A District Health Board

Radiologist, Dr D

A Report by the

Health and Disability Commissioner

(Case 04HDC01638)

Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

Parties involved

Miss A	Consumer
Mrs A	Complaint/Consumer's mother

The public hospital medical staff (in order of involvement, 14 to 23 December 2003):

• Dr B	Registrar, Emergency Department
• Dr C	Consultant/ Emergency Physician
• Dr D	Radiologist
• Dr E	Registrar, Emergency Department
• Dr F	Consultant/ Emergency Physician
• Dr G	Senior House Officer, Emergency Department
• Dr H	Consultant/ Emergency Physician
• Dr I	Radiologist
• Dr J	Radiologist

Complaint

On 31 January 2004, the Commissioner received a complaint from Mrs A about the services provided by a public hospital to her daughter, Miss A. The following issue arising from Mrs A's complaint was identified for investigation:

- *Whether a DHB provided services of an appropriate standard to Miss A between 14 December and 23 December 2003. In particular, whether the assessment and treatment she received, subsequent to a fall, was appropriate.*

An investigation was commenced on 21 April 2004.

On 12 November 2004, the investigation was extended to include Dr D, radiologist, and the following issue:

- *Whether Dr D, radiologist, provided services of an appropriate standard to Miss A on 15 December 2003. In particular, whether he appropriately interpreted and reported X-rays of Miss A's cervical spine performed on 14 December 2003.*

Names have been removed to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Information reviewed

Information from:
- A District Health Board
- A Spinal Unit
- Dr D
- Mrs A

Independent medical advice was received from Dr Chip Jaffurs, emergency physician, and Dr David Milne, radiologist.

Information gathered during investigation

14 December 2003
Miss A, then aged 13, was playing touch rugby with some friends in the street. During the course of their game, the rugby ball became lodged in a nearby tree. On attempting to retrieve the ball, Miss A fell, landing awkwardly on the ground. She injured her head and neck, and lost consciousness for approximately three minutes. On regaining consciousness, Miss A experienced confusion and "flitting" of the eyes for approximately 20 minutes.

An ambulance was called by a neighbour. The ambulance officers fitted Miss A with a cervical collar and placed her on a back-board. An ambulance officer examined Miss A at 6.45pm. Notes of his examination reveal that Miss A complained of pain in her cervical spine, posterior left shoulder and left side. The height from which she fell was recorded as three metres. The ambulance officer also noted that Miss A's abdomen was soft on palpation and her chest was clear, and that she had suffered lacerations to her right lower leg and left elbow. Miss A's Glasgow Coma Score[1] (GCS) was recorded to be 15.

The ambulance transported Miss A to the Emergency Department (ED) of a public hospital at 7.04pm, where she was met by her mother and twin sister. She was triaged as Code 3 by a triage nurse, at 7.05pm, and assessed five minutes later by a staff nurse. The record of this assessment indicates that Miss A's GCS remained 15. A further assessment at 7.25pm also recorded a GCS of 15.

Miss A underwent an examination by Dr B, registrar, at 7.45pm. He obtained information about the presenting complaint and medical history from Miss A and her mother. He then performed a full trauma examination and referred Miss A for an X-ray of her cervical spine. Notes received from the public hospital, which refer to a fall of three metres, read:

[1] Glasgow Coma Score: consciousness level is measured from a score of 3 to 15, the latter being fully conscious.

"Imp [impression] 1. Short period of unconsciousness
2. Superficial [lacerations]
3. No [cervical] spine [injury]
Review with [X-ray]
[X-ray normal] Still some tenderness over L5 midline after 45° passive flexion. Impression is muscular strain but I will review her 30 mins post some analgesia to see if she becomes more comfortable ([discussed with] [Dr C])."

At 9.40pm Miss A's pain score and GCS were recorded as 2 out of 10[2] and 15 respectively. Her notes read: "At moment has pain at back of head, for transfer to EOA [emergency observation area] [observation?] 2 hrs [review]." Having discussed Miss A with Dr C, emergency physician, Dr B reassessed Miss A's symptoms at 9.45pm. He considered that her neck was more comfortable and that she was no longer experiencing midline tenderness. At 10.30pm, Miss A's pain score and GCS were again recorded as 2 out of 10 and 15. Miss A's notes recorded:

"[10.40pm] [vital signs] stable GCS 15/15. For [observation] till [midnight]. Then if okay [discharge]."

Miss A's vital signs and GCS continued to be stable until 11.50pm, and she was discharged from the ED at 12.15pm on 15 December 2003. Prior to her discharge, Dr B noted that she was comfortable, though still suffering from mild pain and stiffness in her left neck, trapezius and scapula. Miss A's discharge notice reads:

"[Cervical] spine [X-ray] – N [normal]
primary + secondary trauma surveys – nil
significant injury, minor abrasions arm + leg –
cleaned + dressed. 6 hours observation."

Mrs A stated:

"We were told if there was any problem with either numbness pain etc to return to [the Emergency Department]."

The X-ray of Miss A's cervical spine was reported by Dr D, radiologist, on 15 December. Dr D's X-ray report read:

"No evidence of a fracture or dislocation."

Dr D stated:

"X-rays of [Miss A] came up for viewing in the usual manner. The standard protocol plain film cervical spine examination at [the public hospital] was available for review,

[2] Pain: pain is measured out of 10, with 10 being considered unbearable, or the most extreme pain.

> with three X-rays including AP, lateral and odontoid views. The radiographs were of good quality … The clinical request form from the Emergency Department indicated [Miss A] had been knocked out, but made no mention of specific clinical features related to the cervical spine. I reported the standard three views of the cervical spine to be normal, with normal alignment of the anterior and posterior vertebral body lines, as well as normal alignment of the posterior lamina and posterior cervical lines. The posterior joints had normal alignment."

Copies of Dr D's X-ray report and Miss A's discharge notice were sent to her general practitioner.

15 December 2003

Miss A rose from bed at approximately 9.00am the following morning, 15 December 2003. She experienced pain in her neck, which worsened on mobilising. She visited her mother's bedroom to discuss the pain she was experiencing. Miss A was able to move her neck downwards. Mrs A then enquired whether Miss A was able to move her neck sideways and upwards. Miss A moved her neck sideways successfully but on attempting to move it upwards, froze. Mrs A enquired whether Miss A was all right, but did not receive a response. Miss A then fell to the floor. She lost consciousness for approximately 2 minutes and was advised not to move by Mrs A, who called an ambulance.

The ambulance, which arrived at 9.33am, was manned by two ambulance officers. Mrs A informed them about the events of the previous evening. She also noted that the officers did not utilise a neck brace or backboard to transport Miss A. The District Health Board current ambulance protocols do not recommend transport on a backboard. Miss A was examined, and notes of that examination read:

> "[History] Discharged [1.00am] today from fall/Ko'ed this morning, 1st time up, had been up approx 5 mins, tried moving head & felt dizzy, [loss of consciousness] of ? 2mins. [On assessment patient] conscious & alert, same neck pain as on discharge. [Past medical history] Head injury [one day ago] muscular neck pain."

The provisional diagnosis was that of syncope, or temporary loss of consciousness due to an inadequate supply of oxygen to the cerebrum. Miss A's GCS was recorded as 15.

The ambulance transferred Miss A to the public hospital ED at 10.03am, where she was triaged as Code 4 by a triage nurse. Miss A then had her vital signs and GCS (15) taken by a staff nurse at 11.00am. Accompanied by her mother, Miss A was examined by Dr E, registrar. The history taken by Dr E read:

> "Fell from tree last pm, ? Ko'ed
> seen in ED, C-Spine X-rayed
> some pains but settled
> At home slept well but this am
> Sore L [left] neck & pains flexing and extending neck
> – Collapsed this am in hall, witnessed by mother

felt light headed, collapsed, responsive on floor immediately."

On examination, Dr E observed that Miss A had a full range of neck movement, but experienced mild pain when he palpated the mid zone of her neck. Dr E consulted Dr F, emergency physician, about Miss A's symptoms. Dr F reviewed the X-rays imaging Miss A's cervical spine taken the previous day. He observed a soft tissue bulge in the region of Miss A's C6/C7 vertebrae, and concluded that she had suffered a ligamentous injury to her neck. He found no evidence of an unstable bony injury. Miss A was provided with a semi-rigid Philadelphia collar and scheduled to attend an orthopaedic outpatient's appointment at a spinal unit in 10 days. Mrs A has since explained that they were informed that they would receive an appointment in the mail for an orthopaedic appointment within the next 10 days. Flexion and extension views of Mrs A's cervical spine were scheduled to be taken at this subsequent appointment. Mrs A was discharged from the public hospital at 1.45pm.

15 to 22 December 2003
Despite her use of the Philadelphia collar, Miss A continued to experience discomfort for the next few days. Given her discomfort, Miss A's grandmother advised her to remove the collar and move her neck around. Mrs A observed that, prior to Miss A's discharge, she had been advised the collar only needed to be in place during the day.

22 December 2003
Mrs A received a message at work from Miss A's grandmother, indicating that Miss A was increasingly in pain. Mrs Wilson and Miss A's grandmother discussed her condition and agreed that she should again be taken to the public hospital. Miss A's grandmother transported her, and they were met later by Mrs A, who travelled to the hospital independently.

Miss A was triaged as Code 4 by a triage nurse, at 1.23pm. She was subsequently assessed at 1.35pm by a registered nurse, who recorded Miss A's vital signs. While waiting to be examined by a doctor, Miss A experienced an episode of increased pain in her neck. Notes written by the registered nurse read:

"Pain increasing felt twinge when sitting in chair severe pain top of head [left] side of neck lasting 5 minutes."

Miss A was subsequently examined by Dr G, senior house officer, at 1.50pm. Dr G took a history of Miss A's presenting complaint, and noted the episode of pain from which she had recently suffered. Dr G then examined Miss A and noted:

"[On examination] alert, oriented

limited range of neck movement
→ limited by pain
– tender to palpation upper neck posteriorly
(?C2/C3)
– no focal neurology

Names have been removed to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

Imp. ? muscular/soft tissue injury
?? bony pathology

Plan. extension/flexion views C-spine."

Flexion and extension X-ray views imaging Miss A's cervical spine were taken at 2.53pm. Miss A explained that this imaging involved her neck being stretched in several directions, which was uncomfortable despite the administration of analgesics. When asked to describe this experience, Miss A clarified that the procedure involved "real bad pain". The radiographer who performed the procedure observed that Miss A could only flex and extend her neck a minimal amount. Having reviewed the X-rays of Miss A's cervical spine in consultation with Dr H, emergency physician, Dr G observed:

"[Review with] [Dr H] – X-rays = no [fracture] or dislocation; no soft tissue swelling."

Dr H explained:

"We felt that these [X-rays] showed no evidence of instability. We were aware of the previous X-ray being reported as normal, and therefore were not looking for any bony abnormality. We felt that this was probably a soft tissue injury to her neck."

Miss A was advised to remove the Philadelphia collar she had been using to immobilise her neck, and was provided with further analgesia. She was also advised to consult her general practitioner between five and seven days later for a follow-up appointment, and to do so earlier if she experienced any problems. She was discharged at approximately 4.30pm.

23 December 2003
The X-rays imaging Miss A's cervical vertebrae were reported the following day by Dr I, radiologist. Dr I's radiology report reads:

"FINDINGS
Flexion and extension views have been performed. These demonstrate a minimally displaced fracture through the pedicles of C2 (hangman's fracture). This is best seen on the extension film. Elsewhere alignment is normal and there is no evidence of a fracture or instability.

CONCLUSION
There appears to be a fracture through the pedicles of C2. This is minimally displaced. There is no significant forward slip on flexion views. This result was discussed immediately with ED staff."

The specialist in emergency medicine, immediately contacted Mrs A at approximately 3.40pm to let her know that staff were "not happy" with Miss A's X-rays. Mrs A was very concerned, and observed that she had "never left work more quickly". Miss A, who was visiting her grandmother at the time, had gone to see a neighbourhood friend. Her grandmother was alarmed when the news was relayed to her that staff at the public hospital

were "not happy" with the X-rays taken of Miss A's neck. Mrs A presented to the public hospital, with Miss A, at 4.42pm. Miss A was triaged as Code 4, and her condition was assessed by Dr H. He recalled:

> "I reviewed the patient who was sitting up in bed in no distress without a collar. She was neurologically intact. I placed her back in a Philadelphia collar. I arranged for her to have a CT scan of her cervical spine, which she had at [5.30pm]."

The CT scan ordered by Dr H was read by Dr J, radiologist. Dr J's radiology report confirmed an "Effendi Type I" hangman's fracture of the C2 vertebra. At 5.50pm, Miss A returned for observation, having undergone the CT scan. The notes read: "no [complaints of] neck pain".

On her return to the ED, Miss A was strapped to a stretcher, and cushions were placed around her neck to immobilise it. The Philadelphia collar provided by Dr H also served this purpose. Miss A was reviewed by a orthopaedic registrar, at 7.00pm. Mrs A was informed at approximately 7.30pm that Miss A would be reviewed by an orthopaedic surgeon. At 8.30pm she was subsequently reviewed by a spinal unit registrar, after having been admitted to the trauma ward of the public hospital. The spinal unit registrar's notes read:

> "[On examination] alert + oriented
> Neck immobilized
> Lying supine
> Philadelphia collar on.
>
> No motor deficit elicited C5-C8
> L2-S1
> Sensation (fine touch) intact.
> Lacerations (superficial)
> To [right] shin.
>
> X-rays [discussed with patient's] mother.
> [Plan] – Continue bed rest + immobilization
> –[the orthopaedic surgeon] will [review] films tonight
> – ? surgical [referral] required."

Mrs A and Miss A were informed of the fracture at approximately 10.30pm by a orthopaedic surgeon.

Following an examination by the orthopaedic surgeon, it was determined that Miss A would not require surgery. She was transferred to the spinal unit on 24 December 2003, where a halo jacket was fitted under sedation. This procedure involved the immobilisation of the neck by means of a frame and metal ring, encircling the head, from which extend metal pins that affix to the skull. X-rays taken subsequent to the fitting of this apparatus revealed

satisfactory alignment of Miss A's cervical spine. The halo jacket remained in place until 13 February 2004, when it was removed by a specialist in rehabilitation medicine.

The consultant at the Spinal Unit, recalled:

> "[Miss A] has shown satisfactory union of the fracture site and on her follow-up she has shown no major impairment or disability."

Outpatient appointment
Following her visit to the emergency department on 15 December 2003, Miss A was informed that an orthopaedic appointment was to be arranged for 10 days' time. A letter was received on 17 January 2004 giving details of an appointment on 4 February 2004. The public hospital stated that no appointment had been arranged as a result of Miss A's second visit on 15 December by the time of her attendance on 22 December 2003; an appointment was made for 24 December 2003 as a result of this latter attendance at ED. As Miss A did not attend (as she was in hospital), another appointment was automatically booked, resulting in a further appointment being arranged for 4 February 2004.

The public hospital explained:

> "[Miss A] presented for the second time on 15 December 2003 when she was seen by the Registrar [Dr E] for a syncope episode. The previous X-rays and documentation was reviewed with … [Dr F]. As there was no obvious head injury or fracture seen or reported, the provisional opinion was that [Miss A] had some sort of ligamentous injury to her neck and a follow-up by [the spinal unit] spinal outpatient clinic was indicated. A request was duly sent for a routine clinic appointment. …
>
> When [Miss A] re-presented on 22 December 2003, an urgent follow-up clinic appointment was arranged for 24 December 2003, at [the public hospital] orthopaedic acute clinic for which [Miss A] is listed as DNA [did not attend]. However, [Miss A] as we know re-presented the next day 23 December and was admitted to hospital … following a CT scan. …
>
> The appointment made 4 February 2004 … was an automatic re-book related to the urgent referral made on 22 December 2003 by the Emergency Department and the DNA recorded on 24 December 2003 by the Orthopaedic Outpatient department at [the public hospital]. …
>
> The Booking Clerk in [the public hospital] Orthopaedic Department's primary concern would have been to ensure this patient wasn't overlooked after the DNA and not offered the opportunity to be clinically assessed, hence the appointment made for 4 February 2004 in the next available clinic with an orthopaedic surgeon. The clerk would not have been anticipating the situation of the patient having been admitted to [the spinal unit] under the Spinal Service, and therefore the opportunity to cancel the automatic letter was lost.

I can understand the confusion that may have arisen around the various separate events, from the time of the first visit to the Emergency Department on 14 December 2003, through to her admission on 23 December 2003, and the subsequent follow-up arrangement during early 2004. These were covering two specialist services as the plan of care changed in accordance with an evolving clinical picture of what [Miss A's] actual injury was and until a final diagnosis was arrived at. …

The referral of 15 December was superseded 6 days later by the change of events."

Independent advice to Commissioner

Radiology advice
The following expert advice was obtained from Dr David Milne, radiologist:

"I have been asked to provide independent advice to the Commissioner about whether [Ms A] received an appropriate standard of treatment from Dr D on 15 December 2003 (case 04/01638)

My name is David Grant Milne, NZMC registration number 12986. I am a Diagnostic Radiologist and Fellow of the Royal Australian and New Zealand College of Radiologists since 1992. Although I am a subspecialist thoracic radiologist, I report accident and emergency radiographs on a daily basis as part of both my private and public work commitments. I believe that I am qualified to give the Commissioner expert advice on this case.

This advice is to aid the Commissioner to resolve the complaint as to:

Whether [Dr D], radiologist, provided services of an appropriate standard to [Miss A] on 15 December 2003. In particular, whether he appropriately interpreted and reported X-rays of [Miss A's] cervical spine performed on 14 December 2003.

I have reviewed all the information supplied by the Commissioner. This includes:

Supporting Information

Information from [Mrs A] (p1-2).

Letters of notification (p3-6).

Further information from [Mrs A] (p7-11).

Information from [Dr D] and [the DHB] (p12-104).

A CD from [the public hospital] Radiology Department upon which the following examinations are digitised:

1. cervical spine X-rays, taken on 14 December 2003;

2. cervical spine flexion and extension views, taken on 22 December 2003; and

3. cervical spine CT scan, taken on 23 December 2003.

Expert Advice Required

On the information available to [Dr D], was his interpretation and reporting of the X-ray imaging [Miss A's] cervical spine, performed on 14 December 2003, appropriate?

Do these X-rays show any sign of a fractured C2 vertebra?

If, in answering any of the above questions, you believe that [Dr D] did not provide an appropriate standard of care, please indicate the severity of his departure from that standard.

To assist you on this last point, I note that some experts approach the question by considering whether the providers' peers would view the conduct with mild, moderate, or severe disapproval.

A brief factual summary has been presented by the Investigator, [for] the Health and Disability Commissioner. I have read this account and the supporting documentation and feel that it is a true representation of the facts.

My Opinion:

The Radiographs:

I have reviewed the radiographs of the cervical spine performed on [Miss A] on [14 December 2003].

Three radiographic projections were obtained of the cervical spine: AP, Lateral and Odontoid peg view.

All radiographs were of acceptable diagnostic quality in terms of exposure, projection and area covered.

The radiographs were obtained as per [the District Health Board] protocol for assessment of possible cervical spine injury. I note that this protocol is in wide use and is the same as that used by [another District Health Board].

The Radiologist's report:

I did not perceive the fracture of the left pars interarticularis and the right posterolateral body of C2 vertebra on review of the films of [14 December 2003] when blinded to the subsequent images of 22 December 2003 and the CT examination of 23 December 2003.

Bone alignment is normal at all levels and there is no prevertebral soft tissue swelling. No convincing fracture lines are discernible.

As I did not perceive the fracture, I therefore have no issue with the report by [Dr D] 'No evidence of a fracture or dislocation'.

The lateral radiographs performed on 22 December 2003 in both flexion and extension demonstrate the subtle fracture lines involving the neural arch of C2. This was an excellent diagnosis by [Dr I] and one that I believe many radiologists would have overlooked.

My advice to The Commissioner

On the information available to [Dr D], his interpretation and reporting of the X-ray imaging of [Miss A's] cervical spine performed on 14 December 2003 was appropriate."

Emergency medicine advice
The following expert advice was obtained from Dr Chip Jaffurs, emergency physician:

"I am an Emergency Medicine Specialist with fellowships in the Australasian College of Emergency Medicine and the American College of Emergency Physicians. I am currently the Director for Emergency Medicine for Whangarei Hospital. I have read your 'Guidelines for Independent Advisors' and agree to follow them.

The case is briefly summarised as follows:

[Miss A] is a 13 year old female who fell approximately 3 meters onto the ground. She experienced loss of consciousness and confusion. She was transported by ambulance after being immobilised and assessed. She complained of pain in her neck, shoulder and side. Examination disclosed a Glasgow coma score of 15, and extremity lacerations.

She arrived at [the public hospital] Emergency Department at 7:04pm. Triage code was 3. The Registrar examined her at 7:45pm. She underwent cervical spine X-rays which appeared normal. After X-rays she was re-examined and found to have tenderness in her lumbar spine. Advice was given by the Emergency Department Consultant. She was observed for signs of head injury until 12:15 am. At this time she had GCS of 15, pain of 2/ 10 in her neck and upper back.

Day 2: The cervical spine X-rays were read by the Radiologist as normal.

[Miss A] arose at 9am with neck pain. Attempts to move her neck resulted in loss of consciousness for 2 minutes. She was returned to the Emergency Department by ambulance.

She arrived in the Emergency Department at 10:03am. Triage code 4. She was evaluated by the Registrar with findings of neck pain and tenderness. Her X-rays from day 1 were reviewed with the Consultant. Soft tissue swelling was noted at C6 – 7 level. She was fitted with a cervical spine collar. Arrangements were made for follow up visit to the Orthopaedic Clinic and further X-rays at her return.

Day 8 [Miss A] is returned to [the public hospital] Emergency Department by her family for continued neck pain. She arrived at 1:23pm. Triage code was 4. She was examined by a Senior House Officer at 1:50pm, who noted tenderness at C2 – 3 and reduced range of motion. Flexion – extension X-rays of the cervical spine were interpreted as normal by the Senior House Officer and Consultant on duty. She was given advice regarding neck strain, asked to follow up with her General Practitioner and discharged at 4:30pm.

Day 9 flexion – extension X-rays were read by the Radiologist. A fracture of C2 was reported immediately to [the public hospital] Emergency Department Consultant who contacted the patient's family who returned her to [the public hospital] Emergency Department at 4:42pm. Triage code was 4. She was seen by the Registrar. The first doctor's note provided to me is timed 7pm and is unsigned. The doctors Emergency Department sheet is missing for this visit. Her care was transferred to the Orthopaedic Registrar. She was neurologically intact. A halo device was applied to stabilise the fracture on day 11 at [the spinal unit].

1. **Was the care provided to [Miss A] by clinical staff at [the public hospital] Emergency Department on 14 to 15 December 2003 adequate and appropriate? If not, please give reasons for your view and explain what care would have been more adequate or appropriate. Please comment also on the advice given to [Miss A] on discharge.**

The care provided to [Miss A] on December 14–15 at [the public hospital] Emergency Department was appropriate. She was triage category 3 which should be seen by a doctor within 30 minutes according to guidelines from the Australasian College of Emergency Medicine. She was seen 41 minutes after arrival which is within a reasonable time limit.

The Emergency Department notes are extensive and complete. Noted is a fall of 3 meters, presumably taken from the ambulance report. Complaints of loss of consciousness, neck and shoulder pain are addressed in the trauma survey which is well documented. Of note, no spinal tenderness is detected. The doctor acknowledges some continued complaint of pain in her lower back and the side of her neck.

X-rays of her cervical spine are obtained and interpreted as normal. After a period of observation for her loss of consciousness, she improves and is discharged.

The Emergency Department chart for 14 December 2003 notes (page 66) advice was given regarding head injury, neck injury and wounds. Was this verbal advice or pre-printed instructions? A discharge notice (page 67) indicates a copy is to be given to the patient at the bottom. By way of advice this documents that [Ms A] is to follow up with her family doctor as needed (prn).

[Miss A's] mother clearly understood that she was to return for any significant problems. She is to be commended for being attentive to her daughter's condition, and available for call back once X-rays are read. She states in her communiqué dated 31 January 2004 (page 1), 'We were told if there was any problem with either numbness pain etc to return to them'.

2. Was the care provided to [Miss A] by clinical staff at [the public hospital Emergency Department on 15 December 2003 adequate and appropriate? If not, please give reasons for your view and explain what care would have been more adequate or appropriate. Please comment also on the advice given to [Miss A] on discharge.

The care provided by clinical staff on 15 December 2003 when the patient returns to the Emergency Department was appropriate. She was triage 4. The doctor does not indicate what time he saw the patient on his note. She has tenderness and pain with movement, though she has full range of motion. A Senior Emergency Physician is consulted. X-rays are reviewed and considered normal, except some soft tissue swelling is possibly noted in front of the lower cervical vertebrae (page 36) is a normal X-ray report. A working diagnosis of ligamentous strain is made. She is placed in a Philadelphia collar. Appropriate follow up arrangements are made. Flexion – extension X-ray views are commonly done in one to two weeks in order to allow muscle spasm to subside. A request for Orthopaedic opinion is documented on page 33.

I cannot tell from the Emergency Department record what additional instructions were given, page 32 documents the diagnosis and follow up arrangements. 'Neck injury' advice had been given the night before. On page 1, the patient's mother indicates the plan for a 'plastic brace' and Orthopaedic follow up appointment are understood.

3. Was the care provided to [Miss A] by clinical staff at [the public hospital] Emergency Department on 22 December 2003 adequate and appropriate? If not, please give reasons for your view and explain what care would have been more adequate or appropriate. Please comment also on the advice given to [Miss A] on discharge.

The care provided on 22 December 2003 in [the public hospital] Emergency Department was appropriate. The patient returned at 1:25pm, triage 4, and is seen by the doctor

within the recommended timeframe of one hour. She had left sided neck pain, worse with movement. She was given pain relief, discussed with the Senior Doctor on duty, and sent for further X-rays in accordance with the protocol for 'Assessment of possible cervical spine injury'. These X-rays were interpreted as normal in the Emergency Department. The Radiologist eventually reported a fracture through C2 which prompted action.

Discharge advice is clearly indicated at the bottom of page 28. Removal of the collar and use of pain relieving tablets are consistent with the diagnosis of muscular/ ligamentous injury to the neck. The X-rays were not reported by the Radiologist until the following day.

4. Are there any clinical standards that apply in this case?

The protocol entitled Assessment of Possible Cervical Spine Injury is similar to the protocol used in our department. Which study to order for a patient with normal X-rays but continued pain is determined by clinical judgement and availability. CT is now preferred for ruling out bony injury, while flexion – extension X-rays or MRI are best for soft tissue and ligamentous injuries.

Two sets of X-rays and clinical judgement suggested ligamentous injury. In the absence of neurologic symptoms, specialty consultation would have added little other than perhaps to influence the choice of imaging. In any case, the images obtained eventually revealed the true diagnosis. A best-bets evidence based review of usefulness of flexion – extension X-rays revealed only 5 relevant papers. The reviewers conclude 'In the acute setting (flexion – extension X-rays) adds little if CT/ MRI can be used to seek fractures and ligamentous instability'. Although CT/ MRI are currently the second studies of choice for continued neck pain, availability is a problem in most Emergency Departments. Our Orthopaedic Department still recommends delayed flexion – extension views for appropriate patients with normal radiography and post traumatic pain.

Discharge instructions in written as well as spoken form are increasingly in use in New Zealand Emergency Departments. In this case it appears standard sheets were given for head injury, neck injury and wounds, verbal instructions were documented on two of three visits. They were retained and followed by the patient's family to their credit. The medical system is not able to make a correct diagnosis 100% of the time. In this case repeated attempts to make a diagnosis paid off. The patient and her family followed instructions, … maintaining availability for new information as it became available. The patient was eventually treated appropriately with no secondary injury or lasting disability."

Code of Health and Disability Services Consumers' Rights

The following Right in the Code of Health and Disability Services Consumers' Rights is applicable to this complaint:

RIGHT 4
Right to Services of an Appropriate Standard

1) Every consumer has the right to have services provided with reasonable care and skill.

Opinion: No Breach – Dr D

X-rays taken on 14 December 2003
Under Right 4(1) of the Code of Health and Disability Services Consumers' Rights, Miss A had the right to have services provided with reasonable care and skill by the staff involved in her care. Dr D was the radiologist who reviewed the X-rays taken during Miss A's first admission to the public hospital Emergency Department (ED) on 14 December 2003. He reviewed them on the day after her admission, reporting that there was no evidence of a fracture or dislocation.

Dr Milne, my independent radiology adviser, stated:

> "I did not perceive the fracture of the left pars interarticularis and the right posterolateral body of C2 vertebra on review of the films of [14 December 2003]. …
>
> Bone alignment is normal at all levels and there is no prevertebral soft tissue swelling. No convincing fracture lines are discernable.
>
> As I did not perceive the fracture, I therefore have no issue with the report by [Dr D] 'No evidence of a fracture or dislocation'."

Dr Milne also commented on the flexion and extension X-rays taken on 22 December 2003, which were reported by Dr I. Dr Milne stated:

> "The lateral radiographs performed on 22 December 2003 … demonstrate the subtle fracture lines involving the neural arch of C2. This was an excellent diagnosis by [Dr I] and one that I believe many radiologists would have overlooked."

The independent medical experts who advise me are nominated by their Colleges with due regard to their experience, skill and standing in the profession; Dr Milne was nominated by the Royal Australian and New Zealand College of Radiologists. I accept Dr Milne's advice. The fracture was so subtle that Dr Milne could not see it on reviewing the films. The

fracture was only identified through more extensive X-rays. In my opinion Dr D provided an appropriate standard of care to Miss A, and did not breach the Code.

Opinion: No Breach – The District Health Board

Miss A attended the public hospital Emergency Department (ED) three times between 14 and 22 December 2003, on each occasion being discharged with the fracture undiagnosed. Only on 23 December 2003 was the fracture in her neck recognised and action quickly taken. Looking back on these events, it is understandable that Miss A and her mother ask why the fracture was not diagnosed and treated on any of the earlier three visits, in particular the second and third attendances.

Review of X-rays by ED medical staff
I have already considered the actions of the radiologist involved on the 14 December 2003 admission, and found that his failure to spot the fracture is not culpable. It would therefore be inappropriate to criticise the medical staff in the ED for not noting the fracture on the X-ray on 14 or 22 December 2003, as they are not radiologists, and have less skill in that specialty area. The X-rays taken on 14 and 22 December 2003 were on both occasions reported the following day by a consultant radiologist, and were discussed by the medical staff on duty in ED at the time of both visits.

14 to 22 December 2003
Although in my view the radiology reporting was of an appropriate standard, it is important to review the actions of the clinical staff in the ED during Miss A's three admissions; the result of radiology investigations is only one aspect of the clinical picture with which Miss A presented. With hindsight, and to a lay-person, it may be difficult to understand how Miss A's fracture escaped discovery on three separate admissions, barely a week apart. Dr Chip Jaffurs, emergency physician, has advised me on the appropriateness of care provided on Miss A's attendances to the ED.

14 December 2003
Dr Jaffurs stated that the care given during the admission on 14 December 2003 was appropriate: Miss A was seen within an acceptable length of time; the documentation was extensive and complete; and the trauma survey was well documented. The X-rays were reviewed by Dr B and Dr C as normal, as the fracture was not perceived. A senior doctor, Dr C, was involved in Miss A's assessment and treatment decisions, and appropriate discharge advice was given.

15 December 2003
Miss A was readmitted some eight to nine hours after her discharge, having collapsed. It was important that the medical staff reconsidered their earlier diagnosis. They reviewed the X-rays taken, provided Miss A with a semi-rigid neck collar, and made arrangements for a specialist outpatient appointment to take place where more extensive X-rays were to be taken of Miss A's cervical spine. Dr Jaffurs stated that the care given during the admission on 15 December 2003 was acceptable, with appropriate follow-up arrangements being made. A senior doctor, Dr F, was involved in Miss A's assessment and treatment decisions.

22 December 2003
Miss A returned a week later with increasing pain in her neck. Again, the medical staff were required to reconsider the diagnosis. Despite having the X-ray report from the 14 December 2003 admission available (indicating no fracture or dislocation), the attending doctor, Dr G, arranged for further and more extensive X-rays to be taken. These were reviewed by Dr G and her senior colleague, Dr H. Again, no fracture was evident, and Drs G and H considered, on the basis of the clinical evidence available, that there had been a soft tissue injury to Miss A's neck.

Dr Jaffurs stated that the care given during the admission on 22 December 2003 was appropriate, referring to the proper following of the public hospital protocol "Assessment of possible cervical spine injury". Discharge advice was given, and a senior doctor, Dr H, was involved in Miss A's assessment and treatment decisions. Miss A was advised to visit her general practitioner within the next week, and an outpatients appointment for the orthopaedic department was in the process of being organised.

Summary
In my opinion, the medical staff involved in Miss A's second and third admissions did not take for granted the diagnosis made on 14 December 2003. There was, on each subsequent admission, a reconsideration of the diagnosis, a review of the X-rays by senior medical staff, and further radiology investigations ordered or performed. That the initial X-ray was reported as normal did not, in my opinion, result in the medical staff not questioning the care they provided to Miss A. The diagnosis was eventually made on 23 December 2003 as a result of what Dr Milne stated to have been an excellent diagnosis that he believes many radiologists would have missed.

Dr Jaffurs reached the following conclusion, with which I agree:

> "The medical system is not able to make a correct diagnosis 100% of the time. In this case repeated attempts to make a diagnosis paid off. The patient and her family followed instructions, … maintaining availability for new information as it became available. The patient was eventually treated appropriately with no secondary injury or lasting disability."

I accept Dr Jaffurs' advice. In my opinion, the clinical staff provided Miss A with appropriate care on 14, 15 and 22 December 2003 and, therefore, did not breach the Code.

Other matter – outpatients appointment
Miss A was advised on her second admission to ED on 15 December 2003 that she would have an orthopaedic outpatient appointment made for her in 10 days' time. A letter subsequently arrived on 17 January 2004, with details of an appointment for 4 February 2004.

The public hospital advised me that an appointment had been made for Miss A on 24 December 2003 as a result of her admission to ED on 22 December 2003, for which she did not attend (DNA), as she was, by then, in hospital. The public hospital further explained:

> "The Booking Clerk in [the public hospital] Orthopaedic Department's primary concern would have been to ensure [Miss A] wasn't overlooked after the DNA and not offered the opportunity to be clinically assessed, hence the appointment made for 4 February 2004 in the next available clinic with an orthopaedic surgeon. The clerk would not have been anticipating the situation of the patient having been admitted to [the spinal unit] under the Spinal Service, and therefore the opportunity to cancel the automatic letter was lost.
>
> I can understand the confusion that may have arisen around the various separate events, from the time of the first visit to the Emergency department on 14 December 2003, through to her admission on 23 December 2003, and the subsequent follow-up arrangement during early 2004. These were covering two specialist services as the plan of care changed in accordance with an evolving clinical picture of what [Miss A's] actual injury was and until a final diagnosis was arrived at. …
>
> The referral of 15 December was superseded 6 days later by the change of events."

I accept the public hospital's explanation as to why Miss A received the outpatient appointment in early 2004. In the circumstances of a number of admissions to ED, an admission to hospital and the close proximity of the Christmas and New Year holiday season, it is understandable that the booking of an outpatients appointment became somewhat confused.

Summary
In my opinion, Miss A presented with an injury that was difficult to diagnose, and the clinical staff provided services of an appropriate standard to Miss A from 14 to 23 December 2003. In addition, I endorse Dr Jaffurs' comment that the clinical staff were ably assisted in Miss A's care by her family. He stated, "[Miss A's mother] is to be commended for being attentive to her daughter's condition." By following the guidance given by clinical staff, Mrs A contributed to the successful outcome of her daughter's care.

Follow-up actions

- A copy of this report will be sent to the Medical Council of New Zealand and the Royal Australian and New Zealand College of Radiologists.

- A copy of this report, with details identifying the parties removed, will be sent to the Australasian College of Emergency Medicine and the Royal Australian and New Zealand College of Radiologists, and placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

Names have been removed to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.