Surgical Registrar, Dr A

Northland District Health Board

A Report by the

Health and Disability Commissioner

(Case 15HDC01053)

Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

Table of contents

Executive summary

First admission to the public hospital

1. In 2014, Mr B, aged 73 years at the time of these events, was admitted to the surgical ward at a public hospital with a four-week history of diarrhoea and abdominal pain. During Mr B's admission, his temperature varied from low to high (between 35.5°C and 37.9°C), and blood tests included a raised C-reactive protein, borderline elevated white cell count, and elevated neutrophils. Prior to discharge on Day 2[1], Mr B had a blood pressure reading of 109/69mmHg, which was low for him. Mr B was discharged, as surgical staff thought that his symptoms were caused by the colchicine he had been taking for his gout, and a plan was put in place for an urgent outpatient colonoscopy, to ensure that there was no significant bowel pathology.

Second admission to the public hospital — Day 8

2. On Day 8, Mr B was accepted by surgical registrar Dr A for review in the Emergency Department (ED). Unfortunately, owing to the unexpected busyness of the ED at the time, there was a delay of 35 minutes between Mr B's arrival at the ED and his triage.

3. A blood sample was collected by RN E at 11.20am. She requested several routine blood tests, as well as a Troponin T test (an indicator for a heart attack). No electrocardiogram (ECG) was carried out at that time by RN E. It was acknowledged by both RN E and Northland District Health Board (NDHB) that an ECG should have been carried out.

4. At NDHB, while it was usual practice for nurses to initiate blood tests in ED, nurses were not expected to inform medical staff specifically, and were not responsible for viewing or acting on the results (with medical staff responsible for this).

5. The Troponin T test result of 990ng/L (abnormal, indicating heart damage) was reported at 12.13pm. Dr A was not aware that RN E had requested a Troponin T test.

6. Following his initial review of Mr B at 10.50am, Dr A discussed the case with medical registrar Dr D, who agreed with Dr A's plan. Dr D agreed to review Mr B as soon as he was able to, but Dr D was very busy in the ED. Dr D said that he had requested assistance with the workload from the back-up registrars, but the on-call medical consultant was busy in a cardiology clinic.

7. At 2.35pm, Dr A viewed Mr B's blood test results, which indicated sepsis and heart damage, and spoke to Dr D again. Dr A stated that Dr D advised that he would review Mr B soon, although he was still very busy in the ED, and possibly admit him to the Coronary Care Unit.

8. NDHB told HDC that there was a higher than usual number of presentations to the ED on Day 8. It stated that Dr D was responsible for six patients, in addition to Mr B. There was only one medical registrar allocated to the ED, medical wards, and surgical referrals during this time.

[1] Relevant dates are referred to as Days 1-8 to protect privacy.

9. Mr B was transferred to the surgical ward shortly before 3pm, without blood cultures having been taken, a catheter inserted, a catheter specimen of urine taken, a fluid balance chart commenced, stool cultures taken, or an ECG undertaken.

10. Dr D told HDC that, on hearing the Troponin T result, he immediately went to find Mr B, only to learn that he had been transferred to the surgical ward. Dr D then went to the surgical ward and began reviewing Mr B shortly before 3.30pm (approximately four and a half hours after medical review was requested). Dr D's impression was NSTEMI (a type of heart attack) secondary to abdominal sepsis, and he put in place a detailed management plan.

11. Dr A prescribed Mr B antibiotics at approximately 3pm. Between 3pm and 4.25pm, Mr B underwent an ECG, chest X-ray, and medical review. Sadly, Mr B's condition deteriorated and he died at 5.17pm.

Findings

12. The Commissioner acknowledged that on Day 8, the ED was busier than usual, which resulted in delays in triage, medical review, and implementation of aspects of Dr A's management plan. However, the Commissioner was concerned that:

- On Days 1-2, no medical or cardiologist input was sought, a source of infection was not considered, and no abdominal CT scan was carried out.

- On Day 8:

    - NDHB had two policies with differing criteria for escalation of test results to clinical staff by telephone and, in practice, neither of these were followed when dealing with Troponin T results. The result of this was that Mr B's high Troponin T result was not escalated to Dr A in a timely manner by telephone.
    - The on-call consultant physician was not readily available for assisting when delays were experienced in medical review.
    - NDHB's practice regarding ward transfers did not reflect its policy and, as a result, Mr B was transferred to a lower acuity ward without discussion with Dr A, and required interventions having been undertaken, in order to meet a target.

13. The Commissioner found that the combination of these failings meant that NDHB failed to provide services with reasonable care and skill to Mr B, and breached Right 4(1) of the Code.

14. Dr A did not breach the code.

Recommendations

15. The Commissioner recommended that NDHB conduct an audit of the effectiveness of its new triage process; review and revise a number of its policies and procedures; develop a clear policy as to who has responsibility for following up test results ordered by ED registered nurses; consider implementing a system that requires the laboratory to alert the patient's treating clinician urgently when Troponin T results are

abnormally high; develop a care escalation plan for the General Medicine team; review the role of on-call consultants to ensure that adequate supervision of junior doctors is occurring; remind all ED staff that the transfer and location to which the patient is transferred must be clinically appropriate; conduct training on the "Adult Sepsis Pathway"; and apologise to Mr B's family.

Complaint and investigation

16. The Commissioner received a complaint from Mr C about the care provided to his late brother, Mr B, by Northland District Health Board. The following issues were identified for investigation:

- *Whether Northland District Health Board provided Mr B with care of an appropriate standard in 2014.*
- *Whether Dr A provided Mr B with care of an appropriate standard in 2014.*

17. The parties directly involved in the investigation were:

Dr A	Surgical registrar
Mr C	Complainant
Northland District Health Board	Provider

18. Information was also reviewed from:

Dr D	Medical registrar
RN E	Emergency Department nurse

Also mentioned in this report:

Dr F	General surgeon

19. Independent expert advice was obtained from general surgeon Dr Julian Speight (**Appendix A**).

20. Independent expert advice was obtained from general physician Dr Richard Shepherd (**Appendix B**).

21. In-house clinical advice was obtained from registered nurse Dawn Carey (**Appendix C**).

Information gathered during investigation

Background

22. Mr B, aged 73 years at the time of these events, had a complex medical history including hypertension,[2] atrial fibrillation,[3] moderate to severe aortic stenosis,[4] mild coronary artery disease,[5] hyperlipidaemia,[6] gastro-oesophageal reflux disease,[7] and gout.[8] He took a number of regular medications including digoxin,[9] atorvastatin,[10] omeprazole,[11] Pradaxa,[12] Betaloc,[13] Cardizem,[14] and Accupril.[15] Mr B underwent cardioversion[16] in 2013 and, at the time of these events, was awaiting cardiothoracic surgery to repair his aortic valve.

23. This report addresses the care provided to Mr B at the public hospital in 2014.

First admission to the public hospital — Days 1-2

24. On Day 1, a general practitioner (GP) at a medical centre referred Mr B to the public hospital. The referral stated that Mr B had been unwell for approximately four weeks, after he was prescribed colchicine[17] for an attack of gout. The referral noted that colchicine was stopped two to three weeks earlier and that Mr B now had soft bowel motions. The referral also stated that Mr B had a tender right lower abdomen, nausea, and raised inflammatory markers, and had recently been treated for dehydration and had recently lost six kilograms. Appendicitis was queried.

25. Mr B was seen in the Emergency Department (ED) at the public hospital by a registered nurse (RN) on arrival. His observations were taken and included a

[2] Hypertension is high blood pressure.
[3] Atrial fibrillation is a common type of arrhythmia (irregular heartbeat) that results in rapid and irregular heart and pulse rates.
[4] Aortic stenosis is the narrowing of the opening of the aortic valve in the heart, restricting blood flow through the valve.
[5] Coronary artery disease is a type of heart disease in which plaque builds up inside the coronary arteries, causing the arteries to harden and narrow.
[6] Hyperlipidaemia is raised cholesterol or triglycerides (a type of fat found in blood).
[7] Gastro-oesophageal reflux disease is a digestive condition in which stomach acid or stomach contents flow back from the stomach into the oesophagus.
[8] Gout is a disease in which defective metabolism of uric acid causes an excess of the acid and its salts to accumulate in the bloodstream and the joints.
[9] Digoxin is a medication used to slow the heart rate in patients with atrial fibrillation.
[10] Atorvastatin is a cholesterol-lowering medication.
[11] Omeprazole is a medication used to treat symptoms of gastro-esophageal reflux disease.
[12] Pradaxa is an anticoagulant medication. Also known as dabigatran.
[13] Betaloc is a beta-blocker medication used to treat hypertension. Also known as metoprolol.
[14] Cardizem is a calcium channel blocker medication used to treat hypertension. Also known as diltiazem.
[15] Accupril is an angiotension converting enzyme (ACE) inhibitor used to treat hypertension. Also known as quilapril.
[16] Cardioversion is a method of restoring the normal rhythm of the heart by a controlled direct-current shock being given through electrodes placed on the chest wall of an anaesthetised patient.
[17] Colchicine is a medication that relieves pain in attacks of gout.

temperature of 37.3°C[18] (slightly high) and blood pressure (BP) of 120/80mmHg (normal).[19]

26. A surgical registrar reviewed Mr B in the ED. The surgical registrar noted that, previously, Mr B's diarrhoea had always resolved after he stopped taking colchicine. Her impression was "? colitis".[20] The surgical registrar's plan was for Mr B to be admitted to the surgical ward, to remain nil by mouth,[21] to receive intravenous (IV) fluids, to receive analgesia, to undergo routine blood tests, to have X-rays, and to have a flexisigmoidoscopy.[22] She also noted that, if the flexisigmoidoscopy was normal, Mr B might need to have a computed tomography (CT) scan.[23]

27. Blood tests, an electrocardiogram (ECG),[24] and X-rays were carried out in the ED. The blood test results included a raised C-reactive protein (CRP),[25] a borderline elevated white cell count (WCC)[26] and elevated neutrophils.[27] The ECG showed atrial fibrillation, and the X-rays were unremarkable.

28. Mr B was transferred to the surgical ward, where his observations were taken every four hours. His BP readings were approximately 143/85mmHg, 128/71mmHg, 148/75mmHg, 139/82mmHg, 120/66mmHg and 109/69mmHg (low for Mr B, given his hypertension). Mr B's temperature readings were around 36.8°C, 37.3°C, 37.6°C, 37.9°C, 36.5°C and 35.5°C. He was given IV fluid.

29. At the morning ward round on Day 2, a consultant general surgeon reviewed Mr B. His plan was for Mr B to be discharged with a prescription for loperamide,[28] and for him to have an urgent outpatient colonoscopy,[29] rather than a flexisigmoidoscopy. The record of the ward round states, in its entirety: "[History] noted. Plan: ok today. Urgent [outpatient] colonoscopy. Loperamide [as needed]." Nursing staff informed the general surgeon that Mr B's BP was 109/69mmHg. The general surgeon instructed them to withhold Mr B's Cardizem. Mr B's discharge summary listed his diagnosis as: "Diarrhoea and abdominal pain under investigation." It also stated that, if he had any concerns before his colonoscopy appointment, he should see his GP or attend the ED, who could contact the surgical team if necessary.

30. NDHB told HDC that diarrhoea and abdominal pain are expected side effects of colchicine, and that the surgical team came to the conclusion that colchicine was the

[18] Normal body temperature is 37°C.
[19] Normal blood pressure is between 90–120/60–80mmHg.
[20] Colitis is inflammation of the lining of the colon.
[21] Nil by mouth is a medical instruction meaning to withhold food and fluids, usually prior to surgery.
[22] A flexisigmoidoscopy is a procedure that allows examination of the rectum and lower colon through a sigmoidoscope inserted into the anus.
[23] A computed tomography scan is an imaging procedure that uses special X-ray equipment to create images of cross-sections of the body.
[24] An electrocardiogram is a recording of the electrical activity of the heart on a moving paper strip.
[25] C-reactive protein is used to detect inflammation. Inflammation can indicate an infection.
[26] White cell count is used to detect infection.
[27] Neutrophils are used to detect infection and inflammation.
[28] Loperamide is a medication used to decrease the frequency of diarrhoea.
[29] A colonoscopy is a procedure for examining the interior of the entire colon and rectum using a colonoscope introduced through the anus.

cause of Mr B's symptoms, but arranged for him to have an outpatient colonoscopy to ensure that they were not missing more significant bowel pathology.

Second admission to the public hospital — Day 8

Referral

31. On Day 8, another GP at the medical centre telephoned surgical registrar Dr A,[30] as Mr B had been unwell since his discharge the previous week. Dr A told HDC that he felt that Mr B should be admitted into the care of the medical team, since his symptoms were not specific and there were no major symptoms indicating a surgical problem, but he agreed to accept him for ED assessment, as he had been under the care of the surgical team very recently.

32. The GP therefore told Mr B to present to the ED, and gave him a referral letter to take with him. The letter stated that Mr B had ongoing loose motions and generally felt washed out and weak. The referral noted that Mr B's temperature was 37.2°C (slightly high), his BP was 140/80mmHg (high systolic pressure), his abdomen was soft and non-tender, and he had reduced skin turgor.[31]

Delay in triage

33. Mr B arrived at the ED at 9.58am and was triaged by an RN at 10.33am, a delay of 35 minutes. NDHB acknowledged that the delay before Mr B was triaged was longer than ideal, but stated that there was a higher than usual number of presentations to the ED on Day 8. NDHB told HDC that the number of presentations to the ED that day was 112, with the average number at that time being 97. It also stated that there was a peak in presentations at 10.30am, when the peak typically occurs after 12pm.

34. NDHB told HDC that it has been unable to determine whether additional staff were asked to assist in the ED. However, it stated that a "Code Orange" was called at 10.30am in response to the high number of patients in the ED and the additional patients expected to arrive. NDHB advised that a number of high level actions were recorded as occurring once the Code Orange was called, including review of all patients with the ED Clinical Nurse Manager.

35. NDHB noted that triage within five minutes of arrival is a standard that would not often be met in New Zealand emergency departments. It told HDC that it is understandable that Mr B was not triaged more urgently, given that many other patients were waiting to be seen, he had been able to walk into the ED, and his GP had not thought it necessary to call an ambulance.

Triage score

36. Mr B was given a triage score of three[32] by the RN. After triage, RN E[33] took Mr B's observations, which included a BP of 87/46mmHg, temperature of 37.2°C, respiratory

[30] Dr A has been registered as a doctor in New Zealand with a general scope of practice since 2008. He has been a surgical registrar in New Zealand since 2005.
[31] Skin turgor is the degree of elasticity of the skin. It is used to assess dehydration.
[32] New Zealand EDs use the Australasian triage scale. A triage score of three means potentially life-threatening, potential adverse outcomes from delay greater than 30 minutes, or severe discomfort or

rate of 22 breaths per minute (high),[34] and a heart rate of 94 beats per minute (bpm).[35] She took him from the ED waiting area into a cubicle, which had full monitoring equipment, piped oxygen, and suction available. NDHB told HDC that RN E was aware that Dr A would be seeing Mr B immediately, so she did not change the triage score in response to Mr B's low BP.

37. Dr A stated that consideration should have been given by nursing staff to giving Mr B a triage score of two.[36] Dr A does not consider that this had an impact on Mr B's immediate care, but stated that subsequently it may have impacted on the priority given to his review by the medical team, up until blood test results were known.

38. NDHB told HDC that the triage score of three was appropriate, and that, in the circumstances, it would have made no difference for RN E to have changed the score after taking Mr B's observations.

Dr A's initial review and management plan

39. Dr A reviewed Mr B at 10.50am, noting his existing medical conditions and recent admission, and recording that he had been lethargic, dry, sleepy and sweaty since discharge, with a reduced appetite, a low-grade temperature, and a lack of bowel motions.

40. Dr A noted that Mr B did not have any gastrointestinal, urinary, respiratory, or cardiovascular symptoms. Dr A told HDC that this appeared to rule out any elements of cardiogenic shock.[37]

41. Dr A examined Mr B and documented that he looked well, with dry skin and mouth, and was not pale or jaundiced. Dr A recorded that Mr B's upper abdomen was mildly tender with fullness, but the rest of his abdomen was soft. Dr A told HDC that Mr B had a significantly reduced oral intake, was very dehydrated, and had no evidence of peritonism.[38] As his impression, he recorded: "Dehydration [and] non [specific] symptoms. To [rule out] intra-abdominal sepsis[39]/lymphoma.[40]" Dr A told HDC that, in light of Mr B's recent history of lower abdominal pain, diarrhoea and high CRP, his provisional diagnosis was intra-abdominal sepsis of unknown cause/lymphoma.

42. Dr A stated that, at this stage, he asked RN E to start fluid resuscitation for both sepsis and dehydration. He said that this involved instituting appropriate fluid balance

distress. The patient is to be seen by a doctor within 30 minutes. It is expected that, for this category of patients, 70% will be seen within that time.

[33] RN E has been a registered nurse since 2004.

[34] A normal respiratory rate is between 12 and 20.

[35] A normal heart rate is between 60 and 100bpm.

[36] A triage score of two means imminently life-threatening or important time-critical. The patient is to be seen by a doctor within 10 minutes.

[37] Cardiogenic shock is a condition in which the heart cannot supply enough blood to meet the body's needs.

[38] Peritonism is a condition marked by the symptoms of peritonitis (abdominal pain, tenderness, and guarding exacerbated by moving the peritoneum) without inflammation of the peritoneum.

[39] Sepsis is a potentially life-threatening condition that occurs when the body's response to infection injures its own tissues and organs.

[40] Lymphoma is a malignant tumour of the lymph nodes.

monitoring with input/output balance by insertion of a urine catheter, monitoring his fluid status hourly, and taking urine, stool, and blood samples for cultures.

43. Dr A's documented management plan was:

> "1. Fluid resuscitation.
> 2. Bloods [and] blood [cultures].
> 3. [In-dwelling catheter] [and] [catheter specimen of urine].
> 4. Input/output chart.
> 5. CT [abdomen].
> 6. Medical review.
> 7. Stool [cultures]."

44. The day after Mr B's death, Dr A documented that he did not request a Troponin T blood test[41] because Mr B did not have any cardiovascular symptoms. Dr A also recorded that he did not request a chest X-ray because Mr B was asymptomatic from a cardiovascular/respiratory point of view, and had had one the previous week, which was normal.

45. Following his initial review, Dr A telephoned on-call consultant general surgeon Dr F[42] to discuss Mr B's case. Dr A stated that he contacted Dr F because he was worried about Mr B. Dr F agreed with Dr A's management plan. Dr F told HDC that, in view of the lack of gross abdominal signs and the known cardiac history, it was appropriate that a medical review be sought early as to possible sites of sepsis other than intra-abdominal. He stated that Dr A discussed other systemic and haematological[43] indicators of possible sepsis with him over the telephone. It was agreed that a CT scan to assess for the possibility of intra-abdominal sepsis was appropriate, despite a relatively benign feeling abdomen, given Mr B's recent admission and planned bowel investigations.

46. Dr A also spoke to the duty radiologist, who agreed to do a CT scan after fluid resuscitation and when the blood test results were back, since Mr B was very dehydrated and there was a need to minimise the risk of renal injuries related to the IV contrast.[44]

47. Dr A then discussed Mr B's case with medical registrar Dr D,[45] who also agreed with the plan. Dr A told HDC that Dr D agreed to review Mr B as soon as he was able to, but that Dr D was very busy in the ED.

[41] Troponin T is a highly specific marker for myocardial infarction (heart attack) or heart muscle cell death.
[42] Dr F has been vocationally registered in general surgery in New Zealand since 2003.
[43] Blood related.
[44] IV contrast is a material (usually iodine-based) that is injected into a vein to improve the visibility of internal bodily structures in X-ray based imaging techniques.
[45] Dr D has been registered as a doctor with a general scope of practice since 2010. He had been a medical registrar for over three years at the time of these events.

48. Dr A stated that, given Mr B's known cardiac history, early involvement from the medical team was appropriately requested, deferring to their expertise on the possible medical causes of sepsis and the need for Intensive Care Unit (ICU)/Coronary Care Unit (CCU) review. Dr A noted that there were no beds available in the CCU or ICU at the time of Mr B's admission. NDHB told HDC that, with the benefit of hindsight, it would have been desirable for the ICU team to have been consulted when Mr B was first admitted.

49. Dr A told HDC that Mr B did not meet the criteria for antibiotics at this time, since he was afebrile, there was no obvious cause for his symptoms, and there was no documented source of infection. Dr A said that Mr B's symptoms could have been from a number of conditions for which antibiotics would not be regarded as first-line management.

50. NDHB stated that Mr B should have received IV antibiotics much more quickly, but that Dr A was justified in considering that the medical team would review Mr B promptly and make this decision.

Troponin T test request

51. A blood sample was collected by RN E at 11.20am. She requested several routine blood tests, as well as a Troponin T test. No ECG was carried out at that time. Additional blood tests were then requested on the same sample, as per Dr A's orders.

52. RN E told HDC that she ordered a Troponin T test to screen for other possibilities. She said:

> "An ECG was regrettably not completed and I can honestly say I was not focussed towards a complete cardiac work up, given his previous surgical admission with repeat referral to the surgical team and his presenting symptoms suggesting a gastric condition."

53. RN E also stated:

> "It is usual practice for nurses to initiate blood pathology tests in ED … Nurses are not expected to inform medical staff of Troponin T requests … Results of the Troponin T test would be apparent along with the other blood tests taken … Further follow up and notification of blood tests may come from the laboratory staff … There is also a short check list on the ED admission record for blood tests initiated by nurses and doctors, however, this is not commonly utilised by staff."

54. NDHB told HDC that it was reasonable for RN E to request a Troponin T test, given Mr B's cardiac history, symptoms, and low blood pressure (for which cardiac ischaemia[46] is a possible cause). However, it acknowledged that it is expected that an ECG is completed for a patient with any cardiac concerns, particularly when a Troponin T test is requested.

[46] Cardiac ischaemia is an inadequate flow of blood to the heart, caused by constriction or blockage of the blood vessels supplying it.

55. NDHB told HDC that, although blood tests for patients in the ED are requested by registered nurses, the nurses are not responsible for viewing or acting on the results. It stated that it is expected that nurse-initiated investigations be documented in the ED clinical records, but nurses are not expected to specifically inform a doctor. NDHB stated that the process in place at the time was for the nurse to indicate which investigations had been requested by ticking the appropriate boxes in the ED clinical records under "Nurse Initiated Investigations". This was not done on Mr B's clinical records. However, NDHB said that, in 2014, this process was not always followed, with some nurses choosing to use the progress notes to document nurse-initiated investigations.

56. RN E did not document in the progress notes that she had requested a Troponin T test.

Plan to transfer to surgical ward

57. At 11.40am, RN E recorded that the plan was to admit Mr B to the surgical ward. Mr B's BP was taken via an automated BP device at 11.58am, and was 91/45mmHg.

Dr A's second review

58. Dr A reviewed Mr B again in the ED when Mr B was halfway through his first bag of IV fluids. Dr A checked Mr B's BP and noted that Mr B was still sleepy. Dr A stated that Mr B was responding to IV fluid treatment, which indicated that his hypotension was mainly due to hypovolaemia.[47] Dr A noted that Mr B had had diarrhoea and had been off food and fluids for some time. Dr A told HDC that he instigated early and appropriate treatment that led to Mr B feeling significantly better than at first presentation. Dr A also stated that Mr B's vital signs were stable enough to be managed in the ED with close monitoring.

59. Regarding the need for ICU review, NDHB stated that Dr A would have been reassured by the prompt improvement in Mr B's condition when given fluid, and the fact that he had referred Mr B to the medical team.

Troponin T test result

60. The Troponin T test result of 990ng/L (abnormal, indicating damage to the heart) was reported at 12.13pm. The result was processed by a medical laboratory scientist and automatically released by the results system. NDHB told HDC that all test results that are expected are automatically released by its software, with unexpected results requiring manual release. NDHB explained that 40–45% of Troponin tests requested by the ED are abnormal, so an abnormal Troponin result is not unexpected.

61. The medical laboratory scientist telephoned Dr A to discuss another abnormal result, which, in contrast to Troponin T results, was not automatically released by the system. The Troponin T result was not discussed.

62. NDHB stated that the criterion for telephoning out a test result is that the result indicates a critical situation requiring urgent intervention. It stated that this is not the case for Troponin T, as acute management of acute coronary syndrome is based on

[47] Hypovolaemia is a decrease in the volume of circulating blood.

history, examination, and ECG findings, not on blood troponin concentration. It stated that telephoning out abnormal Troponin T results would cause a delay in their release, due to the time taken to make the telephone call and the availability of laboratory staff.

63. Dr A was not aware that RN E had requested a Troponin T test. He told HDC that therefore he was not looking out for the result or chasing it up. Dr A recorded, the day after Mr B's death: "I wish … I [had] heard from the lab about the [Troponin] T results [as] soon [as] they [got] them so we could have [intervened] earlier." Dr A told HDC that it was disappointing that the laboratory did not inform him of the Troponin T result.

Decision to transfer to surgical ward

64. Mr B's BP was taken via an automated BP device at 12.20pm, and was 95/47mmHg. At 12.30pm, RN E took Mr B's BP, which was 95/48mmHg,[48] and noted that he was feeling a little better. Mr B's BP was taken again via an automated BP device at 12.48, 12.50 and 12.54pm, and was 64/23mmHg (low), 76/32mmHg (low) and 72/30mmHg (low) respectively.

65. At 1.20pm, RN E recorded that Mr B was to be transferred to a room closer to the front desk. She took his BP again, which was 91/46mmHg.

66. At 1.53pm, RN E completed an ED to Ward Bed Request form for Mr B. She noted that the plan was for IV fluids, full blood count, in-dwelling catheter, abdominal CT scan, medical review, and stool specimens. RN E recorded that Mr B's early warning score (EWS) was one.[49]

67. RN E told HDC that nursing staff always complete the section of the bed request form that specifies which initial assessments have been completed, and the EWS. She stated that it is only when the admitting doctor provides the provisional diagnosis that the ED Nurse Coordinator will act on the request for a bed, through the Bed Manager.

68. RN E stated that the decision to admit Mr B to the surgical ward was based on his GP referral to the surgical team, his presenting complaint of diarrhoea and abdominal pain, and his recent admission to the surgical ward (a week earlier).

69. Dr A told HDC that the decision to transfer Mr B to the surgical ward was not discussed with him (Dr A). Dr A stated that Mr B was moved from ED to a surgical ward before the severity of his condition was known, in keeping with usual ED practice.

70. NDHB told HDC that the decision to admit Mr B to the surgical ward was documented by RN E, and no change to this plan was noted. It stated that it is not

[48] Mr B's blood pressure at 12.30pm was recorded in the progress notes as 95/48, but on the observation chart as 95/47.

[49] The early warning score system predicts the deterioration of patients based on their observations. NDHB's system does not require any action to be taken for a score of one, which is at the bottom of the scale.

unusual for the surgical team to fail to complete the bed request form, leaving it for ED nursing staff to do.

71. Mr B's BP was taken again at 2.30pm in the ED, and was 106/58mmHg (slightly low diastolic pressure).

Dr A's review of blood test results

72. At 2.35pm, Dr A reviewed the blood test results, which included the following elevated results: Troponin T of 990ng/L, WCC of 25.4, neutrophils of 22.5, and CRP of 287mg/L. The haemoglobin[50] results were near normal, renal function was normal, and the liver function tests were slightly abnormal. Dr A told HDC that he informed Dr D that the blood test results indicated sepsis and myocardial infarction, and Dr D advised that he would review Mr B soon (although he was very busy in the ED) and possibly admit him to the CCU.

73. Dr A told HDC that he then updated Dr F regarding the blood test results and the consequent change in emphasis, but the overall plan remained unchanged to continue with the abdominal CT scan pending medical review. Dr A then went to the radiology department and learnt that the CT scan was booked for the following day, as it had not been requested urgently earlier in the day. He rebooked it for 5.30pm that evening.

Transfer to surgical ward

74. Mr B was transferred from the ED to the surgical ward shortly before 3pm, without blood cultures having been taken, a catheter inserted, a catheter specimen of urine taken, a fluid balance chart commenced, or stool cultures taken, as per Dr A's management plan.

75. RN E stated:

> "[T]he plan of care was not available until the later stages of [Mr B's] admission which is not unusual when admitting teams are awaiting final investigative results to determine treatment plans. Commencement of a Fluid Balance Chart recording [Mr B's] input and output, would have been ideal practice regardless of the final care plan. This was not completed by myself. It is also not unusual for Care plans that are not fully completed in ED, to be handed over (on the bed Request/handover form) to the receiving ward. Care plans are acted upon urgently if necessary as determined by a patient's medical condition and also if any prioritised treatments for optimising health outcomes are specified by the admitting [doctor]/team."

76. RN E also told HDC that it was an exceptionally busy and stressed environment that day. She stated that her priority with Mr B was to move him closer to the front desk for visual observation, owing to his low BP. RN E said that, "in the turmoil of a stressed ward, completing tasks, procedures and paperwork becomes a juggle whilst prioritising patient care".

[50] Haemoglobin is used to detect anaemia or low oxygen levels in the blood.

77. NDHB told HDC that blood cultures and in-dwelling catheter insertion should have occurred in ED prior to transfer to the surgical ward.

Dr A's third review

78. Dr A reviewed Mr B again at 3pm, just after Mr B had arrived on the surgical ward. Dr A documented:

> "More awake and feeling much better. … BP 106/58 [slightly low diastolic pressure]. Admitted having chest tightness and [shortness of breath] all day today. [Abdomen] soft, lax, non tender. [Discussed with] the medical [registrar] again ([Troponin T] = 990) → will review very soon. … [Diagnosis] sepsis ?cause and [Non-ST-elevation myocardial infarction (NSTEMI)[51]]. Plan — ECG, blood [cultures] → IV [antibiotics], [chest X-ray], await CT, consider transfer to CCU."

79. Dr A told HDC that Mr B was looking much better at this time, was sitting upright, had moist skin and tongue, and was alert. Dr A stated that Mr B denied any chest pain, palpitations or other cardiovascular symptoms, and had no abdominal pain. Dr A prescribed gentamicin,[52] cefuroxime,[53] and metronidazole to treat Mr B's sepsis.[54]

80. Dr A informed nursing staff on the surgical ward, during their handover at 3.10pm, of Mr B's Troponin T result and diagnosis, and his management plan. A registered nurse from the afternoon shift attended Mr B following handover. A registered nurse from the morning shift carried out an ECG.

81. Dr A told HDC:

> "The decision on whether [Mr B] should be transferred to ICU/CCU after the discovery of his high Troponin result was a decision that I believed should be made following review by the medical team (noting that at this time [Mr B's] vital signs were stable and improved)."

Medical review

82. At 3.19pm, Dr D viewed Mr B's blood test results, including the Troponin T result. Observations were taken at 3.20pm, including BP of 119/67mmHg (normal). It was documented by nursing staff that oxygen was started via a nasal prong.

83. Dr D arrived on the surgical ward shortly before 3.30pm (approximately four and a half hours after medical review was requested) and began reviewing Mr B, but his review was interrupted by Mr B's chest X-ray at 3.30pm. Dr D stated that Mr B being transferred to the ward contributed to the delay in him being seen, as Dr D had to leave the ED and go to the surgical ward to review him.

84. At 3.50pm, Dr A spoke to Dr F again and updated him with Mr B's progress. Dr F agreed with Dr A's plan.

[51] Non-ST-elevation myocardial infarction is a type of heart attack where an artery is partially, rather than completely, blocked.
[52] Gentamicin is an antibiotic.
[53] Cefuroxime is an antibiotic.
[54] Metronidazole is an antibiotic.

85. Mr B returned from the X-ray at 4pm. His BP was taken again and was 120/67mmHg (normal). Dr D completed his review and recorded:

> "[Recent discharge] [with] diarrhoea and [abdominal] pain. Since then ongoing diarrhoea, lethargy, poor appetite, temperatures and diaphoretic.[55] — No [chest pain]/[shortness of breath]/palpitations except this afternoon. — No urinary [symptoms]. [On examination] … BP 87/46 [slightly low systolic pressure and low diastolic pressure].[56] … Pale. … [Investigations] [chest X-ray] — [normal]. Bloods — … [Troponin T] 990. [Impression] — NSTEMI [secondary] to abdominal sepsis."

86. Dr D's management plan was:

> "1. IV [fluids].
> 2. Blood cultures.
> 3. [Mid-stream urine test].
> 4. [In-dwelling catheter].
> 5. Strict fluid balance.
> 6. Awaits CT [abdomen/pelvis].
> 7. Not for cilazapril[57]/[angiotension converting enzyme inhibitor] given [aortic valve area] 0.8cm.
> [8.] Stop dabigatran,[58] start clexane[59] (therapeutic if surgeons happy).
> [9.] Consider ticagrelor[60]/clopidogrel[61] once surgeons happy [with] this.
> [10.] Metoprolol[62] 23.75mg daily [and] aspirin [enteric coated].[63]
> [11.] Continue [antibiotics] as per surgeons.
> [12.] [Intensive Care Unit (ICU)] [review].
> [13.] ? ICU/CCU placement.
> [14.] Telemetry."

87. Dr D stated that, at the time he was first asked to review Mr B, he was seeing two triage category two patients who had been admitted with clear cardiac issues and were waiting for beds in the CCU. Dr D noted that Mr B was a lower category of priority. Dr D stated that the referral from Dr A gave no indication as to the urgency of the review, and that, given the acuity of his other patients, this created delay. However, Dr D stated that neither he nor Dr A would have been aware of the true nature of Mr B's illness at that stage.

88. Dr D also stated:

[55] Diaphoretic means sweaty.
[56] 87/46 was Mr B's initial blood pressure reading in the ED.
[57] Cilazapril is an angiotension converting enzyme (ACE) inhibitor used to treat hypertension.
[58] See footnote 12.
[59] Clexane is a low molecular weight heparin which reduces blood clotting activity. It is used to treat certain types of heart disease.
[60] Ticagrelor is a platelet aggregation inhibitor that prevents platelets from collecting and forming clots.
[61] Clopidogrel is an antiplatelet agent used to inhibit blood clots.
[62] Metoprolol is a beta-blocker medication used to treat hypertension and heart attack.
[63] An enteric coating protects oral medication from the acidity of the stomach.

> "At this stage I had requested the back-up registrars to attend ED to help with the work load and to expedite patient care. … The on-call medical consultant at the time was also doubling as the on-call cardiology consultant and was busy in an acute clinic and was not in a position to assist with patients in ED. Traditionally within the hospital you call the back-up registrars before calling the on-call consultant."

89. Dr D stated that a multitude of factors contributed to the delay in Mr B being seen, including consultants being unavailable for back-up, heavy workloads in the ED, and the inability to get timely support from other registrars to relieve the workload, despite this being requested.

90. Dr D told HDC that, on hearing the Troponin T result, he immediately went to find Mr B, only to learn that he had been transferred to a surgical ward. Dr D stated that, had he or Dr A been aware of the Troponin T result earlier, this may have given more urgency to the referral for medical review. Dr D stated:

> "I went to the Surgical ward straight away and quickly reviewed his notes and saw that basic tests like Chest X-rays and ECG had not been ordered. I urgently organised these in order to expedite his workup and ensure we had all the appropriate diagnostic material needed. I then went to examine him. At that time he had no stigmata of infective endocarditis, such as splinter haemorrhages,[64] or oslers nodes[65] … The orderlies came to take him for his urgent chest X-ray … I initially said to the family that I would get him moved to Coronary care but given the backlog on Coronary care decided ICU would be more expedient and appropriate for him given his illness. I contacted the ICU registrar to come and review the patient which he did promptly and took over care of the patient with the aim of transferring him to ICU."

91. NDHB stated that Dr D was responsible for six patients in the ED, in addition to Mr B. Dr D was the only medical registrar allocated to the ED, medical wards, and surgical referrals during this time.

92. NDHB told HDC:

> "[T]here is a clear policy within the hospital which supports the Medical Registrar in situations where they are busy, prompting them to call the On Duty Consultant. Aside from this, at the time of induction new doctors joining the hospital are reminded by [the Chief Medical Officer] of the importance of calling for senior help whenever this will be likely to improve patient outcomes. Additionally … Medical Registrars in our hospital normally feel comfortable to ask for support from ED Consultants when they are either overwhelmed by numbers of patients waiting to be seen, or in cases when patients are particularly unwell. With this in mind [NDHB did not] think it would be appropriate to conclude that [Dr D] did not have available to him support which could have expedited a review of [Mr B's] case."

[64] Splinter haemorrhages are tiny blood clots that tend to run vertically under the nails.
[65] Osler nodes are painful, red, raised lesions found on the hands and feet.

ICU review and deterioration

93. At 4.07pm, the blood tests results were reviewed by an intensive care registrar.

94. At 4.10pm, Mr B told nursing staff that he was cold, and a blanket was provided. Gentamicin was administered at 4.25pm. Cefuroxime and metronidazole were given at 4.45pm.

95. At around 4.45pm, Dr A went to discuss the case with the incoming medical registrar, as Dr D had finished his shift. At the same time, a rapid response nurse and the intensive care registrar arrived to review Mr B. It was noticed that Mr B was rigoring,[66] and IV paracetamol was given at 4.50pm. During the review, Mr B's condition deteriorated, and a Code Blue[67] was called. At around 5pm, he became unresponsive. Several staff attended. At the same time, Dr A returned to the surgical ward to review Mr B again. Dr A noted that Mr B was not doing well and was being attended to by nursing staff and the intensive care registrar. Dr A telephoned Dr F and the incoming surgical registrar. Dr F attended while resuscitation was underway. Cardiopulmonary resuscitation was unsuccessful, and Mr B died at 5.17pm.

Cause of death

96. The Coroner found that the direct cause of death was aortic valve infective endocarditis,[68] with calcific aortic stenosis being an underlying condition.

Further information — RN E

97. RN E stated that she is very sorry that Mr B's family feel that he did not receive the best care possible.

Further information — Dr A

98. Dr A extended his condolences to Mr B's family.

99. Dr A noted that endocarditis is difficult to diagnose, and outside the general sphere of surgical expertise. He stated that he assessed Mr B several times while awaiting medical review, and kept Dr F up to date with changes and new findings as these came to hand, discussing with him any possible changes in the management plan.

100. Dr A told HDC:

> "I acknowledge … that significantly hypotensive patients that present to the ED with an existing diagnosis of significant aortic-valve stenosis require monitoring and acuity of nursing care in a [High Dependency Unit (HDU)]/ICU setting and I have incorporated these views in to my practice."

[66] Rigoring is when a person suffers an abrupt attack of shivering and a sensation of coldness, accompanied by a rapid rise in body temperature.
[67] Code Blue is a term used to indicate a patient requiring resuscitation.
[68] Infective endocarditis is an infection causing inflammation of the endocardium (the membrane that lines the heart) and heart valves.

Further information — Dr D

101. Dr D stated: "I would like to offer my condolences to [Mr B's] family and friends for his untimely death and wish that the outcome could have been different for him."

Further information — NDHB

102. Mr B's case was presented at a Mortality and Morbidity meeting. The report noted that Mr B was transferred to the surgical ward before medical review in order to meet the ED six-hour target.[69] It noted that this was not in the best interests of Mr B.

NDHB policies

103. NDHB's "[Public Hospital] Emergency Department Standard Operating Procedure"[70] states:

"**2.3 Hospital In-patient Team Responsibilities** …

- All in-patient teams will comply with the business rules, including but not restricted to compliance with the referral process and provision of a care escalation plan to cover episodes where response to the needs of an individual patient does not occur within an acceptable time frame, and/or the number of patients requiring attention exceed normal conditions.
- Each service must allocate sufficient resource to the acute patient burden presenting through the Emergency Department …

3.3 Expected Response Times …

- SMOs scheduled for on-call duty must be available for timely consultation as specified in their individual NDHB contracts. This consultation may be a phone consultation or clinical need may require them to attend the patient in the ED. …

3.4 Care Escalation Plan

- Each service is expected to provide sufficient staff resource to cover the acute demands … on that service for the majority of occasions (ie. 80% of the time).
- On occasion each service will be faced with a demand greater than 'normal'. It is the responsibility of each individual service to provide a default plan in this instance. If there is no plan then the on-call specialist for that service will become the primary contact for the Emergency Department. The duty emergency medicine SMO will initiate contact on a specialist-to-specialist basis.
- If any patient (GP or EM referral) is waiting more than 4 hours to be seen by an in-patient registrar, or at least 4 patients are waiting for assessment by a specific in-patient service then the on-call SMO for that service must be contacted. …

[69] The Ministry of Health has set a target for 95% of patients to be admitted, discharged, or transferred from an emergency department within six hours.
[70] First issued in 2009.

4.4 Documentation and Clerking of Patients for Admission …

- Requesting an inpatient bed: the admitting doctor should complete the Bed Request Form, documenting the provisional diagnosis and plan, and inform the ED coordinator. … The admitting registrar/SHO is responsible for promptly completing adequate clerking to safely move the patient to the ward."

104. NDHB told HDC that the Department of Medicine did not have a written default plan in place at the time of these events. It stated that the SMO on call could be contacted by the registrar, ED lead SMO, or ED Duty Manager to assist if the acute workload was overwhelming.

105. NDHB's "Test Requests, Results and Reports Policy"[71] states:

"**Results and (Initial) Reporting** …

- Documented 'alerts' (eg critical clinical risk and/or abnormal results) will be phoned urgently to the clinician on duty at the time and/or the consultant if so directed."

106. NDHB told HDC that this policy is specifically for laboratory staff.

107. NDHB's "Clinical Communication, Specialist and Advisory Services Policy"[72] states:

"**2.2. Reporting** …

- Grossly abnormal or unexpected results are telephoned to the clinical staff."

108. NDHB told HDC that this policy is to enable communication across all clinical groups.

109. NDHB's "Severe Sepsis Management Policy"[73] states:

"**Diagnosis**

Before starting antibiotics obtain 2 or more blood cultures. … Obtain cultures from other sites as indicated … Obtain a venous blood gas to determine lactate. Severe sepsis is indicated by a lactate > 4.0 mmol/L.

Management

- **Antibiotic Therapy**
  Begin broad spectrum intravenous antibiotics as soon as possible. This must be done while the patient is still in the emergency department.
- **Source Control**
  Evaluate patient for a focus of infection amenable to source control measures including abscess drainage or tissue debridement.
- **Fluid Therapy**

[71] Undated.
[72] Undated.
[73] First issued in 2006.

Use crystalloids during the Emergency Department phase of care. Give fluid challenge to patients with suspected inadequate tissue perfusion and repeat if blood pressure and urine output do not increase and there is no evidence of intravascular volume overload. Consider ultrasound examination of the IVC and heart.

- **Vasopressors/ Inotropic Therapy**
  Start Vasopressor therapy when fluid challenge fails to restore adequate blood pressure and organ perfusion, or transiently until fluid resuscitation restores adequate perfusion. In patients requiring vasopressors, place an arterial catheter as soon as practical. Use Noradrenaline and titrate to mean arterial pressure of 65 mm Hg or greater.
- **Consultation**
  Obtain input from the Intensive Care Specialist and other appropriate specialist services early (Surgery, Medicine, Paediatrics)."

Changes made — NDHB

110. NDHB told HDC that the triage process in the ED has changed significantly since these events. A new triage area has been built, which allows patients to be seen by the triage nurse in a private area where observations can be recorded immediately. It stated that this minimises the risk of delay in the transfer to a cubicle in the ED for patients who are significantly unwell.

111. NDHB stated that the number of medical registrars available to see acute patients in the ED has increased from one to two during the busier parts of each day.

112. NDHB also stated that a new ED treatment chart has been developed, which has space allocated specifically for nursing staff to detail the blood tests they have ordered.

113. NDHB told HDC that an Adult Sepsis Pathway[74] for patients in the ED has been developed. This will assist in ensuring that blood cultures and catheter placement occur in the ED in future for those patients with suspected sepsis.

114. NDHB's Adult Sepsis Pathway sets out that, if the patient has two systemic inflammatory response syndrome (SIRS)[75] criteria present and new to the patient, then the patient has SIRS, and sepsis should be thought of. Numerous criteria are listed. Clinicians are then directed to consider various symptoms of infection. If any are present, clinicians are instructed to ensure that a doctor is present within 30 minutes, to obtain blood cultures, undertake fluid balance measurement, give IV antibiotics, and inform ICU. ICU care is required for severe sepsis. If no symptoms of infection are present, the patient is to be monitored.

Responses to the provisional report

115. Mr C was provided with an opportunity to comment on the "information gathered" section of my provisional report.

[74] Issued August 2015.
[75] Two or more of fever above 38°C or less than 36°C, heart rate more than 90 beats per minute, respiratory rate more than 20 breaths per minute, and abnormal WCC.

116. NDHB did not have any comments to make on my provisional opinion, and stated: "… [T]he DHB was extremely disappointed that this patient's care was not of a standard we would hope to have delivered."

117. Dr A provided a response to my provisional opinion. He stated that he "accepts the conclusion reached by the Commissioner". He also submitted the following:

> "… From my experience at [the public hospital], the ICU team are usually reluctant to admit a patient under their care if the patient is stable enough and needs no invasive monitoring and/or resuscitation particularly when a diagnosis has not yet been determined. This was apparent to me when [Mr B] was assessed by the ICU registrar on the first occasion. I think this is understandable in a small hospital with restricted amenities.
>
> The Emergency Department was extremely busy on the day in question. With hindsight I wish that more on-call, Medical and/or ED Consultant support and in particular actual physical involvement in [Mr B's] care had been available to support the house officers and registrars involved in [Mr B's] care."

118. Dr D provided a response to my provisional opinion. He submitted that the written procedure for seeking assistance did not reflect the "verbal policy" within the ED, and almost entirely applied to after-hours work where there were no back-up registrars available. He also stated that the level of supervision and teaching within ED would depend largely on the consultant with whom you were working, and the workload at the time.

119. RN E was provided with an opportunity to comment on my provisional opinion, and chose not to respond.

Opinion: Northland District Health Board — breach

120. Right 4(1) of the Code of Health and Disability Services Consumers' Rights (the Code) sets out that every consumer has the right to have services provided with reasonable care and skill. NDHB was responsible for ensuring that Mr B received care that complied with the Code, both during his first admission to the public hospital on Day 1–Day 2, and during his second admission on Day 8. As I have said previously, district health boards have an organisational duty to "provide a safe healthcare environment for their patients".[76]

121. In my view, the care provided to Mr B on Days 1, 2 and 8 fell short of accepted standards. While some individual providers hold a degree of responsibility for the shortcomings in Mr B's care on that day, overall I consider that the shortcomings occurred in the context of deficiencies in the systems operating at NDHB. I therefore

[76] See 13HDC00453.

consider that NDHB bears ultimate responsibility for failing to provide an appropriate standard of care to Mr B on Day 8.

First admission to the public hospital — Days 1–2

122. On Day 1, Mr B was admitted to the surgical ward at the public hospital with a four-week history of diarrhoea and abdominal pain. During Mr B's admission, his temperature varied from low to high (between 35.5°C and 37.9°C), and blood tests included a raised CRP, borderline elevated WCC, and elevated neutrophils. Prior to discharge on Day 2, Mr B had a BP of 109/69mmHg, which was low for him. Accordingly, his Cardizem was withheld. Mr B was discharged, as surgical staff thought that his symptoms were caused by the colchicine he had been taking, and a plan was put in place for an urgent outpatient colonoscopy, to ensure that there was no significant bowel pathology.

123. My expert advisor, general surgeon Dr Julian Speight, advised me that Mr B's low blood pressure prior to discharge was probably significant, given his moderate to severe aortic stenosis. Dr Speight stated that it was reasonable to reduce Mr B's antihypertensive medication, but a consultation with a general physician or cardiologist may have been helpful.

124. Dr Speight also advised that Mr B's temperature changing from low to high could have represented sepsis and, in the context of this and markedly elevated CRP and borderline elevated WCC, a source of infection should have been considered, and an abdominal CT may have been helpful. However, Dr Speight stated that the failure to do so would not be a significant departure from the standard of care.

125. Dr Speight advised that it was reasonable to have a working diagnosis of persisting side effects from colchicine, and to discharge Mr B with a plan in place for urgent outpatient colonoscopy.

Conclusion

126. While I accept that discharge with a plan for urgent outpatient colonoscopy was reasonable, I am concerned that there were a number of warning signs evident at this point, including Mr B's low blood pressure, varying temperatures, and elevated CRP and WCC.

127. I consider that medical or cardiologist input, consideration of a source of infection, and a CT scan may have been helpful. In the circumstances, I consider that there were opportunities for further enquiry, and I am critical that they were missed.

Second admission to the public hospital — Day 8

Triage

128. Mr B was accepted by surgical registrar Dr A for review in the ED. Unfortunately, due to the unexpected busyness of the ED at the time, there was a delay of 35 minutes between Mr B's arrival at the ED and his triage. He was given a triage score of three. Subsequently Mr B's observations were taken, and included low blood pressure. His triage score was not changed in response to his low blood pressure, as RN E understood that Dr A would review Mr B immediately.

129. NDHB acknowledged that the delay before Mr B was triaged was longer than ideal, but stated that there was a higher than usual number of presentations to the ED on Day 8, and an unexpected peak at 10.30am. NDHB was unable to determine whether additional staff were asked to assist, but stated that a Code Orange was called. It told HDC that it is understandable that Mr B was not triaged more urgently, given that many other patients were waiting to be seen, he had been able to walk into the ED, and his GP had not thought it necessary to call an ambulance.

130. My in-house nursing advisor, RN Dawn Carey, advised: "I note that [Mr B] was present for approximately 35 minutes prior to being triaged. I consider this to be a considerable delay and reflective of an overwhelmed system."

131. RN Carey further advised that, on the basis of the information available, the initial triage allocation of 3 was appropriate. She explained that the goal of triage is to determine a patient's clinical urgency for time-critical treatment. RN Carey noted that Mr B received initial medical assessment and treatment in a time-frame consistent with his hypotension. She advised that she considered this to be more relevant to patient outcome than RN E changing the triage score.

132. I am concerned that there was a significant delay in Mr B being triaged after he arrived in the ED. However, I acknowledge that the delay was due to the unexpected busyness of the ED at that time.

133. I also accept RN Carey's advice that the triage score of three was appropriate. The purpose of the triage score is to indicate the urgency of the initial review by a doctor. Once Dr A had reviewed Mr B, then it was for him to inform Dr D of the urgency of the requested medical review.

Troponin T test

134. A blood sample was collected by RN E at 11.20am. She requested several routine blood tests, as well as a Troponin T test. No ECG was carried out at that time by RN E, as she was not focussed on cardiac symptoms, given Mr B's surgical symptoms and history. It was acknowledged by both RN E and NDHB that an ECG should have been carried out.

135. At NDHB, while it was usual practice for nurses to initiate blood tests in ED, nurses were not expected to specifically inform medical staff, and were not responsible for viewing or acting on the results (with medical staff responsible for this).

136. NDHB stated that it is expected that nurse-initiated investigations be documented in the ED clinical records. NDHB said that the process in place at the time was for the nurse to indicate which investigations had been requested by ticking the appropriate boxes in the ED clinical records under "Nurse Initiated Investigations". However, NDHB said that, in 2014, this process was not always followed, with some nurses choosing to use the progress notes to document nurse-initiated investigations. RN E did not document in the nurse-initiated investigations section of the records, or in the progress notes, that she had requested a Troponin T test, but said that the results of the Troponin T test would have been apparent along with the other blood tests taken.

137. The Troponin T test result of 990ng/L (abnormal, indicating heart damage) was reported at 12.13pm. The result was processed by a medical laboratory scientist and automatically released by the results system. NDHB told HDC that all test results that are expected are automatically released by its software, with unexpected results requiring manual release. NDHB explained that 40–45% of Troponin T tests requested by the ED are abnormal, so an abnormal Troponin T result is not unexpected. Accordingly, the medical laboratory scientist telephoned Dr A to discuss another result, but did not mention the Troponin T result.

138. NDHB's "Test Requests, Results and Reports Policy" states that critical and/or abnormal results will be telephoned urgently to the clinician on duty at the time. NDHB's "Clinical Communication, Specialist and Advisory Services Policy" states that grossly abnormal or unexpected results are telephoned to clinical staff. However, NDHB stated that the criterion for telephoning out a test result is that the result indicates a critical situation requiring urgent intervention, which is not the case for abnormal Troponin T results. It stated that telephoning out abnormal Troponin T results would cause a delay in their release.

139. Dr A was not aware that RN E had requested a Troponin T test. He told HDC that therefore he was not looking out for the result or chasing it up.

140. RN Carey advised that it was reasonable in the circumstances for RN E to request a Troponin T test, but that she was mildly critical that RN E did not perform an ECG while Mr B was in the ED.

141. RN Carey also advised that, typically, follow-up of blood tests that ED registered nurses request is not done, or expected to be done, by them. She stated that she did not consider that RN E's lack of follow-up of the Troponin T test was a departure from accepted nursing standards.

142. I accept RN Carey's advice. I consider that it was reasonable for RN E to order a Troponin T test, and accept that she was not responsible for following up on the result of the test. That said, there was a need for follow-up, and I am critical that she did not document her request for the test in the clinical record, to alert other practitioners that the test had been ordered. In addition, I am critical that she did not carry out an ECG.

143. Dr Speight was critical of the Troponin T test result becoming known to the surgical team only when Dr A checked all the blood test results.

144. I am concerned that NDHB had two policies with differing criteria for escalation of test results to clinical staff by telephone and, in practice, neither policy was followed when dealing with high Troponin T results. This led to Mr B's high Troponin T result of 990ng/L not being escalated in a timely manner to Dr A by telephone. I have stated previously that it is suboptimal for a DHB not to have an early warning system in place with the laboratories to inform clinical staff of high Troponin T results.[77] While NDHB did have policies in place for escalating critical clinical risk and/or abnormal

[77] See 15HDC00111.

results by telephone, I am critical that these were not followed with respect to Troponin T results in this case, given how elevated the result was.

Medical review

145. Following his initial review of Mr B at 10.50am, Dr A discussed the case with Dr D, who agreed with Dr A's plan. Dr D agreed to review Mr B as soon as he was able to, but was very busy in the ED.

146. At the time Dr D was asked to review Mr B, Dr D was seeing two triage category two patients who had been admitted with clear cardiac issues and were waiting for beds in the CCU. Dr D told Dr A that he would see Mr B after dealing with these patients. Dr D noted that Mr B was a lower category of priority. Dr D stated that the referral from Dr A gave no indication as to the urgency of the review and that, given the acuity of his other patients, this created delay. However, Dr D stated that neither he nor Dr A would have been aware of the true nature of Mr B's illness at that stage.

147. Dr D said that he had requested assistance with the workload from the back-up registrars, but the on-call medical consultant was busy in a cardiology clinic.

148. Dr A spoke to Dr D again after he viewed the blood test results indicating sepsis and myocardial infarction. Dr A stated that Dr D advised that he would review Mr B soon, although he was still very busy in the ED, and possibly admit him to the CCU.

149. Dr D told HDC that, on hearing the Troponin T result, he immediately went to find Mr B, only to learn that he had been transferred to the surgical ward. Dr D then went to the surgical ward and began reviewing Mr B shortly before 3.30pm (approximately four and a half hours after medical review was requested). Dr D's impression was NSTEMI secondary to abdominal sepsis, and he put in place a detailed management plan.

150. NDHB told HDC that there was a higher than usual number of presentations to the ED on Day 8. It stated that Dr D was responsible for six patients, in addition to Mr B. There was only one medical registrar allocated to the ED, medical wards, and surgical referrals during this time.

151. NDHB's "[Public Hospital] Emergency Department Standard Operating Procedure" requires in-patient teams to have a care escalation plan to cover episodes where an individual patient's needs are not responded to in an acceptable time frame and/or the number of patients requiring attention exceeds normal conditions. The General Medicine team did not have a plan in place at the time of these events. The procedure also states that on-call SMOs must be available for timely consultation (by telephone or, if needed, by attendance in the ED). The procedure also sets out that, if any patient is waiting more than four hours to be seen by an inpatient registrar, or at least four patients are waiting for assessment by a specific inpatient service, then the on-call SMO for that service must be contacted.

152. NDHB told HDC:

> "[T]here is a clear policy within the hospital which supports the Medical Registrar in situations where they are busy, prompting them to call the On Duty Consultant. Aside from this, at the time of induction new doctors joining the hospital are reminded … of the importance of calling for senior help whenever this will be likely to improve patient outcomes. Additionally, … Medical Registrars in our hospital normally feel comfortable to ask for support from ED Consultants when they are either overwhelmed by numbers of patients waiting to be seen, or in cases when patients are particularly unwell."

153. Regarding the timeliness of Dr D's review of Mr B, my expert advisor, general physician Dr Richard Shepherd, noted that there was little doubt that ED was very busy at the time. He advised that Dr D's workload was significant even for the "most efficient and experienced medical registrar and that such circumstances would mandate a common sense approach to prioritising patient review". Dr Shepherd considered that the clinical urgency of the situation was not recognised through no fault of Dr D's, and so did not clearly mandate prioritising Mr B's review.

154. Dr Shepherd noted that Dr D did not seek SMO support, as the "[Public Hospital] Emergency Department Standard Operating Procedure" required. Dr Shepherd also noted that Dr D had instead sought support from back-up medical registrars, as he felt that the SMO was unable to assist. Dr Shepherd advised that he would struggle to be overly critical of Dr D's actions, as it would be highly unlikely that the duty SMO would have interrupted his clinic for the admission of non-critical patients (as Mr B was regarded at that stage), and that the duty SMO would have requested the attendance of the back-up registrars, as occurred at the initiative of Dr D.

155. Dr Shepherd further advised that, in an ideal situation, supervising staff should not be put in a position where they are unavailable to supervise RMOs directly during their on-call responsibilities.

156. Dr Shepherd also advised that NDHB's "[Public Hospital] Emergency Department Standard Operating Procedure" could more clearly outline the expected standard for review times between inpatient services. He stated:

> "[This] perhaps highlights the lack of clarity to be found in some aspects of the policy in what is a common clinical scenario — referral from one inpatient service registrar to another. The policy does not make clear specifically what these expectations are, though acknowledges that common sense is required."

157. Dr Shepherd advised that, although ultimately Dr D did not make the correct diagnosis, in his opinion the diagnosis Dr D reached was a reasonable assessment based on the results available at the time. Dr Shepherd noted that Mr B presented with an atypical presentation of an uncommon disease with a subacute course. Dr Shepherd also considered that Dr D's management plan was appropriate. However, Dr Shepherd noted that Dr D's notes did not comment on the ECG findings, which would be expected.

158. In my view, the delay in medical review is concerning. When the ED is unusually busy, as here, there needs to be provision in place for additional clinical support. I

acknowledge that NDHB had procedures in place for dealing with high demand, including escalation plans. However, I note that, while NDHB had a policy requiring escalation to the on-call consultant physician in such circumstances, in reality, the physician was not readily available, as he was in a cardiology clinic.

159. It must be clear to junior staff that there is no impediment to contacting an on-call consultant; they must be proactive in seeking consultant input whenever the clinical need arises. As Dr Shepherd has stated in his advice: "Supervision ignorance is not bliss. It is simply not supervision."

160. In the circumstances, given the number of patients Dr D was responsible for, and the information known to him at the time regarding the severity of Mr B's condition, I acknowledge that the delay in medical review was largely outside of Dr D's control. I accept Dr Shepherd's advice that ideally Dr D should have contacted the on-call consultant physician to request assistance, given the busyness of the ED, and I am mildly critical that he did not do so.

161. I also accept Dr Shepherd's advice regarding Dr D's review. I consider that Dr D's review was reasonable, but that he should have commented on the ECG findings.

Transfer to surgical ward

162. Dr A completed an initial review of Mr B at 10.50am. At 11.40am, RN E recorded that her plan was for Mr B to be admitted to the surgical ward. At 1.53pm, RN E completed an ED to Ward Bed Request form for Mr B. She noted that the plan was for IV fluids, full blood count, in-dwelling catheter, abdominal CT scan, medical review, and stool specimens.

163. RN E told HDC that nursing staff always complete the section of the bed request form that specifies which initial assessments have been completed, and the EWS. She stated that it is only when the admitting doctor provides the provisional diagnosis that the ED Nurse Coordinator will act on the request for a bed, through the Bed Manager. RN E stated that the decision to admit Mr B to the surgical ward was based on his GP referral to the surgical team, his presenting complaint of diarrhoea and abdominal pain, and his recent admission to the surgical ward (a week earlier).

164. Dr A told HDC that the decision to transfer Mr B to the surgical ward was not discussed with him (Dr A).

165. NDHB stated that it is not unusual for the surgical team not to complete the bed request form, leaving it for ED nursing staff to do.

166. NDHB's "[Public Hospital] Emergency Department Standard Operating Procedure" states that the admitting doctor should complete the Bed Request form and inform the ED Coordinator. It also states that the admitting doctor is responsible for completing adequate clerking promptly to move the patient safely to the ward.

167. At 2.35pm, Dr A viewed Mr B's blood test results, which indicated sepsis and heart damage.

168. Mr B was transferred to the surgical ward shortly before 3pm, without blood cultures having been taken, a catheter inserted, a catheter specimen of urine taken, a fluid balance chart commenced, stool cultures taken, or an ECG undertaken.

169. RN E stated that the plan of care was not available until the later stages of Mr B's admission, but acknowledged that commencement of a fluid balance chart would have been ideal practice regardless. She told HDC that it is not unusual for uncompleted care plans to be handed over to the receiving ward. RN E also told HDC that it was an exceptionally busy and stressed environment that day. She stated that her priority with Mr B was to move him closer to the front desk for visual observation, owing to his low BP.

170. In a report following a Mortality and Morbidity meeting, it was noted that Mr B was transferred to the surgical ward before medical review in order to meet the ED six-hour target. It noted that this was not in the best interests of Mr B.

171. Dr Speight advised:

> "When an unstable patient is awaiting specialist review (in this case a medical review), and the diagnosis remains unclear, I think moving the patient out of the Emergency department simply to meet the 6-hour target is ill-advised. In this case the patient was moved to an area of lower acuity (ie a side-room on the surgical ward), rather than to the ICU or CCU."

172. RN Carey advised:

> "I acknowledge that the NDHB response refers to the ED being unusually busy that day. I consider that this plus the push to meet the '6 hour ED transfer' target were contributory factors that facilitated [Mr B] transferring to [the ward] prior to blood cultures being taken and a urinary catheter being inserted. I also note that there is no record of [Mr B] voiding urine while in the ED and the fluid balance chart was not commenced. These interventions are part of the documented initial management plan and I am mildly critical that they were not completed earlier and prior to transfer. I consider that the failure to complete these steps reduced the opportunity to realise [Mr B's] level of unwellness."

173. I accept Dr Speight's and RN Carey's advice. Despite the severity of Mr B's condition being known after Dr A viewed the blood test results at 2.35pm, Mr B was moved to the surgical ward shortly before 3pm. I am critical that NDHB's practice in respect of ward transfers did not align with its policy, which would have required that Dr A, rather than nursing staff, complete the bed request form. The result of this was that Mr B was transferred to the surgical ward without discussion with Dr A, in a situation where such a transfer was not clinically advisable. I am also mildly critical that Mr B was transferred without a number of the actions listed in Dr A's management plan having been carried out, although I acknowledge that the ED was exceptionally busy that day. Further, while the Ministry of Health has set a target for 95% of patients to be admitted, discharged, or transferred from an emergency department within six hours, it is unacceptable for this to have caused Mr B to be transferred when this was clinically inappropriate.

Administration of antibiotics

174. Dr A prescribed Mr B antibiotics at approximately 3pm. One antibiotic was administered by nursing staff at 4.25pm, and the other two were administered at 4.45pm. Between 3pm and 4.25pm, Mr B underwent an ECG, chest X-ray, and medical review.

175. RN Carey advised:

> "Based on the time the antibiotic therapy was prescribed and the interventions that needed to occur prior to the RN administering them — transfer to radiology for x-ray, medical registrar review, taking blood cultures, mixing antibiotics — I do not consider that nursing staff significantly delayed [Mr B] receiving his antibiotic therapy. … I consider that the failure to complete these steps [prior to transfer] … meant that [Mr B] did not receive his antibiotics on [the ward] as quickly as he could have otherwise."

176. I accept RN Carey's advice. As acknowledged previously, I am critical that other interventions (that needed to occur prior to administration of antibiotics) were delayed owing to the busyness of the ED. Unfortunately, this delay then impacted on the administration of antibiotics.

Conclusion

177. Mr B was entitled to expect that NDHB would provide him with services of an appropriate standard. On Day 8, the ED was busier than usual, which resulted in delays in triage, medical review, and implementation of aspects of Dr A's management plan. I acknowledge the impact of the busyness of the ED on aspects of the timeliness of the care provided that day. However, I am concerned that:

- On Days 1-2, no medical or cardiologist input was sought, a source of infection was not considered, and no abdominal CT scan was carried out.
- On Day 8:
    - NDHB had two policies with differing criteria for escalation of test results to clinical staff by telephone and, in practice, neither of these were followed when dealing with Troponin T results. The result of this was that Mr B's high Troponin T result was not escalated to Dr A in a timely manner by telephone.
    - The on-call consultant physician was not readily available for assisting when delays were experienced in medical review.
    - NDHB's practice regarding ward transfers did not reflect its policy and, as a result, Mr B was transferred to a lower acuity ward without discussion with Dr A, and required interventions having been undertaken, in order to meet a target.

178. In my view, the combination of these failings meant that NDHB failed to provide services with reasonable care and skill to Mr B, and therefore breached Right 4(1) of the Code.

Opinion: Dr A — other comment

179. Dr A reviewed Mr B at 10.50am. Mr B's observations had been taken and included a BP of 87/46mmHg, a respiratory rate of 22 breaths per minute, and a heart rate of 94bpm. Dr A recorded his impression as: "Dehydration [and] non [specific] symptoms. To [rule out] intra-abdominal sepsis/lymphoma."

180. Dr A's documented management plan was for fluid resuscitation, blood tests, blood cultures, an in-dwelling catheter, a catheter specimen of urine, an input/output chart, an abdominal CT scan, medical review, and stool cultures. Dr A did not request a Troponin T test.

181. Dr A stated that, given Mr B's known cardiac history, early involvement from the medical team was requested appropriately, deferring to their expertise on the possible medical causes of sepsis and the need for ICU/CCU review. Dr A also told HDC that Mr B did not meet the criteria for antibiotics at admission, since he was afebrile and there was no obvious cause for his symptoms.

182. Dr A told HDC:

> "I acknowledge … that significantly hypotensive patients that present to the ED with an existing diagnosis of significant aortic-valve stenosis require monitoring and acuity of nursing care in a HDU/ICU setting and I have incorporated these views in to my practice."

183. NDHB told HDC that, with the benefit of hindsight, it would have been desirable to have consulted the ICU team when Mr B was first admitted. It also acknowledged that Mr B should have received IV antibiotics much more quickly.

184. My expert advisor, general surgeon Dr Julian Speight, advised that Dr A's initial treatment was reasonable. Dr Speight stated that, on admission to ED, there were sufficient physiological parameters to be suspicious of sepsis, but there was not sufficient evidence to categorically diagnose sepsis, until the white cell count (WCC) was found to be elevated. Nonetheless, Dr Speight stated that the presence of hypotension in a patient with significant aortic stenosis was a cause for concern in its own right, requiring HDU/ICU review. He advised that Dr A's failure to refer to ICU earlier was not a departure from the standard of care, given the impending medical review.

185. Dr Speight also advised: "[A]t the time of admission there was nothing specific to suggest the need for a Troponin test."

Conclusion

186. I accept Dr Speight's advice that Dr A's initial treatment was reasonable, including not requesting a Troponin T test. In my view, ideally Dr A should have consulted with ICU on admission, given Mr B's hypotension and significant aortic stenosis, but I acknowledge that he was falsely reassured that there would be early medical review to consider this. I therefore consider that Dr A did not breach the Code.

Recommendations

187. I recommend that NDHB:

a) Conduct an audit of the effectiveness of its new triage process in regard to the timeliness of triage and triage scoring, and report back to HDC on this within three months of the date of this report.
b) Review its "Severe Sepsis Management Policy" and newly developed "Adult Sepsis Pathway" in light of Dr Shepherd's comments, and report back to HDC on any changes made, within three months of the date of this report.
c) Develop a clear policy as to who has responsibility for following up test results ordered by ED registered nurses, and provide a copy to HDC within three months of the date of this report.
d) Consider implementing a system that requires the laboratory to alert the patient's treating clinician urgently (e.g., by telephone) when Troponin T results are abnormally high, and report back to HDC with the results of this consideration within three months of the date of this report.
e) Review the "[Public Hospital] Emergency Department Standard Operating Procedure" in light of Dr Shepherd's comments, and report back to HDC on any changes made, within three months of the date of this report.
f) Develop a care escalation plan for the General Medicine team, and provide a copy to HDC within three months of the date of this report.
g) Review the role of on-call consultants to ensure that adequate supervision of junior doctors is occurring, and report the outcome of the review to HDC within three months of the date of this report.
h) Remind all staff working in the ED that the transfer and the location the patient is transferred to must be clinically appropriate, and confirm to HDC within three months of the date of this report that this has occurred.
i) Conduct training for relevant staff on the newly developed "Adult Sepsis Pathway", and confirm to HDC within six months of the date of this report that this has occurred.
j) Provide a written apology to Mr B's family. The apology should be sent to HDC within three weeks of the date of this report, for forwarding to Mr B's family.

Follow-up actions

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

189. A copy of this report with details identifying the parties removed, except the experts who advised on this case and Northland District Health Board, will be sent to the Medical Council of New Zealand, and it will be advised of Dr A's name in covering correspondence.

190. A copy of this report with details identifying the parties removed, except the experts who advised on this case and Northland District Health Board, will be sent to the Director-General of Health (Ministry of Health), the Health Quality and Safety Commission, and HealthCERT (Ministry of Health), and placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

Appendix A: Independent surgical advice to the Commissioner

The following expert advice was obtained from general surgeon Dr Julian Speight:

"Thank you for asking me to provide expert advice to the Health and Disability Commissioner (the Commissioner) with regards to the care provided to [Mr B] at [the public hospital] between [Day 1] and [Day 8]. I have read and agree to follow the guidelines laid out in the '*Enquiries and Complaints Manual. Appendix H: Guidelines for Independent Advisors 2007'*. I have also read the updated '*Guidelines for Independent Advisors 31 July 2014'*.

Qualifications: Mr. Julian Speight BSc(hons) MBBS(Lond) FRCS(Ed) FRACS.

I am a consultant General Surgeon working at Kew Hospital, Southern DHB. I hold a current New Zealand practicing certificate (vocational registration in general surgery), am a Fellow of the College of Surgeons of Australasia [FRACS] and a Fellow of the Royal College of Surgeons of Edinburgh [FRCS(Ed)]. I gained my primary medical degree at St Thomas's Hospital, University of London, and have an intercalated degree in forensic osteology.

I am on the executive committees of both the New Zealand Association of General Surgeons [NZAGS] and the Rural Surgical Section [RSS] of the Australasian College of Surgeons.

As a general surgeon I have a sub-specialty interest in colorectal surgery, but I am not a member of the Colorectal Surgical Society of Australia and New Zealand (CSSANZ). I am also an endoscopist, and was the Clinical Director of the endoscopy department at Kew Hospital (SDHB) from 2008 to 2012.

Instructions from the Commissioner:

You have requested that I provide an opinion on the following issues:

a) The appropriateness of the care provided during [Mr B's] [first admission] including whether further investigations were indicated and whether it was appropriate to [discharge him];
b) The appropriateness of the care provided when [Mr B] re-presented on [his second admission], in regard to assessment, monitoring, whether further investigations or interventions were indicated, and resuscitation; and
c) Any other comment on the care provided.

For each question, you have requested that I advise:

a) What is the standard of care/accepted practice?
b) If there has been a departure from standard of care or accepted practice, how significant a departure do you consider it is?
c) How would it be viewed by your peers?

The following report is based on the documents provided:

• Complaint	[Mr C], brother of [Mr B].
• Provider response	[NDHB] [Consultant General Surgeon] [Dr A], Surgical Registrar
• Autopsy report	[Public hospital pathologist]
• Clinical records	
• Supplemental reports	[Dr F], Consultant General Surgeon [Service Manager, Emergency and Medical Services] Appendix 1, Medical qualifications of [Dr A] [Dr D] (02/01/2016)

Brief factual summary in chronological order:

[Day 1]	[Mr B] was admitted to [the public hospital] at 11:05am under the care of [a consultant general surgeon] with a three-week history of diarrhoea, abdominal pain and weight loss. His blood pressure on admission was 120/80 with a heart-rate (HR) of 85 and a temperature of [37.3°C]. An initial diagnosis of Colchicine related side-effects was made. The patient was observed overnight, and a plan for colonoscopy as an inpatient made. Of note, apart from Colchicine (which had been stopped 2–3 weeks prior), the patient was also taking Pradaxa (Dabigatran), Digoxin, Diltiazem and Metoprolol. He remained stable overnight, and it was decided to undertake the colonoscopy as an outpatient. Overnight a temperature of [37.9°C] was recorded. Prior to discharge the following physiological parameters were recorded: BP 109/69, HR 84, temp 35.8°C. Blood tests taken on admission at 12:12 on [Day 1] showed a mild normocytic anaemia (Hb 129, MCV 85), with a slightly elevated white-cell count (WCC 11.10, neutrophils 8.4), elevated platelets (490) and elevated CRP (87). Plain chest and abdominal radiographs were reported as unremarkable. An ECG showed atrial fibrillation (AF). Due to the relatively low blood pressure on discharge he was advised to omit his Diltiazem dose.
[Day 8]	Patient re-referred to [the public hospital] under the care of the on-call Surgeon ([Dr F]).
09:58	Patient arrived to ED.
10:33	Patient triaged (Triage code 3)

	Admission observations: Hr 94, BP 87/46, respiratory rate (RR) 22 & temp 37.2°C.
	Routine bloods drawn and sent by ED nursing staff (included Troponin)
10:50	The patient was admitted to a monitored bed-space in ED once one became available.
	Patient seen in Emergency department (ED) by on call surgical registrar ([Dr A]).
	The presenting symptoms were of lethargy, poor appetite, low-grade fever and sweating.
	Fluid resuscitation started and CT requested. CT planned for following day.
	The case was discussed with on-call Medical Registrar ([Dr D]) who agreed to review the patient when able.
(time unknown)	Laboratory called [Dr A] to discuss APPT of 46 (patient on Dabigatran).
14:00–15:00	[Dr A] reviewed [Mr B's] blood results, revealing elevated WCC (25.4, neutrophils 22.5) and an elevated Troponin (990). Medical registrar made aware of Troponin result.
	Consideration given to transfer to CCU bed. CT re-booked for 17:30.
15:00	Patient admitted to [the ward], and soon after reviewed by [Dr A]
15:50	[Dr A] updated [Dr F] on patient's status.
(Time unrecorded)	Medical registrar review ([Dr D]). Impression of NSTEMI secondary to abdominal sepsis. Plan made to await CT result.
15:56	Chest XRay undertaken (interrupted Medical registrar review of patient according to notes).
17:00	'CODE BLUE' called. Asystole. CPR started. (ICU registrar had attended patient just prior to arrest and Code Blue called).
17:17	Patient declared dead.

1) The appropriateness of the care provided during [Mr B's] [first admission] including whether further investigations were indicated and whether it was appropriate to discharge him on [Day 2].

a) What is the standard of care/accepted practice?
b) If there has been a departure from standard of care or accepted practice, how significant a departure do you consider it is?
c) How would it be viewed by your peers

[Mr B] was referred to the on call surgical registrar by [his GP] on [Day 1] with tenderness in the right iliac fossa (RIF), nausea and raised inflammatory markers. The referral letter states a 4-week history starting with an episode of gout resulting in a prescription of Colchicine. He was seen in [a public hospital in another region] with dehydration and the Colchicine was stopped (2–3 weeks prior to this presentation). His past medical history records both atrial fibrillation (AF) and Aortic Stenosis (AS), which is recorded as 'moderate to severe'. The C-reactive protein (CRP) is noted as persistently elevated at 102 mg/L ([date] and 87mg/L

([date]). On [date] his white cell count (WCC) was still within the normal range at 9.8 (neutrophils 7.2). He was admitted for observation overnight, and both blood tests and a plain abdominal (AXR) and chest Xrays (CXR) arranged. The AXR and CXR were reported as unremarkable. The blood tests did confirm a persistently raised CRP and now a borderline elevated WCC (11.10, with upper limit of normal range being 11.0) and elevated neutrophils of 8.4 (range 1.9–7.5). Although the surgical team describes his progress overnight as being 'stable', in fact he did spike a low-grade fever of [37.9°C]. He was also noted to be moderately hypotensive (low blood pressure) of 109/69. Although this blood pressure would not usually be considered too concerning, in the context of known severe aortic stenosis it is probably relevant.

His symptoms are attributed to his previous reaction to the Colchicine, although the drug had in fact been stopped 2–3 weeks prior. A plan was made for an inpatient flexible sigmoidoscopy, but then this was changed to an outpatient colonoscopy. Although it is not stated in the notes, the reason for not undertaking the flexible sigmoidoscopy on [Day 2] may have been due to the fact that the patient was on the anticoagulant Dabigatran.

[Mr B] was suffering from moderate to severe aortic stenosis (AVA 0.8cm) pending cardiothoracic surgery, so his low blood pressure prior to discharge was probably significant. A plan was made to reduce his antihypertensive medication, which is reasonable, but a consultation with a medical colleague or cardiologist may have been helpful. He had also spiked a temperature during the night, and prior to discharge his temperature was in fact unusually low at 35.8°C. This pattern can represent sepsis. In the context of a 'swinging pyrexia', markedly elevated CRP and borderline elevated WCC, a source of infection should have been considered. In the context of his presenting symptoms of probable abdominal pathology an abdominal CT to rule out colitis or diverticulitis might have been helpful. However, this would have been unlikely to reveal the true diagnosis of endocarditis. I don't think this can be considered a significant departure from the standard of care expected.

On the day of discharge ([Day 2]) [Mr B] certainly did not appear to be significantly unwell. He was able to tolerate oral hydration and his diarrhoea was controlled with Loperamide. The working diagnosis was of persisting side effects from Colchicine, and a plan was in place for an urgent outpatient colonoscopy. I believe this is an acceptable level of care, and would be considered reasonable by my surgical peers.

2) The appropriateness of the care provided when [Mr B] re-presented on [Day 8], in regard to assessment, monitoring, whether further investigations or interventions were indicated, and resuscitation.

a) What is the standard of care/accepted practice?
b) If there has been a departure from standard of care or accepted practice, how significant a departure do you consider it is?
c) How would it be viewed by your peers

Once again [Mr B] was referred directly to the on call surgical team on [Day 8]. [Dr A] states in his 'case reflection' that this was because [Mr B] had recently been admitted under the surgeons for the same problem six days prior. On the second admission his presenting symptoms were less well localized to the abdomen: He was complaining of lethargy, dehydration, low-grade fever and sweats. He did have a reduced appetite and had not passed stool since discharge on the [Day 2] (but was on Loperamide).

[Dr A] makes reference in his statement to a delay in finding [Mr B] a bed in the Emergency Department. This was attributed to the ED being so busy. He was triaged as a '3', which according to the Australasian Triage Scale (ATS) [1] is considered a 'potentially life threatening' case. Applying the ATS [Mr B] should have been seen within 30 minutes. From the timeline elucidated from the clinical records it would appear [Mr B] waited 35 minutes before being seen by the triage nurse, and then waited another 17 minutes before being admitted to a monitored bed space in ED. This amounts to a wait time of close to an hour before being seen by the on call surgical registrar, but is within the timeframe required from triage to review by a doctor. […] Once in an ED bed, [Mr B] was immediately reviewed by [Dr A] and an appropriate examination was undertaken. [Dr A] recognised that the patient was significantly unwell and initiated appropriate fluid resuscitation. A plan was made for IV antibiotics but I note the stat dose of Gentamicin was given at 16:25, and first doses of Cefuroxime and Metronidazole do not appear to have been given until 16:45 when the patient arrived on the ward. In light of the fact the working diagnosis was of significant intra-abdominal sepsis resulting in septic shock, the delay to administration of antibiotics could be considered a departure from standard practice [2]. In my opinion the antibiotics should have been administered immediately after being charted, which presumably occurred after [Dr A] had completed his examination of the patient in ED at around 11:00 to 11:30.

A plan was made to undertake an abdominal CT, and at first this was arranged for the following day. This was later expedited and scheduled for 17:30 on the day of admission. Sadly the patient died before the CT could be undertaken. I do not think the timing of the CT was unreasonable in light of the lack of clinical findings in the abdomen, and the fact that the patient's blood pressure had responded to fluid resuscitation.

[Dr A] also documents discussing the patient with the on-call Medical registrar (recorded as [Dr D] in [Dr A's] notes, and later recorded as [Dr D]) who 'agreed with the plan' at that time. [Dr A] states that [Dr D] was very busy in ED at the time. In [Dr D's] account he also recalls ED being very busy. He had been asked to see two other category 2 patients, and had asked for support from the second-oncall medical registrar. At 14:00 [Dr A] reviewed the blood tests and became aware of both an elevated WCC and an elevated Troponin. It should be noted the Troponin was requested by an ED nurse, and so the result of the test had not been chased up by [Dr A], as he was unaware it had been requested. [Dr A] then spoke again to [Dr D] who was still busy in ED. [Dr D] offered to urgently review [Mr

B] with the aim of possibly admitting him to the coronary care unit (CCU). [Dr D] reviewed the patient at about 16:00hrs. In his statement [Dr D] states that some of the basic investigations (chest XRay, ECG and blood results) were still pending at that time. He attributes this to ED being so pressed for bedspace that the patient had been expedited to the ward. A plan was made for admission to CCU, and the intensive care registrar was consulted. It was at around 17:00hrs when the intensive care registrar was assessing [Mr B] that he arrested and later died.

I think there are certain aspects of care that raise concern here. I believe the surgical team appropriately requested a medical review, but that this took an unacceptably long time to occur. Although there was a plan from quite early on to involve ICU/CCU, the intensive care team was not involved until late in the piece. The on call medical registrar was requested to review the patient at approximately 11:00, and then made aware of a significant rise in the patient's Troponin at approximately 14:00hrs. They were apparently too busy in ED to be able to see the patient, which raises the question as to what protocols are in place under such circumstances? I believe the on call consultant physician should have been notified, and if necessary should have reviewed [Mr B] themselves. [Dr D] states that the on-call medical consultant was also rostered on as the on-call cardiologist, and was busy in an acute cardiology clinic. I also believe [Mr B] should have been referred to the ICU team after review by [Dr A]. I recognize that [Dr A] was waiting on a medical review, and thought that the medical team would make that decision. However, I believe that on admission [Mr B] was sufficiently unwell to warrant ICU review. This certainly seems to be the crux of [Mr C's] complaint ([Mr C] is [Mr B's] brother and represents the deceased's family). [Mr C] is in a unique position to comment on the care of his brother, as he is a [medical professional]. He notes that [Mr B] was in a side-room on [the] ward without oxygen or cardiac monitoring despite the working diagnosis of an acute MI secondary to abdominal sepsis. [Dr D] states that supplemental oxygen is no longer recommended for patients suspected to have suffered a myocardial infarct. He quotes two papers to this effect which I have not sourced as this is not my area of expertise. In [Mr C's] account he also notes that the medical registrar explained that [Mr B] was not in CCU as it was full, and that two other patients in ED were awaiting CCU beds. This is consistent with [Dr D's] account. [Mr C] noted there was a time delay in gaining appropriate equipment when [Mr B] arrested as the equipment had to be sourced from other locations.

I had some concerns around the fact that the admitting consultant [Dr F] had not seen the patient during the admission prior to his death. However the additional information provided reassured me that [Dr F] was available. The on call surgeon has no other conflicting duties during their on-call period. Furthermore, [Dr A] was in fact a very senior surgical Registrar with many years of experience. He had appropriately assessed the patient and put into place an appropriate treatment plan. [Dr A] had kept [Dr F] informed throughout, and on the last clinical review the patient had appeared to improve with fluid resuscitation. A plan was in place for both medical review and urgent CT, both of which would be useful to have occurred prior to any review by [Dr F]. Indeed [Dr F] was on his way to review

the patient when they arrested. I do not feel this was in any way a departure from standard or acceptable care, and would be viewed as reasonable by my peers.

Any other comment on the care provided

- I believe [Mr B] was given too low a triage category. Had he been identified as being severely unwell from the outset, the overall approach to his care may have been more aggressive. In many institutions the senior Emergency Department doctors are involved in assessing severely ill patients, even if they are expected by another service. [NDHB] states that ED specialists at NDHB will review such patients if brought to their attention by the attending ED nurse or speciality clinician.

- It sounds as if the medical registrar may have been overwhelmed, and that also the capacity of CCU/ICU was overwhelmed. The result was a sick patient waiting medical and ICU review in a single room on a surgical ward, without adequate monitoring or resuscitation equipment available. Under such circumstances there should be protocols in place to seek additional staff resources to admit/review medical referrals. [Dr D] reports that he asked for assistance from the 'back-up' registrar, which would seem to meet this requirement. It may have been beneficial to be able to call upon the on-call medical consultant earlier, but they were also rostered to an acute cardiology clinic. If the CCU/ICU is full it may be necessary to provide 'ICU outreach' with the ICU team helping to provide adequate care on the ward environment.

  [NDHB] has responded to my query about why the medical registrar took so long to review. It does seem the ED department was particularly busy that day, with only one medical registrar allocated to ED. This has since been changed, and I gather there are two admitting medical registrars over the busy times? Importantly the admitting Medical Consultant was not contacted about [Mr B] at any time.

Summary:

As is often the case there appear to have been a number of departures from the ideal level of care, which have conspired together to culminate in an adverse outcome:

a. There was a delay between the patient arriving and being triaged of approximately [35] minutes. I believe the standard of care (after consultation with my ED specialist colleagues) is that a patient should be triaged within 5 minutes of arriving in the ED department. This is no doubt a symptom of an overstretched/busy ED department.
b. [Mr B] was triaged as a category 3, when in fact he should have been triaged as a category 2. Although this did not necessarily impact upon his immediate care, it set the scene allowing the severity of his condition to remain under appreciated.
c. The ICU team were not consulted when [Mr B] was first admitted. [Dr A] had appropriately referred to the on call Medical Team, but I believe there was

sufficient evidence of severe sepsis to warrant ICU involvement at that juncture, even when the aetiology of the sepsis was unknown. Especially in light of the patient's known history of AS, as patients with significant aortic-valve stenosis tolerate hypotension poorly. I suspect [Dr A] was falsely reassured that the Medical Team would initiate ICU/CCU review.

d. A Troponin-T test was requested by a member of the ED staff (an RN) without the knowledge of the admitting surgical team. The result was not followed-up by the ED staff, and the result only became known to the surgical team when [Dr A] checked all the blood results at 14:00hrs.
e. The on call Medical Team were consulted regarding a severely septic patient at 11am, but did not review until around 16:00 hrs (some 5 hours later). This was predominantly because there was only one on call medical registrar and the ED was unusually busy that day. Despite the medical registrar being re-contacted at 14:00 hrs when the elevated Troponin-T test came to light, there was still a further significant delay until the patient was reviewed. [Mr B] was admitted to a side-room on the surgical ward with inadequate monitoring or acuity of nursing care. In my opinion a patient with such significant sepsis should have been admitted to an HDU or ICU bed from the outset. This is especially relevant in light of [Mr B's] known aortic valve disease irrespective of the final diagnosis of endocarditis. Significant hypotension of any cause in a patient with AS ideally requires HDU/ICU care.
f. Despite IV antibiotics being prescribed on admission at around 11am, they do not appear to have been given while the patient was in ED. Presumably this was because the ED department was so busy. As far as I can tell the IV antibiotics were not administered until [Mr B's] arrival to [the ward] at around 15:00. There is good evidence that a delay in administering IV antibiotics to a septic patient has a negative impact on survival [2].

I agree with [Dr F's] comments regarding the difficulty in diagnosing bacterial endocarditis, and I do not think that the delay in diagnosis could be considered substandard care. It is not my remit to comment on whether the treatment received affected outcome, but rather whether the treatment received would be considered an 'appropriate standard of care'.

In my opinion the departures in the standard of care were:

i. The delay to medical review (despite a timely referral having been made).
ii. The delay in requesting ICU review.
iii. The delay to administering IV antibiotics.

Unfortunately the delay in ICU/Medical review resulted in [Mr B] being admitted to a non-monitored bed on the surgical ward. The standard of care would have been for [Mr B] to be admitted to an HDU/ICU bed from the outset. Indeed he should have been triaged as a category 2, and would most likely have been admitted to a resuscitation bay in ED. (I have based this final comment on information provided by both an ICU consultant and an Emergency Medicine Consultant at my hospital).

Each of these could only be considered mild to moderate departures from the standard of care. But unfortunately together may have conspired to result in [Mr B's] death. I would like to extend my sincerest condolences to [Mr B's] family.

References:

[1] Australian Government Department of Health and Ageing. *Emergency Triage Education Kit.* ISBN: 1-74186-411-9

[2] Kumar et al. *Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock.* Crit Care Med 2006; 34:1589–1596"

The following further expert advice was obtained from Dr Speight:

"**Instructions from the Commissioner:**

Further to my initial letter, you have requested that I provide an opinion on the following additional questions:

1. The reasonableness of the care provided by [Dr A], including:
   a) Whether [Dr A] should have requested a Troponin-T blood test following his initial assessment at 10:50am
   b) Whether it would have been expected for a laboratory technician to have called [Dr A] to inform him of the Troponin-T blood result;
   c) Whether [Dr A's] initial diagnosis should have been more suspicious of severe sepsis;
   d) Whether it was appropriate for [Dr A] to defer transferring [Mr B] to the Intensive Care Unit (ICU) or Coronary Care Unit (CCU), or requesting ICU/CCU input, until after the medical review;
   e) Whether antibiotics should have been prescribed earlier;

2. The reasonableness of the care provided by [Dr F] regarding his supervision of [Dr A];
3. Whether any of the additional information causes you to amend your original advice or make further comments;
4. The adequacy of the relevant policies and procedures in place at Northland District Health Board at the time of the events complained of; and
5. The adequacy of the relevant policies and procedures currently in place at Northland District Health Board, including any further changes that you consider may be appropriate.

For each question, you have requested that I advise:

a) What the standard of care/accepted practice is;

b) If there has been a departure from standard of care or accepted practice, how significant a departure do you consider it is; and

c) How the care provided would be viewed by your peers?

1) The reasonableness of the care provided by [Dr A], including:

a) Whether [Dr A] should have requested a Troponin-T blood test following his initial assessment at 10:50am

Although it transpired that the Troponin-T test was markedly elevated (and therefore vindicated the Emergency Department Nurse's decision to request the test), I agree with [Dr A's] assertion that at the time of admission there was nothing specific to suggest the need for a Troponin test. The patient had not been complaining of any chest pain at admission (although he later gave a history of chest tightness to [Dr A] on direct questioning, once the Troponin result was known). [Dr A] comments himself that on admission the cause for hypotension was unknown, and that the differential diagnosis list was broad. This could have included a cardiac cause, especially in light of the patient's known cardiac history, but I think it is reasonable that [Dr A] requested a medical review to assess the patient's cardiac system.

b) Whether it would have been expected for a laboratory technician to have called [Dr A] to inform him of the Troponin-T blood result;

I note from the additional material provided to me on this occasion that the laboratory's own protocol states under Results and (Initial) Reporting: '*Documented "alerts" (eg critical clinical risk and/or abnormal results) will be phoned urgently to the clinician on duty at the time and/or the consultant if so directed.'* The protocol does not clarify what constitutes a 'critical clinical risk or abnormal result'. Clearly the lab staff would be unable to alert clinicians to every abnormal result, and many of these results would be of little clinical importance/relevance. I would be interested to know how often the lab processed a Troponin test that was elevated. I am not adequately qualified to comment on whether a Troponin-T of 990 ng/L should be consider sufficiently unusual to warrant fulfilling the criteria of 'critical clinical risk'. But as the upper limit is <15 ng/L it seems likely that this result would meet the threshold. If this question is considered pivotal to the case I would suggest seeking advice from a Cardiologist or Chemical Pathologist.

Perhaps a more pertinent question is: 'who is responsible for checking the result and acting upon it'? I assume that any registered nurse requesting a laboratory test is doing it under the oversight of a registered medical practitioner? In this case I would imagine that the oversight would be provided by either the Clinical Head of the Emergency Department, or the most senior Emergency Department SMO on at the time that the test was requested? In the simplest scenario the requesting clinician is responsible for checking and acting upon the test result. When the patient is transferred between teams, my understanding is that the original requesting physician remains responsible. However, one might argue that the admitting team was also responsible for checking and acting upon all tests requested on that admission. I'm uncertain what the HDC standing is on this matter? In any case, I very much doubt

bringing the result of the Troponin test to [Dr A's] attention any earlier would have altered the outcome, as [Dr A] had already requested a medical review.

I note from [NDHB's] letter (dated 10th March 2016) that a new ED treatment chart has been developed which has a space allocated for the ED nurses to detail any blood tests they have ordered. This seems a pragmatic approach to dealing with this problem into the future.

c) Whether [Dr A's] initial diagnosis should have been more suspicious of severe sepsis:

I agree with both [Dr A] and [Dr F] that it would be unreasonable to have expected [Dr A] to have made the diagnosis of Endocarditis on admission. I hope I did not give the impression that this was the case in my last report. As [Dr A] points out, it is easy to be wise after the event (and with the benefit of the results of a post-mortem examination). Endocarditis is a rare presentation of sepsis, and can be remarkably difficult to diagnose. I also agree with [Dr A's] assertion that on admission it was not clear what the diagnosis was, and that the differential list was broad at that juncture.

However, it is usual to have a 'working diagnosis' once the initial assessment has been completed (ie the diagnosis currently at the top of the differential diagnosis list based on any available clinical history, examination, physiological parameters and laboratory or radiological tests). It is not entirely clear from [Dr A's] notes as to what his working diagnosis was on admission, but I am assuming 'Sepsis of Unknown Origin (possibly abdominal)' would have been near to the top of the list. I am basing this assumption on the fact that he ordered an abdominal CT scan. In his reply (dated 9th May 2016) [Dr A] makes the reasonable observation that at the time of admission the patient was afebrile and blood tests were still pending, thus a definitive diagnosis of sepsis could not have been made.

I think [Dr A's] initial treatment was entirely reasonable (ie: close monitoring and IV fluid resucitation). My initial report commented on the need for timely administration of antibiotics in the face of severe sepsis. [Dr A] responded to this by commenting that my report focused on 'early administration of antibiotics and ICU admission for the treatment of bacterial endocarditis'. I would just like to correct this by pointing out the paper I quoted was assessing the effect in the delay of administration of antibiotics in severe sepsis (and did not specify bacterial endocarditis). [Reference: Kumar et al. *Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock.* Crit Care Med 2006; 34:1589–1596]

d) Whether it was appropriate for [Dr A] to defer transferring [Mr B] to the Intensive Care Unit (ICU) or Coronary Care Unit (CCU), or requesting ICU/CCU input, until after the medical review:

I believe that the insidious onset of [Mr B's] condition led to an underestimation of the severity of his disease. I have tried to remain dispassionate in my assessment of this case, and have tried not to allow the

knowledge of the final outcome and diagnosis to influence my comments. I do however still believe that [Mr B] should have been triaged as a category 2 based on his low blood pressure in the context of a patient with known aortic stenosis. This is not to suggest that an immediate diagnosis of bacterial endocarditis should have been made at triage, but rather in recognition of the fact that patients with aortic stenosis tolerate a low systolic pressure poorly (whatever the aetiology of the hypotension). I note [NDHB's] response to this, and agree that the initial assessment of a triage category 3 based on the immediate clinical appearance of the patient was not unreasonable. I also recognize that the second triage nurse would have upgraded the triage category to 'category 2' based on the observed hypotension, but did not see the need as the admitting surgical registrar was already in attendance. It is easy to be wise after the event, but I do wonder whether the patient may have been seen more urgently by the medical team if he had been labeled 'category 2'? It may also have attracted the attention of the senior ED staff, and may have in turn led to earlier involvement of ICU. That having been said, I do not think this could be considered a departure from an accepted level of care as [Mr B] was still admitted to an ED bed in a timely manner.

e) Whether antibiotics should have been prescribed earlier;

This does relate to the discussion above about whether it was clear that sepsis was the cause of [Mr B's] hypotension in the first instance. Accepting [Dr A's] explanation that a definitive diagnosis of sepsis had not been made until the result of the elevated white-cell count (WCC) was seen, it would seem reasonable to have only requested antibiotics once the WCC was known. This result was available electronically at 14:57, and [Dr A] prescribed the antibiotics after his review at 15:00hrs. Perhaps a more pertinent observation is the fact that the antibiotics were then not administered for another hour and a half.

I note that Northern District Health Board has subsequently updated its Adult Sepsis Pathway to incorporate early administration of antibiotics (and early ICU intervention).

2) The reasonableness of the care provided by [Dr F] regarding his supervision of [Dr A]:

I remain of the opinion that [Dr F's] supervision of [Dr A] was entirely reasonable: [Dr A] was a senior surgical registrar […] at the time. The CV provided by [Dr A] shows extensive training in both Accident & Emergency and Surgery. [Dr A] appropriately consulted [Dr F] throughout [Mr B's] inpatient journey, and had an agreed plan of investigation and treatment. [Dr F] was available to review the patient himself had it been deemed necessary, and was planning to review the patient once the abdominal CT had been undertaken. The abdominal CT was delayed until later in the day to allow fluid resuscitation prior to administering potentially nephrotoxic IV contrast.

3) Whether any of the additional information causes you to amend your original advice or make further comments;

I am gratified that in [its] reply to [HDC] (dated 10th March 2016), [NDHB] acknowledged all of the points I had raised. It is never easy to comment on the care provided by colleagues, especially when the outcome has been an adverse one. This task is made even harder when trying not to allow hindsight to cloud the assessment. I would agree with everything that [was] said in [its] reply, and it would seem that NDHB have made significant changes in areas of practice to prevent a recurrence of such an event (in particular the updated policy on Adult Sepsis Pathway).

4) The adequacy of the relevant policies and procedures in place at Northland District Health Board at the time of the events complained of; and

I have not seen a copy of the earlier version of the Adult Sepsis Pathway (that predates the updated version provided), but I have no reason to assume that it was inadequate.

5) The adequacy of the relevant policies and procedures currently in place at Northland District Health Board, including any further changes that you consider may be appropriate.

As I have stated above, NDHB have responded in a positive manner to the concerns raised and have implemented changes as listed in [its] reply to [HDC]. I do think the comments made in the Surgical Department's Morbidity and Mortality Meeting documentation are pertinent. When an unstable patient is awaiting specialist review (in this case a medical review), and the diagnosis remains unclear, I think moving the patient out of the Emergency department simply to meet the 6-hour target is ill-advised. In this case the patient was moved to an area of lower acuity (ie a side-room on the surgical ward), rather than to the ICU or CCU. However, this is an initiative being driven by the Ministry of Health, and the NDHB cannot be held responsible for its implementation.

The impression I gained from [Mr C's] letter ([date]) was that the family's main concerns revolved around [Mr B] being sent to the ward rather than ICU. It must have been very difficult for [Mr C], a [medical professional], to watch his brother [Mr B] deteriorate without the ability to help. I hope that the family will gain some comfort from knowing that NDHB have investigated the case in detail, have accepted that areas of [Mr B's] care were less than ideal, and have made significant changes to prevent a repeat of these tragic events."

The following further advice was obtained from Dr Speight:

"**Instructions from the Commissioner:**

Further to my initial letter, you have requested that I clarify the following points:

1. You stated that there was evidence of severe sepsis at the time of surgical registrar [Dr A's] initial review of [Mr B] in the Emergency Department. Could you please clarify what this evidence was?

2. You stated in your original report that the Intensive Care Unit (ICU) should have been consulted at the time of [Dr A's] initial review. Could

you please clarify whether it was appropriate for [Dr A] to defer transferring [Mr B] to the ICU or Coronary Care Unit (CCU), or requesting ICU/CCU input, until after the medical review (i.e. whether you still consider it a departure from standard practice that [Dr A] did not consult with ICU at the time of his initial review)?

3. The adequacy of NDHB's Severe Sepsis Management Policy (attached for your ease of reference).

1. You stated that there was evidence of severe sepsis at the time of surgical registrar [Dr A's] initial review of [Mr B] in the Emergency Department. Could you please clarify what this evidence was?

You have previously asked me to comment on: 'Whether [Dr A's] initial diagnosis should have been more suspicious of severe sepsis', and I have copied my original reply below:

'I agree with both [Dr A] and [Dr F] that it would be unreasonable to have expected [Dr A] to have made the diagnosis of Endocarditis on admission. I hope I did not give the impression that this was the case in my last report. As [Dr A] points out, it is easy to be wise after the event (and with the benefit of the results of a post-mortem examination). Endocarditis is a rare presentation of sepsis, and can be remarkably difficult to diagnose. I also agree with [Dr A's] assertion that on admission it was not clear what the diagnosis was, and that the differential list was broad at that juncture.

However, it is usual to have a 'working diagnosis' once the initial assessment has been completed (ie the diagnosis currently at the top of the differential diagnosis list based on any available clinical history, examination, physiological parameters and laboratory or radiological tests). It is not entirely clear from [Dr A's] notes as to what his working diagnosis was on admission, but I am assuming 'Sepsis of Unknown Origin (possibly abdominal)' would have been near to the top of the list. I am basing this assumption on the fact that he ordered an abdominal CT scan. In his reply (dated 9th May 2016) [Dr A] makes the reasonable observation that at the time of admission the patient was afebrile and blood tests were still pending, thus a definitive diagnosis of sepsis could not have been made.

I think [Dr A's] initial treatment was entirely reasonable (ie: close monitoring and IV fluid resuscitation). My initial report commented on the need for timely administration of antibiotics in the face of severe sepsis. [Dr A] responded to this by commenting that my report focused on 'early administration of antibiotics and ICU admission for the treatment of bacterial endocarditis'. I would just like to correct this by pointing out the paper I quoted was assessing the effect in the delay of administration of antibiotics in severe sepsis (and did not specify bacterial endocarditis). [Reference: Kumar et al. Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock. Crit Care Med 2006; 34:1589–1596]'

When [Mr B] initially presented to the Emergency department on [Day 8] he presented with a history of lethargy, dehydration, low-grade fever and sweats. He had a known history of aortic stenosis for which he was awaiting review for a possible aortic valve replacement. He had been an inpatient on [Day 1] (7 days earlier) for presumed colitis, and was awaiting an outpatient colonoscopy.

[Mr B's] presenting physiological parameters included a mild tachycardia (HR 94), a significantly low blood pressure (BP 87/46, MAP 60mmHg) and an increased respiration rate of 22/min. His temperature was within the normal range at 37.2°C.

The following is an excerpt taken from UpToDate which helps define early sepsis and sepsis:

'Sepsis is a clinical syndrome that has physiologic, biologic, and biochemical abnormalities caused by a dysregulated inflammatory response to infection. Sepsis and the inflammatory response that ensues can lead to multiple organ dysfunction syndrome and death' [1].

'**DEFINITIONS** — Sepsis exists on a continuum of severity ranging from infection and bacteremia to sepsis and septic shock, which can lead to multiple organ dysfunction syndrome (MODS) and death. The definitions of sepsis and septic shock have rapidly evolved since the early 1990s. The systemic inflammatory response syndrome (SIRS) is no longer included in the definition since it is not always caused by infection. The definitions for sepsis that we provide below reflect expert opinion from task forces generated by national societies including the Society of Critical Care Medicine (SCCM) and the European Society of Intensive Care Medicine (ESICM). Importantly, such definitions are not diagnostic of sepsis since they do not comprehensively include specific criteria for the identification of infection'.

'**Identification of early sepsis** — Societal guidelines place emphasis on the early identification of infected patients who may go on to develop sepsis as a way to decrease sepsis-associated mortality. The 2016 SCCM/ESICM task force have described an assessment score for patients outside the intensive care unit as a way to facilitate the identification of patients potentially at risk of dying from sepsis. This score is a modified version of the Sequential (Sepsis-related) Organ Failure Assessment score (SOFA) called the quickSOFA (qSOFA). The qSOFA only has three components that are each allocated one point: respiratory rate ≥22/minute, altered mentation, and systolic blood pressure ≤100 mmHg. A score ≥2 is associated with poor outcomes due to sepsis. However, the ability of qSOFA to predict death from sepsis requires prospective evaluation before it can be routinely used for this purpose. Importantly, this qSOFA score is different from the full SOFA score which is part of the 2016 SCCM/ESICM definition of sepsis, the details of which are described separately.'[1]

'A 2016 SCCM/EISCM task force has defined sepsis as life-threatening organ dysfunction caused by a dysregulated host response to infection:

Organ dysfunction — Organ dysfunction is defined by the 2016 SCCM/ESICM task force as an increase of two or more points in the SOFA score.

Infection — There are no clear guidelines to help the clinician identify the presence of infection or to causally link an identified organism with sepsis. In our experience, for this component of the diagnosis, the clinician is reliant upon clinical suspicion derived from the signs and symptoms of infection as well as supporting radiologic and microbiologic data and response to therapy.' [1]

Taking into account the fact that [Dr A] only had physiological parameters by which to assess [Mr B] when he first presented, the qSOFA score would have triggered for both respiration rate (>= 22/min) and systolic blood pressure (<100mmHg). This gives a score of 2, which predicts for poor outcome due to sepsis. There was insufficient information on admission to calculate a full SOFA score, which is intended for ICU use.

'Symptoms and signs — The symptoms and signs of sepsis are nonspecific but may include the following:

1. Symptoms and signs specific to an infectious source (eg, cough dyspnea may suggest pneumonia, pain and purulent exudate in a surgical wound may suggest an underlying abscess)
2. Arterial hypotension (eg, systolic blood pressure [SBP] <90mmHg, mean arterial pressure [MAP] <70mmHg, an SBP decrease >40mmHg, or less than two standard deviations below normal for age)
3. Temperature >38.3 or <36°C
4. Heart rate >90 beats/min or more than two standard deviations above the normal value for age
5. Tachypnea, respiratory rate >20 breaths/min
6. Altered mental status
7. Ileus (absent bowel sounds; often an end-stage sign of hypoperfusion)
8. Decreased capillary refill, cyanosis, or mottling (may indicate shock)

Laboratory signs — Similarly, laboratory features are nonspecific and may be associated with abnormalities due to the underlying cause of sepsis or to tissue hypoperfusion or organ dysfunction from sepsis. They include the following:

1. Leukocytosis (white blood cell [WBC] count >12,000 microL–1) or leukopenia (WBC count <4000 microL–1)
2. Normal WBC count with greater than 10 percent immature forms
3. Hyperglycemia (plasma glucose >140 mg/dL or 7.7 mmol/L) in the absence of diabetes
4. Plasma C-reactive protein more than two standard deviations above the normal value

5. Plasma procalcitonin more than two standard deviations above the normal value (not routinely performed in many centers)
6. Arterial hypoxemia (arterial oxygen tension [PaO2]/fraction of inspired oxygen [FiO2] <300)
7. Acute oliguria (urine output <0.5 mL/kg/hour for at least two hours despite adequate fluid resuscitation)
8. Creatinine increase >0.5 mg/dL or 44.2 micromol/L
9. Coagulation abnormalities (international normalized ratio [INR] >1.5 or activated partial thromboplastin time [aPTT] >60 seconds)
10. Thrombocytopenia (platelet count <100,000 microL–1)
11. Hyperbilirubinemia (plasma total bilirubin >4 mg/dL or 70 micromol/L)
12. Hyperlactatemia (higher than the laboratory upper limit of normal)
13. Adrenal insufficiency (eg, hyponatremia, hyperkalemia), and the euthyroid sick syndrome can also be found in sepsis

It is clear that on initial presentation [Mr B] fulfilled at least three criteria under 'signs and symptoms': Arterial hypotension, tachycardia and tachypnoea. The laboratory blood tests taken on admission also supported a diagnosis of sepsis, with an elevated WCC 25.4 (neurophil count 22.5). I'm afraid I don't have the notes any longer as these were returned to you, but the CRP had been consistently elevated since prior to admission on [Day 1]. I cannot comment on the creatinine, sodium, plasma glucose or platelet-count. But I think the physiological parameters in the presence of a raised CRP and WCC suffice to fulfil the criteria for a diagnosis of sepsis.

According to UpToDate, 'the term **severe sepsis**, which originally referred to sepsis that was associated with tissue hypoperfusion (eg, elevated lactate, oliguria) or organ dysfunction (eg, elevated creatinine, coagulopathy) is no longer used since the 2016 sepsis and septic shock definitions include patients with evidence of tissue hypoperfusion and organ dysfunction' [1]. The diagnosis of '**septic shock**' relies on the patient fulfilling the criteria for sepsis, and then requiring ongoing ionotropic support despite adequate fluid resuscitation. This is not a diagnosis that can be made on admission, as it requires reassessment after fluid resuscitation. [Mr B] was not admitted to ICU, and as such did not have the opportunity to be placed on ionotropic support. However his gradually worsening cardiac function despite adequate fluid resuscitation would seem to suggest the diagnosis of 'septic shock' on the background of an established diagnosis of sepsis. The confounding issue is that [Mr B] may also have suffered a myocardial infarct at some point during his presentation, as indicated by a Troponin-T rise. His worsening cardiac function, which eventually led to his death, may have been significantly affected by any such acute myocardial event. To confuse the issue further, the Troponin-T can also rise in the presence of endocarditis.

As I have indicated before, at the time of admission, and prior to the results of the blood-tests being known, the differential diagnosis list was quite wide. The

differential diagnosis would have included sepsis, but other cardiac causes for hypotension could also be considered.

2. **You stated in your original report that the Intensive Care Unit (ICU) should have been consulted at the time of [Dr A's] initial review. Could you please clarify whether it was appropriate for [Dr A] to defer transferring [Mr B] to the ICU or Coronary Care Unit (CCU), or requesting ICU/CCU input, until after the medical review (i.e. whether you still consider it a departure from standard practice that [Dr A] did not consult with ICU at the time of his initial review)?**

I believe the comment you are referring to is the following?

> c. The ICU team were not consulted when [Mr B] was first admitted. [Dr A] had appropriately referred to the on call Medical Team, but I believe there was sufficient evidence of severe sepsis to warrant ICU involvement at that juncture, even when the aetiology of the sepsis was unknown. Especially in light of the patient's known history of AS, as patients with significant aortic-valve stenosis tolerate hypotension poorly. I suspect [Dr A] was falsely reassured that the Medical Team would initiate ICU/CCU review.

I think it is evident from the discussion above that by applying the qSOFA criteria there was sufficient physiological parameters to be suspicious of sepsis as a cause for [Mr B's] hypotension. As I have stated repeatedly, the admission observations alone were not sufficient to categorically diagnose sepsis. It was not until the WCC was found to be elevated, that I think the diagnosis of sepsis became more definite. However, the presence of hypotension in a patient known to have significant aortic stenosis is a reason for concern in its own right. Patients with aortic stenosis tolerate hypotension poorly as the drop in systolic blood pressure reduces the coronary artery perfusion and risks significant myocardial ischaemia. I am probably not the appropriate specialist to comment as to whether failing to involve ICU at this juncture could be considered a 'departure from standard care or accepted practice'. I have based my comments on a conversation held with an ICU colleague of mine, and if this is a critical question to answer I'd suggest seeking formal advice from an ICU expert.

It is hard to say who should have made the referral to ICU at an earlier point in [Mr B's] care. As I have stated above, I suspect [Dr A] expected the Medical team to review and refer on to ICU if appropriate. I do not think that [Dr A's] actions could be considered a 'departure from standard care' in light of the impending review by the medical team, as I do not think [Dr A] could have anticipated the subsequent delay to that review happening.

3. **The adequacy of NDHB's Severe Sepsis Management Policy (attached for your ease of reference).**

The new policy (revised December 2016) advocates early involvement of appropriate specialist (including ICU) and specifies antibiotics should be started as early as possible (this must be done while the patient is still in Accident and Emergency). Presumably the use of vasopressors would necessitate either starting these in a resuscitation bay in ED, or admission to ICU.

I think this policy covers all of the areas of concern that I have highlighted in my previous letters. Once again, I am not an accredited expert in the field, and either an ICU specialist or Infectious Disease Specialist may be in a better position to comment."

Appendix B: Independent medical advice to the Commissioner

The following expert advice was obtained from general physician Dr Richard Shepherd:

"My name is Dr Richard Shepherd. I have been asked to provide an opinion to the Commissioner on case number C15HDC01053 regarding the care [Mr B] received at [the public hospital]. I have read and agree to follow the Commissioner's Guidelines for Independent Advisors.

I am a Consultant General Physician employed full-time by the Waikato District Health Board. I graduated from Otago Medical School in 1997 with Bachelor of Medicine and Surgery (MBChB). I have attained fellowships with the Royal New Zealand College of Urgent Care, the Division of Rural Hospital Medicine and the Australasian College of Physicians. I have subspecialty interests in nephrology, emergency medicine and palliative care. I have completed the Auckland University Postgraduate Diploma of Community Emergency Medicine, the RACP Clinical Diploma in Palliative Medicine and the Otago University Certificate in Physician Performed Ultrasound. I have no conflicts of interest to declare in this case.

I have been requested by the Commissioner to provide expert advice on the following issues:

1/ The reasonableness of the care provided by [Dr D], including whether he should have reviewed [Mr B] earlier;

2/ The adequacy of the relevant policies and procedures in place at Northland District Health Board at the time of the events complained of; and

3/ The adequacy of the relevant policies and procedures currently in place at Northland District Health Board, including any further changes that you consider appropriate.

Also to comment on any other aspect of the care provided to [Mr B] that I consider warrants such comment.

For each of the above issues raised, my advice has been sought regarding:

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

b) If there has been a departure from the standard of care or accepted practice, how significant a departure it is in my view; and

c) How would the care provided be viewed by my professional peers?

I have been asked to limit my advice to the general medical care provided to [Mr B] as separate advice regarding his general surgical and nursing care has already been provided.

Sources of information reviewed in the preparation of this report:

Letter of complaint [Mr C] [date]

Northland District Health Board's response dated 18 August 2015, including enclosures

Northland District Health Board's Response dated 2 December 2015, including enclosures

Northland District Health Board's response dated 8 December 2015

[Dr D's] response dated 2 January 2016

Northland District Health Board's response dated 10 March 2016

Further Information from Northland District Health Board dated 16 March 2016

[Dr A's] response dated 9 May 2016

[Mr B's] clinical records from Northland District Health Board dated [2014].

Further information from Northland District Health Board dated 10 June 2016.

Infective Endocarditis: Easily Missed? BMJ 2010;341:c6596

Overview:

[Mr B] was admitted to the surgical ward at [the public hospital] on [Day 1], with a four week history of being generally unwell with 1–2 watery bowel motions per day, nausea, weight loss, right lower quadrant abdominal pain and raised inflammatory markers. The initial assessing surgical registrar made a diagnosis of '?colitis' with plans for a 'flexi sigmoidoscopy +/- CT abdomen'. Note was made of colchicine use which had been stopped three weeks earlier and had previously been associated with him developing diarrhoea. Note was also made that this always resolved on stopping taking the colchicine in the past. He was admitted overnight for IV fluids, and analgesics. A low grade fever of 37.9 was noted on the evening of admission. He was reviewed by the consultant Surgeon the following morning with a brief clinical note recorded. He was discharged on loperamide (treatment for his diarrhoea) and plans made for an urgent outpatient colonoscopy.

[Mr B's] general practitioner (GP) arranged for him to be readmitted to the surgical service at [the public hospital] on [Day 8]. His diarrhoea had continued and he had continued to feel generally unwell. His raised inflammatory markers were again highlighted in his referral.

He presented at 9.58am and was triaged by an Emergency Department nurse at 10.33am as the department was very busy. [Mr B] was initially given a triage code of 3 (to be seen within 30 minutes). A second triage nurse who saw him later recorded a low BP of 87/46. He was reviewed by surgical registrar [Dr A] at 10.50am as soon as an ED cubicle was available. He noted a history of ongoing diarrhoea, abdominal pain, more recent lethargy, low grade temperature, sweating and decreased appetite. His prior history of aortic stenosis awaiting surgery, atrial fibrillation, hypertension and mild coronary artery disease were noted. On

assessment he was found to be sleepy with much of the history taken from his wife. Temperature was 37.2, BP 87/46, pulse 94. Cardiorespiratory examination findings were not recorded. [Dr A's] diagnostic impression was 'dehydration and non-specific symptoms — to rule out intra-abdominal sepsis/ lymphoma'. Blood tests were taken (including a troponin T test ordered by an Emergency Department nurse), intravenous fluids started and plans made for CT abdomen and a medical review from the on call medical Registrar [Dr D].

Emergency Department nursing progress notes record ongoing hypotension with BP 95/48 at 12.30pm and 91/46 at 1.20pm. In addition a printout observations trend record of [Mr B's] BP in the Emergency Department shows six BP recordings from 11.18am to 12.54pm. These were initially at half hourly intervals ranging between 87/46 to 95/[47] until 12.48pm where a BP of 64/23 was recorded followed by 12.50pm BP of 76/32, and 12.54pm BP of 72/30.

The troponin result of 990 (abnormal — indicating myocardial injury) was available at 12.13pm. [Mr B] was transferred to the surgical ward at around 2.00pm. [Dr A] reviewed [Mr B] on the surgical ward at around 3.00pm. At that stage he recorded an additional history of [Mr B] having had chest tightness and shortness of breath all day. [Dr A's] diagnosis at that stage was 'sepsis ?cause plus a NSTEMI' (non ST elevation myocardial infarction — heart attack). He requested an ECG, blood culture, chest X-ray and prescribed triple IV antibiotics. (These were first administered at 4.30pm.) The suggestion of transfer to the coronary care unit was made and [Mr B's] CT abdomen was expedited and confirmed for 5.30pm. [Dr A's] 3.00pm entry in the clinical record notes his further discussion with the on call medical registrar [Dr D] with the elevated troponin noted and that he (the medical registrar) would review the patient 'very soon'.

[Dr D's] notes do not record a consultation time but he appears to have reviewed [Mr B] at around 4.00pm. A diagnosis of NSTEMI secondary to abdominal sepsis was made. [Dr D] requested review by the Intensive Care Unit Registrar and queried Intensive Care Unit or Coronary Care Unit placement. A urinary catheter was inserted draining concentrated urine. At around 4.30pm he was reviewed by [an Intensive Care Unit Registrar]. On review [Mr B] was found rigoring and confused with cool peripheries. A venous blood gas was performed at 4.30pm with an elevated lactate level found (suggesting poor tissue perfusion). At 5.00pm during [Mr B's] ICU review he was noted to become increasingly mottled and unwell and became unresponsive with an asystolic arrest diagnosed. Cardiopulmonary resuscitation was unsuccessful and [Mr B] was certified as deceased at 5.17pm.

A subsequent post mortem examination showed infective endocarditis of the aortic valve involving adjacent heart tissue, fibrinous pericarditis and evidence of heart failure. Death was considered to be due to infective endocarditis.

Advice to the Commissioner:

1/ The reasonableness of the care provided by [Dr D], including whether he should have reviewed [Mr B] earlier;

The above question contains two separate, yet related issues. Reasonableness and timeliness of care. I find these questions difficult to consider in isolation however, without also considering [Dr A's] role and particularly his interaction with [Dr D]. The most significant focus from the documentation provided to me appears to rest on the timeliness of [Dr D's] review so I will begin there. In my opinion this is a simple yet also a very complex issue. I concede the factors involved can be weighed differently.

It would appear the time period from referral to medical review was approximately 4.5 to 5 hours. When viewed with the benefit of hindsight, and knowing [Mr B's] outcome, the answer to the issue of timeliness of review seems obvious. This would clearly fall well below the *ideal* standard of care. Defining exactly what is the *expected* standard of care is however more problematic. In an ideal world patients would be seen soon after they are referred. *[The public hospital] Emergency Department Standard Operating Procedure 2009–2016* sets out a number of guidelines regarding the *expected* timeliness of review. None however appear to be specific to specialty registrar to another specialty registrar referral as in this case. This is further expanded upon in question 2/ below. The Operating Policy states that '*Although some interactions and behaviour of staff are clearly delineated, in many circumstances there is a reliance on common sense. This often evaporates whenever one or more components of the workforce, or facility are placed under pressure.*' I would tend to agree. The timeliness of review is a complex interaction of competing demands requiring a significant dose of common sense.

From a practical standpoint there appears little doubt that [the public hospital] ED was very busy at the time of [Mr B's] presentation. Hospital records show [Dr D] had seven acute emergency department patients to be seen up to 1.30pm (including [Mr B]). One was a category 1 patient, three category 2 patients and three category 3 patients. I would regard this as a significant, high acuity work load particularly when it appears four such patients were all due to be seen around the same time of 10.30am and all were category 1 and 2 patients. [Dr D] was the sole medical registrar allocated to the emergency department as well as covering the medical wards, surgical referrals and likely calls from GPs at the time. It is not possible to know the competing circumstances of this other work load outside of the emergency department but the influence of recurrent interrupting phone calls alone should not be under estimated. I would regard the above work load as significant even for the most efficient and experienced medical registrar and that such circumstances would mandate a common sense approach to prioritising patient review.

With what was known at the time of [Mr B's] medical referral (approx. 11am) it may have been quite reasonable that he was prioritised behind the other 6 patients in the emergency department as he had already been reviewed by an inpatient team registrar (surgery), and had a management plan put in place. This appears to

be what occurred. The details of the other medical patients' competing prioritisation are however unknown. The expressed urgency of the initial referral by [Dr A] to [Dr D] is also unknown, though, in his submission [Dr D] states he does not recall any particular urgency being attached to the matter.

In such busy circumstances, targets set out in the Operating Policy (though again not specific to this situation) would be highly unlikely to be achieved. It would be the expected standard that when faced with such workloads, and anticipated delays, that further support be sought. There was an escalation policy in place that the duty medical SMO on call be contacted in the event that any patient waited more than four hours to be seen by an inpatient registrar or that more than four patients were waiting to be assessed. This was not done and should have been activated in [Mr B's] case. In [Dr D's] submission he states that the on call medical SMO was also covering the cardiology service and was busy in a cardiology clinic and unable to assist with ED patients. He further states that the help of the other medical backup registrars was requested and that he regarded this as usual practice. The specific details of this requested support, their timing of providing assistance and their competing workload is unknown also. If the above circumstances [Dr D] describes were correct I would struggle to be overly critical of [Dr D's] actions (though granted outside the letter of the 4hr escalation policy) as I would consider it highly unlikely the duty SMO would have interrupted his clinic to assist with the admission of non-critical patients (as [Mr B] was regarded at that stage). In my opinion the duty SMO would have requested the attendance of the backup support registrars as occurred on the initiative of [Dr D] anyway.

In an ideal situation, supervising senior staff should not be put in a position where they are unavailable to *directly* supervise RMOs during their on call responsibilities. In the broader picture of course, by [Dr D] not utilising the escalation policy correctly, future risk could be created as senior management are not recurrently informed of risky workloads and when breaches of expected timeframes occur. Without such recognition any potentially unsafe staffing levels are unlikely to be reviewed and potentially addressed.

For the question of reasonableness of [Dr D's] care. [Dr D] did not ultimately make the correct diagnosis (subacute bacterial endocarditis). The diagnosis made at the time of his review was non ST elevation myocardial infarction (heart attack) secondary to abdominal sepsis.

In an ideal consultation the dramatically elevated troponin result, in the setting of a remarkably non ischaemic ECG, could have been a trigger for pause for thought as being unusual for a diagnosis of heart attack. When then considered on a background of sepsis, a history of non-specific unwellness and known severe aortic valve disease this might further have expanded the considered differential diagnosis to include myocarditis/endocarditis. In so doing this could have avoided the cognitive error of 'premature closure' that occurred here. That said, in my opinion the diagnosis reached by [Dr D] was a reasonable assessment based on the results to hand at the time, and one the majority of medical registrars would have made (and indeed the diagnosis all the medical staff later involved made). It is all

too easy to be wise in hindsight. [Mr B] presented with an atypical presentation of an uncommon disease with a subacute course. It is unlikely the correct diagnosis would have been made until positive blood cultures were identified or an echocardiogram was performed as further workup for his presumed heart attack.

Following [Dr D's] review he does appear to have recognised the seriousness of the situation and the presence of significant sepsis. Had the diagnosis been a heart attack his management would have been reasonable in that circumstance. Steps were taken to correctly escalate [Mr B's] care to CCU or ICU. Appropriate investigations were reviewed and treatment of the sepsis supported (blood culture, IV antibiotics, IV fluids). [Dr D's] notes do not comment on the ECG findings which would be expected.

Had [Dr D] reviewed [Mr B] sooner than he did I doubt his management plan would have differed materially from what he recommended (medical treatment for his presumed heart attack, IV fluids, and antibiotics (which he deferred to the surgical team's decision due to the suspected source being abdominal). Earlier antibiotic administration may have resulted from his earlier review via feedback to the surgical team. I would however struggle to hold [Dr D] directly responsible for this delay in antibiotic use as the earlier deferred decision making regarding antibiotics had been instigated by [Dr A]. Earlier transfer to a higher dependency unit may have resulted from earlier review, though I suspect this would not have altered the outcome either.

I have been requested to limit my advice to the medical management of [Mr B] and not comment on the surgical team's management. In my opinion though [Mr B's] best chances lay in the early recognition of his sepsis, early antibiotics and adequate fluid therapy. Even when antibiotics were prescribed by the surgical team at approximately 3.00pm there was a delay of over 1.5hrs before they were actually given. This perhaps further highlights the difficulties in recognition of the seriousness of [Mr B's] condition by those attending to him. Core routine investigations were not performed in the emergency department (CXRay, ECG, catheter insertion, blood gas, adequate cultures) as part of [Mr B's] workup. These were later requested on the surgical ward, though unfortunately likely contributed to further delays in antibiotic administration.

In my opinion the failure to recognise the seriousness of [Mr B's] condition at his ED presentation was the critical incident which set in motion the pathway to his outcome and influenced the practice of others attending him. The features of serious illness were there and should have been recognised at initial presentation and antibiotic decision making not deferred. I struggle to accept [Dr A's] comments in his submission section Vii surrounding this. This failure meant [Mr B's] subsequent nursing care appears to have fallen below the expected standard for monitoring. Adequate initial sepsis investigations were not performed and fluid balance, urine output and BP were not paid attention to. His referral to the medical registrar may not have been articulated on a time critical basis resulting in perhaps low prioritisation behind other deemed more sick medical patients. Early transfer out of the emergency department also occurred and ultimately early antibiotics were not given.

In my balanced opinion then I would consider the timeliness of [Dr D's] review fell well short of the *ideal* standard and outside of the *expected* standard of care at [the public hospital]. I would consider this a minor breach of the expected standard however, as at the time, the clinical urgency of the situation was not recognised through no fault of [Dr D's], and so did not mandate clearly prioritising [Mr B's] review ahead of the significant number of other patients waiting to be attended to. The time frames involved in this case would not be an unusual occurrence for delays in referrals between inpatient specialty registrars in many hospitals across Australia and New Zealand. Whilst not ideal, it is not entirely unexpected.

[Dr D] did not adhere to the hospital's escalation policy and therefore fell below that expected standard. I would consider this a minor breach also. I would struggle to directly criticise [Dr D] for his timeliness and reasonableness of care under the circumstances described above due in my opinion to the involved mitigating circumstances as described. [Dr D] was likely dependent on the quality and urgency of the referral assessment made by [Dr A]. In my opinion this assessment and recognition of urgency likely fell short on [Dr A's] part.

There may also be another layer beyond the individuals directly involved in this case. It can be very challenging to keep an over view of total service work load, and patient waiting times and priorities, whilst actively also assessing and treating patients. In my opinion the duty on call SMO also has a *proactive* role in such responsibilities as part of the on call day duties and should be in a position where they can *actively* supervise their juniors and coordinate resources under situations of stress. Supervision ignorance is not bliss. It is simply not supervision. A system which does not facilitate *active* support of RMOs, and that relies on RMO adherence to policies they may not be aware of, invites errors in what should be a high reliability industry with supportive redundancies in place. When adding in a good dose of heavy workload, time pressure and stress, the risk of not following procedures will likely increase exponentially. Under such circumstances I would struggle to be critical of the individual when poor outcomes result.

2/ The adequacy of the relevant policies and procedures in place at Northland District Health Board at the time of the events complained of.

In my opinion the relevant policy in place at the time could more clearly outline the expected standard for review times between inpatient services. Northland District Health Board's Standard Operating Procedure 2009 documents the expectation that inpatient teams will adopt Australasian triage waiting times to inform attendance. It is not clear from the policy if this is restricted to GP direct referral patients or if there is an expectation that these time frames apply to further internal referral from one inpatient specialty registrar to another — as occurred here. In my opinion this policy refers to expected initial consultation times — not re-referral to another inpatient specialty registrar. Such waiting time targets for referral for review from one registrar to another would very seldom be met indeed.

The policy further states that assessment by the inpatient team and completion of admission documentation with submission of the bed request form within 2 hours should occur (Targets-321 model). This is a reasonable standard of care in these circumstances and one which applies in my own institution. That policy however is not specifically directed at inpatient team to inpatient team referral either. It instead is focused on time frames for patients under the care of the ED who are referred to an inpatient team and is targeted to meeting the 6 hour transfer out rule in the emergency department. When the patient is admitted under the initial consulting inpatient service and transferred out of the emergency department, but is awaiting a second inpatient service consultation, there is similarly no guidance on expectations of reasonable time frames. This would appear to be one of the 'common sense' situations the policy allows for.

Apart from the dispute resolution appendix, none of the current patient flow algorithms contained in the appendix provide any guidance for situations where the initial consulting inpatient service wishes to refer the patient on to another inpatient service, either for an opinion, or to take over primary responsibility for the patient. Whilst this may all be semantics, it perhaps highlights the lack of clarity to be found in some aspects of the policy in what is a common clinical scenario — referral from one inpatient service registrar to another. The policy does not make clear specifically what these expectations are, though acknowledges that common sense is required. As can be seen from the documentation in this case though — what is 'common sense' can become quite murky depending on the outcome and whose 'sense' it is being compared to.

The policy further states that if any patient waits more than 4 hours to be seen by an inpatient registrar (but appears to restrict this to GP or emergency medicine referrals) then the on call SMO for that service must be contacted and such events reported to the General Manager and Chief Medical Officer. This is also indicated to apply if more than four patients are waiting for assessment. I would accept that such a policy is clear and provides a structure for escalation of potentially clinically risky situations. Again however it is unclear if this is the expectation for referral timeframes between inpatient registrars. Whether such a policy was/is part of the clinical culture where it is actively encouraged, supported and reinforced by senior clinical staff is unknown. Similarly whether RMO orientation specifically covered such expectations and escalation policies is also unknown. In [Dr D's] submission he states that 'traditionally within the hospital you call the back-up registrars before calling the on call consultant'. This is widely practiced at my institution also. A reluctance of RMO staff to seek senior involvement has been identified as endemic in New Zealand hospitals with its identification occurring frequently in the HDC literature as contributing to poor outcomes. In my opinion a culture of active SMO supervision, reinforcement of expectations and adequate policy orientation is required to address such issues. Whether this made up part of operational procedures at [the public hospital] at the time is unknown and is not referred to in the policy above. The policy does state that sufficient staff resource should be available to cover acute demands for the majority of occasions (ie. 80% of the time). Section 4.3 also states that response times will be audited as part of continuous quality improvement and describes the procedure for escalating under

performance. Whether such a policy was followed, and if audits were regularly performed to ensure adequate response times were consistently met is unknown.

At the time of [Mr B's] presentation there was a Severe Sepsis Management policy in place (first issued 2006). This policy is however very broad in its general guidance and does not address one of the critical issues in sepsis management which is to assist attending staff to recognise when a case of sepsis should be considered. I would not regard this as adequate guidance to assist front line staff to identify potential sepsis.

3/ The adequacy of the relevant policies and procedures currently in place at Northland District Health Board, including any further changes that you consider appropriate.

The same policy in place at the time of the events complained of appears to still be the relevant policy in place currently at [the public hospital] (version 1.5 2015 supplied). My comments in question 2/ above would therefore also apply.

In addition the more recent Adult Sepsis Pathway does not appear to have been integrated into this document under section 3.11 'Clinical Pathways'.

Northland District Health Board has since developed an Adult Sepsis Pathway (2015) which is a significant improvement on the previous Sepsis Management Policy and offers staff a framework to systematically consider a diagnosis of systemic inflammatory response syndrome (SIRS), and then in turn sepsis. This is clear and follows a structured flow which can be rapidly followed by staff.

In my opinion the inclusion of more specific guidance particularly around the terms 'broad spectrum antibiotics' and 'vasopressors' could potentially improve the policy's rapid usability as a 'one stop' pathway. In its current form it is likely less experienced staff, (most likely to benefit from such a pathway), would have to seek guidance from other sources on appropriate antibiotic choices/doses etc. and vasopressor specifics. This could potentially add to further unnecessary delays in treatment.

In my own institution the sepsis pathway includes explicit antibiotic guidance and vasopressor guidance (including adrenaline and phenylephrine dosing protocols) to allow adequate management of septic shock before ICU review/central line placement is achieved. A check point to include consideration of steroid dependent patients is also included. Such specifics potentially reduce delays in the delivery of the care needed whilst awaiting referral to ICU staff, or delays in transfer to ICU, before treatment is started. Such multilayer redundancies within the system offer the potential for staff to intervene earlier and so reduce unforeseen circumstances which might otherwise align and lead to unexpected delays.

The presence of such a sepsis pathway does not however ensure that it is always considered and applied. As in this case, much of the battle is in the *consideration* of sepsis early on. Potentially including a SIRS check point for triage nurses in the

standard emergency department triage form could build in further redundancy that the sepsis pathway is at least considered.

Also to comment on any other aspect of the care provided to [Mr B] that I consider warrants such comment.

In reviewing this case I could not help but resonate with a number of comments contained in [Dr D's] submission, particularly in his closing paragraphs. Bacterial endocarditis is an uncommon diagnosis which can in the case of less virulent organisms present in a subacute manner with many non-specific features. A GP may see perhaps only 1–2 cases in 8–10 years of practice. Symptoms such as loss of appetite, weight loss, arthralgia, and sweats overlap with much more common conditions. Many patients may initially experience only a general malaise. Given the diagnostic difficulty, some 25% of patients take longer than one month to be admitted to hospital after their first clinical signs become evident. In the pre antibiotic era the condition was almost universally fatal. Even in the antibiotic era, if treatment is delayed, up to 25% mortality can be seen — worse than many cancers. That said, [Mr B] had been admitted to hospital a week earlier with what in my opinion was a missed opportunity. By the time of his re presentation to hospital a week later his sepsis was considerably more advanced with evidence of myocarditis (heart muscle infection) and necrosis (heart muscle death) (seen in his elevated Troponin and autopsy findings). By that stage I suspect even antibiotics given immediately in the ED may not have altered his outcome.

The majority of the discussion documentation relating to this case concerns the final day of [Mr B's] life. I would however encourage the attending medical staff during his presentation one week earlier to review their clinical decision making and processes in this case. In my opinion these fell short of the expected standard. I would regard this initial presentation as falling within a general medicine scope of practice — though he was admitted under the surgical service. The admitting doctor at the time noted [Mr B's] duration of unwellness at several weeks. He noted his stopping of colchicine 3 weeks earlier, but that his diarrhoea had not settled as it previously *always* did on stopping colchicine (*suggesting colchicine use was a red herring*). He also noted his significantly elevated inflammatory marker (CRP of >100). His impression was one of colitis with his plan suggesting flexi sigmoidoscopy and ?CT if normal. Overnight a low grade temperature of 37.9 was recorded.

The consultant ward round the following morning records almost no clinical details, no examination findings, no review of investigations, no clinical reasoning and no diagnosis. In my opinion, and I believe in that of the majority of my peers, this would represent a very poor standard of documentation and could invite suggestions that inadequate consideration and care were given to the clinical circumstances and to the proceeding doctors' assessment. The formal discharge summary similarly contained no diagnosis, no mention of his low grade fever, and no explanation for his raised inflammatory markers that his GP had specifically documented when referring him into hospital.

Regardless of the documentation though, I would encourage the staff involved at this point to reflect on the clinical wisdom of discharging a patient from hospital with no diagnosis, unexplained significantly raised inflammatory markers, a low grade temperature and a history of many weeks of having been unwell. Whilst I appreciate it is easy to be wise after the fact, in my opinion [Mr B] should not have been discharged from hospital under the above circumstances ***known*** at that time. His inpatient further investigation and observation at that point would have offered him the best chances of securing the correct diagnosis — even if initially via a process of exclusion (with normal endoscopy and CT abdomen) — until his low grade fevers were recognised, unexplained rising inflammatory markers considered and blood cultures performed. In my opinion a medical review at that stage would have offered the best chances for a different outcome.

Application of, and following, the Adult Sepsis Pathway (which has since been introduced) would have identified [Mr B] even at that stage as potentially having SIRS, then in turn a potential source of infection (abdominal pain, diarrhoea) and in turn blood cultures would have been taken and antibiotics given. In my opinion this would have altered his outcome. If the purpose of reviewing [Mr B's] case is to improve care in the future then this period of his journey should also be reflected on."

Appendix C: In-house nursing advice to the Commissioner

The following expert advice was obtained from registered nurse Dawn Carey:

"Thank you for the request that I provide clinical advice in relation to the complaint from [Mr C] about the care provided to his late brother, [Mr B] by [the public hospital]. In preparing the advice on this case to the best of my knowledge I have no personal or professional conflict of interest. I have read and agree to follow the Commissioner's Guidelines for Independent Advisors. My advice is limited to the nursing care provided to [Mr B]. For the purposes of brevity I have not detailed the complaint or [Mr B's] clinical background, which was provided in the memo requesting clinical advice. I have been specifically requested to comment on the following issues relevant to [Mr B's] presentation to [the public hospital] on Day 8:

i. the time taken for [Mr B] to be triaged;
ii. the triage category allocated to [Mr B];
iii. the follow up of the Troponin T test result by the Emergency Department (ED) RN who requested it; and
iv. the administration of intravenous antibiotics.

I have reviewed the following documentation: complaint from [Mr C]; response from Northland District Health Board (NDHB) dated 16 March 2016 including copies of the blood analysis request forms, audit trail of Éclair; response dated 10 March 2016 which includes reports from non-nursing staff members, General Surgery M&M Report dated [2014], report to [Coroner], Adult Sepsis Pathway; response from NDHB dated 18 August 2015 including statement and case reflection prepared for the Coroner, post mortem report, the clinical notes of [Mr B].

Pertinent to the focus of my advice, NDHB report the following:

i. Agreement that there was a delay between [Mr B] arriving at the ED and being triaged and that this delay was longer than would be considered ideal.
ii. [Mr B] was triaged in accordance with the standard process in place at that time, which was two triage nurses being involved in the assessment. [Mr B] was allocated a triage Category 3 by the first nurse based on the vital signs reported in the GP referral letter and [Mr B] walking unaided into the ED. His vital signs were checked and recorded by the second triage nurse. Noting that his blood pressure had fallen significantly from that recorded on the GP referral letter, the nurse brought [Mr B] through to a cubicle immediately. This cubicle was equipped with full monitoring equipment and had piped oxygen and suction. As the Surgical Registrar was going to see the patient immediately, the nurse did not change [Mr B's] triage Category. The response reports that the triage process has changed significantly and now vital signs can be assessed immediately.
iii. Blood tests are routinely drawn by the ED nurses and sent to the laboratory. While it is not known whether the Surgical Registrar was specifically informed that a Troponin-T test was being requested, any check on [the

public hospital] computer system would show that four serum tests — biochemistry, full blood count, haemostasis and Troponin-T — were sent to the laboratory as a batch.

iv. Intravenous antibiotics were not prescribed at the time of [Mr B's] initial presentation as the Surgical Registrar was justified in considering that the medical team would have input into determining an appropriate antibiotic therapy.

Review of clinical records

i. [Mr B] presented at [the public hospital] ED at 9.58am on [Day 8]. He had been discharged the week before. The accompanying GP letter dated same day and approximately 20 minutes earlier referenced [Mr B] being accepted by [Dr A] — Surgical service. Reason for referral is reported as *…he is not coping well since discharge with ongoing loose motions and general feeling of being washed out and weak.* Reported vital signs are unremarkable; temperature 37.2°C, BP 140/80, AF.

ii. [Mr B] was triaged at 10.33am and allocated Category 3[1]. The ED Assessment Form reports, *presenting problem: diarrhoea/lethargy.* Triage notes are consistent with GP referral reason. Noted past medical history is: *?cardiac — for stent / HTN /Gout.* Untimed vital signs are recorded — *BP 87/46, Pulse 94, Resps 22, Temp 37.2°C, SaO_2 96%.*

Comment: The NDHB response identifies that the first triage RN allocated Category 3 prior to [Mr B's] vital signs being taken.

iii. Documentation indicates that [Mr B] was in a monitored area with regular vital sign recordings from 11.18am. Nursing progress notes (PN) report … *seen by Surg Reg on arrival. Pt nil c/o pain — feels slight nausea. BP hypotensive HR 94. Labs drawn/ luer sited R ACF — IV fluids stat commenced. Plan: admit surgically.* This entry is consistent with [Dr A's] documentation on the Admission to Discharge Planner which is timed as commencing at 10.50am.

Comment: The reported timings are consistent with the NDHB response that when [Mr B] was noted to be hypotensive, he received medical assessment and treatment promptly.

iv. The Blood Analysis Form (BAF) timed 11.20 requested biochemistry, Troponin-T level, full blood count and basic haemostasis screen. This has been *identified* as being completed by an ED RN. A short time later a new BAF signed by [Dr A] was sent to the laboratory requesting specific mineral analysis as *add on* tests to be done from the blood samples already submitted. The submitted Éclair audit trail is consistent with the NDHB response in that the four requested tests were loaded in the same batch on the patient clinical record system.

[1] Australasian Triage Scale (ATS) Category 3 identifies patients with potentially life threatening conditions who could have a potentially adverse clinical outcome if assessment/treatment is delayed for longer than 30 minutes.

Comment: In light of [Mr B's] presentation and queried cardiac history, I consider it reasonable that the RN requested a serum Troponin-T level as part of his blood tests. However, as there are a number of clinical conditions that can result in elevated serum troponin levels I would expect that an ECG would also have been done as part of the initial nursing assessments.

v. Three documents detail [Mr B's] vital signs in the ED. The printed tabular monitor trend indicates that after an initial response to fluid resuscitation, [Mr B's] blood pressure trended downward with recorded systolic consistently less than 80mmHg from 12.48pm. The ED Assessment Form and the Observation Chart reports BP 95/47 at 12.30pm and 106/58 at 2.30pm. Reported respiration rate, oxygen saturations and heart rate on all documents are generally unremarkable.

Comment: The automated blood pressure on the tabular sheet is significantly low and would require prompt action — further fluid resuscitation and consideration of vasopressor infusion — if deemed accurate. I note that automated BP devices can be unreliable in the setting of atrial fibrillation and if the cuff has moved.

vi. Nursing PN at 1.20pm report *...↓BP — currently with Plasmalyte IV @250mls/hr. Pt denies dizziness, light headedness on sitting — standing to independently transfer to to w/chair. BP 91/46 HR 92* [cannot decipher handwriting] ...

vii. At 2.04pm the requested ward bed is reported as being available. Documented handover information identified [Mr B] as triggering an early warning score (EWS) of 1 due to his systolic BP 97mmHg.

Comment: A patient whose vital signs trigger EWS 1 is generally managed with regular monitoring.

viii. The Éclair audit trail shows that at 2.35pm [Mr B's] serum results were viewed by [Dr A]. This is consistent with his documentation detailing his review of [Mr B] on [the ward] at 3pm *...D/w the Medical Reg again (TnTrop=990) ->will review very soon* ...This review also notes [Mr B's] last blood pressure being 106/58mmHg in ED and the patient admitting *...having chest tightness & SOB all day today ... Plan: ECG, Blood cultures -> IV Abs, CXR, await CT, consider transfer to CCU.* Medication chart records [Mr B] being prescribed IV antibiotics — Gentamicin, Cefuroxime and Metronidazole — at 3pm.

ix. Responses and contemporaneous notes report [Mr B] arriving on [the ward] during the nursing handover period. Initial interventions included taking ECG (3.10pm) and vital signs (3.20pm). Nursing documentation reports a Medical Registrar review being interrupted by [Mr B's] transfer to radiology for a chest x-ray and the Registrar completing the assessment post x-ray at approximately 4pm. The Medical Registrar's documented plan includes the need for review by the intensive care (ICU) team. Medication chart reports nursing staff commencing administration of [Mr B's] antibiotics at 4.25pm. Nursing PN documentation reports the ICU Registrar coming to review [Mr B] while the RN was preparing his IV antibiotics.

x. Notes suggest that while the ICU Registrar was attending there was a rapid deterioration in [Mr B's] condition culminating in him arresting at 5pm. Attempts to resuscitate were implemented immediately but were unfortunately unsuccessful, and [Mr B] died.

Clinical advice

i. The time taken for [Mr B] to be triaged

I agree with the NDHB response that [Mr B's] triage assessment was delayed. I note that [Mr B] was present for approximately 35 minutes prior to being triaged. I consider this to be a considerable delay and reflective of an overwhelmed system.

ii. The triage category allocated to [Mr B]

Triage Categories are based on an objective assessment by a skilled practitioner. The goal of triage is not to make a diagnosis per se, but to evaluate the patient's presentation and general appearance to determine their clinical urgency for time critical treatments/interventions. ACEM guidelines[2] include that vital signs are not required to be part of the triage assessment and that the assessment for allocation of triage category should take no more than 2–5 minutes. Based on the information available, I consider that the allocation of ATS Category 3 was appropriate. In my opinion, [Mr B] received initial medical assessment and treatment consistent with his noted hypotension. I consider this more relevant to patient outcome than the second RN changing [Mr B's] triage Category score.

iii. The follow up of the Troponin-T test result by the Emergency Department (ED) RN who requested it

While expectations may differ depending on the size of the hospital, typically the follow up of blood results is not be done or expected to be done by ED nurses due to the volume of patients that they see over the course of their shift. Also the RN who draws the patient's blood in the ED and sends off the samples will not necessarily be the RN who either processes the patient's discharge or transfer to a ward. In my experience, nurses will usually seek a patient's results to inform other treatments options e.g. ectopics on a cardiac monitor would cue a review of biochemistry results.

While I do not consider the RN's lack of follow-up of [Mr B's] Troponin-T to be a departure from accepted nursing standards, I am mildly critical that the RN did not perform an ECG while [Mr B] was in the ED. In my opinion, an ECG should always be performed if a serum Troponin level is considered necessary.

iv. The administration of intravenous antibiotics

Based on the time the antibiotic therapy was prescribed and the interventions that needed to occur prior to the RN administering them — transfer to radiology for x-ray, medical registrar review, taking blood cultures, mixing antibiotics — I do not consider that nursing staff significantly delayed [Mr B] receiving his antibiotic therapy.

[2] Australasian College for Emergency Medicine (ACEM), *Policy on the Australasian Triage Scale*, Policy Nr: P06 (Victoria, Australia: ACEM, 2013).

v. Other comments

I acknowledge that the NDHB response refers to the ED being unusually busy that day. I consider that this plus the push to meet the '6 hour ED transfer' target were contributory factors that facilitated [Mr B] transferring to [the ward] prior to blood cultures being taken and a urinary catheter being inserted. I also note that there is no record of [Mr B] voiding urine while in the ED and the fluid balance chart was not commenced. These interventions are part of the documented initial management plan and I am mildly critical that they were not completed earlier and prior to transfer. I consider that the failure to complete these steps reduced the opportunity to realise [Mr B's] level of unwellness and meant that [Mr B] did not receive his antibiotics on [the ward] as quick as he could have otherwise."