordance with Waikato DHB's usual process. However, I invite Waikato DHB to consider Professor Stone's comments for future cases.

Follow-up appointment

322. Mrs C's postoperative follow-up appointment was not scheduled until she contacted Waikato DHB on 27 Month7. It eventually took place on 8 Month8. I acknowledge Dr B's explanation that Mrs C's referral was delayed until the investigations, including the post mortem, had been finalised. However, I am disappointed that there was a communication breakdown, and consider that extra care should have been taken to ensure good communication in this situation. Waikato DHB has apologised for the delay in scheduling the appointment.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

SIRR investigation process

323. Professor Stone was also critical of the delay in Waikato DHB undertaking its SIRR process and for not involving junior staff in the review. He advised:

> "Expeditious case review and reporting back to patient. Within the patient context I consider this a moderate to serious departure from acceptable care. The patient underwent major surgery after a catastrophic collapse and her baby died. There is an obligation to ensure that all follow-up is expeditious and may need to be repeated on as many occasions as necessary to meet the patient's needs."

324. I note Professor Stone's advice, and remind Waikato DHB of the importance of involving junior staff in serious event reviews and, where possible, of avoiding any delay in commencing the process.

Other comment

USS findings

325. As noted above, the USS conducted immediately prior to Mrs C's collapse showed "no sonographic abnormality". Dr A documented retrospectively at 11.20pm following surgery that she had received verbal USS reporting of "nil significant".

326. During the course of this investigation, Dr H commented to HDC that the verbal report he received from the Radiology registrar was that the findings of the USS were "suggestive of rupture". However, Dr H's statement was not supported by any of the clinicians who reviewed the USS images at the time and subsequently, and is inconsistent with the USS findings and documentation made in the clinical record on the day of the event. Following substantive efforts by HDC to corroborate Dr H's comment, his statement was retracted by Waikato DHB.

Opinion: Dr A

Introduction

327. Dr A is an obstetrics consultant employed by Waikato DHB, and from 8am on 15 Month6 she had overall responsibility for Mrs C's care. Dr A was in the operating theatre from 8am until 12.48pm, and first attended to Mrs C at 12.50pm. Dr A was again in the operating theatre between 3pm and 5.13pm.

Overall management — adverse comment

Overall plan and co-ordination

328. As noted above, I am concerned about the lack of co-ordination between the Obstetrics and General Surgery teams. As the consultant with overall responsibility for Mrs C's care, it was Dr A's responsibility to ensure that Mrs C had a detailed plan, and that her care was co-ordinated effectively with other teams involved in her care. If Dr A was unable to

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

attend to these matters personally, owing to her operating theatre workload, it was her responsibility to ensure that another senior clinician did so.

329. Professor Stone advised:

> "This clearly was a very difficult situation and it was not apparent on admission, what the problem was that was causing the pain. In simple terms I do not see laid out in the notes diagnostic possibilities which could be then worked through and given the severity of the pain, in an expeditious manner."

330. Professor Stone stated:

> "It is standard teaching and is the medical structure on which we practise, that the notes should document, history, examination findings, impression-assessment as to what are the 'hypotheses' and then plan."

331. Dr A told HDC:

> "At the time of my assessment of [Mrs C], we had effectively excluded an obstetric cause of pain, having excluded labour, significant bleeding or abruption as likely cause; while we had reassuring evidence of ongoing maternal and fetal objective wellbeing on continuous monitoring and frequent vitals observations.
>
> The pertinent points to note at the time of my assessment of [Mrs C] included her bowel symptoms, noting preceding altered bowel habits, cessation of passing of flatus from 3am, localisation of pain to right lower abdomen; clinical finding consisted of a mild abdominal distention, soft abdomen and uterus and tenderness in right iliac fossa only.
>
> At the time, I did not identify another obstetric cause to account for her subjective symptoms and the clear plan forward was as documented. It was very important to consider non-obstetric causes and good practice in seeking multidisciplinary input including the general surgeons for consideration of other surgical causes and also anaesthetics for assessment of analgesic review.
>
> To be sure to exclude a possibility of an evolving obstetric condition in this context, regardless [of] the extremely remote likelihood of such event, I recommended the most immediate and meaningful means of ongoing obstetric surveillance with continuous fetal monitoring."

332. At the time of her review, Dr A's differential diagnoses included subacute small bowel obstruction secondary to intra-abdominal adhesions, and possibly appendicitis. Following this first review, Dr A did not have any direct contact with Mrs C until her collapse.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

333. Professor Stone advised:

> "Given that the [Obstetrics] team seemed to have exhausted what they thought were diagnostic possibilities, what were they planning to do and what had they explained to the patient? There is a lack of clarity and for these reasons, notwithstanding what many peers may think, I feel that this is below standard. If there had been a clear plan with justification, then the actions could be understood."

334. Mrs C's care was not handed over to the General Surgery team, and oversight of Mrs C's care remained Dr A's responsibility. No plan was documented by the General Surgery team at this time.

335. RM F commented that between 3.40pm and 5pm she discussed Mrs C's care and her worsening pain several times with the Obstetrics team, but was told that they were awaiting the completion of the General Surgery review before making any decisions about Mrs C's care. I am concerned at the seemingly high threshold for further review by Dr A and her team, particularly in light of Mrs C's worsening pain and need for further strong pain relief.

336. Dr A told HDC that at this time she understood that Mrs C had had a positive response to pain relief, had stable observations and a normal CTG, and was to have a USS to consider non-obstetric differentials. However, I note that the General Surgery team still considered an obstetric cause in its differentials.

337. I am concerned that there was a missed opportunity for Dr A to either speak directly with the General Surgery consultant after her review at 12.50pm and before Mrs C's collapse, or to ensure that a shared plan was formulated which took into account and considered both teams' differentials. The General Surgery team and the Obstetrics team did not have a unified plan to investigate the cause of Mrs C's pain, and I consider that it was Dr A's responsibility to take the lead on this.

338. I have carefully considered Dr A's explanation for the care up until Mrs C's collapse, and note that it is accepted by all the obstetrics specialists who have commented on the care provided to Mrs C that the spontaneous rupture of an unscarred uterus in a non-labouring woman is extremely rare and, prior to Mrs C's collapse, the diagnosis would not have been considered or made by many clinicians in these circumstances. I am therefore mindful that the situation in which Dr A found herself was extremely rare, and that many aspects of the care provided in the developing situation were appropriate and well managed. However, I remain concerned at the lack of oversight by Dr A in leading the planning and investigations into Mrs C's cause of pain. I accept Professor Stone's advice that there was a lack of a clear plan, for which Dr A was responsible.

339. While acknowledging the lengthy periods of time that Dr A was required in theatre, I remain concerned by the missed opportunities for communication between the Obstetrics team and the General Surgery team and am critical that Dr A did not take a more active role in discussing and planning Mrs C's care with the General Surgery team following her review.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Earlier administration of magnesium and steroids

340. Fetal supports were not administered until after Mrs C's collapse. The clinical records show that steroids were administered at 7.08pm, and a magnesium sulphate bolus was administered at 7.10pm.

341. Dr O commented that in hindsight, magnesium and steroids could have been considered at Dr A's 12.50pm review. Similarly, Dr P considered that administration of magnesium and steroids should have taken place in the morning.

342. Professor Stone advised:

> "I would also agree that we tend to (almost by default) give steroids at least if not the Magnesium, if we suspect that there could be even a small chance of a preterm delivery. The use of steroids and Magnesium after the collapse was a complete waste of time and at least as far as the steroids were concerned would have offered no benefit to the baby at that time."

343. Dr A told HDC that at the time of her review, none of the accepted indicators detailed in the Antenatal Corticosteroids Guidelines for women at risk of preterm delivery were applicable to Mrs C's situation. Dr A stated: "Had an objective pathology become identifiable at the time (which there was none), I would readily have considered their use; this however was not the case."

344. In response to my provisional opinion, Dr A stated:

> "[Fetal supports] became indicated according to the same guideline. During the time when we saw a stabilisation of maternal-fetal condition that I had hoped would last, there was then also an objectively higher probability of proceeding to preterm delivery thus these fetal supports should be considered.
>
> Further, with respect to giving fetal supports such as steroids and magnesium sulphate earlier, prior to [Mrs C's] departure to radiology at 5.50pm, there was no change in an objective indication (as the surgeons did not consider surgery imminent and there was no obstetric deterioration or preterm labour) to consider giving these, according to the same guidelines)."

345. I accept that the administration of fetal supports may not have been warranted at the time of Dr A's review at 12.50pm. However, I have noted some concerns above about Dr A's oversight and planning. In my view, had Dr A and her team been more actively involved in Mrs C's care and planning, earlier administration of fetal supports may have been considered. In addition, while acknowledging Dr A's reasoning above, I accept Professor Stone's advice that the administration of steroids and magnesium after the collapse may have been unnecessary.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Timeliness of Caesarean section and laparotomy once in operating theatre — other comment

346. Dr A was again involved in Mrs C's care immediately following Mrs C's collapse at 6.42pm. A key issue that has been heavily debated by the experts and specialists who have commented on this case is the timeliness of the Caesarean section and laparotomy following Mrs C's collapse.

347. Dr A attended Mrs C at 6.50pm, and Mrs C was transferred to the operating theatre at 6.55pm. Sometime between 6.51pm and 6.58pm, the CTG recorded decelerations to 70bpm with a loss of contact, but at 7.07pm the bedside scan showed recovery and maintenance of the FHR, which was recorded on the CTG as 150bpm. A further deceleration of the FHR to 70bpm was confirmed on the bedside scan at 7.08pm. Dr A told HDC that the decision to proceed to a laparotomy and delivery was made at this time. Knife-to-skin occurred at 7.22pm, and Baby C was delivered at 7.24pm.

348. Waikato DHB stated that the expected decision-to-delivery time for a Category 1 Caesarean section is 30 minutes. Professor Stone agreed that the Caesarean section categorisation was appropriate. Waikato DHB and Dr A stated that the time from the decision to the delivery of Baby C was 16 minutes.

349. Dr O commented:

> "From 1842hrs … Delivery and emptying the maternal uterus optimises the ability for successful resuscitation and this is the main function of delivery in maternal collapse … I consider it was appropriate to do an urgent laparotomy and [to deliver] the baby as soon as possible on arrival to theatres."

350. However, Professor Stone advised:

> "The use of medicines for the baby (steroids and $MgSO_4$) were unhelpful in this situation — there is no time for them to work and would have caused some delay and to me maybe also reflect a lack of understanding and even at that stage a reticence to get on and do a laparotomy. Indeed in [Dr A's] letter, the patient was in theatre at 1855 but the decision to proceed to laparotomy was made at 1908, with knife to skin at 1922."

351. Professor Stone advised:

> "Even if up till the collapse the diagnostic uncertainty had influenced the obstetric team not to act, at the point of collapse, there was an urgent need to operate. They could not exclude bleeding-hypovolaemia as the cause of collapse. I am critical of the whole team at this point if they thought that they could resuscitate without opening the abdomen."

352. Dr P also opined that there may have been a delay in performing a laparotomy, controlling the bleeding, and performing a Caesarean section once Mrs C was in the operating theatre.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

353. Dr A told HDC that the principal management of shock is to immediately initiate resuscitative therapy while expeditiously identifying an aetiology (cause) in order to administer definitive therapy to prevent serious complications and death. Dr A stated: "Professor Stone does not acknowledge the duration of a positive response to resuscitation seen in both maternal and fetal recordings following the arrival to theatre."

354. Dr A stated:

> "[Mrs C's positive responses to resuscitation] allowed us the opportunity to consider the correct cause of [Mrs C's] deterioration, soliciting additional assistance, contacting the radiologist for the ultrasound findings … while simultaneously (but *not at all* at the expense of delaying a decision to deliver) facilitating multiple adjuncts in preparation of likely delivery of the fetus."

355. I have considered all of the available evidence and the opinions from my experts and other specialists who have commented on this issue. This was an emergency situation, and I acknowledge the difficulty in providing comment in hindsight whilst knowing the tragic outcome in this case.

356. I note Professor Stone's advice that while he believes that peers would view the care provided as lacking a clear diagnostic pathway and lacking urgency, he also suspects that some would still consider that the individual steps taken were appropriate, and that there would not be a unanimous view on this. I also note that Dr O considers that although aspects of the care could have been managed differently, overall "the care provided was of a standard that would be considered acceptable to the majority of practising peers". With hindsight and knowing the outcome of a uterine rupture, it is clear that Dr A should have proceeded directly to a laparotomy and a Caesarean section once in the operating theatre. However, I again note and accept Dr A's advice that Mrs C and the fetus had stabilised, and that she believed this gave her more time to prepare and assess the situation. As soon as the FHR deteriorated, Dr A proceeded to a Category 1 Caesarean section and performed this in a timely way.

Recommendations

357. I recommend that Waikato DHB:

a) Provide a written apology to Mrs C and her family for the breaches of the Code identified in this report. The apology is to be sent to HDC, for forwarding to Mrs C and her family, within three weeks of the date of this report.

b) Report back to HDC regarding the two action points identified following its SIRR report (as noted at paragraph 180), within four months of the date of this report. If any issues are identified, Waikato DHB is to inform HDC of the further actions to be taken to rectify the issues.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

c) Provide evidence of recent training provided to its staff in the Obstetrics and General Surgery teams on co-ordination of care, escalation of care, and documentation, and provide evidence of the training to HDC within six months of the date of this report.

d) Use this report as a basis for staff training at Waikato DHB, focusing particularly on the breaches of the Code identified, and disseminate the learning and changes following this case via Waikato DHB's existing forums for nursing and medical teams, and provide HDC with evidence that this has been completed, within six months of the date of this report.

e) Report back to HDC regarding the implementation of the New Zealand National maternity early warning system (MEWS) at Waikato DHB in August 2019, within four months of the date of this report. Please highlight the successes as well as any issues identified. If any issues are identified, Waikato DHB is to inform HDC of the further actions to be taken to rectify the issues.

f) Consider Professor Stone's concerns (as identified in his report) regarding:

— early discharge to midwifery care in complex cases; and
— the SIRR process

and report back to HDC on the outcome of its consideration and any proposed changes, within four months of the date of this report.

358. I recommend that Dr A:

a) Provide a written apology to Mrs C and her family for the criticisms identified in this report. The apology is to be sent to HDC, for forwarding to Mrs C and her family, within three weeks of the date of this report.

b) Attend the Medical Protection Society workshop "Achieving Safer and Reliable Practice", and provide evidence of attendance at that workshop, within 12 months of the date of this report.

Follow-up actions

359. A copy of this report will be sent to the Coroner.

360. A copy of this report with details identifying the parties removed, except Waikato DHB and the experts who advised on this case, will be sent to the Royal Australasian College of Obstetricians and Gynaecologists, the Royal Australasian College of Surgeons, the New Zealand College of Midwives, the Midwifery Council of New Zealand, and the Health Quality & Safety Commission.

361. A copy of this report with details identifying the parties removed, except Waikato DHB and the experts who advised on this case, will be sent to the Medical Council of New Zealand, and it will be advised of Dr A's name.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

362. A copy of this report with details identifying the parties removed, except Waikato DHB and the experts who advised on this case, will be placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

Addendum dated 4 December 2020

363. Following the conclusion of the investigation, a vascular consultant and a highly qualified vascular sonographer reviewed the USS taken shortly before Mrs C's collapse. The vascular consultant told HDC that there is a visible aneurysm on the USS.

364. The vascular consultant considers that the aneurysm he can see on the scan is probably related to one of the branches of the internal iliac artery. It is now not possible to say with certainty which blood vessel or pelvic structure the aneurysm relates to on the still image, or what impact the aneurysm may or may not have had on the unfolding events.

365. Further information was sought from Waikato DHB. Waikato DHB told HDC that while it would expect an experienced vascular sonographer to recognise a uterine artery aneurysm, it would not necessarily expect a general sonographer to recognise or consider this in a pregnant woman. Waikato DHB also confirmed that it would not expect an obstetrician and gynaecologist or a general surgeon to recognise an aneurysm on the USS unless they had special training in pelvic or vascular ultrasonography.

366. Waikato DHB told HDC that following the USS verbal report of a vascular structure (see above paragraph 128), further examinations would have been carried out once the scan had been reported on formally. Waikato DHB stated that even if the aneurysm had been diagnosed from the USS taken prior to Mrs C's collapse, she would have been returned to the ward and further imaging would have been arranged prior to any surgical intervention being undertaken.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Appendix A: Independent advice to the Commissioner

The following expert advice was obtained from obstetrician Professor Stone:

“**Professional details:**

I can confirm that I do not have a conflict of interest as far as this complaint is concerned. I have informed the Commissioner that I was aware that the Women's Health Service had lost training accreditation from the RANZCOG and that there had been reviews of the service and that there were considerable pressures on staff and organisation at the Hospital.

As a clinician, at the outset I would wish my condolences to the complainant to be noted and also the staff for being involved in such a tragic outcome.

I wish to emphasize in reviewing this complaint that it is critical to view the events prospectively (as these unfolded) because the outcome is not known at the times that decisions are made. Also, seeking references from the literature needs to be viewed both in the light of what was transpiring and what is reasonable or likely in the clinical situation. It is with this approach that I have attempted to provide this report.

…

Background:

[Mrs C] booked into Waikato [DHB] (rather than seeking independent or self employed midwifery care) because of her medical-obstetric history and the realisation that she would in all probability end up needing complex care. The first point I would make is whether there was a full specialist review at the booking and the nature of this. Most hospitals in New Zealand now complete the booking in with midwives and the nature and timing of the first specialist appointment varies. It is fair to also point out that [Mrs C] is a health care professional and she took initiative into her own hands on occasion as she deemed necessary.

Booking:

[Mrs C] was booked in by the Community Midwifery team. The forms are undated but were printed on 29 [Month2]. Factors that she brought into the pregnancy included

— maternal age [late thirties]

— Previous infertility history with assisted conception

— Major surgery for endometriosis also right nephrectomy and right oophorectomy

— Previous instrumental delivery

— Overweight (I calculated her BMI — not done — as 27.0)

Concerns about this include an understanding of the significance of these factors for example, under gynae history is written ‘Denimyocis Uterus’, which I take to mean adenomyosis — did the person know what this was? Also given the factors, I have not

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

seen a clear plan to manage her pregnancy at that stage, though I know that an early ultrasound scan was done.

The scan performed in the community raised the concern of a possible cornual ectopic pregnancy and her midwife ([RM K]) wrote a referral and called specialists at the hospital, but as they did not see the need to see her immediately and suggested referral to the Early Pregnancy Assessment Unit, the patient contacted her previous infertility specialist who advised that she present to the Emergency Department.

Subsequent hospital scanning was reported as not confirming a cornual ectopic pregnancy and no further action was taken.

[Mrs C] was referred formally to the Antenatal clinic (presumably to see a specialist) on 15 [Month3] at 15 weeks gestation. It would appear however that she was seen on 12 [Month5] at 24 weeks gestation by [Dr B], O&G consultant who wrote a letter to the Community midwives. There is also a maternity referral dated 11 [Month4] noting 'referral sent 15 [Month3]', thus it may be that the midwife was having to re-refer as no appointment had been given.

In my view this is very late to see such a patient. The letter does not mention prenatal screening (for aneuploidy), nor the possible cornual ectopic pregnancy and the summary of the previous infertility and the endometriosis is very brief and does not reflect the gravity of the surgery. Whilst the plan included Aspirin and calcium (as preeclampsia-fetal growth restriction prophylaxis) and a growth scan; the summary is in my view rather insufficient.

A review of old notes, including the surgery, discussion of weight gain-screening for gestational diabetes some comment of whether prenatal screening had been offered and the outcome of that offer and some indication of the woman's wishes would have been appropriate. Being forewarned is forearmed in the management of complex pregnancy.

Thus as a learning point, such women need a fuller booking and much earlier in pregnancy. The hospital system needs to be able to accommodate such patients within the maternity booking process. Because it is well known that complex endometriosis surgery does have an association with adverse pregnancy outcomes (discussed later and references given), having such risks in a care plan clearly documented on the 'front page' or alerts, may have assisted in the later very difficult diagnostic dilemma that the clinicians found themselves in. Whilst this may appear to be supposition, it is helpful to have the fullest possible information available on which to base a diagnostic decision. This is how many of us were taught to write notes and in the electronic record at National Women's there is a risk factor list which is able to be updated at each appointment as risks develop or resolve.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

The admission 15 [Month6]:

Synopsis of the situation:
An obstetric early warning chart was kept (filled in intermittently at the beginning) and it would appear that until the patient's collapse, there were no major changes in the vital signs.

There was however, the undiagnosed severe pain and in such a patient a diagnosis was needed — the staff agreed about this given the efforts made to find the cause of the pain.

The point then becomes what reasonable diagnoses are possible as this will guide the course of action? If we go through the diagnostic reasoning, there are basically 3 possibilities:

1. obstetrical catastrophes,
2. conditions aggravated by pregnancy,
3. conditions unrelated to pregnancy.

At a minimum, the correct diagnosis will have to explain the most striking and prominent feature at the time the patient presented: the acute onset of abdominal pain. Also, I remain unclear about the findings of the ultrasound and why the presence of fluid in the peritoneal cavity was not seen. The issue of whether a further blood test was taken remains a point of contention and unless there are processes to double check the blood tubes at source such as signing the label on the tube in the room of taking the blood, we cannot draw further conclusions. Once the labelled tube leaves the ward, all the lab can do is confirm that the tube was correctly recorded on arrival in the lab.

Taking each of the 3 possibilities and with the information given in the notes:

a) Obstetrical catastrophe: Uterine rupture.

Such severe and seemingly increasingly severe pain suggests a major problem and a uterine rupture — for which this woman had some risks — was possible. The impact of the endometriotic surgery and in the background the possibility of an abnormally sited implantation (though initially discounted by the second in hospital scan) could just be true after all. Placental abruption was less likely given the normal CTG and the soft uterus, though uterine consistency is not an absolute sign and with the BMI being 27 at the start of pregnancy it is unclear just how easy it was to palpate the uterus.

A uterine rupture from an abnormally shaped uterus may be very difficult to diagnose even on ultrasound and an MRI may help. Severe pain however argues for early exploration (Bhattacharya et al 2012).

Uterine rupture overall is said to occur in 0.07% with an unscarred uterine rupture rate 0.013% (Gurudut et al 2011). A large Danish study (Thisted et al 2015) found a spontaneous uterine rupture rate in an unscarred uterus of 0.03%.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

b) Conditions aggravated by pregnancy.

There are a number of conditions that cause severe pain exacerbated by pregnancy including degeneration of fibroids, intestinal or adnexal torsion, infections such as acute pyelonephritis, though the symptoms and signs do not really fit with these possibilities — or at least not as leading contenders. Rupture of a visceral artery — especially a splenic artery aneurysm is well described. Rupture of a uterine vessel is extremely rare and whilst a possibility, would be much less likely than a splenic vessel rupture. There are very few case reports of uterine vessel rupture with endometriosis — though having the old notes is helpful here. However, there are reports also of a perforated appendix or sigmoid colon due to decidualised endometriosis. In these cases, laparotomy was necessary to make the diagnosis and treat (Bouet et al 2008). So, if a complication of endometriosis was considered, laparotomy was still likely to be needed.

The symptoms and signs of a subacute bowel obstruction (secondary to the previous surgery) are not fully consistent with the clinical presentation and were not considered the cause of the patient's presentation by the surgical team.

One of the reasons that I had emphasized the importance of a thorough booking assessment is that it is well recognised that ectopic decidua or 'deciduosis' is a well known phenomenon of pregnancy (Maggiore et al 2016). Further, it is increasingly recognised that although traditionally endometriosis was thought to 'get better' in pregnancy, on occasion, there may be complications including bowel perforation and spontaneous haemoperitoneum. Abdominal pain is the leading symptom and it would seem that exploratory laparotomy is required for diagnosis (and management).Thus in this case, with difficulty of diagnosis, a consideration of the possibility of a complication of endometriosis and need for laparotomy would form part of the differential diagnosis. Of the cases reported — and it has been suggested that these are underreported — bleeding is most often from the uterus or parametrial vessels. Abnormal placentation is widely recognised now in endometriosis *(hence a review of the uterine histology is requested by HDC).*

c) Conditions unrelated to pregnancy. There would be very few that would present principally with abdominal pain and then collapse that could be considered sufficiently probable to guide management.

It is important to note in this that as we are dealing with 2 patients here, namely mother and fetus (and the fetus is certainly viable in terms of gestation), that the principle is to assume an obstetric cause unless there are very strong cogent reasons not to.

So, the clinical question becomes was the patient's condition sufficiently severe to perform a laparotomy (laparoscopy would be inappropriate in this setting — the complainant can be reassured about that)? Given both fetal and maternal risks, why not do a laparotomy and if necessary deliver the baby?

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

A large review of all published cases (25) of spontaneous haemoperitoneum in pregnancy over 20 years showed the main presenting symptom being sudden onset of acute or subacute pain in the second half of pregnancy. In all cases abdominal ultrasound failed to diagnose intraperitoneal bleeding, sometimes transvaginal scanning or CT scanning showed intraperitoneal free fluid, but mostly the diagnosis was made at laparotomy. The bleeding often arose from veins on the posterior wall of the uterus. The recurrent theme was that diagnosis was not made until exploratory laparotomy became inevitable (Brosen et al 2009). Ultrasound may be confusing and a uterine rupture may be reported as placenta praevia, with CT being confirmatory in a case report (Bhoil et al 2016). A further review of uterine rupture in unscarred (non caesarean section) uteri, confirmed the highly variable presentations and argued for a high index of suspicion particularly with unrecognised (or remote) injury such as previous uterine surgery or thermal injury (Dow et al 2009).

Another review of haemoperitoneum showed most related to labour though pain, absence of vaginal bleeding and contractions were also features of the case presented (Huisman et al 2010).

A study of surgery for endometriosis-adenomyosis which included partial myomectomy in which 15/102 women became pregnant there were no uterine ruptures but 2 cases of placenta accreta necessitating hysterectomy (Kishi et al 2014).

A case not dissimilar in presentation to [Mrs C] was reported (Munir et al 2012) where the presentation was pain, with later abnormal CTG and maternal shock. On the basis of this, an emergency caesarean delivery was done, at which a haemoperitoneum was found and after much exploration spontaneous rupture of a posteriorly located utero-ovarian vein was detected. This case report highlighted the presentation and the reason for laparotomy whilst acknowledging the difficulty in deciding to operate in the presence of an unclear diagnosis.

Another case not reported in Maggiore et al 2016 (Nikolau et al 2013) reported uterine rupture attributed to adenomyosis with pain being a leading symptom followed by shock, illustrating that adenomyosis which is endometriosis within the uterine wall may be associated with pregnancy complications. Uterine wall thickness after surgery for adenomyosis has been associated with uterine rupture (Otsubo et al 2016). Villa (Villa et al 2008) also describes a case report of uterine rupture some months after laparoscopic surgery for rectovaginal endometriosis and Wada et al describe uterine vein rupture (Wada et al 2009).

A further case, not too dissimilar was reported by Rasool et al in 2016 where the woman at 28 weeks initially presented with pain and a non contractile uterus who on the second day after admission had an episode of severe acute abdominal pain followed by collapse. A number of diagnoses were considered and the definite cause of the presentation was found at laparotomy, being cornual uterine rupture; illustrating the need to consider uterine rupture in women presenting with abdominal pain and or signs of shock. Another case report described a 32 year old primigravid

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

woman at 27 weeks gestation admitted with abdominal pain, no risk factors for uterine rupture and a soft abdomen (Uzun et al 2010). After the development of abnormal fetal heart recordings, an emergency laparotomy was performed which showed a haemoperitoneum and a tear in the uterine wall. This case illustrates the need for an index of suspicion about uterine rupture because signs may be few and there may be few risk factors.

The point of describing some of the case reports or series in the literature is to show that

1) Diagnosis of uterine rupture or other catastrophic events may be difficult
2) A high index of suspicion needs to be had
3) Often the symptoms may be out of proportion to reported changes in vital signs
4) The management may be necessitated by symptoms as much as signs.

Thus one of the issues in this case, and one which is very difficult for me to assess is just how much pain-distress was the patient in? Was the pain so out of proportion to the signs that action was justified and the possible risks of laparotomy were outweighed by the benefit of making a diagnosis — or excluding a diagnosis? The notes do give a clue to the severity of the pain (and the surgical review did list a brief differential diagnosis which was reasonable and included 'obstetric causes').

I would submit that with modern anaesthesia, the risks of a laparotomy have been found to be small to mother and fetus and it is acceptable to perform a laparotomy and not deliver the fetus should there be no adverse findings. Therefore, I do not believe that the risk of surgery per se should be the principal factor determining management — rather the diagnostic possibilities and how these would be resolved.

Assessment of pain:

The patient would report severe pain. The clinical case notes provide the following:

15 [Month6].

0515: In the admission, recorded a history of abdominal pain and contractions. The severity of the pain was not particularly commented upon. The abdomen was said to be soft non tender.

0530. 'tucked up to sleep given paracetamol'

0545. Pain returned. Given pain relief

0715. still some pain. Abdomen 'tight'

0930. Bell. Still in pain. Pain score 8 (8/10). Called registrar

1015. Given Sevredol. Still pain

1055. Pain much worse. Radiating down her leg

1115. Still in pain. Radiating down her R leg called registrar — SHO

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

1135. VE cervix long posterior. Pain central in lower abdomen.

1158. SHO. Now constant pain. Severe pain despite Sevredol. O/E. In severe pain, crying/gripping the bed sheets. Percussion tenderness+ and some rebound.

The pain severity and the rebound tenderness suggest that there is a serious problem. This was recognised at least in so far as it was decided to call the Surgical Registrar. The registrar was attending to a trauma case. The SHO planned 'repeat bloods' — there is no other record that these were taken.

1250. O&G Team review [Dr A]. Notes record pain 'worst she has had, worse than endometriosis. Abdomen distended more than usual.' Working diagnoses bowel obstruction, secondary adhesions or appendicitis. Plan to refer to general Surgery, given IV morphine and an anaesthetic referral for a PCA for pain relief.

1340 IV Fentanyl given. Pain relieved pain score now 2

1345 vital signs BP 119/72 pulse 70, CTG reactive

1400 Surgical review. BP135/73 pulse 64

1410 Pain score 6 BP 129/68 pulse 68

1445 Pain not stopped since surgical examination

1530 Still in significant pain (midwife entry)

1600 'pain constant 4–5 with cramps that are 8–9 on top' midwife entry … [Mrs C] describes …

1640 writhing around in bed++. Midwife entry

1645 retrospective note from surgical registrar. He had discussed the case with the Specialist. Ultrasound scan (decided upon) and booked for 1800. 'Impression unclear — Renal colic vs internal hernia vs obstetric cause'.

1720–1733 patient given 200mcg Fentanyl IV

1755. transferred to Radiology

1757. vomit mostly water

1805 pulse 72

Comments recorded in retrospect by midwife

1830. pulse 78

1838. vomiting while returning to WAU

1841. 'feeling very clammy and faint'

1842. Staff bell called. [Mrs C] non-responsive

1843. … Attempting to get BP. Very hypotensive, pulse thread, unable to hear BP CTG/FHR~80bpm

1855. [Mrs C] tx to theatre

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

1908. Given 11.4mg betamethasone

1910. $MgSO_4$ for neuroprotection bolus commenced …

1843. Anaesthetist note — 'on bed bagging'

1845. pulse 132 O_2 99, 2 mls naloxone given

1846. in recovery position. Pulse 68

1847. '999777/consultant

1850. Consultant in room

1855 to OT

I will comment and build in responses of staff and patient.

Summary and possible interpretation of the sequence of documented events during 15 [Month6].

a) My comments regarding old notes are pertinent as the detailed history of prior gynaecological disease and surgery may have guided the clinicians towards the possibility of intraperitoneal bleeding which does not appear to have been considered until the maternal collapse.

   The point here is that all cases unfold prospectively and so subsequent histopathology may give an 'answer' but does not provide much assistance in determining the course of clinical action and thus cannot be used as an explanation for management decisions. (This point is made by the patient.)

b) There appears to have been significant pain as an over-riding symptom from the outset which was never controlled and for which an explanation or structured differential diagnosis was never made until either the surgical opinion at 1400, — though not written down at the time and maybe not communicated (see [RM F's] comments about lack of communication) — or possibly the 1250 ward review with [Dr A]. The consideration that an obstetric cause was possible did not seem to be considered seriously.

c) Between mid morning and ~1340 there were a number of attendances to the patient due to pain, but few vital sign recordings. In fact in the period 1015 to 11.58 the patient was seen 4 times by the midwife and once by the SHO but there are no recordings of the clinical vital signs. This is a significant amount of clinical attendance without taking a note of vitals which possibly could give a clue to patient condition.

d) As far as can be ascertained, in addition to not taking vital signs, no further bloods were taken during the day to aid in the diagnostic process. There are no written records of blood taking during the day and the DHB letter provides information on quality control but cannot exclude a 'preanalytical' error. Even should the bloods that were ascribed to the patient have been taken, given the variability of the

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

testing and the clinical condition, it would have been surprising if the haemoglobin had increased by the amount stated. It would appear that the variation was outside the expected range for the laboratory.

e) Notwithstanding the blood results which would only be a part of a diagnostic process, it does appear that during the afternoon the patient's condition did not stabilise and it seems that the main management during the afternoon (of 15 [Month6]) was pain relief. It is clear that during the afternoon [RM F] did take vital sign recordings which were entered onto the chart. These were 'stable' (without going into pregnancy physiology in great detail, the nature of the collapse is typical of bleeding in pregnancy, where the woman maintains cardiac output until almost exsanguinated, due in part to the increased blood volume in pregnancy and the capacitance in the venous system which provides a storage reservoir. Thus vital signs tend to be a late sign of impending cardiovascular collapse. Once collapse has occurred, there is little time before the uteroplacental circulation will cease with major consequences for the fetus). It is also noted that [RM F] was concerned about the patient and did express her concerns. (My interpretation is that the midwife's concerns were either not heard or were not taken as an expression of concern warranting a further review of the patient. The midwife states that she 'was frustrated too …'. As I was not there, I cannot comment further on the dynamics of the communication and to do so would be speculation. If the midwife did indeed state her concerns forcefully then she has done the best that she could to have a diagnostic review.

f) From the time of collapse until delivery of the baby noted to be 1924 hours, it was 42 minutes (1842 hrs to 1924hrs), but as the vomiting was a sign of hypotension — and possibly peritoneal irritation — it is likely that placental perfusion was compromised before 1842. The final CTG merely reflects this. The administration of Betamethasone and Magnesium sulphate in this situation takes up time and would not serve any useful purpose as at the point at which these drugs were given, delivery was needed immediately.

g) The condition that the baby was born in (especially the blood gas results) is consistent with severe birth asphyxia to such a degree, that neonatal death was a likely consequence, unfortunately.

In reply to the specific questions from the Commissioner:

Please comment on the:

1 Overall management of [Mrs C].

This clearly was a very difficult situation and it was not apparent on admission, what the problem was that was causing the pain. In simple terms I do not see laid out in the notes diagnostic possibilities which could be then worked through and given the severity of the pain, in an expeditious manner. One of the problems was that early on, the possibility of an obstetric cause was excluded conceptually. I am a little surprised

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

at this because an obstetric cause, if not at the top of the list, would always figure in a differential in a pregnancy. Also, I believe it is generally known that endometriosis particularly when there has been surgery, may have implications for pregnancy. Whilst I am prepared to be challenged on this, it is well written up in the literature and endometriotic cyst accidents are known to occur in pregnancy — so that is one example that endometriosis does have implications which do not go away once the women is pregnant.

I also feel that in a woman of [Mrs C's] age with the history of infertility and now a spontaneous conception, there needs to be an over-riding concern for the baby and the question — could this be an obstetric problem and should we deliver the baby? Maybe the doctors did think of this, but I do not see it written down.

Thus a consideration of either an obstetric cause or an unexplained but significant problem needing exploration did not top the list of possibilities. But given that, the diagnostic process seemed slow. Admission in the early hours of the morning, surgical review in the afternoon and scan at 1800, over 12 hours from admission, does not seem to reflect the urgency that the pain symptoms would suggest that needed quicker action. I accept that the hospital — both the obstetric department and surgery seemed busy, but triaging the most critical patients is necessary. As I was not there, it is hard to get a sense of the acuity of [Mrs C] but the descriptions of the pain and the concerns of [RM F] suggest that [Mrs C] was very unwell. The case reports I have provided tell of cases of difficult diagnoses with pain a leading presenting symptom, but it was an index of suspicion working through a differential diagnosis that resolved the issues. Whilst as obstetricians we are cautious about non obstetric surgery in pregnancy, actually at the gestation [Mrs C] was, a laparotomy is a safe procedure (laparoscopy can be done even up to 32 weeks, but it would not have been appropriate here because of the acuity and diagnostic possibilities).

The clinical team, especially anaesthetics tried to provide adequate pain relief such as the PCA, <u>but if a non labouring patient is needing that amount of pain relief, a diagnosis is called for. To me that is a critical point</u>. So, even if up until around midday, the care was reasonable, once standard pain relief including Sevredol was insufficient, major efforts to reach a diagnosis were needed before using a PCA. The question surely must have been, what is the cause of the pain; what is going on?

Whilst [Mrs C] is critical of midwifery recording and I agree with some of the comments, in fact it would appear [RM F] provided appropriate care. I have made comment about the nature of communication.

In summary, there was a delay in the recognition of the severity of [Mrs C's] condition and the consequences of that followed. The ultimate diagnosis — in retrospect — is of secondary consequence — there are a number of causes of antenatal obstetric collapse and these generally will not be known until laparotomy.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

With respect to [Dr A's] letter, this was a difficult presentation and certain investigations tended to put the team 'off the trail'. The scan, the haemoglobin in the morning, the stable vital signs all suggested stability. I accept that this is difficult. But the point was that the pain did not settle and required a diagnostic approach. What would have been appropriate would have been a reappraisal and consideration of diagnostic possibilities as I have discussed. These are very difficult situations for a specialist. At such times one can feel very professionally lonely and it is not clear if there was other senior support to call upon for diagnostic advice. (There was support later in the theatre.)

I believe that peers would view the care provided during the admission 15 [Month6] as lacking a clear diagnostic pathway and lacking urgency. I would suspect that some would still consider that the individual steps taken were appropriate and there will not be a unanimous view on this. I do think, specialists working in a large tertiary hospital such as this one would be more likely to feel that the care lacked urgency because such situations whilst not common do occur but in smaller units such cases would be rare.

In considering whether this is a departure from care, caution must be exercised, because this cannot be judged against the outcome which is not known at the time the care is being provided. Reliance on clinical signs and tests is generally a standard way of determining care; what seems to be the problem here is that the pain was out of proportion to the signs and needed an explanation. Certain actions were taken, but ended up being inadequate and too slow. It is not so much a departure from standards as not thinking broadly enough to consider diagnostic possibilities.

2. The timeliness of [Baby C's] delivery following [Mrs C's] collapse.

I have made comment above. It was at least 42 minutes from collapse till delivery and as the uterine perfusion would have been compromised before the final collapse, sadly the outcome for the baby was likely to have been as it was. The use of medicines for the baby (steroids and $MagSO_4$) were unhelpful in this situation — there is no time for them to work and would have caused some delay and to me maybe also reflect a lack of understanding and even at that stage a reticence to get on and do a laparotomy. Indeed in [Dr A's] letter, the patient was in theatre at 1855 but the decision to proceed to laparotomy was made at 1908, with knife to skin at 1922.

The DHB Caesarean section categorisation is appropriate and in this case it would have been a category one.

I do have some concerns about the [DHB] Trauma Protocol — their reference 1538 written 1 July 2014. Apart from its format not being user friendly — too many words and not clear triage steps, it does not really encompass mother and fetus and take account of gestation. Also it should cover maternal collapse from trauma or otherwise. Also, critically, if trauma has led to rupture of a major viscus and/or the uterus (or spleen) — no amount of resuscitation will be successful until the source of the bleeding is found and stopped. The document does make some good points. It is

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

not a protocol but rather a statement — a protocol is a 'how to do' document written in simple terms with simple steps which can be followed in a crisis.

However, I note it does say 'Inexperience can lead to a less aggressive approach for fear of damaging the fetus, when the opposite approach is required …'. Whilst trauma was not the case here it is surprisingly prescient.

In considering whether this is a departure from care. Again as in 1 above, it is more a reflection on the understanding on what is likely to be going on and acting expeditiously.

3. The cause of [Mrs C's] rupture is speculative and I do suggest a second opinion on the pathology as already suggested in a prior email to the Complaints assessor. I have provided literature on the association between uterine rupture and endometriosis-adenomyosis; either a rupture in adenomyosis or from damage from prior endometriosis surgery. The exact cause is not possible to diagnose before operation.

4. Generally the followup care was compromised by the use of hospital policies and may well have exacerbated [Mrs C's] complaint. Also, having letters from staff who did not know [Mrs C] tends to create an impression of impersonality and I would encourage all DHBs to avoid this and have the staff involved communicate with the person who, after all, was their patient.

The letters from the clinical staff looking after [Mrs C] were kind and appropriate, though there are a number of differences of opinion as to facts. The problem is that as time passes apparent facts are distorted and without recourse to notes, staff may not be entirely accurate in comments. I do not get any impression of an attempt to underplay the gravity of the outcomes and I believe that the impression in the letters is of honesty and openness.

Clinically, the care was appropriate and postnatally progress was good with an early discharge for such a major illness. There were issues around communication about the baby's condition. In general, early and open communication along the principles of open disclosure should be encouraged and DHBs should not take up defensive positions. Facts will come out and be treated fairly and there is no point in delaying appointments for 'policy' reasons.

5. I would like to request that all the ultrasound images be made available for independent review, not only about the findings on the image, but the quality and extent of the examination done and then also the content and context of the ultrasound report, noting that these reports are generally done 'off line' and thus unless the radiologist directs the imaging and is present, can at best report second hand what is on the images stored. I am particularly interested in the scanning done at the time when there would have been expected to have been intraperitoneal blood, but all scans should be reviewed.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Similarly, for quality assurance and closure on this complaint I believe a review of the histology would be helpful.

I would like clarity on the processes by which obstetric bookings are done and how information is transferred to the medical record. It is just possible that had more details of the endometriosis surgery been available, the doctors would have considered a different diagnostic path.

In summary, this is a very sad outcome to a challenging clinical situation. I do not think blame is attributable here. As I have written, a number of issues mitigated against expeditious management and there may be others that I am not aware of. There is important learning for the staff, especially the doctors. Notwithstanding the CTG, the baby was compromised some time before the collapse, such that unless this baby had been delivered before the transfer to ultrasound the outcome would have been the same.

Professor Stone
HDC Assessor
Professor Maternal Fetal Medicine
The University of Auckland
References:

Bhattacharyya SK, Bhattacharyya S, Alam H. Lesson learnt following diagnostic failure of a case of acute abdomen in pregnancy. J Obstet Gynaecol Res 2012;38:1231–1232.

Bhoil R, Surya M, Mistry KA. CT diagnosis of spontaneous uterine rupture at term, sonographic appearance of which was confused with placenta praevia. Ann Saudi Med. 2016;36:440–441.

Bouet PE, Sentilhes L, Lefebvre-Lacoeuille C, Catala L, Gillard P, Descamps P. Endometriosis and spontaneous rupture of uterine vessels with hemothorax during pregnancy. Eur J Obstet Gynecol Reproduct Biol 2009;144:92–96.

Brosens I, Fusi L, Brosens JJ. Endometriosis is a risk factor for spontaneous hemoperitoneum during pregnancy. Fertil Steril. 2009;92:1243–5

Dow M, Wax JR, Pinette MG, Blackstone J, Cartin A. Third-trimester uterine rupture without previous cesarean: a case series and review of the literature. Am J Perinatol. 2009;26:739–44. doi: 10.1055/s-0029-1223287.

Gurudut KS, Gouda HS, Aramani SC, Patil RH. Spontaneous Rupture of Unscarred Gravid Uterus. J Forensic Sci, January 2011, Vol. 56, No. S1 doi: 10.1111/j.1556–4029.2010.01622.

Huisman CMA, Boers KE. Spontaneous rupture of broad ligament and uterine vessels during pregnancy. Acta Obstet Gynecol Scand. 2010;89:1368–9.
doi: 10.3109/00016349.2010.514599

Kishi Y, Yabuta M, Taniguchi F. Who will benefit from uterus-sparing surgery in adenomyosis-associated subfertility? Fertil Steril. 2014;102:802-807.e1.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

doi: 10.1016/j.fertnstert.2014.05.028.

Maggiore ULR, Ferrero S, Mangili G, Bergamini A, Inversetti A, Giorgione V, Vigano P, Candiani M. A systematic review on endometriosis during pregnancy: diagnosis, misdiagnosis, complications and outcomes Human Reproduction Update. 2016;22:70–103.

Munir SI, Lo T, Seaton J. Spontaneous rupture of utero-ovarian vessels in pregnancy. BMJ Case Reports 2012; doi:10.1136/bcr.02.2012.5904

Nikolaou M, Kourea HP, Antonopoulos K, Geronatsiou K, Adonakis G, Decavalas G. Spontaneous uterine rupture in a primigravid woman in the early third trimester attributed to adenomyosis: A case report and review of the literature. J Obstet Gynaecol Res. 2013; 39:727–732.

Otsubo Y, Nishida M, Arai Y, Ichikawa R, Taneichi A, Sakanaka M. Association of uterine wall thickness with pregnancy outcome following uterine-sparing surgery for diffuse uterine adenomyosis. Aust NZ J Obstet Gyneacol. 2016;56:88–91.

Rasool M, Masroor I, Shakoor S, Munim S. Spontaneous uterine rupture at 28 weeks: A case report. J Pak Med Assn. 2016;66:898–900.

Thisted DLA, Mortensen LH, Krebs L. Uterine rupture without previous caesarean delivery: a population-based cohort study. Eur J Obstet Gynecol Reproduct Biol. 2015;195:151–155.

Uzun I, Yildirim A, Kalelioglu I, Has R. Spontaneous rupture of unscarred uterus at 27 weeks of gestation. Arch Gynecol Obstet. 2010;281:999–1001

Villa G, Mabroul M, Guerrini M, Mignemi G, Colleoni GG, Venturoli S, Seracchiolo R. Uterine Rupture in a Primigravida with Adenomyosis Recently Subjected to Laparoscopic Resection of Rectovaginal Endometriosis: Case Report. J Min.Invasive Gynecol. 2008;15:360–361.

Wada S, Yoshiyuki F, Fujino T, Sato C. Uterine Vein Rupture at Delivery as a Delayed Consequence of Laparoscopic Surgery for Endometriosis: A Case Report. J Min.Invasive Gynecol. 2009;16:510–512.”

The following further expert advice was obtained from Professor Stone:

“**Review of Ultrasound Images 15 [Month6]**
I have reviewed the images made available from that scan.

The time course of the scan seemed adequate for an abdominal scan and the fact that the patient was noted to be very tender to scan.

There is no clear evidence of free peritoneal fluid (nor gas).

The views taken of the right and left upper quadrants are adequate.

An ‘unusual’ appearance of a structure in the right side-adnexa adjacent to the cervix is commented upon and no diagnostic label is given.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person’s actual name.

The only criticisms are that on the images provided, the placental position is not fully defined and placental appearance similarly is not fully shown. In such a case with already a right nephrectomy and right oophorectomy, the sonographer would likely be considering an abruption. Also fetal biometry would usually be done as a standard. The appearances of what has been labelled as cervix are not particularly clear. These criticisms are not likely to have affected the outcome of the scan.

Conclusion: this was an adequate scan and no diagnostic information became apparent to guide the clinicians.

Whilst it may seem 'academic' a review of all the other scans could be of interest as, should abnormal placentation have been found as was suggested on the very first scan this may have provided another alert earlier in the pregnancy.

Additional comment:
It would seem that the tests performed were non contributory to the diagnostic pathway in this case and the clinicians were faced with the unenviable task of having to plan action based on clinical suspicion alone. There are times when tests do not provide clear cut answers.

Thus the management of this case will be based on opinion and clinical experience. Whilst there were certainly some delays, I can appreciate the clinical dilemma and as such I do not think (unless there is new information) there was a departure from standard care. I suspect some clinicians would have acted earlier as I have stated, but some others would have managed [Mrs C] as was done. I have expanded on this discussion in the main report. The ultrasound scan findings do not alter my conclusion."

The following further expert advice was obtained from Professor Stone:

"This is an additional report provided at the request of [HDC] following the receipt of further correspondence from [Mrs C].

The Office of the Commissioner has requested a further response to [Mrs C] and I have been provided with replies from the District Health Board and from another independent assessor, [Dr O].

Statement of Conflict of Interest:
I can confirm that I do not have a conflict of interest as far as this complaint is concerned. I have not had any communication with any of the parties involved and I have not been able to read the documentation that is part of an Accident Compensation Commission investigation.

Report:
At the outset, I was at pains to reiterate that in reviewing the management provided to [Mrs C], I took a prospective view of events as these unfolded. I did not expect that the clinicians would necessarily determine a diagnosis prior to surgery. The issue of

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

rarity of the diagnosis is not particularly relevant as often this may not be known until surgery or pathology is available.

The points to be made are the processes that led to the care plan and outcome and importantly in this case, given that the obvious diagnoses seemed to have been excluded by the clinicians, then less common problems needed to be considered. Hence, rarity or otherwise is not really relevant, it is the processes by which the care evolved that are the points I thought I had made in my previous report, but which I need to reiterate here.

Also, there is remarkable agreement between my comments and impressions and those of [Dr O]. [Mrs C] is somewhat critical that having made comments and observations [Dr O] and I are perceived as then concluding that the care was of an acceptable standard. I need to state that I did not believe that for a base hospital, with excellent surgical and intensive care facilities both for mother and neonate, the care was as I would have expected. I stated that many of my peers may think the care was acceptable but there are elements of the care which both [Dr O] and I are critical of, and as such would be below a standard of excellence in the hospital.

I will attempt to address each of [Mrs C's] points in detail and make additional comment. In doing so I confirm that I have read the entire bundle sent to me. Many of the policies and protocols are not strictly relevant to this case. Also, I must reiterate the point again that policies around communication for example the 'SBARR' communication tool is only as good as the information provided. I was critical of the initial obstetric booking because [Mrs C] had more than just endometriosis — she had had major complex surgery for that condition, which I maintain should be relevant. If the degree of severity of her endometriosis and the treatment is not documented adequately and accurately, no subsequent audit-assessment process will work. Thus many of the policies are critically dependent on the quality of the initial clinical history.

Concerns of [Mrs C]

Concern one:

I believe that I have addressed concern one which relates to the adequacy of the initial booking obstetric history. As I commented upon at some length in my initial report, the point of the initial history is to guide risk assessment and make an appropriate plan. Now, it was clear that [Mrs C] recognised that she had complexities which would inevitably lead her to need hospital based care. I am not sure if the Waikato DHB (like many other DHBs) had chosen to reduce its so called primary and secondary obstetrics to referral clinics only with outsourced (or independent) midwifery providing most of the antenatal care. This is not a problem that can be solved in this report but it is a recurring theme in maternity care in New Zealand today. Women such as [Mrs C] have complexity which makes so called 'low risk' or community based care inappropriate but it is up to the obstetric staff in the hospitals to work around this system as best as they can.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

The point which I made and continue to make is that had it been recorded what the degree of treatment for the endometriosis had been, it may have flagged possible pelvic organ damage which could have then raised the question when [Mrs C] was admitted on 15 [Month6] … 'Could this be in any way related to her previous problems and surgery …?'. I raised this in my report and I disagree with [Dr O] that associations between endometriosis and obstetric outcome are in obscure journals. I referenced Fertility and Sterility which is one of the leading journals in the area — far from obscure. The additional point I will come back to, is, that once the common or more likely have been provisionally excluded, it would be common clinical practice to ask … 'could it be something else …?' even if this is rare. Clearly, the situation was that [Mrs C] was not only not getting better during the day of 15 [Month6], she was getting worse so additional clinical possibilities needed to be thought about rather than waiting expectantly for something to declare itself, which it ultimately did in a catastrophic way.

[Dr B] was only able to reply on the basis of the medical record, because she was not there at the time, so it is difficult for her to comment on [Mrs C's] statements.

Concern two:
I need to state that I have not been permitted to see [Dr P's] report to ACC.

I do agree with the comments about [Dr A's] response to my initial report. In a verbal comment to HDC I stated that I felt I had tried to be generous and understanding to the situation that [Dr A] had been placed in with respect to the difficulties in reaching a clinical diagnosis. However, it would appear to me that [Dr A] did not understand my point that I was not expecting a preoperative clinical diagnosis to be made, what I was commenting upon was that it seemed that given [Mrs C's] worsening condition during the day with regard to pain, there needed to be a decision made to act. I remain firm that in the situation as presented in the case notes, there would have been justification to perform a laparotomy and given the back up in the level 3 neonatal unit and with adult intensive care also, the risks to [Mrs C] and her baby were manageable.

Of course undertaking laparotomy in pregnancy is a serious decision, but just from the notes it was clear that something was wrong and had not been resolved and the possibility of a less common diagnosis needed to be considered.

Of concern to me is that I am far from clear whether [Dr A] actually saw and examined [Mrs C] herself at the 1250 O&G team review. Was this a 'paper round' or did [Dr A] examine her? I would have to say that [Dr A] will have to clarify this, because it seems that [Mrs C] is not convinced that she was examined by [Dr A]. I would further say that if [Mrs C] had not been examined, then this is a serious issue given that significant amounts of pain relief were being given without a clear diagnosis.

I would also have to agree with the (2nd hand) comments about [Dr P's] interpretation of the CTG.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

I would also agree that we tend to (almost by default) give steroids at least if not the Magnesium, if we suspect that there could be even a small chance of a preterm delivery. The use of steroids and Magnesium after the collapse was a complete waste of time and at least as far as the steroids were concerned would have offered no benefit to the baby at that time.

Concern Three:
I need to address parts of concern three with two above in regard to rostering — workloads. I sought from the DHB and has been provided at tab 4 in the bundle — the rosters for 15 [Month6]. From what I can gather, there was not excessive workload that day. Therefore, I do not see a reason why [Dr A] or other more senior members of the obstetric team would have been too busy to prioritise [Mrs C] as she must have been one of the most unwell women in the obstetric service that day.

I also made comment in my initial report about the midwives. Whilst not being critical on the whole of their recordings, I made mention of whether they raised concerns and were heard. In the light of [Mrs C's] subsequent letter, it would be of value for the HDC to ask about the interaction between midwife and doctor and what role the midwives may have played in the clinical care that day. This does seem to have been addressed in the Serious Incident review.

The other points that are in concern three about diagnoses and rarity or otherwise miss the point as I have commented above. None of us knew the diagnosis before operation, but rarity had to be considered and as [Dr O] also noted there were many times when significant pain was noted and surely this needed action.

Concern four:
I reiterate my previous comments about the timing and I reiterate that even after the collapse there seems to have been a reluctance to just 'get on' with laparotomy. Thus I agree with [Mrs C's] summation. However, this was not really a perimortem caesarean section because [Mrs C] had not had a cardiac arrest at the first time into the theatre.

Perimortem caesarean section implies operating without anaesthesia with the primary aim to improve resuscitative efforts for the mother. Without going into the literature there are case reports of perimortem caesarean section many minutes after cardiac arrest when the baby may still survive — the issue is the timing with respect to the mother.

In [Mrs C's] situation, I would be reluctant to suggest that a laparotomy be done without anaesthesia. Although anaesthetists may be reluctant to do so called 'crash inductions' these days, these can be done very quickly indeed and of course having the patient intubated is a good way of ensuring ventilation.

In summary therefore on this point, I believe that at the collapse it was necessary to just get on and proceed to laparotomy and get the baby delivered as that would have

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

been the only chance for the baby. Even if up till the collapse the diagnostic uncertainty had influenced the obstetric team not to act, at the point of collapse, there was an urgent need to operate. They could not exclude bleeding-hypovolaemia as the cause of collapse. I am critical of the whole team at this point if they thought that they could resuscitate without opening the abdomen. It is well recognised that major obstetric bleeding be it from an ectopic pregnancy or other intraabdominal catastrophe cannot be resuscitated until the source of the bleeding is found and occluded. The blood flow is simply so great that it is not possible to keep up with the blood loss.

In tab 8 there is an Adult Deterioration Detection System. If this works well for the DHB, that is good, but it is noted that there is a Maternity Early Warning System (MEWS) which has been validated and is being trialled nationally at the present time with a view to general implementation.

The Obstetric Cardiac Arrest protocol (though not strictly relevant here) is reasonable, though the right hand panel could be confusing as it may not be possible to 'consider and correct'. This is where my comments about major obstetric haemorrhage are pertinent.

Concern Five:
I have commented on parts of this previously and I made the comment which I can restate in different words here that clinicians should not 'hide' behind protocols and delay follow up after adverse events.

I am not qualified to make specific comments about the musculoskeletal problems, except to say that DHB gatekeeping seems to have caused unnecessary difficulties.

Other comments:
Tab 7 '4' 'The Investigation Process'. The problem here is that this seems to have taken precedence over getting back to [Mrs C]. This process is too slow and too remote from the event. Also it is noted that junior obstetric staff who are likely to be directly involved are excluded.

Tab7 page 14 Post surgical in hospital debriefs — 3rd paragraph. The practice of discharging to midwifery care in such cases is to be deplored. Such patients have undergone major surgery — and in this case suffered the loss of the baby — it seems unbelievable that doctors discharge their responsibilities like this.

Tab 7 page 15 Care and service delivery problems identified as a component of this review. Again this series of bullet points misses the point that there was not a diagnostic and therapeutic pathway and none stepped back and asked where this was leading. I remain convinced that the doctors and DHB seemed to have missed the point here that there was not an overall plan.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Tab 7 page 16 Evaluation Method: Pain Management Audit. There is no comment as to why the patient was needing the pain relief. Again, the point of seeking a reason, that is a diagnosis or a therapeutic plan seem to be missing.

Summary:
In the light of [Mrs C's] letter to HDC dated 13 January 2018, I had been asked to review my original and supplementary report and address [Mrs C's] concerns as best I could.

In particular, it appears that the HDC and [Mrs C] are seeking a firmer commitment from me regarding standard of care. In the interim, [Dr O], also from a major obstetric unit in New Zealand has commented. She and I have had similar criticisms but she seemed to say that the standard would be considered acceptable. However, I beg to differ because in [Dr O's] summary she prefaces her remarks by working back from the diagnosis. I have been at pains to state that I have worked forwards from the presentation on the 15 [Month6]. I have taken the view that [Mrs C] was unstable, the pain was not controlled and (as there was no reason to believe that the pain was not real) there needed to be consideration of possible causes and actions required, even if the causes were not deemed common.

Given the environment in a base hospital with excellent 'back up' notwithstanding what other peers may think, I would maintain that parts of the care were not up to standard and could have been performed differently. I remain of the view that the team were 'not on top of the case' for whatever reason — a reason we may never find out and would only be speculation.

In expressing my sympathy to [Mrs C], I sincerely hope that there is some learning that can come from the events which are the subject of this complaint.

A possible list of learning points follows:

The review by the Obstetric team and DHB took too long.

History taking is a skill but it never hurts to ask details and be incisive — be like a 'Sherlock Holmes' — don't just take things at face value.

When the clinical signs and symptoms don't seem to fit together it is important to re-examine, retake the history, consider the less common and at times act. In Obstetrics we are used to coping with uncertainty — it is part of the speciality.

The policies and procedures are only as good as the information on which these are based.

[Mrs C's] learning points on the last page of her letter are all reasonable especially the issues for radiology, and intrahospital referral.

In specific answer to the HDC questions:

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

1. The standard of care provided by [Dr A].
As stated above with reasons I am concerned that this did not reach what could be expected. In particular, did she examine the patient at 1250 hours on 15 [Month6]? What was the management plan? Given that the team seemed to have exhausted what they thought were diagnostic possibilities, what were they planning to do and what had they explained to the patient? There is a lack of clarity and for these reasons, notwithstanding what many peers may think, I feel that this is below standard. If there had been a clear plan with justification, then the actions could be understood. At the point of collapse there were avoidable delays.

2. The Serious Incident review.
I have already commented that this was not timely enough, needed to include others, ascertain more facts such as did [Dr A] see the patient?; were the midwives expressing concerns and were these listened to?; why was the booking history brief and not including the complex endometriosis surgery in detail?

3. The adequacy of policies and procedures in place.
As already noted many of these were of little relevance. In addition policies around reviews are only as good as the information fed in. In general the reviews need to take place quickly. One example is the RAMP process now in place at National Women's in Auckland (Auckland District Health Board Maternity Quality and Safety Programme).

4. Adequacy of staffing levels.
From the data provided and senior staff comments it would appear that staffing was adequate and that there was no untoward excessive acuity on the day in question. Thus the issue becomes one of prioritising.

5. The time to deliver following collapse.
Here the Colleges are only helpful in part for reasons I have stated in the body of the report. It is generally agreed (RANZCOG guideline) that placing an absolute time figure on this may be unhelpful. My point has been that there were unnecessary delays — such as giving steroids and Magnesium and also trying to resuscitate and here the WDHB guideline may be unhelpful in their comment 'consider and correct'. Where the RCOG guideline is of value is that when a clinician has indications that an urgent caesarean section is needed for maternal collapse — there needs to be the facility to perform the delivery expeditiously and the RCOG has given a time guidance. In this case of course, they managed to get the patient into theatre but there were still delays that no guideline can prevent.

The main recommendations here are that the symptoms were out of proportion to the signs and really quite large to almost excessive amounts of pain relief were given for an undiagnosed situation and yet there was no therapeutic plan. The possibility of an urgent delivery had not been considered (hence steroids had not been given earlier). The gastrointestinal (GI) symptoms (and later uterine activity on the CTG) were not initially considered to be of obstetric rather that GI origin. If a non obstetrical cause of the pain was considered unlikely by ~ mid afternoon, then by default an

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

obstetric cause was likely (and after all she was pregnant and had had major pelvic surgery before, and had had a previous IVF baby due to problems conceiving) so resolving the situation was a necessity in my view.

Thus I have concluded that in my view standards of care have not been met and the improvements to care in the future relate to:

History taking
Reexamination when symptoms and signs do not fit. — *This is a serious departure from accepted standards of care especially if the senior medical staff did not personally examine the patient either by the midday round or in the afternoon when the notes suggest that the patient's condition was unimproved.*

A written therapeutic plan with reasons. — *This is a moderate departure from standards of care. It is standard teaching and is the medical structure on which we practise, that the notes should document, history, examination findings, impression-assessment as to what are the 'hypotheses' and then plan.*

Expeditious delivery once this is decided upon. — *My report suggests that once it was decided (in my view belatedly) that delivery was needed, there was time lost and I consider that this is serious as there seems to have been no good reason to delay for steroids and resuscitative measures and so on without performing the laparotomy in the attempt to find out what was indeed the cause of the collapse.*

Not discharging to midwifery care so early after such a complex outcome. — *In the context in which many units now practise, I consider that this is a mild departure. Given the acuity of the patient I would not have thought that there was an imperative to transfer to midwifery care so early.*

Expeditious case review and reporting back to patient. — *Within the patient context I consider this a moderate to serious departure from acceptable care. The patient underwent major surgery after a catastrophic collapse and her baby died. There is an obligation to ensure that all followup is expeditious and may need to be repeated on as many occasions as necessary to meet the patient's needs.*

Better intrahospital communication and acceptance of intrahospital referrals. — *I consider that this is a moderate departure of acceptable standards for no good reasons. It clearly frustrated the obstetric staff and the patient alike and would not seem to have a patient focus.*

Professor Peter Stone
Professor Maternal Fetal Medicine
The University of Auckland"

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Appendix B: Independent advice to the Commissioner

The following expert advice was obtained from a general surgery consultant, Dr Julian Hayes:

"…

RE: HDC case 17HDC00453

I am Julian Hayes, Consultant Colorectal and General Surgeon at Auckland City Hospital. I am a qualified General Surgeon (FRACS 2001) and Colorectal Surgeon (member of the Colorectal Surgical Society of Australia and New Zealand), vocationally registered with the New Zealand Medical Council (No. 18333). I have been a consultant surgeon since my post-fellowship training in Australia in 2002–2003. I have been asked to comment and provide an opinion on a number of issues related to the care provided by the Waikato District Health Board to [Mrs C] in 2017.

Thank you for asking me to provide this advice on the case of [Mrs C]. I have been provided with clinical records from Waikato District Health Board for:

1) 15th of [Month6].
2) Relevant section of Waikato District Health Board's serious incident review report.
3) [Dr I's] statement dated [2017].

I note that I have been provided with limited information and not been provided with the details of the outcome, which I accepted as irrelevant in determining whether there was a departure from the accepted standard of care. I note that I do have the benefit of hindsight in my analysis.

I have reviewed the documentation provided and I have been asked whether I consider the care provided to [Mrs C] by the surgical team at Waikato District Health Board was reasonable in the circumstances and why. I would like to broaden this to the care provided to [Mrs C] by the surgical and radiology team at Waikato DHB, and I will explain why.

Background

[Mrs C] self-presented at [the] Women's Assessment Unit at 1:30am on 15 [Month6], at 28 weeks and 5 days pregnant. She was [in her late thirties], and had a significant surgical history, including:

- 2010: Laparotomy for salpingo-oophorectomy, frozen section, adhesiolysis, ureterolysis — for severe endometriosis.
- Subsequent right nephrectomy.
- 2011: Hysteroscopy, D&C, extensive laparoscopic adhesiolysis, bilateral ureterolysis, excision of pelvic sidewall endometriosis, dissection of rectovaginal

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

septum, excision of rectovaginal nodule of endometriosis, diathermy to diaphragmatic lesion of endometriosis.

[Mrs C] presented with abdominal pain and diarrhoea. Her observations were normal and a bedside ultrasound scan was unremarkable. Upon review, the impression of Consultant Obstetrician [Dr M] was of possible inflammatory/infective bowel condition, with no acute obstetric concern. Throughout the day, [Mrs C] complained of severe pain in her lower-right abdomen.

[Mrs C] was reviewed by General Surgical Registrar [Dr I] at 2pm (clinical notes written retrospectively). [Dr I] reviewed [Mrs C] and discussed the case with his Consultant, [Dr H]. The decision was made to observe. At 4:30pm [Dr I] was called to review [Mrs C] again. Following a discussion with [Dr H], he contacted the on call Radiologist to discuss further investigations. An ultrasound was decided on. The impression documented in the clinical notes is identified as unclear with renal, colic, internal hernia, or an obstetric cause all identified. The plan was for [Mrs C] to be nil by mouth, for an ultrasound, to have further pain relief, and for general surgery to be contacted once the ultrasound had been done. An ultrasound scan was performed at 1755hrs.

The first question is:

1) The care/treatment plan in place for [Mrs C], and whether her history of presentation and complaint ought to have prompted a different approach.

My comments are as follows:

As noted above, [Mrs C] had a significant previous surgical history in that she had had a number of complicated operations in particular for endometriosis, resulting in a subsequent right nephrectomy and adhesiolysis. It would be expected in this case firstly, that [Mrs C] does not have a right kidney (this is important as I will subsequently note); secondly, that adhesions are a possible source of pain related to bowel obstruction may be expected in terms of the differential diagnosis.

I note that [Mrs C] was admitted early in the morning at 1:30am on the 15th of [Month6] and was initially seen by the obstetric team and was worked up by them. I will go as far to comment that the bedside ultrasound done by the obstetric team on admission did not show any abnormalities that warranted concern as far as I can see. However, I would assume that this was largely focused on the fetus. Because of on-going significant pain the junior surgical registrar, [Dr I], was requested to review [Mrs C] and subsequently did this at 1400hrs on the 15th of [Month6] and discussed the case then with the on call consultant [Dr H]. The review note was written in retrospect at 1645hrs. I note that this is a feature of this case, in particular that a number of the reviews are written in retrospect. His assessment is well documented, however I have a particular concern with his assessment of the cause of the pain. This is because while she had had a right nephrectomy, one of the differential diagnoses suggested was of renal colic (versus an internal hernia versus an obstetric cause). Clearly, having had a right nephrectomy renal colic is very unlikely to be the cause of the pain.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Appropriately (in my view) because of two relatively unremarkable white blood cell counts and completely normal CRP tests over the course of the preceding day, appendicitis was thought to be unlikely. In any case [Dr I's] plan, after discussion with [Dr H], was to 'observe for the time being, and consider imaging if she deteriorated'. What appears to have happened is that because of on-going pain [Dr I] was called to review [Mrs C] again, which was done at 4:30pm, which is around the time that he documented the original review and discussed the case with [Dr H], who advised to discuss the case with the on call radiologist. As a result of that discussion around 4:30–4.45pm an ultrasound was decided on.

I do not have the results of the ultrasound for the reasons noted above. It appears to me that the severity and duration of the recurrent pain that [Mrs C] experienced warranted a more proactive approach than what was taken. I will address this in my comments on the subsequent questions.

The next question is:

2) Whether the diagnostic assessments were timely and appropriate.

[Mrs C] had a number of diagnostic tests done over the course of the admission. Initially on admission she had a bedside ultrasound scan by the obstetric consultant, she also had a fibronectin swab and blood tests taken. She had a complete blood screen done on admission noting a normal full blood count with a CRP of 4. She subsequently had the bloods repeated again at 1205hrs with a white count then of 12.3 and a CRP of 4.6. In terms of these investigations, they were timely and they are appropriate for the clinical scenario. The comment I would have though, was the degree of [Mrs C's] pain and severity of her pain should have provoked more urgency in terms of radiological investigation. Likewise, in the setting of an absent right kidney (therefore, ruling out the possibility of renal colic) and the low index or absence of suspicion of appendicitis I do not believe a further ultrasound of her abdomen was the most useful investigation in terms of investigating her on-going abdominal pain and would suggest that an urgent MRI should have been requested. This is why I have included in my comments the care provided by radiology in this discussion, as the decision to proceed with ultrasound appears to have been on the basis of the discussion between [Dr I] and the radiology consultant on call.

3) Whether surgical options should have been explored sooner, and more thoroughly, than they were.

To a large extent because I do not have access to the results of the ultrasound my advice on this question is somewhat limited. As a general rule, with pregnant patients, because of the risk of general anesthetic and abdominal surgery precipitating an early delivery, surgery is reserved to where it is absolutely indicated. This would depend on the results of the radiology and correlation with clinical progress in particular.

Specifically in this case, where there is a complicated surgical history, and therefore further surgical intervention is likely to be even more complicated and riskier than usual, I do not believe that surgical options should have been explored sooner.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

However, what I can advise for these first three questions above is that:

a) My opinion is that the standard of care is to have appropriate imaging, which in this case I suggest would be MRI.

b) That there has been a departure from the standard of care, which I think in this case is significant.

c) This is likely to be viewed with concern by my peers.

d) In terms of recommendations for improvement, I would suggest more straightforward access to MRI/appropriate imaging and to assessment by a more senior colleague.

4) Adequacy and timeliness of staff monitoring and review of [Mrs C].

My brief has specifically noted that I will not comment on the care provided by the obstetric team. I do note that [Mrs C] was reviewed on a regular basis by a combination of medical and nursing staff over the course of the day of the 15th of [Month6]. However, I am concerned by the timing of the review, or more specifically the documentation of the timing of the review at 1400hrs, and the progression to a definitive plan. While she was seen by [Dr I] at 1400hrs there was not a plan documented in terms of definitive investigations of her problem until he was called back to see her at 1630hrs. The documentation of that plan was made at 1645hrs. I would suggest that:

a) The standard of care in this situation would be discussion of the case with a senior colleague, either a senior surgical registrar or consultant at the time of the initial review and documentation of that discussion and an appropriate plan.

b) I think there has been a departure from the standard of care in this situation, which I think is significant in terms of the potential for a negative outcome in the situation of a patient in the third trimester of pregnancy with significant pain. The passing of even a few hours without having a documented plan in place which would lead to delays, can have significant negative outcome in this situation.

c) I think this would be viewed unfavorably by my peers.

d) A recommendation would be that while the review was timely the documentation and the adoption of a definitive plan was not, and this should be reinforced to the team at Waikato DHB.

5) Adequacy of senior medical input.

To a large extent this has been dealt with by my responses to the previous questions. It appears that [Dr I] did talk to [Dr H] at 1400hrs so I think the senior input was adequate in this situation apart from the fact that the patient was not reviewed in person by either a senior surgical registrar or the consultant on call.

a) The standard of care in this situation would be for the patient to be reviewed by a consultant or senior registrar at some stage early on in the admission.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

b) I do not have access to the notes after 1755hrs so I would not state that there has been a significant departure in the standard of care however in this situation.

6) Adequacy of [Mrs C's] pain management.

I have not been provided with all the documentation of [Mrs C's] admission but I do have the documentation available for the day of the 15th of [Month6]. What I do not have is a comprehensive record of the drugs that she was given. I would comment that significant pain with a patient that is in the third trimester with a complicated history such as this patient would, in my opinion, be a source of concern. While it may be that the pain was not adequately managed, I think probably one of the factors related to that is that a definitive surgical plan needed to be determined earlier, but this was dependent on access to appropriate imaging as noted above.

7) Are there any other matters in this case that I consider warrant commenting on.

As noted above I have pointed out that the care in this situation was provided not only by obstetrics, which is not my place to comment on, but also surgery and radiology. While I am not going to go into depth on this it is clear that [Dr I] did have a discussion with the on-call radiology consultant with respect to the usefulness of an ultrasound or MRI as an investigation and it was decided that an ultrasound would be the most appropriate investigation. Further to this, while CT is usually relatively contraindicated in pregnancy there may be occasional situations where this is appropriate. I can see no record of a discussion between the surgical and obstetric teams and radiology with respect to this.

I suspect that some of the information discussed may have well been inaccurate. For example, the concern about renal colic when in fact the patient did not have a right kidney and she had right sided abdominal pain. However, this should have come out in the discussion. I am concerned in particular that an urgent MRI was not recommended or requested earlier as I think this may have been more definitive in terms of determining the need for urgent surgical intervention. While to some extent this has been addressed in my answers to previous questions I think that:

a) Access to urgent MRI (or CT/USS if appropriate) when required in a clinical scenario of severe abdominal pain in a pregnant patient is the standard of care in a tertiary hospital.

b) That there has been a significant departure from the standard of care.

c) I do not believe this would be perceived favourably by my peers.

d) That the solution to this would be a system that does provide relatively straightforward access to appropriate urgent radiology in this clinical scenario.

Yours sincerely,

Julian Hayes MBChB, FRACS
Colorectal and General Surgeon
Head of Colorectal Unit, Department of Surgery Auckland City Hospital"

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

The following further expert advice was obtained from Dr Hayes:

"I am Julian Hayes, Consultant Colorectal and General Surgeon at Auckland City Hospital. I am a qualified General Surgeon (FRACS 2001) and Colorectal Surgeon (member of the Colorectal Surgical Society of Australia and New Zealand), vocationally registered with the New Zealand Medical Council (No. 18333). I have been a consultant surgeon since my post-fellowship training in Australia in 2002–2003.

I have been asked to review the responses to my initial expert advice report for this case and advise whether these responses change my view on the care provided to [Mrs C] in 2017. I have read the reports supplied by [Dr H] and by [Dr J].

These responses do not significantly change my view on the care provided.

Firstly, [Dr H] disagrees with my opinion in terms of not proceeding with an MRI and points out issues such as the pre- and post-test probability of an ultrasound giving the diagnosis. I appreciate and to some extent agree with [Dr H's] argument. However, I would have to say that my suspicion of the likely diagnosis was of small bowel ischaemia secondary to an internal hernia, which was on the differential diagnosis list at the initial review by [Dr I]. This would have not been diagnosed by an ultrasound scan and would have much more likely been diagnosed by an MRI. The diagnosis that I understand was obtained was a more uncommon problem. Please note that my brief did not include any information about the diagnosis, and that I was instructed to limit my report to the care provided by the surgical team and Waikato DHB up to the time that the diagnosis was made. I hold by my view that an MRI is the most appropriate test in this situation.

Secondly, [Dr J] points out that in terms of the algorithm for investigation of abdominal pain in an obstetric patient the options include ultrasound, CT scan, and MRI. However, avoiding radiation via x-ray or CT is preferred. I appreciate [Dr J's] point that internationally it is agreed that ultrasound is the first modality of choice whereas MRI may be the primary modality of choice depending on the clinical diagnostic suspicion. Both [Dr H] and [Dr J] point out that it was possible to proceed directly from ultrasound to MRI if the ultrasound had not been diagnostic. I appreciate the facility for this approach within the public hospital, which I think therefore provides a very good service. As a general rule my experience in the hospitals I work in now, and in the past, have not been able to provide this level of service. However, given this approach, if an ultrasound had been requested at the initial review at 2.30pm instead of after 4pm, I suspect that my responses would have been different.

I believe that I need to clarify my comments on the 'adequacy of senior medical input' in this case as I have noticed a mistake in my statement 5 (a); 'The standard of care in this situation would be for the patient to be reviewed by a consultant at some stage early on in the admission'. What I meant to say was 'reviewed by a consultant or senior registrar …'. I apologise for this error.

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

While [Dr H] disagrees with this statement, I would say that to a large extent this cannot be separated from my comments on the 'adequacy and timeliness of staff monitoring and review of [Mrs C]'.

In terms of my comments on the adequacy and timeliness of staff monitoring and review of [Mrs C], what I said was:

'The standard of care in this situation would be discussion of the case with a senior colleague, either a senior surgical registrar or consultant at the time of the initial review and documentation of that discussion and an appropriate plan'.

I note from [Dr H's] response after the first review and discussion between himself and [Dr I], that an ultrasound was requested by [Dr I] and 'received by Radiology at 4.07pm'.

As there is no documentation of this plan from the initial review and discussion, although the note was written in retrospect, it is impossible to know what was decided at the initial review. It is the lack of documentation of this plan that concerns me, in that if an ultrasound was decided on as the next step, I do not understand why was the ultrasound request not received until 4.07pm.

In summary, the reasons I hold by my view are as follows:

1. [Mrs C] presented in the second trimester of her pregnancy with a complicated surgical history of significant complications after surgery for endometriosis.
2. She was seen twelve hours after her admission with abdominal pain and was then requiring significant doses of opioid medications for pain.
3. In this particular context, as a surgeon my very strong preference would be to come to a probable diagnosis as soon as possible, and so to be able to decide whether or not this patient required surgery.
4. In my opinion MRI was most likely to provide (or rule out) this diagnosis, particularly given that in my mind, small bowel ischaemia as a result of an internal small bowel hernia (because of her previous complicated surgery) was the most likely diagnosis for the reasons noted in my previous report.

Yours sincerely,

Julian Hayes MBChB, FRACS
Colorectal and General Surgeon
Head of Colorectal Unit, Department of Surgery
Auckland City Hospital"

Names have been removed (except Waikato DHB and the experts who advised on this case) to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.