MidCentral District Health Board

Sports Physician, Dr E

Locum ED Consultant, Dr I

Orthopaedic Registrar, Dr N

Consultant Orthopaedic Surgeon, Dr M

House Surgeon, Dr P

A Report by the

Health and Disability Commissioner

(Case 12HDC00618)

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Executive summary

1. In mid-2011 Ms A, aged 59 years, made a series of visits to her family doctors' clinic, a physiotherapist, and the public hospital's Emergency Department (ED), owing to increasing thoracic back pain. On 18 August 2011, Ms A's GP referred her to a private sports physician, Dr E. Ms A consulted Dr E on 6 September 2011.

2. Dr E overlooked reviewing abnormal blood test results contained in the referral, and did not perform a neurological examination of the lower limbs. Dr E referred Ms A for a bone scan, which was performed on 20 September 2011. The bone scan results suggested a recent collapse fracture of T9.

3. Ms A presented to the ED on 26 September 2011 owing to ongoing thoracic back pain. Ms A had no motor sensory deficit, no incontinence, and no fever. The bone scan result was noted, and blood tests and a plain X-ray were done. The X-ray suggested a wedge-type compression fracture of T9. Ms A was moved to the ED observational area (EDOA) overnight, for repeat blood tests and review the next morning.

4. ED consultant Dr I assessed Ms A at 8am on 27 September 2011. His notes were brief. Dr I assumed a blood test result (raised C-reactive protein) was due to the fracture. Dr I did not discuss Ms A, or refer her for an orthopaedic team review, despite the test results and being aware of a draft referral guideline that indicated that a referral to the orthopaedic team was warranted in Ms A's circumstances. Ms A was discharged that afternoon. Dr I did not document any discharge or follow-up instructions.

5. Dr E reviewed Ms A on 30 September 2011. His notes do not refer to Ms A's presenting symptoms, previous visit to ED, or his examination findings. He reviewed the bone scan results, gave some thought to other pathology, and referred Ms A for an MRI. He did not request further blood tests or record in his differential diagnoses any specific consideration of infection.

6. Ms A presented to the ED for a third time on 10 October 2011. She had no numbness in her lower limbs, and no saddle paraesthesia, and her reflexes were intact. Ms A was moved to the EDOA. The MRI was performed the following morning. The MRI findings were suspicious of vertebral osteomyelitis[1] with a fracture of T8 and T9 vertebral bodies, as well as retropulsed fragments, cord compression, and an abscess.

7. The radiologist telephoned Dr I at the time of the scan to discuss the interim findings. Dr I did not document all of the MRI findings in the ED record. He called the orthopaedic team but did not relay all of the MRI findings to the orthopaedic registrar on call, Dr N.

8. Dr N reviewed Ms A and discussed the case with senior orthopaedic staff, including consultant orthopaedic surgeon Dr M, proceeding on the basis of the incomplete information supplied. A CT biopsy and aspiration was completed on 12 October, and IV antibiotics commenced on 13 October.

[1] An infection of the vertebral body in the spine.

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9. Late on 13 October 2011, Ms A developed sudden signs of neurological compromise, considered to be an acute paraplegia at T9. Orthopaedic surgeon Dr R was contacted, and urgent transfer was arranged to Hospital 2 for tertiary level care and surgery. Sadly, imaging confirmed collapsed infected vertebrae and compromise of Ms A's spinal cord.

Findings summary

10. Adverse comment was made about Dr E's care and treatment of Ms A, in particular that he did not adequately review the referral information received from the GP, did not undertake a neurological examination of Ms A's lower limbs on 6 September, and did not specifically consider infection as part of a differential diagnosis during the 30 September consultation. Dr E's clinical documentation was also suboptimal.

11. Dr I's review of Ms A on 27 September 2011 was not performed to the level of that expected of an ED consultant. Despite an awareness of referral criteria and Ms A's symptoms, Dr I failed to discuss Ms A with the orthopaedic team and refer her for orthopaedic review. Dr I failed to provide services to Ms A with reasonable care and skill and breached Right 4(1) of the Code.[2]

12. On 11 October 2011, Dr I failed in his obligations to document vital MRI clinical findings in the ED record, and failed to document his discussions with the consultant radiologist and orthopaedic registrar. Accordingly, he did not comply with professional documentation standards and therefore breached Right 4(2) of the Code.[3]

13. Dr I did not bring crucial information regarding the results of the MRI to the attention of the orthopaedic team. Dr I did not communicate effectively, and he failed to ensure quality and continuity of services to Ms A. Accordingly, Dr I breached Right 4(5) of the Code.[4]

14. Adverse comment is made about Dr M not pursuing the 11 October 2011 interim MRI letter given the complex nature of Ms A's case. Adverse comment is made about senior house officer Dr J, for not ordering blood tests on 11 October 2011.

15. MidCentral District Health Board did not have a formalised ED to Orthopaedics referral policy in place at the time of these events. Concern was raised at the degree of collaboration and information sharing between these departments. These were deemed relevant factors in suboptimal co-operation and continuity between specialty services in Ms A's case. Accordingly, MidCentral District Health Board breached Right 4(5) of the Code.

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

[3] Right 4(2) of the Code states: "Every consumer has the right to have services provided that comply with legal, professional, ethical, and other relevant standards."

[4] Right 4(5) of the Code states: "Every consumer has the right to co-operation among providers to ensure quality and continuity of services."

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Complaint and investigation

16. The Commissioner received a complaint from Ms A's daughter, Ms B, about the services provided to her mother by a number of different providers.

17. The following issue was identified for investigation:

Whether MidCentral District Health Board provided an appropriate standard of care to Ms A between 21 July 2011 and 15 October 2011.

18. The investigation was subsequently extended to include:

- *Whether Dr E provided an appropriate standard of care to Ms A between 6 September 2011 and 30 September 2011.*
- *Whether Dr I provided an appropriate standard of care to Ms A between 21 July 2011 and 15 October 2011.*
- *Whether Dr M provided an appropriate standard of care to Ms A between 21 July 2011 and 15 October 2011.*
- *Whether Dr N provided an appropriate standard of care to Ms A between 21 July 2011 and 15 October 2011.*
- *Whether Dr P provided an appropriate standard of care to Ms A between 21 July 2011 and 15 October 2011.*

19. The key parties referred to in this report are:

Ms A	Consumer, complainant
Ms B	Complainant, Ms A's daughter
Dr C	General practitioner
Mr D	Physiotherapist
MidCentral District Health Board	Provider
Dr E	Sports physician
Ms F	Ms A's sister
Dr G	House officer
Dr H	ED house officer
Dr I	Locum ED consultant
Dr J	Senior house officer
Dr K	Consultant radiologist
Dr L	Physician, internal medicine
Dr M	Consultant orthopaedic surgeon
Dr N	Orthopaedic registrar
Dr O	Medical officer special scale, orthopaedics
Dr P	House surgeon
Dr Q	Orthopaedic surgery registrar on-call
Dr R	Consultant orthopaedic surgeon
Dr S	Orthopaedic surgeon, Hospital 2
Dr T	House surgeon

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20. Independent expert advice was obtained from an emergency medicine specialist, Dr Vanessa Thornton (**Appendix A**), a sports physician, Dr Graham Paterson (**Appendix B**), and an orthopaedic surgeon, Dr Iain Kelman (**Appendix C**).

Information gathered during investigation

Background

21. Ms A, 59 years old at the time of these events, has a medical history that includes hypertension, obesity,[5] and osteoarthritis of the spine. Prior to the events set out in this report, Ms A was physically active. In 2007 Ms A had sought a medical view about longstanding neck and arm pain.[6]

Initial visit to local doctors' clinic[7]

22. On 8 July 2011, Ms A saw a GP at her local doctors' clinic, (the Medical Clinic) due to back pain she had experienced for five days after having lifted a heavy weight. The GP noted several areas of tenderness in Ms A's thoracic spine. An ACC claim was lodged. The GP prescribed Ibuprofen and Norflex[8] and referred Ms A for a physiotherapy appointment.

Consultation with physiotherapist

23. On 11 July 2011, Ms A attended a physiotherapy appointment with Mr D.[9] He performed a subjective assessment noting key features of Ms A's history and onset of her pain, followed by a physical examination of the spine. Mr D's impression was that the cause was difficult to determine because of her pain. He gave some consideration to the possibility of non-musculoskeletal pain and recommended that Ms A return and seek another opinion from a physiotherapy colleague.[10]

Further GP visits

24. On 15 July 2011, Ms A saw GP Dr C at the Medical Clinic. Ms A had ongoing thoracic pain, and symptoms suggestive of a urinary tract infection (UTI). Dr C noted her previous back strain, and his examination showed non-localised thoracic tenderness, but a full range of movement. Dr C prescribed codeine and diazepam, as well as an antibiotic for the UTI.

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[5] Ms A's BMI was 46.9kg/m^2 — an optimum range is considered to be 20–25 kg/m^2.
[6] A 1992 cervical spine X-ray had shown early degenerative changes.
[7] The care provided by Ms A's family doctors at the Medical Clinic was reviewed by my in-house clinical advisor, who found that the care provided was reasonable in the circumstances.
[8] Norflex (orphenadrine citrate) is a skeletal muscle relaxant.
[9] The care provided by Mr D was reviewed by an HDC expert physiotherapy advisor and deemed reasonable in the circumstances.
[10] Due to subsequent events, Ms A did not return to see Mr D's colleague. Ms A told HDC that from this point on, due to pain, her sister drove her to most appointments.

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25. On 18 July 2011, Ms A saw another GP at the Medical Clinic for review. Her pain was noted to be getting better slowly. An absence of cauda equina syndrome[11] symptoms was noted. Blood tests were organised (which showed non-specific readings consistent with inflammation — including elevated C-reactive protein[12]). Ms A had an infected cat scratch on her right wrist, which was treated with antibiotics.

Presentation to the Emergency Department

26. On 21 July 2011, Ms A was taken by ambulance to the Emergency Department (ED) because of increasing thoracic back pain. Ms A told ambulance staff that she had reduced appetite and nausea, a UTI, and a skin infection. Her temperature was 37.2°C, and she had a pain score of 8/10.

27. At 5pm Ms A was seen by an ED nurse and triaged as a category 3.[13] At 6.05pm her vital signs were checked.[14] At 6.20pm she was given codeine and paracetamol.

28. At 10.20pm Ms A was seen by the ED house officer, Dr G. Dr G took a full history and noted Ms A's recent UTI and wrist infection, together with the increasing thoracic back pain unresponsive to analgesia, which was significantly impairing Ms A's ability to cope at home alone. Dr G documented that there was no history of fever or weight loss, and no steroid or IV drug use. Ms A's past medical history included a UTI, recent hypertension, and dyslipidaemia.[15] Ms A's medications were noted as metoprolol (for hypertension), simvastatin (for lowering cholesterol), diazepam (a muscle relaxant), bendrofluazide (a diuretic), codeine, paracetamol, and amoxicillin (for infection).

29. Ms A's heart sounds were dual, and her chest was clear. Her abdomen was soft and non-tender. She had mid-thoracic and para-spinal[16] tenderness. Her white cell count was 14.7×10^9/L,[17] and her CRP was elevated at 107mg/L.

30. A spinal X-ray was taken, which showed degenerative changes, but no compression fracture was evident and no suspicious bone lesion was seen.

31. The impression formed by Dr G was that Ms A's musculoskeletal pain was due to a soft tissue and muscle strain. Dr G noted that Ms A had no neurological deficit, and

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[11] Cauda equina syndrome is a relatively rare but serious condition that describes extreme pressure and swelling of the nerves at the end of the spinal cord.

[12] C-reactive protein (CRP) is a protein produced by the liver. Levels rise in response to inflammation and infection. The normal range is <5mg/L. The reading on 18 July was 149mg/L.

[13] New Zealand emergency departments use the Australasian triage scale, which has five triage categories: triage category 1 patients are very urgent, while triage category 5 patients are less urgent. For each triage category there is a specified maximum clinically appropriate time within which medical assessment and treatment should commence.

[14] Heart rate 80bpm, blood pressure 140/80mmHg, respiratory rate 16, pain on movement of 7/10.

[15] A disorder of lipoprotein metabolism, including lipoprotein overproduction or deficiency. Dyslipidaemias may be manifested by elevation of the total cholesterol, low-density lipoprotein (LDL) cholesterol and triglyceride concentrations, and a decrease in the high-density lipoprotein (HDL) cholesterol concentration in the blood.

[16] Adjacent to the spinal column.

[17] Normal range is 4.0–10.0.

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he considered that the raised WCC and CRP were likely to be secondary to Ms A's recent UTI and cellulitis. Dr G raised some concerns about Ms A's ability to cope at home. Dr G formulated a plan of regular pain relief and oral fluids. Ms A was moved to the ED Observation Area (EDOA)[18] overnight, and was to have a PEDAL team[19] review in the morning.

32. A consultant reviewed Ms A the next morning (22 July) in the EDOA. He noted that Ms A's pain had eased considerably overnight. Ms A was seen by a PEDAL team social worker, and ACC support services were to be arranged. Ms A was comfortable and was discharged home at 3.15pm on 22 July with pain medication, codeine phosphate 60mg four to six hourly, and diazepam.

Availability of results

33. MidCentral DHB advised HDC that at the time of these events, routine blood results were available to both community doctors and hospital physicians.[20] A regional archive existed for PACS,[21] but community doctors could not access it. There were no shared pharmacy records in the region.[22]

34. The DHB advised that when a patient was seen in ED a copy of the ED doctor's note was posted to the patient's GP. ED doctors would not necessarily know about patients' visits to GPs or private clinicians unless the patient or his or her GP specifically informed the hospital.

Further GP visits

35. On 28 July 2011, Ms A re-presented to the Medical Clinic for repeat medications and an ACC certificate. Ms A's back pain was noted to be improving.

36. On 15, 18, 25 and 29 August 2011, Ms A saw Dr C again. On 15 August, Ms A presented with increasing thoracic pain across her lower back and shoulder blades, which had not been resolving with analgesia. A trial of stronger analgesia (morphine) was commenced with formal review recommended for later that week.

Referral to sports physician

37. At the review on 18 August 2011, Ms A's sleep had improved, but her pain was unresolved. Dr C felt that further investigation was warranted, and made a referral to a sports physician, Dr E, partly to facilitate CT imaging.

[18] The DHB advised that the EDOA facilitates the observation and monitoring of patients deemed clinically appropriate. Most patients admitted to the EDOA are likely to be going home, including those with chest pain waiting for blood results, and those with back pain who require observation for response to pain relief.

[19] Hospital 1 offers a post emergency department assessment and liaison (PEDAL) service. The PEDAL service is made up of a district nurse and a social worker. The service assesses a group of patients prior to discharge to ensure they return to a safe environment for their medical and social needs. Patients are referred to the PEDAL team by ED staff.

[20] Via a medical laboratory.

[21] Picture Archiving Communication System.

[22] This was later upgraded to include community pharmacy dispensing records, and most MCDHB clinicians now have access to these.

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38. During consultations on 25 and 29 August 2011, Dr C reviewed Ms A's analgesia while she was waiting for the specialist review.

39. Dr C's referral letter to Dr E included recent consultation notes, blood tests and X-ray reports, and requested that a CT scan be organised. The referral letter states:

> "Thank you for seeing [Ms A]. She injured her back in July lifting a [heavy weight]. The pain has persisted and become severe. She has not got any neurological signs or symptoms. She was seen at ED and they did an X-ray — copies of reports appended. She is becoming increasingly disabled with pain and I wonder whether she needs a CT scan?"

Consultation with sports physician

40. On 6 September 2011, Ms A saw Dr E. Dr E operates a referral-only practice.[23] The appointment was scheduled as an initial 30-minute consultation.

41. Dr E told HDC that, according to a review of his practice management system (PMS),[24] Ms A arrived late (18 minutes into the 30-minute consultation). Ms A disputes this[25] and, in her response to my provisional report, reiterated that she was not late. Dr E's initial response to HDC does not include any reference to experiencing time constraints at the time of the consultation, but his later response states that he did. Dr E's contemporaneous records are not prefaced by a mention of time issues.

42. Dr E said that he noticed the history of Ms A's back pain and her ED attendance. He documented that the X-ray and blood tests had not identified an obvious cause for her pain, and that there was no suggestion of other pathology.

43. Dr E acknowledged that he overlooked reviewing the abnormal blood results accompanying Dr C's referral. Dr E said that this was probably because he was running short of time. In addition, Dr E told HDC that Ms A indicated that the hospital had told her that "nothing was wrong".

44. Dr E said:

> "It had the effect of misleading me into thinking that the investigations she had done had revealed no abnormality. Therefore when I looked through the attached correspondence, in combination with being rushed … I was probably already assuming that all the tests were normal and have obviously not paid the attention I should have."

[23] Dr E told HDC that when referrals are received, patients are contacted to make an appointment; 30 minutes is usually allowed for an initial consultation, or 45–60 minutes if a complex case is anticipated; 15 minutes is allowed for follow-up appointments.
[24] Arrival times were recorded by the receptionist on the computer system while concurrently advising Dr E that a patient had arrived at the clinic. These records are no longer available, as Dr E subsequently changed his practice location and computer systems.
[25] Ms A's sister, Ms F, accompanied her. Ms F told HDC that she recalls that she and her sister were on time.

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45. Dr E assessed Ms A's gait and recorded that she had local tenderness over T10. Dr E did not record a neurological examination of the lower limbs. Dr E told HDC that when people present with pain in the thoracic spine, it is routine for him to enquire about referred pain and neurological symptoms in their lower limbs. If they do not complain, then it is not routine to go on to perform a full neurological examination of the lower limbs.[26] Dr E stated:

> "While I have not recorded it in my report, I do remember that [Ms A] did not complain of any pain down her legs or neurological symptoms …
>
> I probably didn't do a neurological examination of her lower limbs. I did however record that she was tender to palpate 'about the level of T10' which would suggest that I did visually inspect her back and palpate along its length …"

46. On 6 September 2011, Dr E wrote a letter[27] to Dr C (headed "ACC contract assessment report and treatment plan"). Dr E's findings in his reporting clinic letter were:

> "The pain to palpate … with movements of her spine is in keeping with a musculoskeletal problem as opposed to an internal problem. I note your suggestion about getting a CT scan. I do think this would be worthwhile more clearly outlining what we are dealing with. In the 1st instance I have referred [her] for a bone scan."

47. There is no mention of Ms A's abnormal blood results in the clinic letter. Dr E told HDC that even if he had known about the abnormal blood results, it would not have altered his management. Dr E's letter was used as the referral for the bone scan.

48. Dr E's response to HDC acknowledged that in hindsight his report letter was not ideal. He stated:

> "[I]mplicit in my decision to investigate this further was my unease about the degree of pain she complained of and the need for further information as to what was going on. I therefore do not think that the less than ideal report has compromised her management."

Further GP visits

49. On 8 September 2011, Ms A saw Dr C for unrelated problems. Dr C noted that Ms A was awaiting a bone scan and had ongoing back pain despite taking morphine. Dr C did not want to increase the dosage of Ms A's morphine because she was experiencing side effects of nausea and constipation. Dr C prescribed Ms A medication for her constipation.

50. On 13 September 2011, Ms A saw a GP at the Medical Clinic, with a chest infection and superficial thrombophlebitis[28] of the left knee. It was noted that she was awaiting

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[26] Dr E told HDC that he has since discussed this clinical issue with a peer and an orthopaedic surgeon.
[27] Dr E dictates letters immediately following a consultation, and the letters are sent to the referrer at the end of the day.

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a bone scan, was slow to mobilise, and was using morphine. On 16 September 2011, Dr C completed ACC and WINZ documentation. The bone scan was noted to be imminent.

Bone scan

51. At 3pm on 20 September 2011, Ms A had a whole body bone scan — a Bone N22 SPECT scintigraphy[29] — performed at [the hospital's] Medical Imaging.

52. Physician Dr L found:

> "The patient is noted to be very well covered. There is markedly increased radiophosphonate uptake across the body of about T9, which appears flattened. No other bony abnormalities are seen in the skull, chest wall, vertebral column, pelvis, shoulder regions or lower limbs."

53. Dr L commented:

> "[There are changes] [s]uggestive of relatively recent collapse fracture of T9. The patient should be investigated for possible osteoporosis or history of relevant trauma. Plain X-rays or possibly CT of this region for confirmation may be indicated."

54. Dr E told HDC that he was unable to view scintigraphy images himself, so he was reliant on the report findings. The bone scan report to Dr E was also copied to Dr C.

55. Dr L told HDC:

> "My report on the bone scan … referred to the patient's body habitus because this reduces the detail that can be seen on a bone scan and must be taken into account when interpreting results. In suggesting a collapse fracture as the most likely cause of the scan abnormality this was based on there being no evident signs or symptoms of infection and the apparently minor symptoms … Since Nuclear Medicine bone scanning is known to be quite non-specific [and] a number of different pathologies can give rise to much the same appearance, my report went on to state: 'The patient should be investigated for possible osteoporosis or history of relevant trauma. Plain X-rays or possibly CT of this region for confirmation may be indicated.'"

GP contact

56. On 25 September 2011, Ms A saw a GP at the Medical Clinic with chest pain and a productive cough. Antibiotics were prescribed. The GP noted the bone scan result.

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[28] Inflammation of a vein just under the surface of the skin, usually in the lower limb.

[29] A bone scan — a diagnostic technique used to assess the presence of anomalies in the distribution pattern of bone formation.

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Second presentation to ED

57. On 26 September 2011, Ms A was taken by ambulance to ED, arriving at 1.31pm. Ambulance staff reported that Ms A had musculoskeletal back pain. Her pain was severe when moving, and radiating to her right rib. Ms A had been feverish and nauseated with reduced appetite. Her observations in the ambulance were a temperature of 38.3°C, a heart rate of 97bpm, blood pressure of 120/80mmHg, and oxygen saturation of 98%. Her pain score was 9/10. Paracetamol was given en route.

58. At 1.50pm Ms A was assessed in ED. The nursing history noted that Ms A's morphine use had resulted in constipation, she had a productive cough with brown sputum, and that her GP had prescribed antibiotics. She was triaged as category 4 and placed in the assessment area.

59. At 1.53pm house officer Dr H saw Ms A. Dr H reported a history of acute back pain for three months, and that Ms A had been started on m-Eslon (morphine sulphate). Ms A's pain was mid-thoracic radiating around to her chest — reported as 2/10 at rest, but 10/10 when she moved. She was unable to lie flat because of the pain. Ms A denied any trauma or motor sensory deficit, and had no incontinence, fever or rigour. The bone scan results were noted in the patient history, and that her medications included bendrofluazide, m-Eslon and roxithromycin (an antibiotic, for her chest infection).

60. On examination it was documented that Ms A had significant tenderness over T9 with para-spinal tenderness. She also had pain at 40 to 50 degrees of flexion of the hip, but normal sensation and power in her legs. Ms A's heart sounds were dual, her chest was clear, and her neurological status was normal.

61. Blood test results showed C-reactive protein (CRP) of 186mg/L, sodium 128mmol/L[30] and potassium 3.0mmol/L.[31] At 2.45pm Ms A's observations in ED were a temperature of 36.6°C, blood pressure of 121/61mmHg, heart rate of 74bpm, and respiratory rate of 16 breaths per minute.

62. A plain X-ray was performed. The report found a "[w]edge type compression fracture T9 which has developed since the prior study. Prominent kyphosis centred at T9, new since the prior study …"

63. Dr H noted that there was significant wedging/loss of height of T9, and possibly the T8 and 10 vertebrae as well.

64. The impression was of a T9 fracture, in keeping with the bone scan, with no neurological deficit, high CRP secondary to a fracture, and hyponatraemia (low sodium) and hypokalaemia (low potassium). The plan documented was to repeat blood tests at 6am the next morning, encourage mobilisation, give analgesia, and arrange a PEDAL review. Ms A was moved to the EDOA overnight.

[30] Normal range is 135–147mmol/L.
[31] Normal range is 3.4–5.2mmol/L.

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65. The nursing notes in the EDOA comment that Ms A had anxiety about mobilisation and being weak in the legs, although she could complete all activities of daily living (ADLs) with supervision. The observation chart indicates a pain score of 6/10 at rest and 10/10 when moving.

66. The PEDAL team reviewed Ms A. The acute pain team was also called to assist with analgesia, suggesting adding sevredol and trialling tramadol.

67. Ms A remained afebrile with a heart rate of 90bpm initially, dropping to 70bpm at 5pm. It is noted that she self-medicated an extra dose of metoprolol at around 10pm but her heart rate remained stable.

Consultant review

68. At 6am on 27 September 2011, blood specimens were taken. No CRP result was reported. Ms A's sodium level was 130mmol/L, and her potassium level was 2.9mmol/L. Locum ED consultant Dr I[32] had responsibility for the ED on 27 September 2011.

69. Dr I's position description states that he had responsibility for medical officers of special scale (MOSS), resident medical officers (RMOs), and trainee interns in the ED. His work schedule included reviewing the decisions of MOSS and RMOs in the ED, and "arranging for admission, specialist review, safe discharge and/or follow-up as required for patients presenting to the Emergency Department".

70. At 8.20am Ms A was reviewed by Dr I. His note is brief and does not comment on or review the assessment undertaken the previous day by Dr H, or the morning blood results. Dr I recorded:

> "Pt stated that her pain is much better. She was able to walk to the bathroom with less discomfort.
>
> Sitting up with no apparent distress
>
> Plan: PEDAL to re-evaluate this AM."

71. Dr I advised HDC:

> "I agree that the elevated WBC count and the CRP level were red flags for possible underlying significant pathology. However, both these parameters are non-specific. Since she was afebrile and non-toxic, and she had a documented spinal fracture, I believe that myself and the other ED staff assumed that these elevated levels were due to this fracture and increased pain. However, I felt it would be reasonable to discharge her from ED to have her GP or the ACC arrange for an outpatient MRI scan, which was the standard procedure prior to an orthopaedic referral."

[32] Dr I was working as a contract consultant in emergency medicine. He no longer practises in New Zealand and, at the time of writing, has no current Annual Practising Certificate.

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DHB referral guidelines

72. At the time of Ms A's presentations to ED in 2011, no formal policy existed in relation to referrals to Orthopaedics, but a broader draft guideline was in place governing referral criteria headed "Guidelines for allocation of clinical line for adult acute admission where ambiguity may exist".[33]

73. In relation to back pain, the draft guideline stated:

> "10. Back pain
>
> [Refer to] Orthopaedics if:-
>
> (a) Spinal fracture of recent origin
> (b) With neurological symptoms due to disc lesion or spinal stenosis
> (c) Diagnosis of spinal osteomyelitis/discitis
>
> All other cases to be considered on a case by case basis …"

74. Dr I told HDC that he was aware of these criteria at the time of Ms A's admissions. However, he did not request an orthopaedic review of Ms A or discuss her with the orthopaedic team. Dr I told HDC:

> "I did not call the orthopaedic team … since I was waiting for the PEDAL team to assess her and offer suggestions … the PEDAL team had determined that [Ms A] was ready to be discharged to home …"

75. Initially Dr I advised HDC: "[I]t was, in my opinion, along with the assessments and advice given by the ancillary services, that she had reached a level for us to discharge her from the ED." Dr I also told HDC that, in his view and experience, the orthopaedic team would not accept a patient without any neurological deficits who needed just pain control, even with a previously known vertebral fracture.

76. Dr I later told HDC that Ms A was discharged by the nurse "after she was assessed by the PEDAL team as I had discussed with the PEDAL team and the ED nurses who were taking care of this patient". Dr I did not document any discussion with the PEDAL team or include any discharge or follow-up instructions in the clinical file. At 2.45pm Ms A was discharged from ED, with district nursing support to assist her at home.

Second consultation with Dr E

77. On 30 September 2011, Dr E reviewed Ms A. Dr E recalls Ms A being accompanied to this appointment by a relative.[34]

78. Dr E's records make no reference to Ms A's existing symptoms or examination findings. Dr E told HDC that Ms A was also late for this appointment (12 minutes into a scheduled 15-minute consultation), and that he was aware of the repeat visit by

[33] The draft guidelines were later formulated into a specific policy document, MDHB-6450, issued on 28 June 2012.
[34] Ms A was again accompanied by her sister, Ms F.

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Ms A to the Hospital between consultations with him.[35] He discussed the bone scan results with Ms A (that there was increased uptake in T9 but nil elsewhere in the vertebral column).

79. Dr E's clinic letter to Dr C, dated 30 September 2011, noted:

> "The probability therefore is of a vertebral fracture secondary to osteoporosis as opposed to this uptake being due to more sinister pathology. However, I have referred her for an MRI scan of her thoracic spine to be more certain about this."

80. Dr E said that he requested an MRI because a bone scan is a sensitive investigation but non-specific. It alerts one to a problem but does not allow a diagnosis from that investigation alone.

81. Dr E did not request a full blood count or CRP assessment, and did not record any consideration of infection in the differential diagnoses.

82. Dr E told HDC that he was concerned about the possibility of more sinister pathology including infection and Ms A's increasing pain, which was why he referred Ms A for an MRI scan. He stated:

> "One can argue about the pros and cons of further blood tests, ordering such would have only delayed getting the MRI scan done. Further if the blood tests had shown a raised CRP, the next step would have been to order an MRI scan which is what I did."

83. Dr E also stated:

> "At both visits to the hospital … the staff at [Hospital 1] were aware of the raised CRP levels. I therefore cannot see what benefits repeating the blood tests would have done other than delay getting the MRI scan done … it was that investigation [the MRI] that determined the problem."

84. In his response to HDC, Dr E accepted that his two clinic letters do not convey a complete summary of all the issues that arose during his consultations with Ms A, and stated that the letters are "not up to the specialist standards that my profession/college would expect of me or that I would expect of myself".

GP contact

85. On 3 October 2011, Ms A consulted Dr C regarding pitting oedema of both her ankles. Her diuretic was changed from bendrofluazide to frusemide, and a follow-up appointment was booked for 6 October 2011. Ms A did not attend the 6 October 2011 appointment.

[35] Dr E recalled that Ms A's sister had also pointed this out to him during the consultation.

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Third presentation to ED

86. On 10 October 2011, Ms A was taken by ambulance to ED. Ms A was noted to have increasing back pain despite medication changes during her previous admission. Ambulance staff noted that she had been diagnosed with a fracture of T9, and a possible pathological fracture/degenerative spine. When the ambulance arrived, Ms A was sitting and unable to mobilise. She had oedema of her lower extremities. All her observations were normal.

87. At 10.35am Ms A was seen in ED by a triage nurse and, at 2.35pm, she was seen by senior house officer Dr J.[36] Dr J noted Ms A's increasing back pain, and that she was mobilising with a frame. He also recorded that she had a history of constipation.

88. On physical examination Ms A was noted to have no numbness in her lower limbs, and no saddle paraesthesia.[37] She had normal tone but weakness in the lower limbs, with power of 4/5 in her right and left lower limbs. Her sensation was normal and her reflexes were intact. No laboratory tests were ordered.

89. Dr J's impression was of a mobility problem, and a plan was made to move her to the EDOA, for her to receive pain relief, and for her to be reviewed by the PEDAL team. Ms A was due to have an MRI the next day.

Dr I review

90. At 8.15am on 11 October 2011, Dr I reviewed Ms A. He noted that the MRI was scheduled for 9.45am.

91. Dr I documented:

> "Pt. has an MRI at 9.45am this AM. PEDAL to evaluate pt. after the MRI …"

MRI scan

92. At 9.47am on 11 October 2011, an MRI of Ms A's whole spine (without IV contrast) was performed.[38] Ms A returned to the ward at 11.15am.

93. Consultant radiologist Dr K's[39] report concluded:

> "Findings suspicious for osteomyelitis[40] with pathological fracture of T8 and T9 vertebral bodies with retropulsion fragments, cord compression at T9, paraspinal

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[36] Dr J was a postgraduate year 3 senior house officer working in the ED.
[37] Saddle anaesthesia or paresthesis is a numbness or tingling in the crotch area.
[38] The MRI was performed at a private clinic located at Hospital 1. The referring doctor was noted to be Dr E. The MRI was funded by ACC, as it was a private referral.
[39] Dr K was an employee of the radiology service for just over a year. He was subcontracted by the radiology service to provide services of two sessions (one full day) a week at MidCentral DHB for a few months.
[40] An infection of the vertebral body in the spine. Haematogenous spread is the most common cause of vertebral osteomyelitis, and usually causes bone destruction in two adjacent vertebral bodies and their intervertebral disc. Lumbar vertebral bodies are most often involved, followed in frequency by the thoracic, and rarely cervical vertebrae. *Staphylococcus aureus* is the most common infecting organism in developed countries, accounting for more than 50% of cases.

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abscess and Gibbus deformity of the thoracic spine. Recommended MRI thoracolumbar spine with contrast for further evaluation.

Findings discussed with [Dr I] in the Emergency Room at the time of examination.

Thank you for your referral. We would be pleased to assist with interpretation of the study if required."

94. Dr K told HDC that, at the time the MRI was conducted, he telephoned Dr I and verbally conveyed the findings and his recommendation.

95. Dr I acknowledges receiving a call, but his recollection is that it occurred later (between 2.05pm and 3.40pm).

96. Dr I responded to HDC:

"[Dr K] gave me the preliminary report of the MRI scan pending the official report. He provided me with pertinent information relevant for me to proceed with the next step, which was to call the orthopaedic team. I wrote down this information provided to me by Dr [K] on a piece of paper which I used to convey the information to the orthopaedic team."

97. Dr I did not document in the ED clinical notes his discussion with Dr K regarding the MRI findings. Dr I documented:

"… MRI: Possible osteomyelitis and/or [metastases]?

Plan: Ortho consult."

98. Dr K wrote an interim letter, dated 11 October 2011, addressed to Dr E (who referred Ms A for the MRI) and copied to the ED and Dr C, GP. The interim letter, the body of which is Dr K's full report (see above, paragraph 93), was not copied to the orthopaedic service. A copy of the interim letter was sent to the ED by mail, and by fax at 1.19pm and again at 1.57pm. The interim letter was also sent electronically to Ms A's GP. However, as the MRI was performed privately and funded by ACC, and not publicly funded via MidCentral DHB, it was not routine to send electronic copies of such reports to the DHB.

99. Nursing notes at 2.05pm record that the plan was to await the MRI formal report and then possibly refer Ms A to Orthopaedics. At 3.40pm nursing notes state that a decision about orthopaedic admission was pending.

100. Dr I told HDC that the interim information from Dr K was available to him when he later discussed Ms A with the orthopaedic registrar on call, Dr N (see below).

101. The radiology service told HDC that the official final MRI report (see above, paragraph 93) was dictated on 12 October 2011 and, on request from the orthopaedic

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team, was made available to the DHB electronic record through Eclair[41] and PACS at 11.03am on 14 October 2011.

Orthopaedic review

Handover from Dr I

102. Dr N told HDC that Ms A was referred to him by Dr I by telephone, and that Dr I's ED notes suggested possible osteomyelitis or possible pathological fracture.

103. Dr I did not document his discussion with Dr N. Dr I told HDC that he telephoned Dr N and conveyed to him all the information received verbally from Dr K. Dr N advised HDC that Dr I did not bring all of the MRI radiology findings (notably an abscess, retropulsed fragments, and cord compression) to his attention. Dr N stated:

> "[Dr I] told me that [Ms A] had a spinal fracture due to osteomyelitis and or metastases. He did not tell me the MRI report result. If he had I would recall this and would have documented this in the notes."

104. Dr N recalls seeing the MRI imaging himself, but does not recall seeing any reporting of the imaging at that stage.

105. Dr I's explanation for not documenting his discussion with Dr N was:

> "I did not find a need to document that in detail since he agreed to come see the patient … Had I not conveyed the relevant information ... he would not have agreed to come down to see the patient …"

Dr N's review

106. At 5pm on 11 October 2011, Ms A was reviewed by Dr N.[42] Dr N noted that Ms A had had increasing pain over the last three months, and that she was mobilising with difficulty. Ms A was noted to have had weight loss and a reduced appetite, but no fever or sweats. She had no incontinence issues.

107. A physical examination found normal tone, power, and reflexes in the upper and lower limbs. Ms A had reduced sensation on one side of the chest wall at the level of T8 and T9. The gluteal cleft and bladder sensation were recorded as normal.

108. Dr N noted the results of the X-ray (kyphosis and significant wedge collapse at T9/10), and what he had been advised by Dr I (which Dr N documented as "? osteomyelitis ? pathological [fracture]").

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[41] The MCDHB electronic records system.

[42] Dr N's experience level in October 2011 was a non-training registrar with two years of orthopaedic registrar experience. Dr N was covering as the on-call registrar for Dr M's team from 4pm on Tuesday 11 October to 8am on 12 October 2011. He was not involved in Ms A's care after that.

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Discussion with senior staff

109. Dr N discussed Ms A's case with his senior surgeon, Dr O (Orthopaedic Medical Officer Special Scale), and then orthopaedic consultant Dr M.[43]

110. Dr N said he recorded the plan he discussed with the senior clinicians. He said that with a spinal case such as this, "I would take my management plan from them, given the complexity …"

111. Dr O stated that the MRI results communicated at that time did not mention cord compression. Dr M does not recall ever seeing the radiologist's written report (of the MRI) or having it read out to him, but said that he did review the MRI images, available via PACS, on the morning of 12 October. Dr M did not consider that the imaging showed cord compromise that required complete bed rest. In his view, there was cord compression, but not such as to compromise function. He did not consider that the fragments were retropulsed, but stated that there was inflammatory response and some narrowing of the spinal canal, and a paraspinal abscess.

112. Dr M's clinical judgement was that such an abscess did not represent an indication for surgical decompression, as it did not affect the spinal cord, and his interpretation of the scan did not suggest a change in his initial management plan (see below). In view of the likely diagnosis of infection, Dr M felt that the fracture pattern was sufficiently stable to allow gentle mobilisation.

113. Ms A was to be admitted to the ward under Dr M's care. Dr N recorded a management plan for regular observations, blood tests (including investigations for multiple myeloma,[44] calcium and thyroid tests), analgesia, mobilisation "as able", a chest X-ray, and a CT guided aspiration of T9 to attempt to make a diagnosis before treatment.[45]

114. Dr M said that antibiotics were not started at that point because specimens were needed first to isolate the organism causing the infection. Ms A was not considered to be systemically unwell at that time, and it was Dr M's view that treatment could be delayed until the results were received.

115. Dr M told HDC that the differential diagnoses in his mind were pyogenic infection, mycobacterial infection and neoplasia, and that the history indicated a pathological process of two to three months' duration.

116. Dr N told HDC that Ms A's mobility status plan was for gentle mobilisation assisted by nursing staff, for example, being able to go to the toilet with assistance from nursing staff. It was not an instruction to mobilise actively.

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[43] Dr M, a vocationally registered orthopaedic surgeon, was employed by MCDHB as a part-time consultant.

[44] A form of cancer that forms in a type of white blood cell known as a plasma cell.

[45] Dr N contacted the on-call radiologist.

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Admission to ward

12 October 2011

117. At 2am on 12 October 2011, Ms A was admitted to the surgical ward. Nursing staff organised physiotherapy and occupational therapy advice about aids to be used for safely mobilising to the toilet. Ms A was very slow to mobilise to the bathroom/toilet over the course of that day, using a crutch then later a stick.

118. Dr O saw Ms A on the 8am ward round. Team house surgeon Dr P recorded the consultation. The entry was headed "thoracic spine lesion–> pathological [fracture] ? osteomyelitis".

119. At that time, Ms A reported no sensory disturbance or lower limb weakness, and no bowel or bladder disturbance. Ms A had no fever. A lower limb neurological examination did not reveal any deficit. Ms A was anxious, so the investigations and MRI results were explained to her, and she was advised that further tests were needed. The plan was for a CT guided biopsy[46] at T8–T9, analgesia, mobilising, laxatives, and a urine specimen.

120. At 5.08pm on 12 October, the CT guided aspiration (biopsy) was carried out in the radiology department, and was sent for analysis.

121. Dr P stated to HDC:

> "During [Ms A's] admission, prior to her acute paralysis, the instructions regarding her mobility were clear from [Dr O] and [Dr M] that she was allowed to mobilise gently. My interpretation of this was she was not on spinal cares or bed rest, but safe for her to mobilise in her room or up to the toilet, with as much supervision or assistance the nursing staff thought was appropriate."

13 October — IV antibiotics started

122. On 13 October Dr M saw Ms A on the morning ward round. Dr P recorded the consultation. The entry was headed "thoracic spine lesion ? cause (likely infection)". It was noted that Ms A had ongoing back pain. Histology, cytology and culture test results were pending at that stage. The results of the bone scan were noted. The plan was to chase up the outstanding test results, give Ms A analgesia, and for her to mobilise gently.

123. At around 12.30pm Ms A was showered with assistance and then transferred to the orthopaedic ward.

124. At 3.30pm Dr P discussed the CT aspirate findings with Dr M. White cells were seen but no bacteria. There was blood, but no pus present. Dr M advised HDC that the absence of pus in the specimen was potentially supportive of mycobacterial infection. Intravenous antibiotics (ceftriaxone 1g once daily) were then commenced until the culture and sensitivities were reported.

[46] Using CT for image guidance, biopsy and/or aspiration needles are directed towards a lesion and a tissue sample obtained for pathologic evaluation.

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125. Dr P explained to HDC:

> "The preliminary biopsy aspirate of an abundance of white blood cells (no bacteria) became available on the 13th October. I called [Dr M] with the result and this was the first time it was decided to initiate antibiotic therapy. It was discussed with him to start on broad spectrum IV antibiotics until culture and sensitivity results were available. Ceftriaxone 1g IV was [Dr M's] choice given [Ms A] had an augmentin intolerance. I charted the antibiotics and informed nursing staff who efficiently administered this within half an hour of being charted. On review of the notes and medication chart I have noticed a charting error made by myself that I must apologise for and must have caused some confusion during the review of this case. The dated time of IV ceftriaxone commencement on the drug chart is 12/10/14. This is [a] clear printing error which I am 100% certain. There was NO instruction earlier than 13th October 3.30pm to start IV antibiotics, therefore there was no delay in administering IV antibiotics to [Ms A], once it was deemed appropriate by [Dr M]."

126. Dr M was not in the hospital in the late afternoon of 13 October or on 14 October 2011.

127. In the early evening on 13 October 2011, Ms A mobilised using a low pulpit frame. At 6.50pm Ms A was short of breath and given oxygen.

14 October

128. On the morning of 14 October, Ms A was tearful as a result of her pain. Dr P noted that the IV ceftriaxone had been started.

129. Nursing notes record that Ms A had used a commode overnight. At 1.35pm physiotherapy notes record that her mobility was difficult. Ms A was not mobilised, other than onto a commode, on the afternoon of 14 October, last using it at 3.15pm. Ms A declined to move out of bed in the afternoon as she was very tired. No changes in her neurological status were reported.

130. At 4pm Dr P reported that the culture had shown *Staphylococcus aureus* resistant to penicillin but sensitive to flucloxacillin, Augmentin and ceftriaxone. The plan was to continue ceftriaxone over the weekend. Other test results were still pending.[47]

131. Dr M told HDC that the approach at that point was:

> "… based on the understanding that the management of vertebral osteomyelitis is initially medical unless there is neurological compromise. Even in the presence of neurological compromise, the outcome of surgical intervention is often poor; fraught with multiple risks … and technically demanding … Surgery has the potential to increase a neurological abnormality and is therefore approached with caution in the neurologically intact patient."

[47] Specifically, SPEP (serum protein), Bence-Jones (urine protein), and QuantaFERON Gold assay (blood test for TB) results.

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Neurological deterioration

132. At 11pm on 14 October, house surgeon Dr T was called to see Ms A because she was experiencing numbness of her lower limbs. Dr T recorded that Ms A reported having no sensation in both her lower limbs from the level of the umbilicus down.

133. On physical examination, Ms A had normal tone in both lower limbs, was hyper-reflexic[48] on both sides, with power noted as being 0/5 for all movements of the lower limbs bilaterally. She had loss of sensation in the lower limbs, and the perineum, to the level of T8/10. Dr T's impression was of a further compression fracture at the level T8–T10 and spinal cord compression.

134. Dr M commented to HDC that "unfortunately the first signs of objective neurological compromise … was a complete paraplegia", and that prior to 14 October Ms A's reports of pain were both at rest and with movement. The paraplegia having occurred after several hours of bed rest, suggested a possible cause of a sudden vascular origin, such as spinal infarct, secondary to infection.

135. Dr T discussed Ms A with the orthopaedic surgical registrar on call, Dr Q. At 11.15pm, Dr Q reviewed Ms A and recorded that she had suffered acute paraplegia at T9, noting that there had been progressive deterioration over a few hours. The situation was then discussed with orthopaedic surgeon Dr R by telephone. A possible diagnosis of TB/non-benign lesion was also considered.

136. The plan was for Ms A to be nil by mouth from midnight, and to have a repeat MRI scan in the morning and possibly surgery the next day. Dr Q reviewed the records of the bone biopsy, noted a moderate growth of *Staphylococcus aureus*, the increased white cell count and increased CRP, and that there was no microbiology report yet available.

15 October

137. At 8am on Saturday 15 October, Dr R assessed Ms A on the morning ward round. At 11am Dr P recorded that Dr R had been unable to contact the on-call consultant at the spinal injury unit.

138. Around this time, a change to the IV antibiotic dosage occurred. Dr P told HDC:

> "[R]egarding dose change of the IV ceftriaxone on the 15th of October. On review on the clinical notes it does appear to be my writing and initials which have increased the antibiotic dose to 2g IV ceftriaxone … Despite review of the notes I am unable to recall why the dose of antibiotics was changed. At [that] stage in my career I wouldn't have done this without discussion with or instruction from a senior colleague or hospital pharmacist. This is usually something I would document clearly, however I can only presume that time pressure from it being a Saturday on-call shift with an urgent hospital transfer to [Hospital 2] to organise, that I did not get to document this reason prior to her being transferred."

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[48] An over-responsive reflex.

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Contact with tertiary service

139. Dr R subsequently contacted Hospital 2 orthopaedic surgeon Dr S, to arrange urgent transfer of Ms A for tertiary level care. Dr S advised that Ms A should be transferred to Hospital 2 immediately for an urgent MRI and surgery.

140. At 3.30pm, Ms A was transported to Hospital 2.

141. Dr M commented:

> "I reiterate that [Ms A] went from no objective neurology to complete paraplegia as her neurological compromise event. That was not predicted at time of admission and gave us no chance to consider tertiary referral based upon the management plan outlined … in 2011, there was little in the way of a tertiary referral service available,[49] if one had wanted to transfer a patient from our service with back pain of any cause, without neurological compromise. Having said this, based upon my initial decision to treat medically … I did not feel that a tertiary referral was initially needed. Having said the above, retrospectively I do wish that I had referred this patient for a second opinion at an early stage. This is however based on hindsight and a progression that I was not expecting. I am uncertain as to how much that opinion and/or transfer would have changed the outcome."

Hospital 2

142. Dr S told HDC that on arrival in Hospital 2 Ms A had a T8 sensory level with a profound paraplegia. She had imaging that confirmed a significant collapse of the T8/T9 vertebral body, and compromise of the spinal cord at that level. MRI and CT scanning confirmed collapsed infected vertebrae and an unstable pathological fracture requiring stabilisation.

143. Ms A underwent an urgent laminectomy the next morning. She underwent further surgery on 18 October 2011, and further debridement of the infected vertebrae. Subsequently, Ms A had sepsis complications involving her chest. She had more surgery on 25 October 2011 for extensive debridement via a thoracotomy. On 22 November 2011, Ms A was transferred to a spinal unit.

Subsequent events

144. Dr R advised HDC that, in 2009, he was firmly of the view that a CRP test should be done in cases of patients presenting to ED with severe spinal pain and, where clinically appropriate, such patients should be referred to the Orthopaedic Service.[50] He said that he had raised this issue with other senior DHB staff in 2009, and was of the clear understanding that such a referral process would be instituted by the ED at MCDHB.

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[49] Dr M said that there was no tertiary referral service readily available for a patient such as Ms A. MCDHB's tertiary referral service for back problems was for neurological compromise that could not be dealt with locally. In the main, that was to the spinal unit, and mostly related to traumatic events and associated paralysis.

[50] Dr R advised HDC that his view in this regard was informed by his review of two cases involving issues regarding the diagnosis of spinal infection on presentation to ED. Those cases included a 2007 case investigated by HDC (Opinion 07HDC14539), and a 2009 case at MCDHB.

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DHB actions

145. The DHB advised HDC that Ms A's care was reviewed, and the following actions had been taken:

- In June 2012, the draft "Guidelines for allocation of clinical line for adult acute admission where ambiguity may exist" were formulated into a formal policy document, "Allocation of clinical line for acute admission (adult, child and adolescent)".[51] The wording of the policy was reviewed by the Clinical Directors group.

- In December 2012, a Root Cause Analysis (RCA) was completed. The event was classified as SAC 1.[52] The root cause in Ms A's case was identified as being a delayed referral to the orthopaedic team following diagnosis of a spinal fracture on a bone scan, related to ambiguous instructions in the policy. The RCA also noted: "ED identified there is a culture that the orthopaedic doctors are reluctant to accept some back pain referrals." The RCA recommended the following actions:

  a) A review of the format/wording of the policy "Allocation of clinical line for acute admission (adult, child and adolescent)" to improve decision-making for clinical directives.

  b) The orthopaedic and ED teams develop an agreed algorithm for management of back pain.

  The RCA also noted that there was an opportunity to improve the culture between the Emergency Department and Orthopaedics. Following on from the RCA, the ED identified specific specialty liaison consultants to enable better communication and collaboration between ED and other specialties, including Orthopaedics.

- A family meeting was planned in late 2012, but Ms A was unable to attend.[53] MCDHB Operations Manager apologised to Ms A by telephone.

- Senior ED staff audited the notes of several patients who had presented with back pain. A specific guideline, "Acute Back Pain in Emergency Department", was finalised by MCDHB.[54] This was written in collaboration with the orthopaedic team. All patients who present with back pain are to be managed in collaboration with the orthopaedic team. There is now a lower threshold for requesting MRI in back pain presentations. The document specifies baseline investigations to be undertaken (including CRP) as well as indications for CT and MRI.

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[51] MDHB-6450, issued on 28 June 2012.

[52] A Reportable Event is any adverse event classified as a SAC 1 (most serious) or SAC 2 rating. An adverse event is an incident that results in harm or death to a consumer (or patient). The Severity Assessment Code (SAC) is a numerical rating that defines the severity of an adverse event and, as a consequence, the required level of reporting and investigation to be undertaken for the event.

[53] Ms A told HDC that on that day she had an urgent family matter to attend to, so she could not attend any meeting.

[54] MDHB-6712, issued 8 November 2013.

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- The ED identified specific specialty liaison consultants to enable better communication and collaboration between ED and other specialties.
- A quality framework and suite of quality measures for EDs has been developed and is being implemented into the Department, incorporating the guidance of the National Emergency Departments Advisory Group.
- As part of the national health strategy and the aim of a national shared health record, MCDHB's region is working toward a shared electronic record — a regional platform along with other lower North Island DHBs. A patient administration system upgrade[55] is anticipated so that a shared electronic record between MidCentral Health and two other DHBs will come into effect providing a platform for extension into primary health.
- Since 2013, the ED has developed a presentation entitled "Spine and Spinal Cord Injury". This is presented to ED house officers during teaching sessions, and repeated every quarter.

Responses to provisional report

146. Ms A's response to the "information gathered" section of the provisional report has been incorporated into the "information gathered" section of this report where relevant.

147. Dr E provided the following response to the provisional report:

> "I read the report and think that on the whole it is a fairly reasonable assessment of the situation. Perhaps my only point of dispute is the suggestion that I need to manage my time better. This was in relation to being rushed for time when the patient turned up late. The comment to make is that in addition to my medical practice I am involved in lots of other sporting, school and community activities and have therefore become very good at managing my time … At the end of the day, the reason for passing on that information was simply to explain why my report was as brief as it was. As I have repeatedly stated, it didn't change my management. I did what needed to be done which was to organise a bone scan and then the MRI scan which led to the detection of her problem."

148. Dr J responded to the provisional report as follows:

> "[T]he patient already had a confirmed vertebral fracture with no neurology, albeit with a raised CRP. I did not think a further CRP — a very non specific test, would have changed her management given she had a definitive investigation the following day with the MRI scan. I found no reason on my examination to expedite the MRI.
>
> I accept that this patient possibly should have been referred to orthopaedics at the time instead [of] staying on the ED short stay unit (regardless of CRP), however it has also been documented that the orthopaedic team at the time were reluctant [to] accept patients with chronic back pain. Therefore I believed a referral would be

[55] Estimated for completion in December 2014.

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more successful following the MRI scan which is what occurred. I do not believe taking blood tests on that attendance would have changed the outcome in this patient in any way."

149. Dr I's response to my provisional report included a written apology letter to Ms A, and he made the following submissions:

- He said that the system in place at that time did not permit him to arrange urgent CT or an MRI scan for her. His understanding was that ACC had that responsibility for patients who had ongoing back pain without any acute neurological deficits.
- In relation to Ms A's care on 27 September, Dr I said:

  "Since, at the time, the patient did not have any acute neurological deficits, ED physicians' decision to admit or discharge a patient depends to a large extent on the recommendations from the PEDAL and Acute Pain Management teams. They re-assessed the patient on September 27, 2011, and determined that the patient could be discharged for outpatient follow-up. They also usually arrange such follow-up for patients. My experience with their assessments and plans had always been very positive and helpful. Since they arranged follow-up care for [Ms A], I did not document any such plans in my notes myself."
- He also added: "[W]ith my previous experience with the system in place, [the] orthopaedic department would not have even considered seeing [Ms A] in the emergency department since she was not a candidate for any acute surgical interventions."
- In relation to October 11 and 12, Dr I said:

  "I received a telephone call from the radiologist, [Dr K], in the afternoon, who gave me a preliminary report of the MRI scan. I wrote down his verbal report on paper, and contacted the orthopaedic registrar immediately after that telephone call. [Dr K's] primary concern was possible osteomyelitis vs metastasis of the involved vertebrae. There was no mention of possible debris, fragments, cord compression, or an abscess. I also was not informed by any of the ED staff of a faxed report from [Dr K] after the telephone conversation with him. The written report from [Dr K] may have arrived after I left the ED for the day.

  I verbally gave the information I received from [Dr K] to the orthopaedic registrar, [Dr N], very clearly emphasising that [Ms A] had possible osteomyelitis or metastasis, making sure to get his attention that this patient needed to be seen by the orthopedic department without any delay …"
- Dr I also said:

  "[R]etrospectively, and considering her ongoing pain, I wish I had found a more expedient way to get an MRI scan for [Ms A] during her visit to the ED in September 2011. This has always been my usual practice in [my own country] where we, as ED physicians, have more freedom to obtain additional imaging modalities without having to plead and convince radiology consultants, or go

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through a third party such as ACC. This by no means indicates any incompetency on my part, but rather the somewhat intimidating system in place for surgical specialty referrals at the MidCentral DHB. Given the findings and determinations of ACC and PEDAL, I found no clinical persuasion to contact orthopaedics."

- Dr I stated: "I agree that I should have documented some of my findings and interactions with other departments in more detail. For this, I offer my humble apology."

150. MidCentral DHB responded that having considered the provisional report, it did not have any further comment to provide.

151. Dr M, Dr N, and Dr P responded, via their legal representative, that they did not wish to make any comments on the provisional report or associated recommendations and follow-up actions.

Opinion: Preliminary comment

152. I have carefully considered the standard of care that Ms A was provided over several months by a number of different providers across a number of different professional disciplines.

153. I am mindful of the comment of my emergency medicine specialist expert advisor, Dr Vanessa Thornton:

> "Back pain is a very common presentation to ED. In most cases it is due to a benign cause. It is not uncommon for the pain in osteomyelitis to be accounted for by a minor injury in the initial review and as it is notoriously difficult to diagnose osteomyelitis."

154. Nevertheless, I consider that Ms A's care was characterised by missed opportunities for her vertebral infection to have been considered and a referral for specialist orthopaedic review initiated earlier. This complex and tragic case provides salutary and important clinical learning of the importance of clear and comprehensive review and information sharing between specialities.

155. The failures in Ms A's care resulted primarily from deficiencies on the part of some individual clinicians. However, in relation to the DHB, this was coupled with an organisational deficiency that did not facilitate the continuity of care between the hospital's ED and orthopaedic teams. My findings in relation to the relevant individuals and the DHB are set out below.

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Opinion: Dr E — Adverse comment

Introduction

156. On 6 September 2011, Ms A saw sports physician Dr E privately, having been referred by GP Dr C.

157. I have received conflicting accounts from Ms A and Dr E about whether Ms A was late for her appointments, which make it difficult to make a finding. Ms A is adamant that she was not late. Dr E said that, based on his patient management system records, Ms A was late and, as a result, he experienced time constraints during the consultation. Dr E's clinical records are not prefaced by a mention of time issues, and his initial response to HDC did not mention this. In addition, he has been unable to provide HDC with a copy of the relevant patient management system records.

158. I remain of the view that it was Dr E's responsibility to manage his time with patients effectively and, where necessary, take steps to improve this. However, I note Dr E's submission that the time constraints during his consultation with Ms A did not change his management of her.

Care and treatment

6 September 2011

159. On 6 September 2011, Dr E noted the history of Ms A's back pain and her ED attendance, including that she had had an X-ray and blood tests done. However, Dr E failed to review Ms A's abnormal blood results accompanying Dr C's referral. Dr E said that this was probably because he was running short of time. He further stated that "when [he] looked through the attached correspondence, in combination with being rushed … [he] was probably already assuming that all the tests were normal and ha[s] obviously not paid the attention [he] should have".

160. Dr E assessed Ms A's gait and recorded that she had local tenderness over T10. Dr E did not record a neurological examination of Ms A's lower limbs.

161. Dr E stated that it is routine for him to enquire about neurological symptoms if a patient presents with thoracic spine pain. He said: "While I have not recorded it in my report, I do remember that [Ms A] did not complain of any pain down her legs or neurological symptoms" and that, given the above, "I probably didn't do a neurological examination of her lower limbs". Dr E stated that he did, however, record that Ms A was tender to palpate "about the level of T10", which suggests that he did visually inspect and palpate her back.

162. My expert advisor, sports physician Dr Graham Paterson, advised that Dr E's overall care of Ms A was of an acceptable standard. However, he was critical of Dr E's examination of Ms A on 6 September 2011. Dr Paterson advised:

> "This case is about the examination of a patient with *severe thoracic pain of seven weeks' duration*. In my opinion a sports physician exercising due care, seeing a new patient with these symptoms, would undertake a thorough neurological examination of the lower limbs, even during a time-constrained consultation …

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the absence of lower limb neurological symptoms is not a reason to forego this component of the examination."

163. Dr Paterson also noted that it would have been prudent for Dr E to have included a repeat full blood count and CRP assessment on 6 September 2011, in addition to the bone scan that Dr E requested. Dr E submitted that even if he had known about Ms A's abnormal blood test results, as outlined in Dr C's referral letter, at that time, it would not have altered his management.

164. I accept Dr Paterson's advice that Dr E's care of Ms A was, overall, consistent with accepted practice. Nevertheless, I am concerned that Dr E did not thoroughly review Ms A's notes and clinical referral information, which I would expect a specialist physician to do before seeing a patient for the first time. I am also critical of the standard of Dr E's assessment and examination of Ms A at that time, and recommend that he reflect on Dr Paterson's comments about his care of Ms A on 6 September 2011.

30 September 2011

165. At the follow-up appointment on 30 September 2011, Dr E reviewed Ms A again. Dr E's records do not refer to Ms A's existing symptoms or examination findings, or her visit to hospital. Dr E discussed the bone scan report with Ms A and referred her for an MRI. I accept Dr Paterson's advice that the referral was appropriate.

166. I also accept, as evidenced by Dr E's referral records, that he had turned his mind more generally to the possibility of sinister pathology and Ms A's reports of increasing pain. However, Dr E did not specifically record a consideration of infection amongst the differential diagnoses, and he did not request a further full blood count including CRP assessment. Dr Paterson advised that this was a mild departure from standards.

167. Dr E responded that further bloods would only have delayed the MRI, and the hospital staff were aware of previous blood results, and if the CRP was still raised the next step would be MRI in any event.

168. In my view, it would have been prudent and best practice for Dr E to have specifically considered infection and arranged further blood tests including CRP at the time of the 30 September consultation. While I do not find Dr E in breach of the Code in this regard, I note that his failure to do so was a missed opportunity to clarify the clinical picture.

Consultation documentation

169. On 6 September 2011, Dr E did not make any reference in his documentation to the presence or absence of neurological symptoms. On 30 September 2011, Dr E did not record Ms A's existing symptoms, examination findings, or her visit to hospital.

170. Dr Paterson advised me that Dr E's clinical records were not ideal. Dr E acknowledged to HDC that his clinical records for both consultations with Ms A were

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"not up to the specialist standards that my profession/college[56] would expect of me or that I would expect of myself". In my view, Dr E's reports were suboptimal, and he should have taken more care to fully record all relevant clinical history, assessments and examinations, and his clinical impressions.

Opinion: Dr I — Breach

Adequacy of 27 September review and assessment

171. Ms A was taken by ambulance to ED on 26 September with severe pain on movement, radiating to her right rib. Ms A was noted by the ambulance officers to be feverish and nauseated, with a reduced appetite. Examination in the ED revealed that Ms A had significant tenderness over T9 with paraspinal tenderness, pain at 40 to 50 degrees of flexion of the hip, but normal sensation and power in her legs. Blood tests and a plain X-ray were taken. The impression was that Ms A had a T9 fracture with no neurological defect, and a high CRP secondary to the fracture. Ms A was moved to the EDOA overnight, with a plan for repeat blood tests the following morning, analgesia, a PEDAL review, and mobilisation.

172. Dr I was the ED consultant with overall responsibility for Ms A on 27 September 2011. He reviewed Ms A at 8 o'clock that morning. His record of his assessment is brief, and he noted that Ms A's pain was "much better". Dr I's documented plan was for PEDAL to re-evaluate Ms A that morning. There is no evidence that Dr I reviewed the assessment undertaken the previous day, or the morning blood results.[57]

173. Dr I acknowledged that Ms A's elevated WBC count and CRP level were red flags for possible underlying significant pathology. However, he noted that the parameters were non-specific, and that he assumed that the elevated levels were due to Ms A's fracture and increased pain. He felt it reasonable, in those circumstances, to discharge Ms A from the ED. Dr I did not document any discharge or follow-up instructions. Ms A was discharged at 2.45pm on 27 September 2011, with district nursing support to assist her at home.

174. My expert raised concerns about Dr I's interpretation of Ms A's inflammatory markers. Dr Thornton advised:

> "[A] CRP of 186 in the setting of a fracture would be very unlikely as the CRP was too high and the fracture had been present 6 days prior to [admission] to ED. The CRP usually rises in the acute phase and settles over 7 days. The bone scan had been on the 20th of September and the fracture was documented at this time."

175. Dr Thornton concluded:

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[56] The Australasian College of Sports Physicians.

[57] Further blood tests were taken at 6am, which showed a sodium level of 130mmol/L and potassium level of 2.9mmol/L. No CRP result was reported.

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"The cause of the fracture which had occurred over the 9 weeks since the previous presentation was unclear as there had been no significant trauma in the intervening period. The bone scan had recommended a CT. In the acute setting of pain but no neurology, fever, raised CRP and bone scan with a fracture with significant wedging this would be the most acutely accessible and useful test.

The appropriate course of action for [Ms A] on this presentation of fever, raised CRP and back pain without neurology was a CT to be requested and a referral to Orthopaedics for admission and review. [Dr I's] review in the [EDOA] for [Ms A] is a moderate deviation from the standard of care expected by an SMO."

176. Dr I told HDC that he was aware of the DHB's draft guideline criteria for orthopaedic referral, which included a spinal fracture of recent origin. However, Dr I did not request, or discuss, an orthopaedic review of Ms A during her second ED presentation. Dr I stated:

"I did not call the orthopaedic team … since I was waiting for the PEDAL team to assess her and offer suggestions … the PEDAL team had determined that [Ms A] was ready to be discharged to home …"

177. Dr I also speculated that the orthopaedic team might not accept a patient with a previously known vertebral fracture without neurological deficits, who needed pain control.

178. Given his seniority and associated responsibilities, I do not accept Dr I's reasoning for not referring Ms A to the orthopaedic team. I also note that the orthopaedic team was not given any opportunity to consider Ms A's presentation at this stage.

179. I accept Dr Thornton's advice that Ms A should have been referred to Orthopaedics at the time of her presentation to ED on 26/27 September. In my view, Dr I's review and assessment of Ms A on 27 September 2011 was below accepted standards for an ED consultant. Despite an awareness of draft referral criteria and Ms A's symptoms, Dr I failed to discuss Ms A with the orthopaedic team and/or refer her for orthopaedic review. In my opinion, he failed to provide services to Ms A with reasonable care and skill and, accordingly, he breached Right 4(1) of the Code.

Recording of discussion with radiologist

180. Ms A was taken to ED by ambulance again on the morning of 10 October 2011 with increasing back pain. On arrival at ED, Ms A was sitting and unable to mobilise, and had oedema of her lower extremities, although her observations were normal. Ms A was reviewed by senior house officer Dr J, who noted that she had no numbness in her lower limbs, and no saddle paraesthesia, and that she had normal tone but weakness in her lower limbs. Ms A's sensation was noted to be normal and her reflexes were intact. Ms A was moved to the EDOA, and a plan was made for pain relief and a review by the PEDAL team. It was noted that Ms A had an MRI scheduled for the next day.

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181. Dr I reviewed Ms A on the morning of 11 October 2011. He noted that an MRI was scheduled for 9.45am, and he documented that Ms A was for a review by the PEDAL team after her MRI. Dr I's entry did not comment on the review of the previous day.

182. Dr I submitted that he spoke to consultant radiologist Dr K following the MRI and that Dr K's "primary concern was possible osteomyelitis vs metastasis of the involved vertebrae". Dr I stated: "There was no mention of possible debris, fragments, cord compression, or an abscess." Dr I's recollection was that the telephone conversation with Dr K occurred between 2.05pm and 3.40pm. This time is not supported by the evidence, which shows that Dr K's interim letter dated 11 October 2011 was first sent to the DHB (by fax) at 1.19pm.

183. Dr K's interim letter regarding the MRI findings (containing all information in his report), which was dated 11 October 2011 and copied and faxed to the ED, contained pivotal clinical findings (notably including reference to an abscess, retropulsed fragments, and cord compression). Dr K documented that he discussed the MRI findings with Dr I "at the time of examination". I accept that Dr K telephoned Dr I and conveyed the findings and his recommendation. At that point, the information contained in the interim MRI letter was within the DHB system.

184. Dr I said that he wrote down the findings conveyed to him by Dr K "on a piece of paper". He then used that piece of paper to convey the MRI information to the orthopaedic team.[58] Dr I did not document his discussion with Dr K in the ED clinical record. Dr I documented only: "MRI: Possible osteomyelitis and/or [metastases]?" (Dr K's letter did not mention metastases.) Dr I then discussed Ms A with the orthopaedic registrar on call (see below). Dr I also failed to document his discussion with the orthopaedic registrar.

185. The Medical Council's statement on "Maintenance and retention of patient records"[59] states that doctors:

> "… must keep clear and accurate patient records that report:
>
> - Relevant clinical findings
> - Decisions made
> - Information given to patients
>
> …
>
> (b) Make these records at the same time as the events you are recording or as soon as possible afterwards …"

186. As I have stated previously, "The importance of good record keeping cannot be overstated. It is the primary tool for continuity of care and it is a tool for managing patients."[60] Dr I failed in his obligations to document vital clinical findings in the ED

[58] No such note appears on the DHB clinical file.
[59] August 2008.
[60] Opinion 10HDC00610, available at www.hdc.org.nz.

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notes, and he also failed to document his discussions with the consultant radiologist and orthopaedic registrar. Accordingly, in my opinion, he did not comply with professional standards and therefore breached Right 4(2) of the Code.

Communication with orthopaedic registrar

187. Dr I told HDC that he telephoned orthopaedic registrar Dr N to inform him of the MRI findings, and that he conveyed all the information he had received from Dr K. As noted above, Dr I did not document his discussion with Dr N. Dr I's explanation for not documenting his discussion with Dr N ("I did not find a need to document that in detail since he agreed to come see the patient …") is unconvincing given the critical nature of the MRI findings.

188. Dr N said that Dr I told him that Ms A had a spinal fracture due to osteomyelitis and/or metastases, and that he was not told about all the MRI findings. The clinical records support Dr N's recollection, in that Dr I's record notes only "MRI: Possible osteomyelitis and/or [metastases]", and Dr N recorded at 5pm "? osteomyelitis ? pathological [fracture]".

189. As I have noted previously, "If it isn't recorded in the notes the starting point is that it didn't happen."[61]

190. In the absence of documented evidence, and considering the information about the MRI results that Dr I and Dr N documented at the time in the clinical records, I find that Dr I did not bring all of the MRI interim information to Dr N's attention; in particular, Dr I did not inform Dr N of the MRI finding of an abscess, retropulsed fragments, and cord compression. Relaying of the MRI results was critical to Ms A's further management. I note that without full information about the MRI results, Dr N's ability to provide appropriate care and treatment for Ms A was significantly impeded. In my view, Dr I let down Dr N and the orthopaedic team.

191. I find that Dr I did not communicate effectively with Dr N and, accordingly, he failed to ensure quality and continuity of services between the ED and orthopaedic services. Accordingly, Dr I breached Right 4(5) of the Code.

Opinion: Dr J — Adverse comment

192. When Ms A presented to the ED on 10 October 2011 she was reviewed by senior house officer Dr J. Dr J examined Ms A, formed an impression that she had a mobility problem, and moved her to the EDOA with a plan for pain relief and a review by the PEDAL team, noting that she was scheduled for an MRI the next day and consultant review.

[61] Hill, A., "Systems, Patients, and Recurring Themes", *New Zealand Doctor* (9 March 2011). Available at: www.hdc.org.nz.

193. Dr Thornton advised me that Ms A's history and examination at this time indicated a significant deterioration over the two weeks from her previous ED presentation (on 26 and 27 September). Dr Thornton stated that blood tests should have been performed by Dr J on this admission.

194. I accept Dr Thornton's advice and am critical of Dr J for not ordering further blood tests. However, I accept Dr Thornton's advice that a thorough examination was documented, there was no acute neurology or evidence to expedite the MRI investigation booked for the following day, and that for a junior doctor in emergency medicine this would be an acceptable level of care.

Opinion: Dr N — No breach

195. When Dr N reviewed Ms A on 11 October 2011, he initially noted the results of the X-ray and what he had been told by referrer Dr I. Dr N assessed Ms A, and noted that she had had increasing pain over the last three months, that she was mobilising with difficultly, and that she had weight loss and reduced appetite, but no fever, sweats or incontinence. Dr N's physical examination of Ms A identified that she had normal tone, power and reflexes in her upper and lower limbs, but that she had reduced sensation on one side of the chest wall at the level of T8 and T9. Ms A's gluteal cleft and bladder sensation were also noted to be normal.

196. Dr N appropriately discussed the case with senior staff, Dr O and consultant Dr M. However, Dr N proceeded on the basis of the incomplete information he had been given by Dr I. Dr K's interim letter detailing the MRI findings was not copied to the orthopaedic team, as it was not routine for the DHB to receive reports of private ACC funded scans. Dr K had, however, appropriately faxed a copy of his interim letter to the ED on 11 October, and directly advised Dr I of the findings by telephone.

197. It is important to note, therefore, the comment of my expert orthopaedic surgical advisor, Dr Iain Kelman, in relation to the significance of Dr I's primary failure. Dr Kelman advised that had Dr N been made aware of all the vital MRI findings, "he might well have thought differently on the matter and appreciated the significance of these findings …". In my view, Dr N was let down by Dr I. I note that it was open to Dr N to enquire after the written interim MRI letter. However, in these circumstances, I consider it was reasonable for Dr N to rely on the verbal information provided to him by a senior colleague.

198. Dr N followed Dr O's instructions, discussed the case with Dr M, recorded the treatment plan, and informed the doctor responsible for the ward that night.

199. I accept Dr Kelman's advice that Dr N's actions "are entirely in keeping with the instructions that he was given by the senior medical staff", and his management of Ms A "was in keeping with that of an orthopaedic registrar". As such, Dr N did not breach the Code.

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Opinion: Dr M — Adverse comment

200. Registrar Dr N discussed Ms A with consultant Dr M on 11 October 2011, after Ms A had been referred to the orthopaedic team.

201. When considering Ms A's care, consultant Dr M initially relied on Dr N's assessment to formulate a treatment plan, which Dr Kelman considered was appropriate. However, Dr Kelman pointed again to the significance of earlier failings (described above) when he advised: "I feel sure that a different plan of management would have been formulated had [Dr O] and [Dr M] been made aware of all the findings on the MRI scan."

202. Dr M advised HDC that he did review the MRI images, but did not consider that the imaging showed cord compromise that required complete bed rest. He also considered that the fracture pattern was sufficiently stable to allow gentle mobilisation. I am critical of Dr M in this regard. I am concerned that Dr M did not pursue, or instruct his team to pursue, the written interim MRI letter. Expert radiologist reports are a critical piece of information, and should be read. I am also critical that Dr M did not recognise that the images carried potential complexity, which should have acted as a further incentive to read the interim MRI letter. This was a complex case and a material report was not read. This was suboptimal.

203. Dr M recommended that a CT biopsy and aspiration be arranged in the first instance, in order to obtain a diagnosis. Dr M's differential diagnoses were pyogenic infection, mycobacterial infection and neoplasia. Dr M did not start antibiotics at that point, as he planned to obtain specimens first. Dr Kelman stated: "With respect to vertebral osteomyelitis on its own without the above findings (collapse retropulsed fragments and paraspinal abscess) I would agree could be treated conservatively with appropriate identification of the organism and antibiotics."

204. The CT biopsy was carried out at approximately 5pm on 12 October.

205. Dr M reviewed Ms A on the morning of 13 October, and it was noted that Ms A's histology, cytology and culture test results were pending. Dr M's plan with respect to Ms A's mobilisation was stated to be "as able", and this centred on assisting Ms A in moving from her bed to the commode when required.

206. The CT aspirate findings, which showed white cells but no bacteria, were discussed with Dr M in the afternoon of 13 October, and intravenous antibiotics were then commenced. Dr M explained his approach to Ms A's care and treatment as being "based on the understanding that the management of vertebral osteomyelitis is initially medical unless there is neurological compromise". Ms A's neurological deterioration was identified on the evening of 14 October 2011.

207. Dr Kelman advised:

> "[Dr M] indicated that he felt a biopsy was necessary in the first instance in order to obtain a diagnosis. Bearing in mind his differential diagnosis this was a reasonable clinical approach to the problem. He is correct in saying that the early

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administration of antibiotics can make the interpretation of results extremely difficult. After the biopsy was obtained I consider it is reasonable to then commence a broad spectrum antibiotic in situations such as this and to await the definitive results from the microbiologists. This was duly carried out … When the diagnosis of a staphylococcus aureus infection was established on the afternoon of [14 October] appropriate antibiotics were commenced."

208. Dr Kelman concluded that, overall, the care undertaken by the orthopaedic department was of a standard that could not be criticised given the complexity of the clinical problem presented, and that the orthopaedic team acted appropriately with the information at hand. I am nonetheless critical of Dr M for the failure to pursue and read the consultant radiologist's interim MRI letter. I note that this was a complex situation, and Dr Kelman's observation that such information may well have changed the management plan.

Opinion: Dr P — No breach

209. In my opinion, Dr P was involved in Ms A's care only peripherally and, in my opinion, did not breach the Code in these circumstances.

Opinion: MidCentral District Health Board — Breach

Continuity of care between DHB specialities

210. I am critical of the clinical care and treatment provided to Ms A by a number of individual staff of MCDHB, as set out above. However, as set out below, I am also critical of the overall care that Ms A received from MCDHB, for which MCDHB is responsible.

211. As I have stressed previously, individual clinicians need to be competent in their clinical assessment and management of patients, and staff need to be supported by systems that guide good decision-making and promote a culture of safety.[62] First, I am concerned that MCDHB's ED staff were not adequately supported by a system to guide their decision-making and to ensure continuity of care between the emergency and orthopaedic teams at the time of these events.

212. I discovered during the course of my investigation that in 2009, prior to these events, senior orthopaedic staff had already discussed issues surrounding the referral to the orthopaedic service of patients presenting to the ED with severe spinal pain. Dr R advised HDC that it was his clear understanding that a process would be instituted by the ED at MCDHB. However, by 2011 only a draft guideline had been produced in relation to such referrals.

[62] Opinion 09HDC02089, 4 July 2012.

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213. In my view, clear criteria and processes for referrals to orthopaedics from ED for patients with acute back pain presentation should have been in place. I acknowledge that a number of positive improvements have now been made by the DHB. However, at the time of these events, a clear policy governing referrals from ED to orthopaedics, enhancing the quality and continuity of care between those departments, had not been finalised by the DHB. In my view, not having a clear formalised referral policy in place was a relevant factor in the suboptimal co-operation and continuity between the specialty services in Ms A's case.

214. Secondly, I am also concerned that Dr I reported to HDC that, in his view and experience, the orthopaedic team would not accept a patient without any neurological deficits, who needed only pain control, even with a previously known vertebral fracture. The RCA also identified this as a concern. Dr Thornton stated: "I note a comment made [in the MCDHB response] that 'orthopaedic teams are reluctant to accept back pain referrals'. This would be a comment made from many EDs across New Zealand."

215. In my view, specialties need to work together effectively, foster good working relationships and clear lines of communication, and be guided by appropriate protocols. I have also placed a very clear emphasis on provider organisations ensuring they have in place "cultures that empower people; cultures that embody transparency, engagement, and seamless service as they put consumers at the centre of services".[63] I reiterate that message in this case.

216. Thirdly, although it was not routine for privately initiated and funded scan reports to be electronically copied to the DHB, once the consultant radiologist's interim MRI letter was faxed to the ED on 11 October, the DHB system had in its possession information that was material and critical to Ms A's care. I am concerned that that information was not sought out or accessed by orthopaedic team members until 14 October. A more effective system would have ensured that the interim MRI letter was available and flagged to the orthopaedic team on 11 October, and may have ameliorated the ED consultant's individual failure to pass on critical information.

217. Overall, in my opinion, for the reasons set out above, MCDHB did not adequately ensure quality and continuity of services to Ms A and, accordingly, MidCentral District Health Board breached Right 4(5) of the Code.

Recommendations

218. I recommend that MidCentral DHB:

a) Provide a formal written apology to Ms A for its breach of the Code. The apology is to be sent to HDC within three weeks of issue of this report, for forwarding to Ms A.

[63] Hill, A., "Systems, Patients, and Recurring Themes", *New Zealand Doctor* (9 March 2011). Available at: www.hdc.org.nz.

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b) Provide to HDC, within three months of issue of this report, an evaluative update report on the effectiveness of all system and policy changes implemented as a result of this case. The report should contain the following:

   1) A further random audit of the notes of patients who have presented to ED in the last 18 months with acute back pain, to review staff compliance with the "Acute Back Pain in Emergency Department" policy, and to assess the frequency of CT/MRI requests and blood testing.

   2) A qualitative review of the effectiveness of the use of newly created specialty liaison consultants to enable better communication and collaboration between ED and other specialties.

   3) Details of the quality framework and suite of quality measures for EDs that has been implemented into the Department.

   4) An update on the improvements to the regional shared electronic record, and the patient administration system upgrade that was scheduled for completion in December 2014. This should include consideration of reviewing the availability to MCDHB staff of electronic interim report results of investigations, including those initiated privately, undertaken at the radiology service and the MRI unit.

   5) The instigation of a process that ensures that when reviewing radiology scans, orthopaedic team members review the associated specialist radiologist written report.

   6) An evaluation (including feedback from junior doctors) of the use of the presentation entitled "Spine and Spinal Cord Injury" to ED house officers during teaching sessions, which is repeated every quarter.

   7) An update on tertiary referral service availability to MCDHB in the event of patient presentation to ED with suspected spinal abscess or paraspinal abscess where there is an apparent threat to compression of the cord.

219. I recommend that Dr E arrange for a sports physician peer to review a random selection of patient assessments and clinical documentation/letters, and provide the peer report back to HDC within three months of this report being issued.

220. In my provisional report I recommended that Dr I provide a formal written apology to Ms A for his breaches of the Code, and that it be sent to HDC within three weeks of issue of this report, for forwarding to Ms A. Dr I provided a written apology letter with his response to my provisional report.

221. I recommend to the Medical Council of New Zealand that, in the event that Dr I returns to New Zealand and applies for an annual practising certificate, it conduct a review of his competency.

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Follow-up actions

222.
- A copy of this report with details identifying the parties removed, except the experts who advised on this case and MCDHB, will be sent to the Medical Council of New Zealand, and it will be advised of the names of Dr I, Dr E, Dr M, Dr N, and Dr P, in the covering correspondence.
- A copy of this report with details identifying the parties removed, except the experts who advised on this case and MCDHB, will be sent to the Australasian College of Sports Physicians (ACSP).
- A copy of this report with details identifying the parties removed, except the experts who advised on this case and MCDHB, will be sent to the Royal Australasian College of Surgeons (RACS), and the Australasian College of Emergency Medicine (ACEM), and will be placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

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Appendix A — Independent emergency medicine advice to the Commissioner

The following expert advice was obtained from Dr Vanessa Thornton, an emergency medicine specialist.

"I have been asked to provide an opinion to the Commissioner on case number C12HDC00618 and I have read and agree to follow the Commissioner's Guidelines for Independent Advisors.

I am the Head of Department of Middlemore Hospital Emergency Department New Zealand, the largest Emergency Department in Australasia. I have been the HOD since 2008. My qualifications are FACEM (Fellow of the Australasian College of Emergency Medicine) and MBChB at Auckland University. I have been a fellow of the college for 14 years and graduated as a Doctor in 1992. I am drawing on my experience as an Emergency Physician and the literature available around back pain and osteomyelitis in the emergency setting.

[…]

I have been advised to provide advice on the following issues:

1. On the standard of assessment and care [Ms A] received at [Hospital 1] on each presentation

- 21/22July 2011
- 26/27 September 2011
- 10/11–15th October 2011

2. Please provide your expert opinion on the care, assessment, and clinical decision-making by [Dr I] ED consultant and other ED staff members.
3. Please provide your review on the timeliness of antibiotic prescribing of antibiotics for [Ms A].
4. In your view should [Ms A] have been referred to [the] orthopaedic team earlier?
5. Please comment on the standard of communication between [Dr I] with other hospital staff including the ED team, radiology staff and the orthopaedic team.
6. Please comment on the appropriateness of the recommendation arising out of the DHB's RCA and the remedial actions taken as a result of this event.

Summary of presentation
[Ms A] presented to the ED [for] the first time on the 21/7/2011 at 1644.

[Ms A] was brought in by ambulance due to thoracic pain increasing over the last 2 weeks. The ambulance history reported increasing pain over the last couple of weeks after an injury lifting a heavy weight despite analgesia given by the GP. She reported reduced appetite and nausea. She also reported a recent UTI and skin infection. Her examination temp 37.2 HR 84 RR17 and a pain score of 8/10. She was treated with Ondansetron en route.

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She was seen by a nurse at 1700 and was noted to have back pain not controlled by analgesia from her GP. She had been on oral antibiotics from her GP for a UTI/ wrist infection and was not coping at home with the pain. She was triaged as a TC 3 and at 1805 her vitals were checked with a HR 80 BP 140/80 RR 16 Pain on movement of 7/10. She was given Codeine and Paracetamol at 1820.

She was seen by the ED house officer at 1020pm [Dr G]. The history was of a 2 week history of back pain after lifting [a heavy weight]. She developed pain in the rib and used paracetamol to ease the pain. The pain had gradually got worse and was exacerbated with inspiration and movement. The GP had treated her with codeine, brufen and paracetamol. She continued with pain and was treated with diazepam and norflex. The pain was increasing despite treatment.

At the same time she developed a dysuria and frequency and was treated by the GP for an E coli UTI and had had cellulitis of the arm.

The relevant documented negatives were no history [of] fever, weight loss, steroid or IV drug use.

Her past medical history included a UTI recent HT and dyslipidaemia.

[Ms A] was currently on Metoprolol, simvastatin, diazepam bendrofluazide, codeine, paracetamol and amoxicillin.

The social history indicated that she had previously been independent but had required assistance from her sister due to the current pain.

On arrival her examination showed HR 72, RR 16, BP 138/78. Her HS were dual and chest was clear. Her abdo was soft and non-tender. Examination of her back indicated tenderness in the mid thoracic spine and Para spinal tenderness with normal sensation.

Her R wrist had mild swelling and ? a puncture site.

[Dr G] completed blood tests including WCC 14.7 elevated CRP 107 elevated but less than the 14/7/2011 (149 at that time). [Dr G] completed lumbar x-ray where there was no obvious fractures and degenerative change only.

The impression made by [Dr G] was musculoskeletal pain with no neurological deficit. The raised WCC and CRP [were] likely to be secondary to the recent UTI and cellulitis. Also [Dr G] raised social concerns with respect to [Ms A's] ability to cope at home.

[Dr G] formulated a plan of regular pain relief oral fluid. She was moved to the ED Observation Area and PEDAL team review in the morning.

In the morning [a doctor] reviewed [Ms A]. He has noted that the pain had eased overnight and that the physio was to review. If comfortable to discharge home and was given codeine and diazepam on discharge. [Ms A] was reviewed by PEDAL

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team social worker and ACC support was to be implemented. She was discharged home at 1515 22/7/2014.

Second presentation on the 26th of September 2011
[Ms A] re-presented on the 26th of September 2011 at 1331. She once again was brought in by ambulance. The ambulance reported that she had musculoskeletal back pain and it had not improved. A bone scan on 20/9 revealed a flattened T9. Patient had previously been independent and [doing physical work]. On ambulance arrival pain was severe with movement radiating to the R rib worse with coughing. Had been on antibiotics for chest infection. She felt hot feverish and nauseated with reduced appetite. Observation in the ambulance was temp 38.3 HR 97 BP 120 and sats 98%. Her pain score 9/10. Panadol was given en route in the ambulance.

In ED [Ms A] was assessed by a nurse at 1340. The nursing history was of difficulty managing due to pain in the thoracic area. Reduced appetite and fluid over the last couple of days. The Morphine for the pain had resulted in constipation. [Ms A] had a productive cough with brown sputum. On antibiotics from the GP. She was triaged as 4 and placed in the assessment. Her initial observations in ED at 1440 were a temp 36.5 BP 15/60 HR 90 RR 17.

[Dr H] the ED house officer saw [Ms A] at 1330. [Dr H] reports a history of acute back pain for 3 months after pushing heavy object. [Ms A] had been started on m-eslon and this had helped. Pain was mid thoracic radiating around to chest 2/10 at rest worse with movement 10/10 and unable to lie flat due to the severe pain. [Ms A] denied any trauma and motor sensory deficit. No incontinence and no fever or sweats.

It is noted in the history a bone scan on the 20/9 with a report which showed increased uptake in T9 and ? Collapse. A CT/xray was recommended.

Her medication included bendrofluazide, meslon and roxithromycin.

On examination it was documented that [Ms A] was sitting very still and had significant tenderness over T9 was noted with Para spinal tenderness. Examination of the lower limbs with pain at 40 to 50 degrees of flexion of the hip. Normal sensation and power was stated in legs.

Examination of the heart sounds were dual and chest was clear.

[Dr H] completed a set of investigations which included a CRP of 186 WCC Na 128 and K 3.0.

The plain film xray of the thorax was commented on as being reviewed by the ED consultant (? which one) and significant wedging was noted on the plain film 'consistent with the bone scan'.

[Dr H's] impression was of T9 fracture with no neurological deficit, high CRP secondary to a fracture and hyponatremia and hypokalaemia was accounted for as dilutional.

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[Dr H's] initial plan was to encourage mobilisation, analgesia and PEDAL review in the morning. [Ms A] was moved to the observational ward. It is not clear if the plan was discussed with an ED Consultant.

The nursing notes in the observation ward comment on anxiety with mobilisation and weak in the legs although an ability to complete all ADLS with supervision.

The observation chart via the nursing team indicates a pain score of 6/10 at rest and 10/10 with movement. [Ms A] remained afebrile throughout her presentation with HR of initially 90, which dropped to 70 at 1700. It is noted that she self medicated an extra dose of metoprolol at around 2200hrs but the HR remained stable.

In the Observation ward [Ms A] was reviewed by [Dr I] and he noted that she was more comfortable with mobilising and was in no apparent distress. I note that blood tests were requested for the morning but I am unsure of the results. The PEDAL team was in the plan.

The PEDAL team was reviewed on the 26th of September. It is noted that the acute pain team was called to assist with analgesia. The pain team suggested adding sevredol and trialling tramadol. She was already on 30mg bd meslon for the pain. A follow up note is not seen for the 27th of September.

[Ms A] was also reviewed by physiotherapy on this admission and was said to be safe at the time of discharge mobilising with one crutch.

Presentation 10 October 2011

[Ms A] re-presented on the 10/10/2011. Once again an ambulance brought [Ms A] to ED with back pain and social issues. She was noted to have increasing back pain despite medication change on last admit to ED. The ambulance noted that she had been diagnosed with a fracture of T9 ? pathological fracture/degenerative spine. On arrival of ambulance patient was sitting in her chair and unable to mobilise with family with her. It is noted that she has oedema of her lower extremities which was new. All observations were normal range and she was carried on a chair to a stretcher and then to the ambulance.

In ED she was seen by a triage nurse at 1025 and seen by [Dr J] at 1435. He noted increasing back pain and due for MRI the next day. There was history of constipation and difficulty passing bowel movement.

On examination this presentation weakness in the lower limbs bilaterally is noted with power of 4/5 in the right and left lower limbs. The sensation was normal and reflexes were intact.

An impression by [Dr J] was of a mobility problem and a plan for the observation ward and review by the PEDAL team. No investigations were done on presentation in particular no blood tests or urine.

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[Dr I] saw [Ms A] the next morning and it is noted that he wrote at 0815 ? osteomyelitis ? mets, await MRI and ortho consult was requested.

[Ms A] was reviewed by the ortho registrar at 1700 on the 11/10/11. It is noted that she has had increasing pain over the last 3 months. Still mobilising but with difficulty. [Ms A] was noted to have weight loss and reduced appetite with no documented fever or sweats.

An examination by the ortho registrar noted normal tone power tone and reflexes but reduced sensation at the level of T8 and T9. Cleft and bladder sensation were documented as normal.

The results of the xray were noted as a significant wedge fracture and the MRI was documented as ? osteomyelitis.

The registrar discussed this case with his consultant [Dr M] and plan was in place for blood tests, analgesia, mobilisation and a CT guided biopsy. Further investigations were requested including bence jones (? Multiple myeloma), calcium and Thyroid function tests.

[The house officer] admitted [Ms A] to the ward and her history included the story of weakness in the lower limbs. All investigations were requested by the admitting house officer.

[Ms A] was admitted to the ward.

Response to questions

- **Standard of care received by [Ms A] on each presentation to [the] ED**

As a general statement on [Ms A's] admission I note that the nurses have regular documentation throughout all presentations and that documentation is clear and concise.

1. 21/22 July 2011

I have noted the history and examination undertaken by [Dr G] at the time of [Ms A's] presentation. I note that the house surgeon has completed an appropriate history and examination at the time of [Ms A's] first presentation and completed a full set of investigations consistent with back pain guidelines including an X ray and blood tests. [Dr G] has noted the raised CRP at the time of presentation but has attributed this to her recent E Coli UTI and cellulitis. It is also noted that the CRP was less than the time of GP review. This would be reasonable as bacterial infection causes an increase in the CRP and the CRP had settled from the previous CRP. Appropriate overnight observation and review by medical and community teams ensured safe discharge of [Ms A].

The appropriate standard of care occurred at the first presentation in ED. Follow up with the GP of the pain should be recommended at time of discharge with review of the CRP to ensure resolution.

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26/27th September 2011

On review of [Ms A's] second presentation to the [ED] I note that [Ms A] was seen and reviewed initially by a house officer [Dr H]. This was a presentation with increasing back pain with fever in the ambulance and at this time [Ms A] had a fracture documented on bone scan. [Dr H] completed a full and appropriate history with appropriate investigations. It appears [Dr H] attributed [Ms A's] raised CRP of 186 to a fracture. At this time I also note that [Ms A] was recommended by the bone scan report to get a CT/ plain films. Whilst [Dr H's] conclusions and impressions in this case were clearly documented it would be not unreasonable to have made these conclusions at the level of a house officer. The standard of care by the house officer was as expected for the level of training. It is not clear if an ED consultant review occurred at presentation.

[Ms A] was reviewed by an SMO the following morning, [Dr I]. The note was brief and referred only to settling of pain with significant analgesia. The SMO has not commented on the house surgeon assessment however a CRP of 186 in the setting of a fracture would be very unlikely as the CRP was too high and the fracture had been present 6 days prior to admit to ED. The CRP usually rises in the acute phase and settles over 7 days.[1] The bone scan had been on the 20th of September and the fracture was documented at this time.

Furthermore many papers have supported a raised CRP as being an indicator of bacterial infection especially if significantly elevated. A fever was documented in the ambulance. A study into raised CRP in the elderly showed that a CRP of greater than 80 was consistent with a bacterial infection.[1,2]

The cause of the fracture which had occurred over the 9 weeks since the previous presentation was unclear as there had been no significant trauma in the intervening period. The bone scan had recommended a CT. In the acute setting of pain but no neurology, fever, raised CRP and bone scan with a fracture with significant wedging this would be the most acutely accessible and useful test.

The appropriate course of action for [Ms A] on this presentation of fever, raised CRP and back pain without neurology was a CT to be requested and a referral to Orthopaedics for admission and review. [Dr I's] review in the observation ward for [Ms A] is a moderate deviation from the standard of care expected by an SMO.

2. 10/11 October

On review of the acute presentation on the 10th I note that [Ms A] was seen by an ED registrar. On this presentation a history and examination was completed which indicated a significant deterioration over the 2 weeks from the previous admission. A thorough examination which documented some mild limb weakness which I note was explained by [Dr J] as due to pain. I note that on this admission there were no laboratory tests performed. Based on the previous abnormal investigations, [to] which I assume the ED would have access, blood tests should have been performed by [Dr J] on this admission and would have indicated the still raised CRP for [Ms A]. (nb The blood tests requested by the GP on the 3/10/14 indicated a raised CRP and WCC although I am not sure if the ED has access to these results.)

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[Dr J] knew [Ms A] had an MRI appointment for the following day and I agree that as there was no acute neurology then there was no evidence on admission to expedite this test.

Once again on this presentation [Ms A] would have had significant back pain with a raised CRP, had the tests been done, then [Ms A] should have been referred by [Dr J] directly to orthopaedics for admission and await an MRI scan.

It is not clear what level of training [Dr J] is in the Emergency Programme. For a junior registrar in emergency medicine this would be an acceptable level of care. [Dr J] did not discharge [Ms A] and he knew that an MRI was an extremely useful investigation which was booked for the following day. Referral could subsequently occur following the investigation from the observation ward.

- **Please provide review on the standard of care and assessment by [Dr I] and other ED staff.**

As above.

- **Please provide your view on the timeliness of the prescribing of IV antibiotics for [Ms A].**

[Ms A] did not receive IV antibiotics until the 13th of October at 1600hrs despite arriving in [the Hospital] on the 10th of October. I see that the date of prescribing is the 12th of October, her date of admission by [Dr P]. The diagnosis of likely osteomyelitis and abscess was initially made on the basis of the MRI in association with the pain on the 11th of October.

[Ms A] was not handed over to the orthopaedic team until the MRI report had been received at 1405. There is no reference in the notes about discussion of the use of antibiotics in the setting of osteomyelitis documented by the ED Consultant [Dr I]. [Dr I] comments that he would defer to the admitting team in non-emergency situations where antibiotics treatment is not time critical in order to let the admitting team decide on the antibiotic choice. As [Ms A] did not display any signs of sepsis or septic shock (low BP, high HR, fever) there is no evidence for time critical antibiotics in ED.

As commented by [Dr M] he would prefer a tissue diagnosis and perform a biopsy in most cases prior to initiating antibiotics. The antibiotics were commenced following the biopsy.

- **In your view should [Ms A] have been referred to [the] orthopaedic team earlier?**

As stated above I believe [Ms A] should have been referred to orthopaedics on her second presentation to ED on the 26/9/2011. A raised CRP in the setting of significant back pain would dictate referral to orthopaedics in the acute setting.

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- **Please comment on the standard of communication between [Dr I] with other hospital staff including the ED team, radiology staff and the orthopaedic team.**

The communication between [Dr I] and the orthopaedic registrar is not documented however a verbal referral to orthopaedics with the provisional diagnosis and access to the reports for review would be the usual process and standard of referral for patients from ED to orthopaedics.

[Dr K] radiologist states in his letter (and it is documented on the report) that in view of the significant pathology he rang [Dr I] and gave him a verbal report. An immediate verbal report on significant findings is not uncommon in the setting of ED and is usually followed by the written report. [Dr I] commented that an MRI report was received in ED and available in the notes prior to discussion with the Orthopaedic registrar. Immediate communication with a verbal call from radiology to the ED of significant pathology is the expected level of communication followed by a written report for all clinicians to view. It is unclear to me when the written report was available to staff at the hospital.

- **Please comment on the appropriateness of the recommendation arising out of the DHB's RCA and the remedial actions taken as a result of this event.**

I note that following this event an RCA was undertaken and I will specifically comment on the recommendations for the acute setting.

1. As a result a back pain policy was recommended and implemented. Whilst one was in draft at the time of [Ms A's] presentation it had not been formalised. I have reviewed this policy and believe that this policy will assist in preventing future similar events and assist in the management of back pain in the ED.
2. Improved communication between specialities. Specific specialty liaisons have been introduced to ensure specialty communication. This will assist with ongoing communications on many other cases.

Summary

In summary back pain is a very common presentation to ED. In most cases it is due to a benign cause. It is not uncommon for the pain in osteomyelitis to be accounted for by a minor injury in the initial review and as it is notoriously difficult to diagnose osteomyleitis.[3] Time is often a factor in the diagnosis. I note a comment made by [the Operations Manager] "orthopaedic teams are reluctant to accept back pain referrals". This would be a comment made from many EDs across New Zealand.

In the case of [Ms A] her first presentation was confused by the recent UTI and cellulitis both of which can cause a raised CRP. It was indeed reasonable to assume that her symptoms would settle. However ongoing pain with a significantly raised CRP and a fever on the second presentation 26th/9/11 should have resulted in an orthopaedic review.

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The Guidelines which have been implemented will assist with ensuring appropriate review when indicated. The policy also indicates that patients with red flags or intractable pain should be discussed with an SMO. In these cases SMO involvement assists to ensure that high risk patients are identified and are referred to the appropriate teams with limited resistance will assist in the future care of such patients.

References

1 http://www.uptodate.com/contents/acute-phase-reactants?source=search_result&search=crp+elevation&selectedTitle=1%7E150
2 Serum C-reactive protein as a biomarker for early detection of bacterial infection in the older patient Angela Liu, Triet Bui,, Huong Van Nguyen et al
3 http://www.uptodate.com/contents/vertebral-osteomyelitis-and-discitis?source=search_result&search=vertebral+osteomyelitis&selectedTitle=1%7E54”

Dr Thornton provided further comment:

“I have received further communication from the DHB with respect to [Ms A] and as below.

1. Communication from radiology.
Immediate communication with a verbal call from radiology to the ED of significant pathology is the expected level of communication followed by a written report for all clinicians to view. Further communication indicates the interim report was available for the orthopaedic Drs at 1300hrs on the day of orthopaedic admission. This is the expected standard of care.

2. The level of training has now been clarified for [Dr J].
As a PGY3 Dr and a junior emergency medicine trainee this would be an acceptable standard of care of [Ms A]. All junior Drs of this level would require SMO supervision at this level of training.

3. Review of House officers findings [Dr H’s]
As clarified by further communication from the DHB, an SMO was not involved in the review of [Dr H’s] initial review of [Ms A’s] presentation to ED on the 26th of September. [Dr H’s] work was at a level acceptable for a house officer. Early SMO review of practice would be expected at this level of training.”

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Appendix B — Independent sports physician advice to the Commissioner

The following advice[64] was provided by a sports physician, Dr Graham Paterson.

> "I note that you are seeking comment on any changes to the points made in my preliminary advice in light of the additional information provided. I have read the eight page response from [Dr E] received by HDC on 02/08/2013 and in response make the following comments:
>
> 1. The receipt of the initial referral letter on 26/08/2011 eight days after it was written, coupled with the content of the specific referral paragraph,
> ***'Thank you for seeing [Ms A]. She injured her back in July lifting a [heavy weight]. The pain has persisted and become severe. She has not got any neurological signs or symptoms. She was seen at ED and they did an x-ray — copies of reports appended. She is becoming increasingly disabled with pain and I wonder whether she needs a CT scan?'***
> does not suggest the need for an urgent or extended consultation.
> 2. [Ms A] arrived late at both the initial consultation (18 minutes into a scheduled 30 minute consultation) and follow up consultation (12 minutes into a scheduled 15 minute consultation). These are crucial facts that [Dr E] has presented based on data from his practice management system. This certainly would compromise the capacity for those consultations to be of the standard commensurate with specialist sports medicine practice. Ideally [Dr E] would have prefaced his consultation letters with some statement referencing the time constraints that he faced. I recognise that such statements are awkward to include when dictating in the presence of the patient as is [Dr E's] habit.
> 3. The issue of whether '***In such a case, a sports physician exercising due care would undertake a thorough neurological examination of the lower limbs'*** as stated in my preliminary report is interesting. This case is about the examination of a patient with ***severe thoracic pain of seven weeks' duration***. In my opinion a sports physician exercising due care, seeing a new patient with these symptoms, would undertake a thorough neurological examination of the lower limbs, even during a time-constrained consultation. My view is confirmed by my discussion of this issue with [a] specialist spine surgeon, who is adamant that, at the very least, an assessment of lower limb muscle tone, checking for clonus and the plantar response would be essential. He added that lower limb neurological symptoms would not reliably be reported in a case where the pathology was located in the thoracic spine. Therefore the absence of lower limb neurological symptoms is not a reason to forego this component of the examination.
> 4. With regard to my third conclusion:

[64] Dr Paterson's initial advice was obtained at a preliminary stage prior to his review of further information gathered. That advice is superseded by this report and, therefore, it is not attached.

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'If after the second consultation when [Dr E] ordered the MRI scan he was concerned about the possibility of more sinister pathologies, and he considered an infection amongst those possibilities, why did he not request a repeat full blood count and CRP? Had he done so he may have, at the very least, been able to negotiate with MidCentral Health to secure an MRI scan on an urgent basis.'

[Dr E] states that he requested the MRI scan straight away and that a request for a repeat full blood count and CRP would only delay the MRI. However I note in response to question nine that [Dr E] states ***'I have taken to ringing [the] MRU to arrange a date for MRI scan investigations if I think that investigation needs to be done urgently'.***
[Dr E] does not give any indication as to whether or not he considered infection to be amongst the differential diagnoses which was central to my third conclusion.

5. [Dr E's] answers to questions three and four both pertain to the time constraints and as such are covered by comment 2 above.

6. He does confirm that he is unable to view the scintiscan images for himself and thus is totally reliant upon the Medical Imaging Report from Mid Central Health ([Hospital 1] Medical Imaging). I have now sighted the scintiscan images for myself and will comment separately on the Medical Imaging Report at the conclusion of this report.

7. [Dr E] states that during his follow-up consultation he was made aware of a repeat visit by [Ms A] to [Hospital 1] that occurred between his initial consultation and follow up consultation. I take from that comment that [Dr E] took some level of reassurance by the hospital's discharging of [Ms A]. Given that the hospital medical personnel would have had ready access to all of the hospital records pertaining to [Ms A], this seems quite reasonable.

8. [Dr E] has now adopted a practice policy of getting patients who arrive more than half way through the allocated appointment to reschedule so as ***'not to compromise either their care or my service to them or that of the patients following them'*** I think that there is considerable merit to this policy.

9. I agree with [Dr E's] final comment relating to the rise in CRP associated with fractures. In my opinion a rise of this magnitude (186mg/L) could not be explained by a thoracic fracture alone.

In my preliminary report I arrived at five conclusions but I did not number them. I have therefore set these out below so that there can be no confusion.

[Dr E's] written records of the two consultations with [Ms A] are not ideal.
This conclusion still stands but in light of the time constraints that [Dr E] faced, the brevity of both records is better understood. A statement making reference to the time constraints should have been included in the written records even if it was added at a later date.

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His examination at the first consultation was not adequate but from the documentation supplied, numerous subsequent examinations by other health professionals showed that there were no abnormal neurological findings and therefore a more thorough examination by [Dr E] at the time of his first consultation would not have resulted in a different outcome.
This conclusion does not change.

If during the first consultation [Dr E] had read the cut and paste part of the referral document from [Dr C], it would have been prudent to include a repeat full blood count and CRP assessment in addition to the SPECT scintiscan that he did request. If [Dr E] had done so, it is possible that the correct diagnosis of osteomyelitis might have been arrived at earlier than 11/10/2011.
This conclusion does not change but is mitigated to some extent by the issue of the time available in the consultation.

If after the second consultation when [Dr E] ordered the MRI scan he was concerned about the possibility of more sinister pathologies, and he considered an infection amongst those possibilities, why did he not request a repeat full blood count and CRP? Had he done so he may have, at the very least, been able to negotiate with MidCentral Health to secure an MRI scan on an urgent basis.
The critical question of whether [Dr E] considered an infection to be part of the differential diagnosis has not been addressed in the eight page document received by HDC on 02/08/2013. I suspect that he did not consider this possibility. In that case this does represent a mild departure from the expected standard of care from a Sports Physician.

[Dr E's] requests of a SPECT scintigraphy after the first consultation and an MRI scan after the second consultation were entirely appropriate.
This conclusion does not change.

In summary therefore I am of the opinion that [Dr E's] overall care was of acceptable standard given the time constraints he faced. However his apparent failure to consider infection as part of the differential diagnosis represents a mild departure from the standard of care that would be expected from a Sports Physician.

With regard to the Medical Imaging Report of [Ms A's] whole body scan of 20/09/2011 I would like to make the following observations:

The clinical indication listed is '***2/12 history of low back pain (T10 level)'***

[Dr L] notes that the patient is '***very well covered***'. He then comments that '***There is markedly increased radiophosphonate uptake across the body of T9 which appears flattened. No other abnormalities are seen in the skull, chest wall, vertebral column, pelvis shoulder regions or lower limbs'***.

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He follows with '***Comment: Suggestive of relatively recent collapse fracture of T9. The patient should be investigated for possible osteoporosis or history of relevant trauma, Plain x-rays or possibly CT of this region for confirmation may be indicated'.***

While acknowledging that the clinical information, as listed, is not an ideal representation of the situation given that the pain was severe and that the T10 level is not usually referred to as the low back, the Comment, in my opinion, raises some questions.

I would recommend that this report be reviewed by a suitably qualified Radiologist or [Internal] Medicine Physician as the addition of any reference to infection or osteomyelitis within the Comment in all probability would have resulted in the correct diagnosis of [Ms A's] pathology being appreciated well before the 11th of October 2011.

Yours sincerely,

Dr Graham Paterson FACSP"

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Appendix C — Independent orthopaedic advice to the Commissioner

Orthopaedic surgeon Dr Iain Kelman provided the following advice:

> "I have been specifically requested to comment upon the care afforded to [Ms A] by the Emergency Department and the Department of Orthopaedics at [Hospital 1]. I provided a summary of the case as it was presented to me in December 2012 and summarised the case in my previous assessment (page 13).[65]
>
> Further information has now been obtained as well as reports by her treating physicians at the hospital and I have been asked to make further comment.
>
> [Summary of events redacted for brevity.]
>
> 11-10-2011 MRI whole spine
>
> The conclusion of this examination was as follows:
>
> > Findings suspicious for osteomyelitis with pathological fracture of T8 and T9 vertebral bodies with retropulsion fragments, cord compression at T9, paraspinal abscess and Gibbus deformity of the thoracic spine. Recommended MRI thoracolumbar spine with contrast for further evaluation.
> >
> > Findings discussed with [Dr I] in the Emergency Room at the time of examination.
> >
> > Thank you for your referral. We would be pleased to assist with interpretation of the study if required.
> >
> > (Radiologist: [Dr K])
>
> I have reviewed the MRI scan personally and agree with the findings.
>
> *Comment (IK):*
>
> *Critical to this case are the following findings:*
>
> - *Pathological fracture T8 and T9 suspicious for osteomyelitis.*
> - *Cord compression at T9.*
> - *Paraspinal abscess.*
>
> *It is my opinion that with the presentation of the above findings it should have been recognised that this was a relative emergency. The presence of cord compression and the presence of a paraspinal abscess I would consider are findings which make urgent treatment necessary.*

[65] Dr Kelman's initial advice was obtained at a preliminary stage prior to his review of all information being gathered. That advice is superseded by this report and, therefore, it is not attached.

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With respect to vertebral osteomyelitis on its own without the above findings (collapse retropulsed fragments and paraspinal abscess) I would agree could be treated conservatively with appropriate identification of the organism and antibiotics. In general principles an abscess in any situation requires to be drained. An abscess adjacent to the spinal cord with evidence of cord compression render this case as one requiring urgent assessment.

At that time the full report was not available. It is not clear what information was given to [Dr I] by the radiologist and what information he gave to [Dr N]. [Dr I] recorded in the Emergency Department notes:

Possible osteomyletis and/or mets.

[Further summary of events redacted for brevity.]

MEDICAL PRACTITIONER RESPONSES ([Hospital 1])

[Information redacted as not relevant to orthopaedic care provided.]

[DR N]

[Dr N] is a non-training orthopaedic registrar with two years experience working under the consultants [Dr R] and [another consultant]. His on call duty commenced on Tuesday 11th October at 4 pm and ran through until 8am the following morning. He was asked to assess [Ms A] and did so at 5pm on 11-10-2011.

[Dr N] carried out a clinical investigation and recorded no neurological deficit.

He reported on the x-rays and MRI scan and reported that the MRI scan demonstrated possible osteomyelitis and possible pathological fracture.

The radiologist's report was not available to him (5pm on 11-10-2011). The only information available to him was that supplied by the notes and the verbal communication from [Dr I].

[Dr N] wrote a further report dated 29-07-2014 in which he set out in greater detail accurately all the points of the case. The pertinent parts of this report are as follows:

> [Dr I's] Emergency Department notes:
>
> Has had MRI at 9.45 this a.m. PEDAL to evaluate patient after this.
>
> MRI scan: Possible osteomyelitis and/or mets?
>
> Plan: Ortho consult.

[Dr N] points out that the formal report was approved on 14-10-2011.

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[Dr N] after contacting [the radiology service] on 08-07-2014 stated that they believed that a preliminary electronic report was probably placed on the hospital system at 1357 hours on 11-10-2011.

I have searched the disc 3/3 provided, all other formal approved reports are present but there is no record of a preliminary report.

[Dr N] appears not to have seen this report as he gave his impressions of the MRI scan to [Dr M] when he discussed with him the case on the evening of 11-10-2011. [Dr I] also made no mention in his letters of having seen such a preliminary report.

Notwithstanding the above [Dr N] followed [Dr O's] instructions, discussed the case with [Dr M], accurately recorded his treatment plan, informed the doctor responsible for the ward that night relaying to him the treatment plan.

[Dr N] also dealt in detail the issues with respect to mobilisation and the administration of antibiotics. His explanations are entirely in keeping with the instructions that he was given by the senior medical staff.

Had [Dr N] been made aware that the MRI scan demonstrated a paraspinal abscess, retropulsed fragments and compression of the spinal cord he might well have thought differently on the matter and appreciated the significance of these findings. I feel sure that a different plan of management would have been formulated had [Dr O] and [Dr M] been made aware of all the findings on the MRI scan.

[Dr M] would not have seen the patient, the MRI scan or the report and relied upon [Dr N's] assessment to formulate the treatment plan.

[Dr N] states in his report that the full findings involving the retropulsion of fragments and cord compression with abscess was not documented in the Emergency Department notes nor was it communicated to him.

He wrote in the notes that she was to mobilise as able which was part of the agreed plan between himself, [Dr O] and [Dr M]. No mention was made of physiotherapy.

I consider that [Dr N's] management was in keeping with that of an orthopaedic registrar.

[Information redacted as not relevant to orthopaedic care provided.]

[DR M]

[Dr M] is a vocationally registered orthopaedic surgeon trained in New Zealand and with Post Fellowship orthopaedic experience overseas. He is highly regarded in the orthopaedic community.

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To place on record I do have experience in spinal conditions, my first Post Fellowship, Post Registration position was as Consultant in Charge of a Spinal Trauma Unit. As part of this I was also part of a specialised team caring for patients with spinal tuberculosis.

[Dr M] clarifies the matter with regard to retropulsed fragments, cord compression. He states that this was not communicated to [Dr N] and therefore was not communicated to himself. [Dr M] states that the sensory changes at T8–T9 could well have been as a result of the mechanical compression of the spinal nerves at this level secondary to the wedge compression. I would agree with this.

[Dr M] states that after his discussion with [Dr N] he felt it appropriate that CT biopsy and aspiration be arranged. He gave a differential diagnosis of pyogenic infection, mycobacterial infection or neoplasia. He stated that the long duration of the pathological process might indicate a mycobacterial infection and that a significant pyogenic infection would have presented at an earlier time. It should be pointed out however that as an outpatient she had at least two courses of antibiotics which would have modified the pathological process of a pyogenic infection. This information was not available to [Dr M] or [Dr N] and it was only evident after full investigation was carried out.

[Ms A] was seen on the morning of her admission (12-10-2011) by [Dr O]. [Dr M] does not appear to have been present on the ward round. He states however that he reviewed the MRI scan. He noted the narrowing of the spinal canal but felt that there was no signal change in the cord. He also noted the inflammatory response and a paraspinal abscess. In his letter he implied that the abscess was not compressing the spinal cord. However the radiologist felt that the cord was compressed. My interpretation of the MRI presented is that there was spinal canal narrowing with compression of the spinal cord but without signal changes in the cord. He felt that the abscess and the degree of compression did not indicate a need for surgery at that time.

[Dr M] indicated that he felt a biopsy was necessary in the first instance in order to obtain a diagnosis. Bearing in mind his differential diagnosis this was a reasonable clinical approach to the problem. He is correct in saying that the early administration of antibiotics can make the interpretation of results extremely difficult.

[Dr M] then went on to discuss the stability of the spine. He is correct in stating that the three column structure of the spine was first proposed by Denis in 1984 and related mainly to trauma. Denis proposed that if any two columns of the vertebral spine are disrupted the spine should be considered unstable. This teaching is still accepted today. Even in a situation of trauma to the thoracic spine if there is two column disruption to the spinal column a surgeon would want the patient immobilised until such time as fixation could be carried out. I would consider it risky to mobilise a patient with two column disruption from any cause.

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It appears that at no time was physiotherapy input requested. This appears to have been a request of the nursing staff.

After the biopsy was obtained I consider it is reasonable to then commence a broad spectrum antibiotic in situations such as this and to await the definitive results from the microbiologists. This was duly carried out. At that time on 13-10-2011 [Dr M] was still seriously considering the possibility of a mycobacterial infection and his comments regarding this are appropriate. When the diagnosis of a staphylococcus aureus infection was established on the afternoon of 14-10-2011 appropriate antibiotics were commenced.

It appears that [Dr M] was not informed of events of the evening of 13th October and 14th October. It appears that [Dr R] was on call for the weekend and managed the situation as it was presented to him. He did this appropriately with eventual transfer of [Ms A] to [Hospital 2].

[Dr M's] discussion with respect to the management of vertebral osteomyelitis by medical means is appropriate in the absence of pathological fracture and abscess. However the management of vertebral osteomyelitis with a pyogenic abscess vertebral collapse and retropulsed fragments would be open for discussion.

With respect to the mobilisation of [Ms A] it is clear that mobilisation was stated to be 'as able'. It is clear that [Ms A] could not mobilise independently and at all times required help. Crutches and frames were used and in the latter stages she was only mobilised from her bed to the commode. I consider it important to realise that in fact she could not mobilise.

It will not be known exactly what was the cause of her paraplegia. The possibilities exist of a mechanical cause, pressure caused from the abscess or a vascular cause. From the nursing notes she was last out of her bed at 1515 hours on 14-10-2011. Her paraplegia was first noted at 2300 hours on the same day. However this does not mean that her paraplegia occurred at that time and it is more likely that this developed over a period of many hours before that. Had a paraplegia occurred as a result of a mechanical cause it would be noted within a very short time after mobilisation and therefore this is unlikely. Therefore the compressive effects of an abscess or possible spinal infarct secondary to the infection remain as possibilities. The question of referral to a tertiary service is discussed by [Dr M]. The need for a tertiary service comes about if the local hospital is unable to deal with the clinical presentation either because of the lack of personnel skill to manage special situations or lack of back up to be able to do so. I consider that the presence of a spinal abscess or paraspinal abscess where there is threat to compression of the cord requires specialised treatment of a spinal surgeon or neurosurgeon. [Dr R] found himself in this situation when confronted with the patient on 15-10-2011.

I think [Dr M's] remarks with respect to an earlier referral to the orthopaedic department are appropriate and had she been seen by the orthopaedic department on 27-09-2011 the outcome is likely to have been different.

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I consider that [Dr M's] management of the case is what would be expected of a consultant orthopaedic surgeon.

DR O

[Dr O] reported the history as has been set out in the clinical notes up to the time he first saw her. Again the MRI report was of a pathological fracture with osteomyelitis and no record of paraspinal abscess, cord compression or bone fragments within the spinal canal.

On the morning after her admission (12-10-2011) it appears it was [Dr O] who undertook the post intake ward round. [Dr O] in his letter stated that an examination was carried out and of importance no lower limb neurological deficit was noted. He stated that he communicated his findings with [Dr M].

His management was in keeping with what would be expected of a Medical Officer of Special Scale.

[DR P]

[Dr P's] report 24-07-2014

[Dr P] states that he did not see any radiology report until the time when he completed the discharge summary.

[Dr P] wrote in the hospital file that [Ms A] 'feels weak in legs', this was a comment he wrote recording what [Ms A] had stated at the time of the ward round.

He admitted to making a prescribing error by placing the incorrect date on the treatment chart. He also stated that he did not document the reason for increasing the dose of antibiotics but feels that he would not have done so without instruction.

[Dr P] made an error in date documentation which had no consequences but I do not consider that this is a major breach of the care that would be expected of a junior house officer.

[Information redacted as not relevant to orthopaedic care provided.]

[DR R] (ORTHOPAEDIC & SPINAL SURGEON)

[Dr R] wrote three reports dated 20-04-2013, 15-06-2013, 10-07-2014. [Dr R] stated that he first became aware of [Ms A's] clinical state at 2315 hours on 14-10-2011. He states that he considered emergency decompression initially but then on reflection felt that she may require several surgical speciality services which were not available in [Hospital 1] and therefore she was transferred to [Hospital 2] under the care of [Dr S]. [Dr R] is correct in this decision as [Dr S] found it necessary to involve a neurosurgeon. The case was later complicated in requiring the services of thoracic surgeons. He therefore transferred her appropriately to [Hospital 2].

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[Dr R] has commented upon the case in his letters of 20-04-2013 and 15-06-2013.

[Dr R] has tried to determine the nature of the onset, noted that she reported leg weakness early in the afternoon of 14th October and later that evening reported a sudden and dramatic neurological event. As stated before I consider it is not possible to state the exact cause of her paraplegia.

[Dr R] had discussed this with his orthopaedic colleagues including [an external orthopaedic surgeon] and together they felt that there were certain clinical indicators which were misinterpreted and ignored. It appears that [Dr R] has subsequently discussed this in detail with [an MCDHB orthopaedic surgeon].

I consider that [Dr R] acted appropriately once he had become aware of [Ms A's] situation as would be expected of an orthopaedic consultant surgeon.

[DR Q]

[Dr Q] reported on his involvements with [Ms A], he was asked to assess her by the on call house surgeon ([Dr T]) at 11pm on 14-10-2011. [Dr Q] stated that he had reviewed her notes and felt that her paraplegia had developed in the course of some hours prior to him assessing her. He appropriately discussed her with [Dr R] at the time, he was advised to keep her nil by mouth for the remainder of the night pending further investigations and possible surgery the following day.

[Dr Q's] care of [Ms A] was of a level that would be anticipated of an orthopaedic surgical registrar.

SUMMARY

[Information redacted as not relevant to orthopaedic care provided.]

I would consider that the care undertaken by the Orthopaedic Department at [Hospital 1] was of a standard that could not be criticised given the complexity of the clinical problem presented to them at such a late stage in its pathogenesis.

Having now had the opportunity to review the hospital notes together with the letters from hospital doctors written in response to this complaint I now revise my opinion with respect to the care afforded [Ms A] at [Hospital 1].

[Information redacted as not relevant to orthopaedic care provided.]

ORTHOPAEDIC DEPARTMENT

The Orthopaedic Department became aware of [Ms A] being in the Emergency Department after the consultant of the Emergency Department phoned the on call registrar. The on call registrar did not have access to any interim report at the time he first saw her and had only the verbal communication with the emergency room consultant.

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He therefore related the clinical information as presented to him in the notes and relayed to him by word of mouth, to his seniors [Dr O] and [Dr M]. He acted appropriately with the information to hand.

The information relayed to the orthopaedic seniors ([Dr O] and [Dr M]) was deficient. A plan of management was formulated based upon this information which was appropriate. Based upon this, instructions were given that she was to mobilise as able. This would indicate that if she were not able to mobilise other arrangements must be made. No instructions were given to mobilise [Ms A]. Physiotherapy involvement was at the request of the nursing staff.

I consider now that the mobilisation that was undertaken was unlikely to have caused an acute event resulting in paraplegia. She did not mobilise independently and always had the help of either nursing staff or a walking frame. Therefore I consider that this activity is unlikely to have caused the paraplegia.

The issue of antibiotics has been discussed in detail and I consider that the approach undertaken, particularly when considering the differential diagnosis given by [Dr M] was appropriate.

As discussed above the exact cause of the paraplegia cannot be determined but a vascular event is high on the list of possible causes. A vascular event could be as a result of the infection itself or as a result of pressure affect from the abscess.

I consider therefore that the Orthopaedic Department had incomplete information from the Emergency Department and as a result the severity of the situation was not appreciated or acted upon in order to prevent the catastrophic events which followed.

I therefore consider that they acted appropriately with the information at hand in the treatment of [Ms A].

IAIN M KELMAN

MB.BCh.FRCS.FRCPS.FCS(Orth).
FRACS, Dip.Rehab.Med.
ORTHOPAEDIC SURGEON"

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