District Health Board

A Report by the
Health and Disability Commissioner

(Case 16HDC00134)

Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

Contents

Executive summary

1. Sixteen-month-old Master A presented to a public hospital (Hospital 1) on four occasions. At each presentation he was not weight-bearing on his left leg. Master A was diagnosed with a spiral tibial fracture, and during the course of the presentations the possibility of non-accidental injury also became a key diagnosis.

2. On 14 Month1, Master A and his mother, Ms A, presented to the Emergency Department (ED) of Hospital 1. Master A had not been weight-bearing on his left leg for approximately 36 hours. He was assessed by a number of ED staff, and an X-ray of his left leg was taken. No fracture was identified on the imaging, and Master A was transferred to the Paediatric Department, where further assessments were carried out and the X-ray re-reviewed. Again, no fracture was seen, and Master A was discharged home with analgesia and advice to return immediately if he deteriorated. The DHB told HDC that there is no record in the clinical notes that non-accidental injury was considered specifically, but it is noted that the cause of injury was unknown. The paediatric consultant on this shift, Dr C, acknowledged that the clinical documentation for Master A's presentation was incomplete, and attributed this to considerable pressure on the ward, with days being long and busy.

3. On 17 Month1, Master A and Ms A re-presented to the Paediatric Department. In the context of a busy clinic, the paediatric consultant on this shift, Dr G, carried out a concise and focused assessment of Master A's left foot, and an X-ray of the foot was taken. No abnormalities were identified. Master A's presenting issue was documented as a deep soft tissue injury, and although Dr G advised HDC that he considered inflicted injury, he acknowledged that this was not captured in the documentation. Master A was discharged home for monitoring and follow-up review in the Paediatric Ward if symptoms persisted.

4. Master A and Ms A presented to the Paediatric Ward on 19 Month1, and Master A was reviewed by a senior house officer. The paediatric consultant on this shift, Dr H, requested that Master A remain on the ward, and an orthopaedic opinion be sought. An orthopaedic registrar attended and recommended an MRI scan. Dr H advised HDC that he attended the ward later that day with the intention of carrying out a child protection assessment on Master A. However, when Dr H arrived on the ward, he was advised that Master A had gone home. An MRI scan was scheduled for 1 Month2.

5. When Master A presented to the Orthopaedic Ward on 1 Month2 to undergo the MRI under general anaesthesia, a pre-anaesthetic checklist noted that Master A had a broken tooth. A Paediatric Nursing Assessment Form documented faded bruises on Master A's right forehead and cheek, a missing tooth, and two black fingernails on the right hand. According to the nurses who assessed Master A, these findings were passed on to the house officer on duty. Following the MRI, a bone scan was recommended. However, because of the difficulty in arranging this at Hospital 1, Master A was transferred to Hospital 3.

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

6. The Paediatric Team at Hospital 3 reviewed Master A on 6 and 7 Month2, and a repeat X-ray of Master A's left leg confirmed a diagnosis of a tibial spiral fracture. Additional injuries were also documented, including two black fingernails, two damaged fingernails, a missing left bottom incisor, bruises around the hips and chest, and a light pink discolouration over the right lower quadrant of the abdomen. Given this, an Unexplained Injury Process was initiated. A Report of Concern was sent to Oranga Tamariki, and a referral made to the Child Protection Team. A skeletal survey was also planned.

7. On 8 Month2, Master A was flown back to Hospital 1 for the skeletal survey and, following this, Master A was discharged. Paediatric consultant Dr C was on call for this shift, and advised HDC that Master A had been discharged without her knowledge. In addition, although the findings of the skeletal survey were discussed and forwarded on to Oranga Tamariki on the day it was carried out, it was not formally reported on until 20 Month2.

8. Master A sustained further injuries following discharge, and was found deceased.

Findings

9. The Commissioner considered that the DHB's systems did not encompass an adequate safeguard for Master A, and that the evidence overwhelmingly demonstrates a systemic failing on the part of the DHB. The DHB had sufficient information to diagnose Master A's spiral tibial fracture and non-accidental injuries earlier, but a series of failings in assessment, communication, documentation, and coordination of care, and a failure to adhere to policies and procedures prevented this from occurring.

10. The Commissioner found that the DHB failed to provide services to Master A with reasonable care and skill, and therefore breached Right 4(1) of the Code of Health and Disability Services Consumers' Rights (the Code).[1] The DHB also failed to ensure co-operation among providers to ensure quality and continuity of services, and breached Right 4(5) of the Code.[2]

Recommendations

11. The Commissioner recommended that the DHB:

a) Provide a written letter of apology to Master A's family.

b) Advise HDC on the outcome of the review of medical staffing levels and rostering practices in the Paediatric and Radiology Departments.

c) Carry out an audit on the standard of documentation of 50 child presentations to Hospital 1.

d) Carry out an audit, over a period of three months, on the reporting timeframes of paediatric skeletal surveys.

[1] Right 4(1) states: "Every consumer has the right to have services provided with reasonable care and skill."
[2] Right 4(5) states: "Every consumer has the right to co-operation among providers to ensure quality and continuity of services."

e) Report back on the protocol being developed around hi-tech imaging requests for children under the age of 12 years.

f) For the purpose of shared learning, disseminate the anonymised version of this report to clinical teams across all hospitals within the DHB, as well as on a national level at relevant meetings.

12. The Commissioner also recommended that the DHB continue to follow up with Oranga Tamariki and the New Zealand Police regarding a multi-agency meeting to discuss the findings from the DHB's serious adverse event report and this report.

Complaint and investigation

13. The Commissioner received a complaint from Ms A about the services provided to her son, Master A, by the DHB. The following issues were identified for investigation:

- *Whether the DHB provided Master A with an appropriate standard of care in Month1 and Month2.*

14. The parties directly involved in the investigation were:

Master A (dec)	Consumer
Ms A	Complainant
The DHB	Provider

15. Further information was received from:

Ms B	Registered nurse
Dr C	Paediatrician
Dr D	Radiologist
RN E	Registered nurse
RN F	Registered nurse
Dr G	Paediatrician
Dr H	Paediatrician

16. Also mentioned in this report:

Dr I	Medical officer of special scale
Dr J	Emergency medicine consultant
Dr K	Paediatric senior house officer (SHO)
Dr L	Orthopaedic registrar
Dr M	Consultant orthopaedic surgeon

17. Independent expert advice was obtained from an emergency physician, Dr Vanessa Thornton, a paediatrician, Dr Roger Tuck, an orthopaedic surgeon, Dr Robert Rowan, and a paediatric radiologist, Dr Russell Metcalfe. The reports are included as **Appendices A, B, C, and D**, respectively.

Information gathered during investigation

Introduction

18. This report discusses the care provided to 16-month-old Master A across four presentations to Hospital 1 in Month1 and Month2. Each presentation related to Master A not weight-bearing on his left leg. Eventually, Master A was diagnosed with a spiral tibial fracture.[3] During the course of multiple presentations to hospital, the possibility of non-accidental injury also became a key diagnosis.

First presentation

19. On 14 Month1, Master A was taken to the Emergency Department at Hospital 1 by his mother, Ms A. Previously he had been well, but he had not been weight-bearing on his left leg for approximately 36 hours.

20. Clinical Nurse Specialist (CNS) RN E examined Master A at 10.23am and presented her findings to a medical officer of special scale (MOSS), Dr I, and an emergency medicine consultant, Dr J. RN E told HDC that in all ED presentations of injury to children she considers the possibility of non-accidental injury. She said that at the time she had no concern regarding non-accidental injury, and therefore no steps were taken in respect of this.

21. A left lower limb X-ray[4] was completed at 12.01pm. The X-ray was reviewed by Dr I, who could not identify a fracture. Dr J then examined Master A and transferred him to the Paediatric Team. The DHB told HDC that there is no record in the clinical notes that non-accidental injury was considered specifically, but it is noted that the cause of injury was unknown.

22. In the Paediatric Department, Master A was reviewed by a consultant paediatrician, Dr C, and a paediatric SHO, who documented the following:

> "Background
>
> — Normally fit and well

[3] A spiral tibial fracture, also known as a toddler's fracture, is a spiral fracture of the shaft of the tibia (the shinbone in the leg) with an intact fibula (the calf bone in the leg).
[4] A full left leg X-ray.

— NVD,[5] nil neonatal concern

— No allergies

— No reg meds

— Immunisations UTD[6]

SHx[7]

— Lives in […], has […] yo [sibling] (sic), attends daycare full time.

…

On examination

— Non-toxic appearing 16mo boy
— No respiratory distress
— 'Snuffly breathing'
— Non-blanching petechial[8] rash on upper chest, mum states she noticed it yesterday after [Master A] had been caught up in some blankets."

23. Dr C accepts that the notes are incomplete. She explained that she was under considerable time pressure at the time, as she was on call more frequently than normal, and the days were long and busy.

24. Dr C told HDC that due to the presence of the petechial rash, a social history was taken from Ms A. Dr C recalled:

> "[Ms A explained that] her older [child] lived with her at home. That she had a partner but he did not live at the home and was not alone with [Master A]. [Master A's] father did not have contact with [Master A]. She advised that [Master A's] father was in prison for domestic violence. This had made her very careful about who had access to her children. She confirmed that no one other than [Ms A] herself, [Master A's] sister and the daycare staff had the care of and contact with [Master A]."

25. Dr C told HDC that she reviewed the X-ray requested in ED and could not see a fracture. She considered the possibility of a metaphyseal[9] fracture, but saw no sign of this on the X-ray. She stated that she also considered whether Master A had a toddler's fracture, or a fracture of the tibia. Dr C concluded that as there was no evidence of a fracture, Master A could be discharged home with regular analgesia. She told HDC that Master A was discharged with Open Access, which meant that the family could call the Paediatric Ward

[5] Normal vaginal delivery.
[6] Up to date.
[7] Social history.
[8] Petechiae are pinpoint, round spots that appear on the skin as a result of bleeding beneath the skin.
[9] The narrow portion of the femur.

and present straight back to the unit with any concerns. Dr C documented the following plan:

> "1. [Discharge] home
>
> 2. Return if any deterioration
>
> 3. Continue regular analgesia at home."

Result of left lower limb X-ray

26. The final report for Master A's left lower limb was reviewed by ED staff at 11.33am on 17 Month1. The report found:

> "[A] small osseous[10] fragment adjacent to the posterior[11] aspect of the distal[12] left femoral metaphysis.[13] This does not have the typical appearance of a non-accidental injury although it is not a typical normal variant either. A small fracture cannot be completely excluded. Further imaging such as an MRI may also be valuable."[14]

27. The DHB completed a Serious Adverse Event[15] Report (SAER) into Master A's care, which noted that no further action was taken by ED in respect of this report. An MRI was not ordered at this point.

Second presentation

28. Also on 17 Month1, Master A re-presented to the Paediatric Ward. Master A was reviewed by a paediatric SHO although the time of this review is not documented. Dr K noted Master A's previous presentation, that there was no history of injury or trauma, and that Ms A was concerned that Master A had not improved. Dr K noted that a left lower limb X-ray had been carried out at Master A's previous presentation and that no abnormality had been detected.

29. Dr K discussed Master A's case with a consultant paediatrician, Dr G, who was on call at the time. Dr G told HDC that he decided to visit Master A "to eliminate the more serious explanations for non-use of a limb". Dr G added that his "concerns were to exclude bacterial infection of bones/joints, malignancy or fractures, whether inflicted or accidental".

30. Dr G told HDC that in the context of a busy clinic, he took a concise and focused approach to his assessment of Master A. Dr G stated that he was directed to the left foot as being

[10] Osseous is a term used to refer to something consisting of, or resembling, bone. In this context it is referring to a bone fragment.
[11] Further back in position.
[12] Situated away from the center of the body or from the point of attachment.
[13] The narrow portion of the femur.
[14] As discussed later, spiral fractures are not always visible at an early stage.
[15] A serious adverse event is an event with negative reactions or results that are unintended, unexpected, or unplanned. In practice, this is most often understood as an event that results in harm to a consumer.

the source of discomfort rather than any other part of Master A's leg. The clinical notes state that the left foot had "no obvious deformity/swelling/bruising/ redness". Dr G said that although he did not conduct a focused examination on Master A's tibia and fibula, he did hold the distal aspect when evaluating Master A's ankle and foot.

31. An X-ray was requested for Master A's left foot but not his whole leg. Under "Clinical Details" on the examination request form, the SHO documented:

> "Non weight bearing [left] foot 4/7
> No history of injury
> Systemically well
> No bruising/swelling or deformity
> Apparent tenderness mid-forefoot."

32. No abnormality was observed on the left foot X-ray. Dr G told HDC that Dr K had given him a verbal message that the lower left limb X-ray from the previous presentation was normal, and he had "no awareness" that the X-ray report suggested a possible femoral fracture.

33. Master A's presenting issue was documented as a "likely deep soft tissue injury/strain". Dr G told HDC that "although inflicted injury was in [his] thinking … sadly nothing was documented to capture this". He added that he was "satisfied that there was nothing serious accounting for [Master A's] non-weight bearing, based on his reassuring results, and his clinical picture". Master A was discharged home for monitoring and follow-up review in the Paediatric Ward on 21 Month1 (Monday) if symptoms persisted.

Third presentation

34. Master A and his mother re-presented to the Paediatric Ward at midday on 19 Month1. Master A was reviewed by an SHO. The on-call paediatric consultant was Dr H. Although Dr H did not meet Master A, he was given a history by the SHO at approximately 1.30pm. Dr H requested that Master A remain in the ward, and that an opinion from the orthopaedic registrar be sought.

35. The SHO documented: "Orthopaedics to arrange MRI and [follow-up]. I will discuss this with the ortho[paedic] reg[istrar]."

36. Later that day, orthopaedic registrar Dr L reviewed Master A and noted the results of his left lower limb X-ray of 14 Month1. Dr L documented:

> "<u>Plan</u>
>
> — Soft band and crepe bandage for comfort
> — Arrange MRI scan: will be arranged by paediatric department
> — [Review] in orthopaedic clinic with MRI scan."

37. Dr H reported the following to HDC:

> "I attended the ward at 1630 on Saturday afternoon, to see both [Master A] and another patient under my care … On my arrival to the ward, I was advised [Master A] had gone home. It was not clear why he had gone home and when I enquired, no clear explanation could be provided …
>
> I had attended the ward on Saturday afternoon to see a child who was otherwise well in order to do a Child Protection Assessment. This could have involved obtaining further information from [Master A's] mother regarding any possible mechanisms of injury, further information about [Master A's] living circumstances and a physical examination to look for any other signs of trauma."

Request for MRI

38. On 21 Month1, Dr L completed an MRI request. Under the heading "Clinical Details", he wrote:

> "— non-[weight] bearing on left lower limb for 1 week. Refuse to allow to touch of left knee and foot.
> — no obvious trauma, afebrile[16]
>
> …
>
> — X-ray — left femur lower metaphysis posterior fracture — ? pathological fracture."

Fourth presentation

39. On 1 Month2, Master A presented to the Orthopaedic Ward to undergo an MRI under general anaesthesia. A pre-anaesthetic checklist noted that Master A had a broken tooth. No pathology was seen at the distal femoral metaphysis (the site of initial concern on the first X-ray carried out on 14 Month1). However, abnormality was found on the left tibial shaft, and Master A was admitted to the ward with a working diagnosis of "infection or tumour of left tibial shaft".

40. At approximately 4.30pm, a student nurse, Ms B, completed a Paediatric Nursing Assessment Form. The "Social History" aspect of the form was partially completed. The sections referring to the name of Master A's father and "Any restriction with visitors" were left blank. Ms B told HDC that when she asked Ms A if she could put something down for the father's name, she said no, and that she did not mention any visitor restrictions. A family violence screen was completed with a negative result.

41. Under the heading "Hygiene/Skin Integrity", Ms B documented faded bruises on Master A's right forehead and cheek, a missing tooth and two black fingernails, and one lost nail on the right hand. Ms B told HDC that she "did not link a non accidental injury to the presenting complaint", but said that she informed her preceptor, registered nurse (RN) RN

[16] Without fever.

F, of these observations immediately. Ms B understood that RN F shared the information with the house officer on duty.

42. RN F confirmed that she advised the house officer on duty of the injuries, but cannot recall who this was. She added that Ms A was questioned about the injuries and gave reasonable explanations (the tooth injury had occurred at kindergarten, and his fingers had been jammed in a door). RN F told HDC that she did not immediately suspect non-accidental injury as being the cause of the injuries. Although there is no record of any communication with the house officer, at 9.45pm Ms B documented: "[Master A] here for investigations and a protective environment."

43. On 2 Month2, Master A and his mother left the hospital in the evening. The Orthopaedic Team recommended that Master A remain in hospital over the weekend (3–4 Month2) because of the potential risk of a pathological fracture due to the bony abnormality seen. The DHB reported that Ms A declined this advice and signed an indemnity form, promising to return Master A to the ward after the weekend.

44. Master A and Ms A returned to Hospital 1 on 5 Month2. A bone scan was planned for Master A, but because of the difficulty in arranging for it to be done under general anaesthesia at Hospital 1, it was decided that Master A would be transferred to Hospital 3 under paediatric care (with orthopaedic input).

45. The transfer letter to the Paediatric Department at Hospital 3 notes the "Diagnosis" as "Refusing to mobilise on [left] lower leg, MRI showed ? infection ? tumour of [left] tibial shaft." The nursing transfer letter notes family circumstances that had not been documented in Master A's medical notes previously — specifically, that Master A was living at home with his mum, his father had a restraining/parenting order, and that his mother's new partner was on home detention.

46. The DHB's SAER found that there was no documentation showing that the nursing and medical teams had discussed the possible cause or significance of Master A's injuries and, further, that "no care or protection concerns were communicated to the receiving paediatric team in [Hospital 3], nor had any such concerns been documented during the previous presentations or reviews".

Admission to Hospital 3

47. During 6 and 7 Month2, Master A was reviewed by the Paediatric Team at Hospital 3. A repeat plain X-ray of Master A's left leg confirmed a diagnosis of a tibial spiral fracture. The following additional injuries were also documented:

> "Has 2 black fingernails [and] 2 damaged fingernails on [right] hand. Mum says repeatedly shut fingers in door — accidentally.
>
> Missing left bottom tooth incisor — no history of witnessed trauma

> Bruises over both left [and] right iliac crests[17] [and] up trunk over ribs of right chest wall in axillary line.
>
> Light pink discolouration over [right] lower quadrant of abdomen — Mum states it is a birthmark."

48. The Paediatric Team at Hospital 3 also recorded Master A's family circumstances in detail, including the fact that his mother's new partner was on home detention for assault, and that he had permission to be in their home. Due to the number of unexplained injuries noted on Master A, an Unexplained Injury Process was initiated. A Report of Concern was sent to Oranga Tamariki, and a referral was made to the Child Protection Team. This was communicated to the Police and the Social Work Team at Hospital 1. As part of the investigation into the suspected non-accidental injury, a skeletal survey was also planned.

49. A consultant paediatrician at Hospital 3 contacted Dr C at Hospital 1, and it was agreed that Master A would be transferred back to Hospital 1 to undertake the skeletal survey.

50. Master A was discharged from Hospital 3 with the following diagnoses:

> "Primary Diagnosis
>
> - Left tibial spiral fracture ?cause
>
> Secondary Diagnosis
>
> - Right lateral incisor missing ?cause
> - Right fingernail haemorrhages secondary to trauma
> - Contusions on back and buttock ?cause"

Transfer back to Hospital 1

51. Master A was transferred back to Hospital 1 on the evening of 7 Month2. Police and Oranga Tamariki staff met Master A and Ms A at the airport and accompanied them to the hospital, where a one-to-one patient watch was commenced. The plan for Master A on readmission was a skeletal survey and a senior paediatric medical review the following day.

Skeletal survey

52. A skeletal survey was performed on the morning of 8 Month2.

53. Dr C told HDC that during the day, she was in email communication with a paediatric radiologist from Hospital 2, Dr D, to discuss Master A's skeletal survey.

[17] The crest of the ilium is the curved outer border of the hip bone.

54. At 8.59am, Dr C emailed Dr D requesting a review of Master A's skeletal survey. At 12.21pm, Dr D emailed Dr C her review comments:

> "I have reviewed the skeletal survey on [Master A]. He has a fracture of the tip of the terminal phalanx of the right index finger. I think the lower femoral irregularity is a normal ossification[18] variant and not a metaphyseal fracture. He is really too old to have classic metaphyseal fractures. I am disappointed I was not called earlier about this child."

55. Dr C replied to Dr D at 1.06pm as follows:

> "There was an issue with orthopaedics taking over and also with the child being sent home before [Dr H] could review him during the one admission. The MRI was also ortho-directed without much input from us. And then the report of femur fracture right at the beginning, which [radiology], [paediatrics] and [orthopaedics] said with certainty was not a fracture."

Skeletal Survey X-Ray — Medical Imaging (Hospital 1) policy

56. This policy states that for non-accidental injury in children, "an on-site radiologist must be involved".

57. The DHB's SAER found that at the time of events, the above policy was unable to be followed, as two of the Hospital 1 radiologists, including the radiologist site leader, were on leave, and the third radiologist did not read skeletal surveys for non-accidental injury.

58. The SAER also noted that although Dr C expected Dr D to report on the skeletal survey formally, Dr D understood the request simply to be an informal review of the images. Dr D stated that she was not routinely reporting films from Hospital 1. She added that the different patient archiving and communication system (PACS) between Hospital 2 and Hospital 1 made it difficult for cross-hospital reporting to occur, and she would not consider doing so unless expressly asked by the clinical leader of Hospital 1 Radiology.

59. When the charge medical radiology technician became aware that reporting Master A's skeletal survey was not the understanding of Dr D, the District Clinical Leader, who had started work five weeks previously, was contacted. The District Clinical Leader reviewed the skeletal survey images but did not issue a formal report, as she understood that skeletal surveys were to be double read.

60. The DHB's SAER found that leave cover arrangements when both the DHB paediatric radiologists were absent were not clear to the radiologist service in either Hospital 1 or Hospital 2. As a result of the above, although Master A's skeletal survey was discussed and results passed to Oranga Tamariki on the day of the survey, it was not formally reported on until 20 Month2 — 12 days after it was performed on 8 Month2.

[18] The formation of bone or of a bony substance, or the conversion of fibrous tissue or of cartilage into bone or bony substance.

Discharge

61. Dr C reported to HDC that she was at an out-of-town clinic when Master A was discharged on 8 Month2. During a break in her clinic, she spoke to Master A's assigned Oranga Tamariki social worker and told her of the skeletal survey findings. Dr C asked the Oranga Tamariki social worker to write a safety plan and send it to the Paediatric Ward, and also spoke to the Paediatric Ward manager to advise her that Master A could be discharged once the safety plan was available.

62. The hospital social worker documented the following plan in Master A's notes:

> "[T]o be discharged today …
> [Oranga Tamariki] and Police involvement.
> Safety Plan to be completed by [Oranga Tamariki] prior to discharge.
> No further involvement for hospital social worker."

63. At 12.30pm, the hospital social worker documented: "[Oranga Tamariki] to contact Children's Ward to advise decision about discharge."

64. At approximately 3pm, a further entry is made in Master A's notes by a paediatric SHO stating: "Police detective arrived on ward and stated he was happy to release [Master A] … home. No medical issue preventing discharge."

65. Master A was discharged from hospital on the afternoon of 8 Month2.

66. Dr C stated that when she returned to the Paediatric Ward after her clinic, Master A had been discharged despite a safety plan not being available. Dr C told HDC that this was done without her knowledge.

Memorandum of Understanding[19] — Schedule 1: Children Admitted to Hospital with Suspected or Confirmed Abuse or Neglect

67. Under the heading "Multi-Agency Safety Planning Prior to Discharge", the MOU outlines the following:

> "• All children admitted with suspected or confirmed abuse or neglect will have a Multi-Agency Safety Plan in place prior to discharge from hospital. [Oranga Tamariki] have a key responsibility for the development and implementation of this plan.
>
> • The core elements of this plan will be developed prior to the discharge planning meeting, in consultation between [Oranga Tamariki], the paediatrician under whose care the child was admitted and key contact persons from other agencies involved.

[19] MOU between Oranga Tamariki, Police, and DHBs.

- The DHB will convene a discharge planning meeting prior to discharge, to include key staff, agencies and parents/caregivers involved in the care of the child before or after discharge …

- The Multi-Agency Safety Plan will be documented on the agreed standard template, and will include:

  — Names and contact details of those involved in making the Safety Plan.

  — Names and contact details of key contact people including Oranga Tamariki social workers, the DHB key contact person and the Police Investigating Officer.

  — Identification of who will care for the child after discharge, including such details as names, addresses and other contact details.

  — What and how support will be provided to the child and the child's caregivers after discharge.

  — Safety arrangements after discharge.

  — Health and rehabilitation needs after discharge …

  — Any barriers to service provision after discharge, and how these will be addressed.

  — Arrangements for monitoring and review of the plan."

68. The DHB's SAER found that final discharge planning and procedures in the MOU were not followed. Dr C told HDC that the DHB policies were in "a state of flux". The above MOU was not required reading. The DHB advised HDC that it was "not aware of the MOU being required reading [at the time of the events]", and at the time of the events "was not uploaded onto our document control system".

Subsequent events

69. Master A sustained further injuries following discharge and was found deceased.

Policies and procedures

Partner abuse screening

70. This policy sets out recommended screening guidelines for services but notes that they are recommendations only.

71. With respect to when screening should occur, the policy recommends:

"• Screening for abuse should occur at every emergency department visit, this includes mothers of children reviewed in the Emergency Department or admitted to hospital.

• Screening for abuse should occur in paediatric settings for mothers of children as part of well child assessments, when children are reviewed in the emergency department or paediatric assessment unit (PAU) or admitted to hospital and when family violence is suspected, including when child abuse is identified.

• Screening for abuse should occur in general inpatient settings as part of admission to and discharge from hospital."

Further information — the DHB

Findings from SAER

72. The DHB's SAER of Master A's care found the following:

- The first X-ray report was inconclusive but a paediatric radiologist was not involved in discussing this or to plan further imaging. This resulted in erroneous conclusions and unnecessary imaging requests.
- Incomplete history taking, including social history and consideration of risk factors for the presence of non-accidental injury.
- Incomplete differential diagnosis, non-accidental injury not documented as a possible concern despite clinicians being aware this was a possibility.
- Inconsistent communication and sharing of information within and between clinical teams including in the clinical details section of radiology request forms.
- There was a different understanding between the charge MRT and paediatric radiologist about who was responsible for reporting the skeletal survey.
- Some radiologist staff were unclear about the arrangements for paediatric radiology cover when both were on leave.
- A national multi-agency safeguarding (MOU) was not followed prior to discharge following Master A's readmission from Hospital 3.

Recommendations/actions from SAER

73. The following recommendations were made as a result of the above findings:

"• Clinicians reminded to follow-up inconclusive radiology reports.

• Ensuring the multidisciplinary team adopts a systematic approach to gathering, sharing, and documenting relevant information. Initiate a process to develop shared care principles between teams.

• Ensure all staff are aware and follow the national MOU between DHBs, Police and [Oranga Tamariki].

- Ensure all children's health staff can access training and support in managing family violence/child protection issues.
- The DHB's paediatric radiologist should implement a district radiology policy for non-accidental injury to children. A clear process should be put in place for general radiologists to access paediatric radiology support if paediatric radiologists are unavailable.
- Convene a meeting with Police and Oranga Tamariki regarding the findings of this investigation and to consider findings from other agency reviews.
- Review service requirements and staffing requirements to ensure alignment including radiology ensuring that leave cover arrangements for all staff are clear and are communicated to the appropriate people."

74. The DHB advised HDC that all recommendations arising out of the SAER have been completed, with the exception of:

- The multi-agency meeting between the Police, Oranga Tamariki, and the DHB. The DHB advised that the multi-agency meeting has not been held as the Police have expressed reluctance to do so until the Coroner's inquest is complete.
- Hi-tech imaging requests for children under the age of 12 years being triaged and protocoled. The DHB advised that current staffing levels do not allow for such a protocol, but it is in the process of developing an alternative protocol that is intended to achieve the same general outcome.

Responses to provisional opinion

Ms A

75. Ms A was given an opportunity to comment on the "information gathered" section of the provisional opinion. She reiterated that she felt that Master A's spiral tibial fracture should have been diagnosed earlier.

The DHB

76. The DHB was given an opportunity to comment on the provisional opinion. It advised that with some minor exceptions, it considered the provisional opinion to be fair and accurate, and that the recommendations made were appropriate. Where relevant, the DHB's response has been incorporated into the report.

77. The DHB accepts that in this instance, the system failed with tragic outcomes for Master A and his family. The DHB deeply regrets what has occurred and is committed to making changes to ensure that it does not happen again.

Opinion: The DHB — breach

Introduction

78. The focus of my report is on the role the DHB played in caring for Master A in Month1 and Month2. District health boards are responsible for the operation of the services they provide, and can be held responsible for any service level failures. I acknowledge that the DHB was one of several agencies responsible for ensuring Master A's safety. As I will outline below, I consider that the DHB failed to provide appropriate services to Master A in a number of ways.

79. To preface my discussion below, I will not be focusing my criticisms on any one individual or team at Hospital 1. In my view, the system that was meant to wrap around Master A had the information it needed to diagnose his spiral tibial fracture and non-accidental injuries earlier. However, a series of failings in assessment, communication, documentation, and coordination of care, and a failure to adhere to policies and procedures prevented this from occurring.

Diagnosis of spiral tibial fracture

80. My emergency physician expert, Dr Vanessa Thornton, advised that the "limping child" is a common cause of presentation to EDs, accounting for up to 4% of presentations. This presentation varies from benign to very serious. Dr Thornton noted that at Master A's first presentation on 14 Month1, simple investigations were performed by Hospital 1 ED, and these were "appropriate" first steps.

81. My orthopaedic expert, Dr Robert Rowan, considered that across Master A's second, third, and fourth presentations, "although the diagnosis of the tibial fracture was delayed, [the DHB's Orthopaedic Team] made appropriate investigations and were very thorough in their assessment and logic".

82. My paediatric radiology expert, Dr Russell Metcalfe, advised that across all of Master A's presentations where imaging was carried out, with the exception of the skeletal survey on 8 Month2, the radiology care and input Master A received met accepted standards of care.

83. I accept that the initial assessment carried out by Hospital 1 ED was appropriate. I also consider that the diagnosis of Master A's spiral tibial fracture, although delayed, was not a departure from accepted standards. Furthermore, with the exception of the skeletal survey (discussed below), I am satisfied that the imaging carried out on Master A was appropriate.

Diagnosis of possible non-accidental injury

84. My paediatric expert, Dr Roger Tuck, advised: "[T]here is little if any evidence that trauma, inflicted or otherwise, was on the differential diagnosis for this child and there is a lack of social history and evidence of family violence screening." Similarly, Dr Rowan commented that "throughout the multiple presentations at [Hospital 1] there was no noted consideration of the possibility of a non-accidental injury".

85. Dr Rowan further advised that "there was a significant delay in the diagnosis of non-accidental injury" and that there were "a number of warning signs in the presentations for the diagnosis of non-accidental injury to be considered".

86. I am very concerned that it took multiple presentations to hospital, and a transfer to Hospital 3, before the diagnosis of non-accidental injury was explicitly considered and noted in the clinical notes. According to statements from Dr G, Dr H, and Dr C, non-accidental injury was considered. However, I am critical that this consideration did not lead to the appropriate documentation (discussed below) and escalation pathways.

Communication and documentation

87. Dr Tuck considered that there was a general lack of documentation regarding the social circumstances of Master A and his family. Dr Tuck noted that many hospitals have specifically designed child injury charts and algorithms to assist in the careful documentation of the history and mechanisms of injury, to help minimise missed diagnoses of inflicted injury and child abuse in general. Dr Tuck further noted that [at the time of the events], the DHB was not part of the national Child Protection Alert System, but that from 2017 the DHB became part of the system along with every other DHB in New Zealand.

88. Dr Tuck also noted:

> "[T]ransfer of care from clinician or clinical team to another is identified as one of the high risk points in the patient journey and a rich opportunity for mistakes and errors. Good handover needs clarity around what still needs to be done, or in the context of investigations, what needs to be followed up and by whom."

89. The DHB's SAER also found that there was incomplete history taking, including social history, and that non-accidental injury was not documented as a possible concern despite clinicians being aware that this was a possibility. In particular, the SAER notes the following:

- At the second presentation on 17 Month1, when a left foot X-ray was requested, the clinical details that were passed on to the radiology team did not include a differential diagnosis of non-accidental injury.
- At the third presentation on 19 Month1, there was a breakdown in communication, which resulted in Master A's discharge. The paediatric and orthopaedic clinical records up to and including this time did not explicitly state that non-accidental injury was a possible explanation for Master A's presentation.
- It was not until Master A's fourth presentation on 1 Month2 that he was screened for family violence, and a Paediatric Nursing Assessment Form was completed. Despite this, the social history aspect of the form was only partially completed.

90. When Master A was transferred to Hospital 3, the nursing transfer letter noted that Master A's mother had a new partner, who was on home detention. However, no specific care and protection concerns were documented.

91. I note that both Dr C and Dr G advised HDC of the time pressures on them, and described their clinics as busy. I further note that the DHB acknowledged that a review of medical staffing levels and rostering practices was appropriate following this case.

92. Documentation assessing possible non-accidental injury across multiple presentations was poor. It concerns me that each consultant responsible for reviewing Master A considered non-accidental injury yet did not document this or complete a full social history of Master A and his family. It is particularly concerning that a paediatric nursing assessment was completed only at the fourth presentation, and that this assessment was only partially undertaken. I accept that at the time of events, Dr C's and Dr G's clinics were very busy and, as such, adequate documentation became challenging. This repetitive lack of documentation across numerous staff is highly concerning, and signals a system that had become tolerant of suboptimal practice.

93. Documentation is a key communication tool between clinicians, critically with a pattern of ongoing assessment, and is essential to good patient care and continuity of care. On Master A's first, second, and third presentations, he was reviewed by a different consultant and registrar team, each of whom advised me that they considered non-accidental injury, yet did not document it. In my view, the inadequate documentation led to an incomplete clinical picture of Master A, critically as to risk of harm, being passed between different paediatric registrar/consultant teams, and also between paediatric, orthopaedic, and radiology departments.

94. Other concerning features relate to the co-ordination of Master A's care, as discussed below.

Co-ordination of care

Radiology

95. The leave arrangement for Hospital 1 radiologists at the time of events was unclear, and not well communicated to the district clinical leader. In addition, there was a lack of clarity around who would formally report on Master A's skeletal survey in the absence of a radiologist at Hospital 1. As a result, there was a 12-day delay in the formal reporting of the survey.

96. My paediatric radiology expert, Dr Russell Metcalfe, advised that the 12-day delay in providing a formal report would be classified as a moderate departure from the standard of care. However, he notes that the verbal and informal email report provided on the day of the survey mitigates the severity of the departure.

Hospital discharge

97. At Master A's third presentation, he was discharged on 19 Month1 without the knowledge of his responsible clinician, Dr H, and before a Child Protection Assessment had been carried out. He was again discharged on 8 Month2 without the knowledge of his responsible clinician, Dr C, and before multi-agency safety planning could occur on his final admission to Hospital 1.

98. Paediatric expert Dr Tuck advised that it was inappropriate to discharge Master A on 19 Month1 and 8 Month2. In his opinion, in the context of proven or suspected child abuse, the child should not be discharged home until the clinical team has the undertaking from Oranga Tamariki that the child is going to a place of safety.

99. Master A's journey through the Paediatric, Orthopaedic, and Radiology teams was inadequate. On two occasions he was discharged inappropriately and before vital assessments could be carried out on him. His skeletal survey was not formally reported until 20 Month2. The above demonstrates poor communication and collaboration between and within teams, ultimately compromising the care Master A received.

Policies and procedures

100. Several important policies and procedures concerning non-accidental injury were in place, but were not followed.

101. First, the DHB's Partner Abuse Screening policy recommends screening for family violence at all Emergency Department and Paediatric Department presentations. As noted above, it was not until Master A's fourth presentation on 8 Month2 that he was screened for family violence and a Paediatric Nursing Assessment Form was completed.

102. Secondly, the policy around imaging for non-accidental injury required the involvement of an on-site radiologist. However, an on-site radiologist was not involved because at the time, two of three Hospital 1 radiologists were on leave, and the remaining radiologist did not read skeletal surveys for non-accidental injury.

103. Thirdly, the MOU between DHBs, Oranga Tamariki, and the Police required a number of steps to be followed before a child with suspected or confirmed abuse could be discharged from hospital. This included convening a discharge planning meeting and completing a multi-agency safety plan. Neither of these steps occurred before Master A was discharged. The DHB told HDC that the MOU was not required reading [at the time of the events], and had not been uploaded to the DHB's document control system at the time.

104. Whilst I am concerned that a number of policies were not followed by staff, I am also concerned that the DHB did not have robust systems in place to ensure that these policies could be followed. With respect to the radiology policy, the leave arrangements at the time were such that they prevented staff from being able to follow the policy. With respect to the MOU, I am highly critical that the DHB took inadequate steps to ensure that staff were aware of it and could access it.

Conclusion

105. Master A's care demonstrates the challenges clinicians face when diagnosing non-accidental injuries. These challenges could have been addressed by more rigorous analysis, particularly given circumstances where suspicion of inflicted injury should have been expressly explored, policies and procedures followed, and effective communication and documentation carried out.

106. In my view, the DHB failed to provide services to Master A with reasonable care and skill for the following reasons:

- The diagnosis of non-accidental injury was not considered adequately across multiple presentations to hospital, resulting in a delayed diagnosis. This was reflected in poor documentation of social history, cause of injury, and family violence screening.

- The important policies and procedures around family violence screening and non-accidental injury were not followed by numerous staff. Moreover, the DHB did not have robust systems in place to ensure that the policies could be followed.

107. Furthermore, the DHB failed to ensure quality and continuity of services for the following reasons:

- The inadequate documentation led to an incomplete clinical picture being passed on from team to team, and this contributed to a delay in Master A's diagnosis.
- Master A's journey through the Paediatric, Orthopaedic, and Radiology teams was inadequate, and included two inappropriate discharges from hospital and delayed reporting of his skeletal survey.

108. Across all disciplines, my experts have advised me that there were systemic failings in the care provided to Master A within teams, and across services. Dr Rowan concluded:

> "[T]he over-riding finding from the information given is that there was a lack of consideration of the diagnosis of non-accidental injury. The lack of consideration was systemic across all services."

109. Similarly, Dr Metcalfe advised that "the systemic issues were more to blame than any one individual". Dr Tuck also advised that "there is absolutely no doubt that the system let this child down from first to last presentation", and he concluded that the standard of care provided to Master A was "significantly below" accepted standards.

110. Having considered the information gathered and the advice from my experts, the evidence overwhelmingly demonstrates a systemic failing on the part of the DHB. For the reasons outlined above, I find that the DHB failed to provide services to Master A with reasonable care and skill, and breached Right 4(1) of the Code. The DHB also failed to ensure co-operation among providers to ensure quality and continuity of services, and breached Right 4(5) of the Code.

The DHB's SAER findings and recommendations — other comment

111. I acknowledge that the DHB carried out two internal reviews of the care provided to Master A. I am thoughtful about the SAER findings around the involvement of a paediatric radiologist earlier, the potential to avoid transferring Master A to Hospital 3, and unnecessary imaging.

112. My expert, Dr Metcalfe, advised me that the first imaging that should have had paediatric radiology input was the skeletal survey. I note that this occurred. Dr Tuck advised that he has "no particular issue with the quality or quantity of imaging" that Master A underwent. Dr Rowan also advised that the Orthopaedic Team sought appropriate input from the combined orthopaedic group at Hospital 1, the radiology service, and, subsequently, the musculoskeletal oncology service at Hospital 3. Accordingly, I am not critical of these aspects of the DHB's care. However, the SAER findings provide further learnings from this case. I fully endorse the SAER recommendations and am pleased to note that most have been complied with.

Recommendations

113. I recommend that the DHB:

a) Provide a written letter of apology to Master A's family for the breaches of the Code identified in this report. The apology should be provided to HDC within three weeks of the date of this report, for forwarding to Master A's family.

b) Advise HDC on the outcome of the review of medical staffing levels and rostering practices in the Paediatric and Radiology departments, and whether any improvements have occurred with respect to this, within three weeks of the date of this report.

c) Carry out an audit on the standard of documentation of 50 child presentations to Hospital 1 — in particular, the completion of family violence screening and social history. Where the results do not reflect 100% compliance, the DHB should consider and advise HDC on what further improvements could be made to ensure compliance. The DHB should report back to HDC within six months of the date of this report.

d) Carry out an audit, over a period of three months, on the reporting timeframes of paediatric skeletal surveys. Where the results do not reflect 100% compliance, the DHB should consider and advise HDC on what further improvements could be made to ensure compliance. The DHB should report back to HDC within six months of the date of this report.

e) Report back to HDC on the protocol being developed around hi-tech imaging requests for children under the age of 12 years, within six months of the date of this report.

f) For the purpose of shared learning, disseminate the anonymised version of this report to clinical teams across all hospitals within the DHB, as well as on a national level at relevant meetings, within six months of the date of this report.

114. I also recommend that the DHB continue to follow up with Oranga Tamariki and the New Zealand Police regarding a multi-agency meeting to discuss the findings from the DHB's SAER and this report.[20] The DHB is to report back to HDC on its progress and/or any outcome of such a meeting, within six months of the date of this report. This Office acknowledges that the meeting may not be possible until the conclusion of the Coroner's inquest.

Follow-up actions

115. The DHB will be referred to the Director of Proceedings in accordance with section 45(2)(f) of the Health and Disability Commissioner Act 1994 for the purpose of deciding whether any proceedings should be taken.

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

117. A copy of this report with details identifying the parties removed, except the experts who advised on this case, will be sent to Oranga Tamariki and the New Zealand Police. They will be advised of the name of the DHB.

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

Addendum

119. The Director of Proceedings filed proceedings by consent against the DHB in the Human Rights Review Tribunal. The Tribunal issued a declaration that the DHB breached Right 4(1) and Right 4(5) of the Code by failing to provide services to Master A with reasonable care and skill, and failing to provide co-operation among providers to ensure quality and continuity of services.

[20] See paragraph 117.

Appendix A: Independent emergency physician advice to Commissioner

The following expert advice was obtained from an emergency physician, Dr Vanessa Thornton:

"I have been asked to provide an opinion to the commissioner on case number C16HDC00134, and I have read and agree to follow the commissioner's Guidelines for Independent advisors.

I am currently the acting Chief Medical Officer at Middlemore Hospital and have been the Head of Department of Middlemore Hospital Emergency Department New Zealand the largest Emergency Department in Australasia from 2008 to 2017. My qualifications are FACEM (Fellow of the Australasian College for Emergency Medicine), FRACMA (Fellow of the Australasian College of Medical Administrators) and MBChB at Auckland University. I have been a fellow of the Emergency Medicine College for 17 years and graduated as a Doctor in 1992. I am drawing on my experience as an Emergency Physician and the literature available around fractures. I have reviewed the following documentation:

Letter of complaint dated […];

[The DHB's] response dated 29th December […];

[The DHB's] response dated 31st March […];

[The DHB's] response dated 2nd June […]; Clinical records from [the DHB] for [Master A's] presentation 14th of [Month1];

Xray referral and pictures of the left leg x-ray.

I have been advised to provide advice on the following:

The adequacy of the assessment on 14th [Month1];

The adequacy of the review of the x-ray on 14th of [Month1];

The adequacy of the actions and/or follow up with respect to the foot x-ray on the 14th of [Month1];

Any other matters in this case related to the Emergency Department presentation.

Summary of presentation
[Master A] presented to [the [Hospital 1]] Emergency Department on the 14 [Month1] at 0919. The presenting problem noted at triage was leg injury with no history of trauma. [Master A's] mother had reported him being active yesterday but not wanting to use the left leg today. The observations at triage were temp 37.3 and weight 13kg. [Master A] was given a triage category of 4. [Master A] was seen by a Clinical Nurse specialist (CNS) [RN E] at 1036. The history taken by the CNS was that mum had noted

the day before that [Master A] had not been walking on the leg. Mum stated that [Master A] could not put weight through the L leg. Mum had taken [Master A] to the park but doesn't remember any mechanism of injury and was walking after the trip to the park. Mum states that [Master A] has been tired and sleeping a lot. Mum denies any fevers or other inter-current illness. [Master A] had been eating and drinking as usual. Today Mum had been called by day care as [Master A] had not been weight bearing and Mum had brought him to the ED. [Master A] had a past history of being fully immunised and had no significant past history and no medications. In particular he had no history of hip problems identified at birth. On examination temp was 37.3. It was reported that [Master A] was crying throughout the examination. The L leg had no swelling, wounds or bruising of the leg. [Master A] was able to rotate the hip with a normal range of movement. There was no obvious tenderness to the hip, femur, tibia and ankle. The CNS decided that the impression was perhaps a leg injury and requested an xray of the left leg and discussed the case with the ED registrar [Dr I] and [Dr J] ED SMO. The x-ray was reviewed by [Dr I] and no fracture was seen. [Dr J] reviewed the patient and [Master A's] Mum stated he was still crawling and refusing to weight bear. On his examination [Dr J] also reviewed his testicles which were normal as was his HR 127 RR 50 and saturations at 99%. [Dr J] recommended treatment with brufen and a referral to the paediatric team to assist with the diagnostics.

Response to questions

The adequacy of the assessment on 14th [Month1]

The assessment undertaken by [RN E] at time of arrival in ED included a full history and examination including temperature and assessment of the left leg for rashes bruises and range of movement. [RN E] requested an xray of the left leg which is appropriate for all limping children as studies have shown that even without a history of trauma there may be evidence on xray.[1] Basic treatment of panadol and brufen was initiated by the Emergency Department on [Master A's] arrival in ED. [RN E] then reviewed the case with the registrar [Dr I] and the consultant [Dr J]. The xray was reported as no evidence of a fracture and [Dr J] could not ascertain the cause of the limp in ED so [Dr J] recommended that [Master A] be reviewed by the paediatric team. The differential diagnosis in the limping child includes trauma even with no history of trauma but also includes other causes like leukaemia, infection, tumour. In most EDs a limping child has a standard of assessment that also includes a FBC and ESR/CRP if the limp has been present for greater than 24 hours or if no fever is present.[2] In this case these tests were not done in the ED but the history of the limp was acute rather than a few days. Reading the response from [the DHB] once in the paediatric assessment unit [Master A] received a basic set of blood tests. The adequacy of the assessment is at standard of care expected for an acute event in the ED.

The adequacy of the review of the x-ray on 14 [Month1]

The x-ray was reviewed by the CNS, the ED registrar and the consultant. I have reviewed the x-rays at the time of presentation. There is no obvious fracture at the

time of review and the patient was referred to paediatrics for review of ongoing symptoms. Plain films are then subsequently reviewed by the radiologists and the reports are usually followed up by ED. It is common not to see a hairline fracture in the initial x-ray of children but on subsequent follow up calcification may be seen confirming a previous fracture in children. This review is at the standard of care expected by a CNS and ED consultant on the initial presentation of a limping child. Appropriate follow up of symptoms is the most important aspect of the care. The letter from [the DHB] reports a nurse review following the initial presentation on the 14th and advised [Master A's] Mum to seek further medical review if [Master A] was still limping.

The adequacy of the actions and/or follow up with respect to the leg (femoral and tibial) xray on the 14th of [Month1]

I note in the reply from [the DHB] that the formal leg xray report was available on the 16th of [Month1] at 1556 and reported a 'small ossicle adjacent to the distal femoral metaphysis and a fracture cannot be excluded'. I haven't seen this report. This was apparently reviewed on the 17th of [Month1] at 1133 and acknowledged by the ED. It is not clear to me what follow up the ED performed of this report. It would be usual practice to follow up with the patient an abnormal report with a phone call and review symptoms. I note that the paediatric department was already reassessing [Master A] in their assessment unit on the 17th and it may be the ED staff were aware of this. If so it would be usual practice to review the result and comment on the action. This report provided to me does not provide commentary from the ED on this matter so would need clarification from [the DHB]. Assuming [the DHB] knew the patient was in the hospital this would be expected standard of care. It would be appropriate to comment on reviewing this report that the child had been followed by paeds. It would be below standard practice not to comment that this had been followed up as it closes the loop for the result. This is a mild deviation from the standard of care.

Any other matters in this case related to the Emergency Department presentation.

The 'limping child' is a common cause of presentation to EDs accounting for up to 4% of presentations. This presentation varies from benign to very serious conditions such as osteosarcoma[3]. The most common cause for the limping child is usually inflammation from a virus which settles with simple analgesia. Simple investigations as were performed by [Hospital 1] are the appropriate first step with early follow up of symptoms and escalation of investigation the most important aspect of the patient's care.

1. Oudjhane K, Newman B, Oh KS, et al. Occult fractures in preschool children. J Trauma 1988; 28:858.
2. Huttenlocher A, Newman TB. Evaluation of the erythrocyte sedimentation rate in children presenting with limp, fever, or abdominal pain. Clin Pediatr (Phila) 1997; 36:339.
3. Singer JI. The cause of gait disturbance in 425 pediatric patients. Pediatr Emerg Care 1985; 1:7."

Appendix B: Independent paediatric advice to Commissioner

The following expert advice was obtained from Dr Roger Tuck:

"You have asked me to provide advice on this case.

I have no conflicts of interest.

I graduated MBBS from the University of London (UK) in 1972. I obtained Membership of the Royal College of Physicians (UK) in 1974 in adult medicine. I obtained Fellowship of the Royal Australasian College of Physicians in Paediatrics in 1981 and was admitted to the Fellowship of the Royal College of Physicians of Edinburgh in 1994. I have been a consultant General Paediatrician with the Northland District Health Board and its previous iterations since 1983. During this time I have practised continuously in General Paediatrics. I have considerable experience in the field of Child Protection which includes the assessment and management of inflicted injury, and have attended regular updates both within NZ and overseas.

I have read the Guidelines for Independent Advisors.

Q1. Was the diagnosis of possible viral illness as a cause for [Master A's] presenting symptoms on 14th [Month1] 'reasonable'?

The notes from his emergency department admission show the picture of a child refusing to weight bear on his left leg, but who was in otherwise in good health. There were no abnormal vital signs and he was afebrile. In particular he was noted to have a Full Range Of Movement (FROM) in the joints of his left leg, the one on which he wouldn't bear weight. There is a condition called 'Irritable Hip' in infants and young children which is thought to be a transient synovitis of the hip joint not infrequently related to a concurrent viral illness. If this were the case with [Master A], one would expect findings on examination of the hip joint, it would be painful to move. One might also expect evidence of a recent febrile illness. Specifically in this instance it was noted that there was FROM of all joints in the left leg, making this, and any other cause of 'arthritis' unlikely. In my experience 'probable/possible viral illness' is code for 'we don't actually know what is the cause of the presenting signs and symptoms, but we are pretty confident that it is not something serious that requires intervention'. So, you would say to parents in this situation, 'we don't think this is a fracture, or bone infection or an acute arthritis or anything that warrants anything other than symptomatic treatment and observation.' My concern is that there is little if any evidence that trauma, inflicted or otherwise, was on the differential diagnosis for this child and there is a lack of social history and evidence of family violence screening. Many emergency departments use specifically designed child injury charts which provide prompts to clinical staff to highlight the features of and risk factors for child abuse and therefore minimise the chance of oversight of this critical diagnosis.

Q2. Would it have been reasonable for the ED doctor to discuss the radiology report with the paediatric team?

Adequate clinical 'handover' should include reference to all laboratory and radiology findings and pending results.

Q3. Was there an issue of oversight of the radiology report by the clinical teams?

In my opinion, this was the critical point in the history of this unfortunate case. Inflicted injury should already have been high on the list of differential diagnoses for this very young child who presented with significant pain in the left leg sufficient for him to refuse to weight bear without, to that point, an adequate explanation for that pain. At 2120hrs on that day, a preliminary radiology report raised the possibility of a distal metaphyseal fracture of the left femur. Such a fracture would have been classically associated with the spiral fracture of the left tibia. The torsional forces required to produce this fracture will often damage the metaphyses which is why it is such a 'red flag'. This report was 'cleared' by the Emergency Department team at 11.30 (I assume 1130 hrs ie 11.30am) on the 17th. Whether this was subsequently confirmed or not by more sophisticated imaging was immaterial at that time. There are few fractures that are so suggestive of inflicted injury, and this, plus the absence of either historical or clinical explanation for what must have been very significant pain in the left leg was a huge red flag in my opinion. Inflicted injury to the left leg therefore should have been the primary diagnosis requiring exclusion at that time. The involvement of the orthopaedic team was another missed opportunity where the diagnosis should have been staring them in the face. This should have resulted in a completely different 'journey' for this child to the one that eventuated and may have helped to save his life. This raises the issue of appropriate and timely follow up of laboratory and radiology results. Imaging of the leg was a critical investigation in the assessment of this child and a specialist radiology report, even a preliminary one from an outsourced reporting service, should have been urgently sought. Metaphyseal fractures are easily missed by non-radiologists so xrays taken for possible inflicted injury should always be reported by a radiologist. All DHBs should have access to a radiologist with knowledge and experience in the imaging of child abuse and inflicted injury. Someone, usually the requestor, has to take responsibility for chasing the reports either by following up themselves or handing the responsibility (good handover) to another.

Q4. Was the clinical impression from the 17th [Month1] presentation appropriate.

Clearly not.

Q5. Was it appropriate to discharge the child home on the 17th.

No. The decision to discharge was based on, in my opinion, an incomplete and inadequate assessment of the situation as outlined in Q3. At this time, the child should have been an inpatient under surveillance and the subject of a Report Of

Concern (ROC) to MVCOT/[Oranga Tamariki] and under investigation by the two statutory agencies. (Police and MVCOT/[Oranga Tamariki]).

Q6. Should the medical team have read the nursing notes.

Of course. Doctors who don't read nursing notes do so at their own peril. In my experience, nursing notes are complimentary to the medical notes and are another set of eyes and ears often providing a completely different and important perspective of what are sometimes complex situations.

Q7. Was the decision to send [Master A] to [Hospital 3] based on local MRI findings appropriate.

By this time, the clinical team responsible for the child was well and truly on the wrong investigative and management pathway. I find it very difficult to understand the lack of injury, either accidental or inflicted, mentioned as a possible explanation for the MRI findings which mentioned significant deep tissue swelling. Had trauma, inflicted or otherwise, been confidently excluded as an explanation for the MRI findings, then it would have been an appropriate referral.

Q8. The appropriateness of the actions of the medical staff in allowing [Master A] to go home on 8th [Month2].

In the context of proven or suspected child abuse, any clinicians involved with the child have a duty of care. If the child is an inpatient under clinical care, the child should not be discharged home until MVCOT/Oranga Tamariki […] can confirm that the child is going to a place of safety. The child should not be discharged until the clinical team has that undertaking.

Q9. Was there a general lack of documentation regarding the social circumstances of the child and family?

Absolutely. An acceptable standard in 2017 would be written evidence of Family Violence Screening having taken place and much more detail around the home and social circumstances including who else was in the home with the child, particularly adult males, and notably, non-biologically related males. Many emergency departments and paediatric units have, as mentioned above, specifically designed child injury charts and algorithms which assist in the careful documentation of the history and mechanisms of injury and help minimise missed diagnoses of inflicted injury and child abuse in general.

Q10. Was the consideration of inflicted injury late?

Clearly this was an example of a very late diagnosis and the absolute tragedy being that the child still died after the diagnosis was made and statutory agencies involved. Considerable ongoing education is required to ensure that emergency departments and other first responding clinicians and clinical services are aware of the epidemiology of Child Abuse in New Zealand and are equipped to be able to make

appropriate diagnoses promptly and to know their local and internal referral pathways. [At the time of the events], [the DHB] was not part of the national Child Protection Alert System. In 2017 it is, along with every other DHB in New Zealand.[…] This is a system that will flag any reported child protection issues relating to the NHI when it is entered into the hospital management system on admission to any DHB facility. Had [Master A] been the subject of a previous ROC, that would have been flagged immediately on his first admission and would have prompted the clinical team to take extra care in considering his safety.

Q11. At what point was input from a paediatric radiologist warranted.

In my experience, most DHB radiology/imaging departments have access locally to adequate specialist imaging opinion on NAI/inflicted injury. It is seldom, in my experience, that a paediatric radiologist will make the difference in the differential between inflicted and accidental injury. This is mostly based on history, including any Police enquiry, and explanation of the mechanisms of the injury and an understanding of the social dynamics pertaining to that child and family. However, easy access to a paediatric radiology service by regional hospitals for second opinions can indeed be extremely helpful. This has clearly been a very distressing case for all concerned, not least the family. It is only too easy to be wise in hindsight, and in a highly pressured public health system easy to make mistakes and overlook important signs of abuse and neglect of our children. We are getting better at giving children the benefit of the doubt, but we have some distance yet to travel.

Dr Roger Tuck
Paediatrician"

The following additional expert advice was obtained from Dr Tuck:

"Further expert advice in addition to that provided 11 August […]

Ql. Was the paediatric assessment unit review on 19th [Month1] appropriate?

Prior to this visit, the soft tissue abnormalities noted on the imaging had been identified by the paediatric team on the previous assessment as likely to be the result of trauma although little evidence that much enquiry had been entered into with regard to the mechanism of such an injury. There was also a brief reference to the possibility of inflicted injury (NAI) on the ACC form completed at the first admission on the 14th [Month1]. There is also written evidence that on this admission (19th) [Dr M], consultant orthopaedic surgeon, diagnosed a left sided distal femoral metaphyseal fracture. Even in the absence of a history to explain the mechanism of injury, these two findings of significant soft tissue swelling and (even presumptive or possible) metaphyseal fracture lead to the diagnosis of exclusion being severe inflicted injury.

The wrenching and torsional forces need to produce the, unidentified at the time, spiral fracture, would have explained the tissue oedema and metaphyseal fracture. Despite the absence of evidence of family violence screening or any detailed social history in the context of a young mother who had already been the victim of violence and whose current live in boyfriend was on preventive detention for a violent crime should still have led the paediatric service to have inflicted injury as their primary diagnosis to exclude in my opinion. The findings on that day, had the dots been joined up, should have prompted a report of concern and would have justified an urgent skeletal survey, which based on the ultimate post-mortem findings, might well have shown evidence of previous injury. This young mother may have denied any significant social issues or relayed any concerning information to the staff, but we have no evidence that she was asked and the rule is that 'if it wasn't written, it didn't happen'. This assessment on the 19th, was another missed opportunity in my opinion.

Q2. At question 3 of your report, you discuss the oversight of [Master A's] radiology report. Please clarify the responsibility the paediatrics team held and whether their actions/inactions were a departure from accepted standards.

As discussed in my original report, transfer of care from one clinician or clinical team to another is identified as one of the high risk points in the 'patient journey' and a rich opportunity for mistakes and errors. Good 'handover' needs clarity around what still needs to be done, or, in the context of investigations, what needs to be followed up and by whom. The problem in this case as I see it is that there was no apparent sense of urgency in firming up a diagnosis that might have accompanied a strong suspicion of inflicted injury. A significant proportion of xrays performed in the emergency department are acted upon at the time by the attendant clinical team and there is no particular urgency to follow up on the formal radiology report. Acute respiratory presentations would be a good example in children, the formal report being a 'formality' as it were in most situations, and seldom showing up important findings missed by the attending clinical team at the time. In this situation, had the diagnosis of possible/probable inflicted injury been uppermost in people's minds, there would have been a greater sense of urgency to get an expert opinion and to follow up. The gap between the original xray in this child being performed and the formal 'signed off' report was over two days, which for the most part is possibly satisfactory, but inordinately too long to wait if inflicted injury is suspected. The problem was that inflicted injury did not appear to be the diagnosis needing urgent exclusion at the time.

Q3. At question 9 of your report, you refer to the 'acceptable standard in 2017' in your report. Was the standard [at the time of the events] the same? If not, please outline what the standard was.

In [Month1] an acceptable standard would have been documented evidence of family violence screening and social history enquiry. The standards that I outlined in my original report were those that paediatric services around the country would have agreed were those that should have been in existence at the time. The [DHB], at that

time, had Family Violence professionals employed, whose job it would have been to promulgate those standards across all clinical areas. As mentioned, at the time that this child attended, [the DHB] had not joined the national Child Protection Alert system, but has subsequently.

Q4. Please comment on the amount of imaging [Master A] underwent between 14 [Month1] and 8 [Month2]

I have no particular issue with the quantity or quality of imaging that this child was submitted to, however, we continue to teach clinicians in training that the quality of the history and subsequent examination is paramount and will guide appropriate targeted investigations. The problem in this unfortunate case appears to be a major deficit in history and differential diagnosis which resulted in the wrong questions being asked of the imaging and the wrong conclusions being mooted.

Q5. Where you have identified a departure from the standard of care in your previous report and your answers above, please specify whether these departures are mild, moderate or significant.

The use of the descriptor 'toddlers fracture' seen in the ACC form I consider particularly telling and indicates much about how we are changing in our approach to the diagnosis and management of child abuse and inflicted injury. There is no such thing as a 'toddlers fracture'. There are toddlers with fractures who, just as at any other age, require a diagnosis and an explanation of the mechanism of their injury. Many will have perfectly innocent explanations for their injuries, but historically many children who acquired that label would have been the victims of unidentified violence or neglect. I have little doubt that had 'the penny dropped' earlier, then things may have turned out differently for this child. A contemporary approach to child protection involves a keen appreciation of the epidemiology of the problem, a high index of suspicion and good tools and processes to guide assessment and management and minimise error. There is absolutely no doubt that the 'system' let this child down from first to last presentation. The standard of care of this child as outlined in the information that you have provided was significantly below that expected both then and particularly now, with tragic outcome.

Dr Roger Tuck
Paediatrician"

Appendix C: Independent orthopaedic advice to Commissioner

The following expert advice was obtained from Dr Robert Rowan:

> "I, Robert Rowan, have been asked to provide an opinion to the Health and Disability Commissioner on Case No: 16HDC00134; I have read and agreed to follow the commissioner's guidelines for independent advisors.
>
> My qualifications are MBCHB (Auckland) 1994, FRACS (Orth) 2003.
>
> I have been asked to comment on the case of [Master A]. In particular I have been asked by the Commissioner to comment on:
>
> 1. The appropriateness of the orthopaedic input on 19 [Month1]
> 2. The appropriateness of the assessments made at the orthopaedic admission on 1 [Month2]
> 3. Whether the orthopaedic team should have read the nursing notes, including the paediatric assessment form
> 4. Whether paediatric radiology input should have been sought prior to the MRI on 1 [Month2]
> 5. Whether the orthopaedics team should have considered other forms of imaging prior to the MRI
> 6. The appropriateness of [Master A's] management plan on 2 [Month2]
> 7. The adequacy of the handover provided to [Hospital 3] on 5 [Month2]
> 8. The timeliness of the diagnosis of tibial spiral fracture in this case
> 9. The timeliness of the diagnosis of non-accidental injury in this case
> 10. The overall orthopaedic management of [Master A] including the amount of imaging he underwent
> 11. Any other matters in this case, related to the orthopaedic care, that you consider warrant comment
>
> I have reviewed the documentation provided to me by the office of the Health and Disability Commissioner which has included notes from the presentations to [Hospital 1] and radiology reports. I have also had the opportunity to review the imaging that was undertaken at [Hospital 1]. I have also been provided with the initial complaint letter to the Health and Disability Commissioner dated […]. I have been provided with letters to the complainant [the] District Health Board dated 29 December […] and to the Health and Disability Commissioner dated 31 March […].
>
> I have been asked to comment specifically on the orthopaedic care provided. I do not have any direct reports from the orthopaedic service which were involved in the care of the complainant's son.
>
> I have also been provided with a copy of the Serious Adverse Event Report from [Hospital 1].

A factual summary of the events and resources supplied to me from the Health and Disability Commission. The timeline is outlined in the previous responses to the Health and Disability Commission from [the] District Health Board and in the clinical notes. I will not repeat the factual information provided to me in this report.

In answer to the Commissioner's questions:

1. The appropriateness of the orthopaedic input on 19 [Month1]

[Master A] was seen on 14 [Month1] in the Emergency Department at [Hospital 1] and subsequently referred for paediatric review. As recorded in the notes provided, he was seen at 12.15 pm on 14 [Month1] by the paediatric service. It was noted at that time that he had a normal blood test with a CRP of 1 and a white cell count of 9.1 and a neutrophil count of 2.7. It was noted that he was reluctant to weightbear on his left leg. He showed no signs of sepsis. It was also noted that he was not obviously tender in that leg, with a full range of motion of the ankle, knee and hip.

When a child presents with reluctance to weightbear the common differential diagnoses are

1. Soft tissue injury or fracture
2. Infection, either osteomyelitis or septic arthritis, or soft tissue infection.
3. Inflammatory joint pain (such as transient synovitis of the hip)

The normal blood tests and examination findings on that day were reassuring that there was no sign of infection.

There was no note made about the possibility of fracture. There was no note made about the social history.

A follow-up phone call was made on 15 [Month1] and [Master A] was found to be in a similar condition.

[Master A] then re-presented on 17 [Month1]. At that time further assessment by the paediatric team was undertaken and repeat blood tests undertaken.

[Master A] presented with his mother for the third time on 19 [Month1]. He was again assessed by the paediatric team who made a referral to the orthopaedic service.

[An orthopaedic registrar] wrote in the notes dated 19 [Month1]. No time is documented. His note says that x-rays were discussed with [Dr M]. It was written in the notes that there may be a fracture of the left distal femoral metaphysis posteriorly. A plan was written to place a bandage around the leg and arrange an MRI scan to assess this further. Comment was made that this be arranged by the paediatric team and that the patient would be followed up in the orthopaedic clinic.

I believe that it was appropriate for the paediatric team to refer to orthopaedics for assessment at this time. [Master A] had presented for the third time in five days with similar complaints of reduced mobility and reluctance to weightbear on the left leg.

I do have concerns about the orthopaedic input provided on 19 [Month1].

There is no documented clinical examination or review of patient history from the [orthopaedic registrar]. It is important to take a clinical history and undertake a thorough examination when assessing the limping child. An appropriate examination and history may have been undertaken, although this is not documented in the notes. Further information with regards to this could be gained from the orthopaedic registrar.

The abnormality seen on x-ray is a normal variation as documented in Keats Atlas of Normal Radiologic Variations.

It is however understandable that the abnormality in the distal femoral metaphysis could be interpreted as being a fracture. If a fracture had occurred around the end of the femur, the patient is very likely to have localised tenderness there. The appearance on the x-rays is not typical of a fracture and would be much more typical of a normal variation. Radiology report on the x-ray undertaken on 14 [Month1] recommended further investigation with an MRI scan.

As a fracture was suspected, it is very reasonable to investigate this further. The reason for further investigation would be to assess whether this fracture extended across the cartilaginous portion of the epiphysis of the distal femur and into the knee joint. I would note however that if this was the case there would be an effusion (swelling) within the knee joint which would be clear on clinical examination.

In summary, although the x-ray was misinterpreted, it is very reasonable to consider the abnormality on the x-ray to be a possible fracture and to investigate further to exclude this. There is however no documentation of a thorough history or examination being undertaken by the orthopaedic team before further investigation was initiated.

2. The appropriateness of assessments made on the orthopaedic admission on 1 [Month2].

The admission on 1 [Month2] was for an MRI scan to be undertaken under general anaesthetic. There is no medical documentation at the time of this admission. There is clear documentation from a nursing student that he had a broken tooth. The recorded note says ‘broke a tooth off yesterday at pre-school’.

It appears that in [Hospital 1] there was a systemic lack of enquiry with regards to the possibility of non-accidental injury. There does appear to be no enquiry related to this from the emergency department, the paediatric team or the orthopaedic team.

At the time of this admission for an MRI scan I am not aware of any medical assessments being undertaken.

The assessment that was undertaken shows a clear systemic lack of enquiry with regards to the possibility of non-accidental injury at [Hospital 1]. This is not particularly directed at the orthopaedic team, from the documentation provided this appears to be systemic across the organisation.

3. Whether the orthopaedic team should have read the nursing notes including the paediatric assessment form.

On 1 [Month2] [Master A] was admitted to have an MRI scan under general anaesthetic. It would be unusual for the orthopaedic team to read the nursing admission note when the patient is being admitted as a day case procedure for an elective MRI scan under general anaesthetic. I therefore think it is unreasonable to expect the orthopaedic team to have read these notes.

If any concerning findings are found at the time of admission by the nursing staff, it would be common for the nursing staff to highlight this to the medical staff for review. I am not aware of that occurring in this case.

4. Whether paediatric radiology input should have been sought prior to the MRI scan on 1 [Month2]

There is a variation of ossification in the distal femur that was seen on x-ray. A radiology report was available to the orthopaedic service which suggested that this was not a typical normal variant. The radiology report stated that a fracture could not be excluded. The radiology report stated that an MRI scan would be a useful investigation.

I think it is therefore reasonable for the orthopaedic team to have requested an MRI scan. They did have advice from a radiologist suggesting that this was an appropriate further investigation. At the time of booking the MRI scan the case would have been discussed with radiology. If the radiologist undertaking the MRI scan thought it was an inappropriate investigation, further discussion could have been had at that time.

The surgeons were working in [Hospital 1]. My understanding from the information provided is that paediatric radiology service was not easily available to them at that time. General radiologists would be expected to provide a reasonable level of input with regards to paediatric cases. The written advice of the radiologist in the x-ray report was that an MRI scan was appropriate. It was therefore very reasonable to proceed with the MRI scan.

5. Whether the orthopaedics team should have considered other forms of imaging prior to the MRI

The MRI scan was the recommended next investigation by the radiologist. It was therefore reasonable to proceed with the MRI scan.

Serial x-rays however can be very helpful in making a diagnosis and in this case may have been very useful. It would have been very reasonable to consider repeating the plain x-ray.

Clinical examination of the patient by the orthopaedic service should also have been undertaken prior to the MRI scan being undertaken. Clinical examination may have localised the problems to the tibia and this would have been likely to lead the orthopaedic service to repeat the x-ray.

It would therefore have been very reasonable for a repeat x-ray to be undertaken. The MRI scan however was the recommended investigation by both the orthopaedic consultant and the reporting radiologist following the initial plain x-rays. This was a reasonable investigation to undertake.

6. The appropriateness of [Master A's] management plan on 2 [Month2]

I do not have any documented evidence from the medical staff available to me with regards to the management plan on 2 [Month2]. My understanding from the later reports is that a discussion was held between the orthopaedic team and paediatric team. My understanding is that the results of the MRI scan were discussed. The MRI scan was reported as showing an abnormality in the tibia. The likely diagnosis was suggested to be Langerhans Cell Histiocytosis which is an aggressive benign bone tumour. The differential diagnosis was listed as osteomyelitis and Ewing's sarcoma (which is a malignant tumour).

I reviewed the imaging myself. There is no evidence of a soft tissue mass. There is evidence of periosteal new bone. It is unlikely that the imaging represents a Ewing's sarcoma. Based on the report of the radiologist, further investigation is appropriate.

If the diagnosis is suspected to be Langerhans Cell Histiocytosis, the most appropriate investigation is either a skeletal survey (a plain x-ray investigation involving x-rays of multiple bones) or a full body MRI scan. A skeletal survey would also be an appropriate investigation if a non-accidental injury is suspected.

At that time it was decided the appropriate further investigation was a bone scan. The bone scan is a reasonable investigation to be undertaken in the context of the differential diagnoses which were being considered.

The bone scan could not be undertaken [at Hospital 1] so referral to [Hospital 3] was undertaken to proceed further.

It would have been reasonable to undertake a skeletal survey prior to referral.

The orthopaedic and paediatric services at [Hospital 1] were working in an environment where a complete set of paediatric investigations were not available to them. They were also working in an environment where they did not have tertiary level paediatric radiology input. The decisions that were made with regards to

investigations were reasonable and appropriate. There were multiple other investigation scenarios possible that could have been undertaken and arguably could be more appropriate in this situation. The approach however that was undertaken was not unreasonable.

7. The adequacy of the handover to [Hospital 3] on 5 [Month2]

I have not been provided with any information with regards to the handover to [Hospital 3].

8. The timeliness of the diagnosis of tibial spiral fracture in this case

The diagnosis of the tibial spiral fracture was made on 7 [Month2] following a plain x-ray in [Hospital 3]. The initial presentation was on 14 [Month1] which is three weeks earlier.

Spiral fractures of the tibia are often unable to be diagnosed on plain x-rays. It is therefore not uncommon for radiologic confirmation of diagnosis until 10–21 days following the injury when periosteal new bone can be clearly seen on plain x-rays.

Clinical examination and history are very important in determining the diagnosis when the x-ray is normal. Patients with a spiral tibial fracture will have tenderness along the site of fracture in the tibia. As noted in my report above there is no clear documentation of clinical examination by the orthopaedic service in [Hospital 1] at any time.

9. The timeliness of diagnosis of non-accidental injury in this case

There was a significant delay in the diagnosis of non-accidental injury. There are a number of features in this particular case that are very well outlined in the notes from [Hospital 3]. The concerning features of the presentation include:

(i) The social history
(ii) The unexplained tibial fracture (accepting the delay in diagnosis of the tibial fracture which is not uncommon)
(iii) The missing lower lateral incisor
(iv) The haemorrhages under the 2nd and 3rd finger nails of the right hand and under the 4th and 5th fingers
(v) Contusions over the iliac crest, scapula and right buttock and over the lower vertebrae

I do note that the assessment in [Hospital 3] was thorough and complete, including a thorough clinical examination. In [Hospital 3] there was an appropriate assessment with regards to the possibility (and in fact likelihood) of non-accidental injury.

Throughout the multiple presentations at [Hospital 1] there was no noted consideration of the possibility of a non-accidental injury.

I do note there was a relative delay in diagnosing the tibial fracture. This is not uncommon and may or may not have been contributed to by the apparent lack of clinical examination from the orthopaedic service in [Hospital 1]. There were however a number of warning signs in the presentation for the diagnosis of non-accidental injury to be considered.

I believe the lack of consideration by the emergency department service, the paediatric service, the orthopaedic service including the nursing and medical teams, would reflect a systemic lack of consideration of the possibility of non-accidental injury in [Hospital 1].

Non-accidental injury is very difficult to diagnose. It is very commonly missed and I do not believe that this case is unique in regards to this. Non-accidental injury does need to be considered with many paediatric admissions, and unfortunately the consideration was not given in this case.

10. The overall orthopaedic management of [Master A] including the amount of imaging he underwent

The overall orthopaedic management was acceptable and reasonable. It would have been appropriate for [Master A] to be examined by the orthopaedic service and a history to have been undertaken by the orthopaedic service. There has not been any documentation provided to me that this occurred, however it may have occurred. The investigations undertaken and the advice given from the radiology service has suggested a number of possible diagnoses as the cause for [Master A's] presentation. Based on the interpretation of the x-rays by the orthopaedic service, and the interpretation of the x-rays by the radiology service, further investigations were sought. The sequence of investigations is reasonable. It is however noted that a number of alternative approaches to the investigation could have been undertaken. I do note that the investigations undertaken were reasonable and not inappropriate.

11. Any other matters in this case, related to the orthopaedic care, that you consider warrant comment.

The orthopaedic care provided to [Master A] was reasonable. I believe the orthopaedic care could have been improved by clinical examination by the orthopaedic service. If this did occur, documentation of the examination should have been undertaken.

Although alternative approaches to the management could also have been undertaken, the approach that was undertaken was reasonable. In the end the investigations undertaken did lead to the correct diagnosis being made and assisted the [Hospital 3] paediatric and orthopaedic service in raising a high suspicion with regards to non-accidental injury.

Although one could discuss in detail the appropriateness of the investigations and management from the orthopaedic service, the over-riding finding from the information given is that there was a lack of consideration of the diagnosis of non-accidental injury. The lack of consideration was systemic across all services that dealt with [Master A] in [Hospital 1].

Yours faithfully

ROBERT ROWAN
ORTHOPAEDIC & HAND SURGEON"

The following additional expert advice was obtained from Dr Rowan:

"I, Robert Rowan, have been asked to provide an opinion to the Health and Disability Commissioner on Case No: 16HDC00134; I have read and agreed to follow the Commissioner's guidelines for independent advisors.

My qualifications are MB ChB (Auckland) 1994, FRACS (Orth) 2003.

I have been asked to give a supplementary report to my report dated 25 January […].

Subsequent to my report I have been provided with further notes from [the] District Health Board. These notes include:

1. A typed noted dated 22 [Month1] documenting notes by [Dr L] orthopaedic registrar.
2. Further notes dated 23 [Month1] by orthopaedic registrar [Dr L].
3. Further notes dated 7 [Month2] by orthopaedic registrar [Dr L] following radiology meeting.
4. The first of two pages of a discharge summary for an admission dated 1 [Month2] to 6 [Month2] for [Master A].
5. Clinic note dated 1 [Month2] by [Dr M], orthopaedic consultant.

I note that [Master A] was seen on 1 [Month2] by [Dr M].

His clinic letter is extremely thorough and well documented.

[Dr M] in his clinic letter presents a thorough history and examination as well as the findings of investigations undertaken up until that date. He documents a clear and appropriate plan for management.

There are also clear notes from the orthopaedic registrar, [Dr L] which include a documentation of his examination on 22 [Month1].

My conclusion from the additional information is that the orthopaedic team made thorough assessments of [Master A]. Although the diagnosis of a tibial fracture was delayed, they made appropriate investigations and were very thorough in their assessment and logic.

The orthopaedic team also sought appropriate input from the combined orthopaedic group at [Hospital 1], the radiology service at [Hospital 1] and subsequently the musculoskeletal oncology service in [Hospital 3].

I therefore have no concerns with regards to the management undertaken by the Orthopaedic Service. I believe their assessment and investigations were appropriate. [Master A's] tibial fracture was difficult to diagnose and other potential diagnoses were considered.

The comment in my initial report that there was no consideration given by the Emergency Department, Paediatric Service or Orthopaedic Service to the possibility of non-accidental injury remains. I do believe that an earlier diagnosis of a tibial fracture may have raised the possibility of non-accidental injury earlier, but in this particular case confirming the diagnosis was difficult.

If any further information is required, please do not hesitate to contact me.

Yours sincerely

Sighted & electronically approved by:

ROBERT ROWAN
ORTHOPAEDIC & HAND SURGEON"

Appendix D: Independent paediatric radiology advice to Commissioner

The following expert advice was obtained from Dr Russell Metcalfe:

"I have been asked to provide an opinion to the Commissioner HDC

Re: [Master A] Ref C16HDC00134

In assessing [Master A's] care I acknowledge that I have read 'Guidelines for Independent Advisors' and agree to follow them.

For the record I had a peripheral involvement with this case providing peer review of the post-mortem CT study for a colleague in [Hospital 3]. (I was mentioned as a Starship radiologist but not named page 7 of [the DHB's] Serious Adverse Event report).

My Qualifications are:

1. Medical degree MBChB — Otago 1984
2. Diploma of Child Health Otago (DCH) 1988
3. FRANZCR 1993 Auckland New Zealand
4. Specialty Paediatric Radiologist at Starship since 1994
5. Joint Clinical Leader Starship Radiology since 2000
6. RANZCR Paediatric Radiology Examiner since 2007
7. Lead Paediatric Radiology Examiner since 2015
8. Past President Australia and New Zealand Society of Paediatric Radiology
9. I know of no HDC complaints against me.

In addition as part of my routine work at Starship I am regularly (every week) asked to review and offer opinions on Paediatric Cases from other DHBs in New Zealand. This gives me a reasonable knowledge of the standards for Paediatric Imaging in a general hospital setting in New Zealand.

I have been asked to provide guidance regarding the processes the Radiology Department followed in [Master A's] case.

My instructions from the Commissioner are in the form of a list of questions (below). For each question I have been asked to advise:

a. What is the standard of care/accepted practice?
b. If there has been a departure from the standard of care or accepted practice, how significant a departure do you consider this to be? (i.e. mild, moderate or severe?)
c. How would it be viewed by your peers?
d. Recommendations for improvement that may help to prevent a similar occurrence in future

List of Sources of Information Reviewed

The file provided by the HDC which includes:

1. The letter of complaint dated […]
2. [The DHB's] Serious Adverse Event Report (Radiology and Paediatrics)
3. Clinical Records from [Hospital 1] and [Hospital 3] covering the period 14 [Month1]–8 [Month2]
4. Non-Accidental Injury to Children Policy
5. Skeletal Survey X-ray-Medical Imaging [Hospital 1]
6. I have also reviewed ALL the imaging including the Post Mortem studies

Questions Posed (highlighted in red and underlined, my response in black)

HDC Question 1. The timeframe on reporting the images requested. Please consider each image requested
a. What is the standard of care/accepted practice?

References Used

1. RANZCR 'Standards of Practice for Diagnostic and Interventional Radiology' V10.2 I March 2017

2. ACR (American College of Radiology). Practice Guideline for Communication of Diagnostic Imaging Findings. ACR; 2010.

RANZCR 'Standards of Practice for Diagnostic and Interventional Radiology' V10.2 I March 2017

NOTE: The bold highlighting is my emphasis.

5.5.3 Communication of Imaging Findings and Reports

The practice shall ensure that reports are made available in a **clinically** appropriate, **timely manner** and shall carry out regular reviews at least once every year on the time between the performance of the study and the issuing of the report.

Indicators

1. The practice has a documented **policy for report turnaround** times which sets out expected turnaround times for defined urgent and non-urgent findings.
2. The practice maintains records of regular reviews of reporting turnaround times in accordance with this policy, and implements and records corrective action should there be any indications that the designated reporting times are not being met.
3. If there are urgent and significant unexpected findings, there is a protocol which ensures that:

a) the reporting radiologist uses all reasonable endeavours to communicate directly with the referrer or an appropriate representative who will be providing clinical follow-up;

ACR (American College of Radiology). Practice Guideline for Communication of Diagnostic Imaging Findings. ACR; 2010.

B. Principles of Reporting (Final Report)

4. The final report should be transmitted to the ordering physician or health care provider in accordance with the appropriate state and federal requirements. The ordering physician or other relevant health care provider also shares in the responsibility to obtain results of imaging studies he or she has ordered.

Summary of Standards

Neither the Royal Australia New Zealand College of Radiologists (RANZCR) nor the American College of Radiologists (ACR) state specific reporting turn around times in the relevant standards. Consequently the report turnaround times summarized below cannot be faulted on that basis.

X-rays Left Lower Limb 14 [Month1] (2 day report turnaround)

In terms of assessing whether they were reported in a 'clinically appropriate timely manner':

1. The child was well other than not weight bearing on his leg, so not a clinically urgent scenario requiring urgent reporting.
2. There were no clinically significant unexpected findings requiring urgent reporting.
3. The standard of care would be for the Emergency department to make an initial assessment of the x-rays, which they combine with their clinical findings and other laboratory results to formulate a management plan. Their assessment that the films were essentially normal was correct.

OPINION — Report Turn Around Time Meets Standard of Care

X-rays Left Foot 17 [Month1] (5 day report turnaround)

In terms of assessing whether they were reported in a 'clinically appropriate timely manner':

1. The child was well other than not weight bearing on his leg, so **not a clinically urgent scenario** requiring urgent reporting.
2. There were no clinically significant **unexpected findings** requiring urgent reporting.

3. The standard of care would be for the Emergency department to make an initial assessment of the x-rays, which they combine with their clinical findings and other laboratory results to formulate a management plan. Their assessment that the films were essentially normal was correct.

Given points 1–3 the 5-day turnaround meets accepted practice, and is the standard of care in some other DHBs.

This period included a weekend. Typically for New Zealand Public Hospitals, unreported imaging from normal working hours will not be reported over a weekend. This will wait till the following week.

OPINION — Report Turn Around Time Meets Standard of Care

MRI Lower Limb 1 [Month2] (3 day report turnaround)

The MRI findings were assessed promptly as clinically significant, and reviewed with the clinical team the same day. In this setting the subsequent 3-day report turnaround meets the standard of care.

OPINION — Report Turn Around Time Meets Standard of Care

Chest X-ray 02 [Month2] (4 day turnaround)

The child was an inpatient for some of those 4 days. The chest X-ray was performed as a screening test for possible malignancy based on the MRI findings. No clinical decisions were reliant on its findings.

This 4 day period included a weekend, so again in a New Zealand Public Hospital setting this would not be reported over the weekend.

There were no clinically significant **unexpected findings** requiring urgent reporting.

OPINION — Report Turn Around Time Meets Standard of Care

Skeletal Survey 8 [Month2] (12 day turnaround)

[Hospital 1] Paediatric SMO 1 had an informal report from SMO 1 Paediatric Radiologist in [Hospital 2] (email and phone call) the day the procedure was performed.

The provision of a formal written report was delayed but the reporting of urgent findings directly to the referrer as occurred **meets the RANZCR stated standard of care** (see below).

1.RANZCR 'Standards of Practice for Diagnostic and Interventional Radiology' V10.2 I March 2017

3. If there are urgent and significant unexpected findings, there is a protocol which ensures that:

    a) the reporting radiologist uses all reasonable endeavours to communicate directly with the referrer or an appropriate representative who will be providing clinical follow-up;

The 12 day delay in providing a formal report is outside accepted norms for a study such as a non-accidental skeletal survey. The new guidelines in the Non-Accidental Injury to Children Policy recommend a 3–4 day report turnaround time. This new best practice time frame is appropriate for a district Hospital, particularly given the need to have two Paediatric radiologists double read these.

There were additional fractures stated in the final report not seen on the preliminary report. This is not uncommon, and is a reflection of how subtle some of these injuries can be and the time it takes to fully evaluate the multiple X-rays that make up the skeletal survey. In my experience at Starship this discrepancy between the provisional and final reports would not have influenced the outcome. Unexplained fractures were identified in the provisional report and notified to the clinical team.

OPINION — the 12 day delay in providing a formal report I would classify as a Moderate departure from the standard of care. The fact that a verbal and informal email report were provided the day of the study mitigates the severity of this breach.

The relevant imaging studies and reporting turnaround times are summarized below.

Exam Type	Date	Time	Dictated	Verified	Where reported
X-ray Left Lower Limb	14 [Month1]	11.33	16 [Month1]	16 [Month1]	[Radiology service]
X-ray Left Foot	17 [Month1]	11.38	22 [Month1]	22 [Month1]	[Radiology service]
MRI lower limb	1 [Month2]	08.57	4 [Month2]	4 [Month2]	[Hospital 1]
Abdomen ultrasound	2 [Month2]	10.53	2 [Month2]	2 [Month2]	[Hospital 1]
Chest X- ray	02 [Month2]	12.34	06 [Month2]	6 [Month2]	[Radiology service]
Skeletal Survey	8 [Month2]	08.54	20 [Month2]	20 [Month2]	[Hospital 3]

Question 1 Continued.

The timeframe on reporting the images requested. Please consider each image requested.

c. How would it be viewed by your peers?

The timeframe for all imaging except the skeletal survey would be deemed appropriate for a small DHB public Radiology Department.

d. Recommendations for improvement that may help to prevent a similar occurrence in future

1. As per RANZCR standards [the DHB] Radiology should have a 'documented policy for report turnaround times which sets out expected turnaround times for defined urgent and non-urgent findings' for both in-house and remote TeleRadiology.

HDC Question 2. The ED clinician review and acknowledgement of the X-ray report (for X-ray of 14 [Month1]) but lack of action in response to this.
ED Report Review Time

The report was available to the clinicians in the Emergency Department at 1556 hrs on 16 [Month1]. X-ray results are reviewed on a daily basis, the report not viewed till 17 [Month1] at 1133 hours. This would meet standards of practice expected.

It would be expected that an urgent or unexpected report would be notified promptly. This report came through as routine. This matched the non-urgent clinical scenario and the essentially normal report.

OPINION — ED Department Report Review Time Meets Standard of Care

ED Department Lack of Action on X-ray report from 14 [Month1]

The report findings were

> 'There is a small osseous fragment adjacent to the posterior aspect of the distal left femoral metaphysis. This does not have the typical appearance of a nonaccidental injury although it is not a typical normal variant either. A small fracture cannot be completely excluded. A comparison view with the right femur may be useful. Further imaging such as an MRI may also be valuable. The osseous structures in the remainder of the left lower limb are normal.'

Regarding the two recommendations:

1. Comparison view right femur
2. MRI lower limb.

The Referral information documented in the radiologist report states:

> '16 month old male unable to weight bear on the lower limb. No known trauma. Examination uncertain.'

The radiologist report is appropriate based on the clinical details he was provided with. The Referring Doctor is not obliged to act on the radiology report. The ED clinicians integrate all the clinical findings, blood and X-ray results to develop a differential diagnosis and plan management. The ED clinicians who had seen [Master A] considered the possibility of a toddlers fracture. This was not recorded in the notes but was confirmed verbally by the senior medical team during the course of a [DHB] investigation. (Letter signed by [CEO] dated 31 March […]).

In the notes there is a completed ACC Injury Claim Form (ACC 45) filled out on 22 [Month2] that states in Part B 'unknown — suspected non accidental injury vs Toddler's fracture.'

This confirms that a toddler's fracture was being considered.

The other serious differential considered was a viral illness. Non accidental injury does not seem strongly suspected, but was mentioned appropriately in the radiology report based on the atypical appearance of the distal femoral metaphyseal fragmentation.

Suspicion of a toddler's fracture or viral illness would NOT support acting on the radiology recommendations.

No action (wait and see) would be the appropriate management at that stage.

OPINION: ED action meets standard of Care.

The lack of written documentation of toddlers fracture at the time of ED assessment 14 [Month1] as one of the differentials would seem a very mild departure from the standard of care.

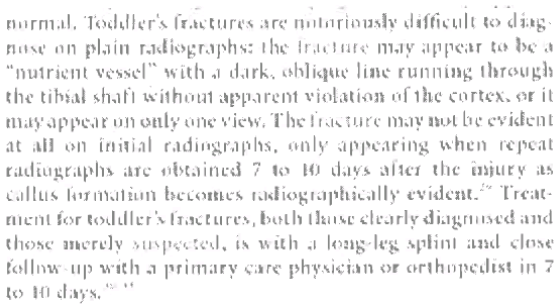
The lack of written documentation of toddlers fracture at the time of ED assessment 14 [Month1] as one of the differentials would seem a very mild departure from the standard of care.

HDC Question 3. The decision for [Master A] to undergo an MRI based on the findings from the X-ray of 14 [Month1].

Reference:

Pediatric Emergency Medicine

Jill M. Baren Elsevier Health Sciences 2008 page 185



normal. Toddler's fractures are notoriously difficult to diagnose on plain radiographs: the fracture may appear to be a "nutrient vessel" with a dark, oblique line running through the tibial shaft without apparent violation of the cortex, or it may appear on only one view. The fracture may not be evident at all on initial radiographs, only appearing when repeat radiographs are obtained 7 to 10 days after the injury as callus formation becomes radiographically evident.[5] Treatment for toddler's fractures, both those clearly diagnosed and those merely suspected, is with a long-leg splint and close follow-up with a primary care physician or orthopedist in 7 to 10 days.[5,11]

The appropriate clinical management for a suspected toddlers fracture is stated above (long leg splint and close follow up with a primary care physician or orthopaedist in 7 to 10 days).

Typically the next imaging would be repeat x-rays of the leg at 10 to 14 days after the follow up clinical appointment to look for signs of a healing fracture. The earliest such x-ray changes would be seen 7 to 10 days after the fracture.

It is NOT the standard of care in New Zealand to image suspected toddlers fracture with MRI.

However, in [Master A's] case there was an additional clinical question related to the unusual appearance of the distal femur and the repeated hospital visits on the 14th, 17th and 19th of [Month1] which is not typical for the clinical course of a child with an occult toddler's fracture.

In this setting the decision to proceed to MRI as the next best imaging test was appropriate, and not based just on the x-ray of 14 [Month1].

MRI positives

1. It involves no radiation
2. Best technique for evaluating possible bone or soft tissue trauma, infection or tumour, which are the likeliest problems in this scenario.

MRI Negatives

1. Requires general anaesthesia or deep sedation in young children
2. Reporting Radiologists need to be appropriately trained

OPINION: MRI referral meets standard of Care

HDC Question 4. Was an appropriate level of urgency assigned to the MRI request?
The MRI was performed 17 days after the first Emergency Department assessment on 14 [Month1]. Six working days after the request on 22 [Month1].

The initial ED assessment was followed by further assessments at [Hospital 1] on 17 [Month1] and 19 [Month1] by both Paediatric and Orthopaedic teams. There was no clinical or x-ray suggestion of a disease process that required urgent investigation.

The letter to the complainant […] from [the DHB] states 'On 21 [Month1] the paediatric house officer sent a referral to the fracture clinic for an MRI with a note for it to be "done this week".' The scan was performed 7 working days later, well within accepted practice given the lack of clinical urgency.

OPINION: Level of priority for MRI referral meets standard of care.

HDC Question 5. The lack of availability of Paediatric Radiologists to review the skeletal survey of 8 [Month2]

There was in fact a [Hospital 2] Paediatric Radiologist, SMO 1 available on the day the study was performed. They gave a verbal and email report on the skeletal survey the same day 8 [Month2]. This meets requirements stated in the new District Non Accidental Injury to Children Policy (MIDAS 21071), which states '… a Paediatric radiologist will provide a verbal report to the clinician within a day …'

OPINION: Availability meets standard of care.

HDC Question 6. The quality of communication between [Hospital 1] and [Hospital 2] Radiology Departments

Episodes of communication I have identified include

1. Charge MRT [Hospital 1] consulted with Paediatric Radiologist SMO1 at [Hospital 2] about the adequacy of the films obtained in the skeletal survey on 8 [Month2].
2. Paediatric SMO 1 emailed Paediatric Radiology SMO 1 on the morning of 8 [Month2] to let her know a skeletal survey was being done, then phoned her that afternoon.
3. Charge MRT [Hospital 1] contacted the District clinical leader to find out who would report the skeletal survey study on 8 [Month2].
4. [Hospital 1] MRT contacted the [Hospital 2] based District clinical leader 13 [Month2] to ask who would read the post mortem studies as no paediatric radiologist was available.
5. Paediatric radiologist SMO1 was on leave from 9 [Month2]. She was contacted overseas by three different people to see if she could supervise the study.

Discussion

There appears to have been no problem with the relevant people being able to contact each other between [Hospital 1] and [Hospital 2].

The system worked on 8 [Month2]. A qualified paediatric radiologist (SM01) reviewed the films and gave a provisional report by email and then verbally.

She was then unable to formally report the study before going on leave because of the incompatible PACS/RIS between the two hospitals.

The difficulty subsequently was not with communication but with the lack of qualified radiologists available to report the skeletal survey and post mortem studies.

OPINION: Appropriate communication achieved between [Hospital 1] and [Hospital 2] Staff.

HDC Question 7. The lack of follow up regarding who would read the skeletal survey of 8 [Month2] and whose responsibility this was to ensure it would be formally reported.
The Clinical Head of Radiology [Hospital 1] takes primary responsibility for the activities in their department. I note they were on leave (page 6 of [the DHB's] Serious Adverse Event report) at the time however.

The Charge MRT at [Hospital 1] contacted the District Clinical Leader who reviewed the skeletal survey images on 8 [Month2] but did not do a report as she was told that skeletal surveys are recommended to be double read, and that she was aware that paediatric radiologist SMO 1 had given an opinion on the study. (Page 6 of [the DHB's] Serious Adverse Event report).

As the District Clinical Leader it would have been her responsibility to make arrangements for the skeletal survey to be reported.

b. If there has been a departure from the standard of care or accepted practice, how significant a departure do you consider this to be? (i.e. mild, moderate or severe?)

The departure of care in regard to the District Clinical Leader was mild, and mitigated by the fact that:

1. She had only held the role [for a few] weeks
2. She knew that Paediatric radiologist SMO 1 had provided a verbal report already

OPINION: Mild departure from standard of care. This did not compromise the outcome.

HDC Question 8. The lack of availability of Paediatric Radiologists to review the post mortem imaging.
Background
Taking Starship as Best Practice, [at the time of the events] post mortem imaging studies were frequently unreported for weeks. Since then Starship radiology has implemented new policies to incorporate post mortem whole body CT, and to specify turn around times for reporting, both verbal provisional and formal final report.

[At the time of the events] Postmortem CT was a relatively new procedure in New Zealand, and not routinely performed outside Starship.

There are few Public Hospital fellowship trained Paediatric radiologists in New Zealand. […] The number of full time equivalents (proportion of their time doing Paediatric radiology) is less as most either work in private as well or do other hospital based adult work.

Reporting post mortem imaging studies require a high level of expertise and experience. [At the time of the events] Starship Radiology Department was just becoming proficient with post mortem CT. In July that year I assisted a Paediatric radiologist in […] to do her first forensic post mortem CT by phone while I was on holiday. This was only 2 months before this case.

So in short the only Paediatric radiologists in New Zealand with experience reporting these studies [at the time of the events] were in Auckland and Christchurch.

The protocols for performing, reviewing, and reporting Postmortem CT studies (including double reading) had not been set up at [the DHB] [at the time of the events]. The local Paediatric radiologists were not experienced with this technique.

[Master A's] Post Mortem Imaging was reported in [Hospital 3] with myself double reading.

OPINION: At the time this was best practice.

HDC Question 9. The general lack of consultation with a Paediatric Radiologist and when you would have considered it to have been appropriate to consult with a Paediatric Radiologist?
From a tertiary paediatric radiology viewpoint, I think ideally all Paediatric Imaging should be reported by Paediatric radiologists. However this is not currently achievable, and is far from the standard of care anywhere in the world, let alone New Zealand.

The majority of paediatric trauma limb x-rays in New Zealand would be ACC cases reported in private practice by non-Paediatric radiologists. This is the standard of care. If there are unexpected findings on these x-rays the child is usually referred to an orthopaedic surgeon for further investigation and management. Depending where the Orthopaedic surgeon works and their level of concern, they may consult a Paediatric radiologist.

OPINION: In this case the first imaging that absolutely should have had paediatric radiology input was the child abuse skeletal survey on 8 [Month2].

A paediatric radiologist may have helped with prior imaging by:

1. X-rays 14 [Month1]

More confidently recognize the bony fragmentation at the distal aspect of the femoral metaphysis as a normal variant. This was described in 2009 (Kleinman et al). It is unlikely this would have altered the clinical course or the events leading to this complaint.

2. Decision to perform **MRI** Lower Limb **02 [Month2]**

A paediatric radiologist would likely have suggested a follow up leg x-ray prior to **and rather than performing an MRI.**

Reference

Metaphyseal Fragmentation with Physiologic Bowing: A Finding Not to Be Confused with the Classic Metaphyseal Lesion
Paul K. Kleinman et al American Journal of Roentgenology. 2009;192: 1266–1268.

3. MRI Left Lower Leg 02 [Month2] report

An experienced Paediatric or general radiologist would have recognized the tibial findings as a healing fracture, not a possible tumour or infection. Errors of misinterpretation are not uncommon particularly in the setting of a general radiologist working in a small Radiology Department where they are expected to deal with all aspects of imaging. In a Public Hospital setting these errors can be reduced by double reading, review at multidisciplinary meetings.

HDC Question 10. The appropriateness of the leave cover arrangements at [Hospital 1] Radiology Department.
Referring to page 6 of the [Hospital 1] Serious Adverse Event report I note that at the time there were only 3 radiologists at [Hospital 1]. Two were on leave. In a small Radiology department this is not unexpected and would be the same at many departments throughout New Zealand.

It is not possible to comment further on the appropriateness of the particular leave the two radiologists were taking.

OPINION: Within accepted practice.

HDC Question 11. The adequacy of the changes that have been made to [Hospital 1] Radiology Department as a result of [Master A's] care as stated in The Serious Adverse Event Report.

Changes Recommended 1
Ensure that all imaging requests for CT and MRI for children up to age 12 years are triaged and protocoled by a paediatric radiologist.

Comment — Appropriate recommendation
But why was 12 years chosen? Age 15 years is the cut-off between paediatric and adults at Starship and for most paediatric services in New Zealand.

Additional Suggestions
Just as important as the triage and protocoling of CT and MR, is the reporting.

a) These studies should ideally be reported by paediatric radiologists (reference below).

If that is not possible then the next best option is:

a) Providing double reading of Paediatric CT and MRI studies by a paediatric radiologist, particularly when the primary reader is junior.
b) Paediatric radiologists should ideally report all outsourced paediatric imaging. It would be best practice if providers of teleradiology services had paediatric radiologists reporting on imaging for children under 15 years.

Reference
Second Opinion Interpretations by Specialty Radiologists at a Pediatric Hospital: Rate of Disagreement and Clinical Implications
Eakins et al AJR 2012; 199:916–920

This study shows a substantive difference exists between the imaging interpretations of radiologists at outside referring institutions and those of radiologists at a tertiary care children's hospital. They quote a disagreement rate of 41.8%, 22% being deemed major.

Changes recommended 2
[The DHB] Paediatric Radiology service should implement a district radiology policy for non-accidental injury to children.

Comment: Appropriate recommendation.

Change recommended 3.
A clear process is in place for general radiologists to access paediatric radiology support if [DHB] paediatric radiologists are unavailable.

Comment: This is a very important appropriate recommendation.

Change recommended 4.
[The DHB] Radiology Service needs to ensure that leave cover arrangements for all staff are clear and are communicated to the right people.

Comment: Appropriate recommendation

HDC Question 12. The adequacy of the revised Non accidental injury policy as opposed to its predecessor, the [Hospital 1] Skeletal Survey policy.
The new policy states:

'The [Hospital 1] radiology clinical leader discusses skeletal survey request with a paediatric radiologist who will provide a verbal report within a day and a written report within 3–4 days with double reading to occur before this is issued.'

Comment: The detail regarding who this paediatric radiologist is needs to be clarified.

1. If the two [Hospital 2] based Paediatric radiologists are away then best practice would be for another Paediatric radiologist to be consulted (not the Consultant Radiologist on site). This Paediatric radiologist may be in [another centre].
2. Double reading the skeletal survey is best practice, (not mandatory however). It is not stated in the new policy but best practice would be for both primary and secondary readers to be Paediatric radiologists.
3. The policy does not reference sedation for children undergoing skeletal surveys. This should be addressed somewhere. This may have to be a separate policy.

HDC Question 13. Any other issues identified that you consider warrant comment.
No other issues.

Dr Russell Metcalfe
Paediatric Radiologist"

The following additional expert advice was obtained from Dr Metcalfe:

"On page 6 of your report, you state that the 12 day delay in providing a formal report of the skeletal survey would be classified as a moderate departure from the standard of care. On page 11 of your report, you state that it would have been the District Clinical Leader's responsibility to make arrangements for the skeletal survey to be reported and her departure in care was mild. Please could you clarify your position on this?

The mitigating factors for the district clinical leader were

1. She had only recently started in this position and was new to the NZ health system.
2. There seemed to be no formal protocol for handling of child abuse skeletal surveys. The system relied on the goodwill of the paediatric radiologists in [Hospital 2] to do this work. At the time the ability to do this quickly was limited as the [Hospital 2] and [Hospital 1] PACS systems (IT infrastructure) were separate.
3. A provisional report had been provided by the [Hospital 2] based Paediatric Radiologist.
4. The systemic issues were more to blame than any one individual."