HEALTH & DISABILITY COMMISSIONER
TE TOIHAU HAUORA, HAUĀTANGA

Emergency department care of patient with an unrecognised cervical spine injury

Executive summary

1. On 1 May 2020, Mr A, aged 69 years old, was riding an electric scooter when he fell and hit his head, losing consciousness for a few minutes. Mr A has a history of ankylosing spondylitis (AK), which is a chronic inflammatory arthritis that primarily affects the spine and sacroiliac[1] joints, often causes lower back pain and stiffness, and potentially increases the risk of fracture.

2. Mr A walked back to his home, and his wife took him to North Shore Hospital Emergency Department (ED) (Health New Zealand | Te Whatu Ora Waitematā (Health NZ)). During mobilisation for a computed tomography (CT) scan of his spine, Mr A felt severe pain; the scan revealed a fracture-dislocation of the C6–C7[2] with over 10% displacement. Sadly, Mr A is now tetraplegic (paralysis affecting all four limbs and the torso caused by cervical spinal cord injury or damage).

3. My investigation has found that, although Mr A's injury may have been unpreventable in the circumstances, there were deficiencies in the care provided to him by Health NZ, particularly in relation to an incomplete neurological examination and mobilisation of Mr A to the CT scanner. I have found that these failures amount to a breach of Right 4(1) of the Code of Health and Disability Services Consumers' Rights (the Code), which stipulates that every consumer has the right to have services provided with reasonable care and skill.

Recommendations

4. Given the substantial changes made since these events and as a result of the adverse event review (AER) conducted by Health NZ, I recommend that Health NZ:

- Provide Mr A and his family with a written apology for the deficiencies identified in this report. The apology is to be provided to the Health and Disability Commissioner (HDC) for forwarding within three weeks of the date of this report.
- Provide HDC with a final update on the implementation of the recommendations made in its AER, including training logs. This information is to be provided to HDC within three months of the date of this report.

Background

ED

5. Mr A arrived at the ED at 4.23pm and was initially assessed by nursing staff. COVID-19 visitor restrictions at the time meant that his wife was unable to accompany him into the ED. It was documented that he had a headache, pain in his upper thoracic spine (12 vertebrae section

[1] Connects the sacrum (base of the spine) to the ilium (pelvis) and acts as shock absorbers that transfer weight between the upper body and legs.
[2] The C6 and C7 spinal motion segment, located at the base of the neck, includes the sixth and seventh cervical vertebrae and the disc between them.

of the upper to mid back connecting to the rib cage), and a contusion to his head but that he had not experienced vomiting or limb weakness. Mr A said that, immediately after the fall, he was able to stand independently, maintain full balance and coordination, bend without assistance, and walk unaided.

6. A registered nurse (RN) transferred Mr A to a wheelchair. The AER states that the nurse placed a 'yellow lanyard' around Mr A's neck to alert staff of a potential neck injury that had not yet been assessed and 'cleared' by a suitable clinician, in accordance with its ED Trauma Guidelines. In contrast, Mr A told HDC that nothing was placed around his neck. There is no documentation in the clinical notes referring to the lanyard. Mr A said that no cervical collar was applied, and no spinal immobilisation precautions were undertaken despite a significant fall mechanism, visible head trauma, heavy bleeding, and obvious swelling around the neck region.

7. Mr A told HDC that, at 4.28pm, he transferred himself onto a stretcher and took off his shirt, which is mirrored in the AER. In contrast, ED clinical notes state that Mr A was log-rolled (a technique used to turn a patient with a suspected spinal injury, keeping their head, neck, and spine in neutral alignment) onto the stretcher. Mr A was examined by an ED registrar, and his neck and back AK was noted. It was also noted that Mr A was more comfortable sitting at 20–30 degrees and that his pain increased significantly when lying flat. The AER states that the head end of the bed was elevated slightly to about 30 degrees and a pillow was placed behind his head for comfort.

8. The ED registrar noted that, on examination, Mr A was moving both legs without concern, his power was grossly normal, and he had no external abnormality. It was also noted that Mr A stood up and mobilised in the department and that he was moving normally. The examination noted that Mr A had no c-spine pain but that he experienced discomfort over T2–3 (spinal segment between the second and third thoracic vertebrae in the upper back, just below the neck) but no other spinal tenderness and that perianal sensation[3] was intact. The ED registrar documented that she did not formally test the myotomes (motor) or dermatomes (sensory),[4] suggesting that sensation of the limbs and motor power was not tested. The AER notes that Mr A had 'normal power and sensation of his limbs' and that he 'did not complain of any limb paraesthesia' (pins and needles).

9. The ED registrar's impression was documented as a minor head injury with an open wound and possible upper thoracic spine injury. The plan was for pain relief and a CT scan, which was requested at 5.04pm. The AER states that ED staff were concerned about the long wait for the CT scan, which was escalated to the ED Associate Charge Nurse and the ED registrar, who subsequently contacted the radiology department around 7pm. At 7.40pm, Mr A reported numbness and a burning sensation in his right ring finger, which he said staff

[3] The feeling in the skin around the anus, buttocks, and perineum (saddle region). Reduced sensation, numbness, or tingling in this area is a critical red flag symptom.

[4] Myotome and dermatome testing are clinical examinations used to identify spinal nerve root injuries. Myotomes test muscle strength using isometric resistance, and dermatomes test skin sensation; both focus on specific spinal levels.

dismissed. The clinical notes state that the ED registrar examined his finger and noted it as having a full range of motion. The AER notes that the ED registrar did not suspect a neurological cause for Mr A's symptoms at the time.

CT scan

10. At 7.45pm, Mr A was taken for his CT scan. The AER acknowledged that there was a three-hour delay between the time of ordering and completing the scan. In response to the provisional report, Mr A told HDC that, before undergoing the CT scan, he had substantial neurological function.

11. Mr A was transferred from the ED trolley to the CT table. Mr A said he walked independently to the CT table, and this is supported by the ED registrar's clinical documentation. In contrast, the AER states that six staff within the radiology team log-rolled Mr A onto the CT table. Mr A told HDC that he informed radiology staff that he suffered from AK and expressed concern regarding his pain and the risks associated with positioning and movement but that he was not listened to. This is not mentioned in the clinical records.

12. An attempt was made to lay Mr A flat, which Mr A said resulted in severe pain. At this stage, Mr A developed severe pain in the back of his neck and numbness. The clinical notes state that Mr A reported tingling in his right C6, tingling in his arms and legs and that he was unable to move his legs or wiggle his toes on demand. The AER states that, shortly after lying flat, Mr A developed signs consistent with a spinal cord injury. The CT scan showed a fracture-dislocation of the C6–7 with over 10% displacement. Mr A was transferred to Middlemore Hospital for ongoing care and is now tetraplegic.

Further information from Health NZ

<u>Findings of the AER</u>

13. The AER found that the care provided to Mr A was of a reasonable standard but noted the following:

- There was a lack of detailed, specific knowledge of the risk of a supine position in patients with AK, and the risk was underestimated by staff.
- The CT was an essential diagnostic test and Mr A needed to be supine for this to occur. Despite using spinal cares, Mr A's spine was not able to be maintained in a neutral position for the CT scan.
- The concurrent presence of several other poly-trauma patients resulted in a delay of three hours for the CT scan to be performed.
- The ED was very busy at the time, and this event occurred during the COVID-19 pandemic, which placed a great degree of stress on the system.
- Mr A had no clinical signs of c-spine injury at initial assessment.
- It is extremely rare that a patient with an unstable c-spine fracture will do the activities that Mr A did and then later develop a spinal cord injury.

Independent review of AER

14. Health NZ also commissioned an independent review by an ED specialist of its AER and the care provided by Health NZ. The review states that the factual material content of the clinical notes and/or the AER will not be challenged. A summary of the pertinent findings is included as Appendix B. The review found that the care provided was appropriate and that the event was almost 'certainly unpreventable.' The reviewer said that this is because a c-spine injury is not detected without imaging and the standard of care for detecting such fractures is a CT scan, which requires the patient to be 'in the very position that might cause displacement of the fracture due to the pre-existing kyphosis[5] and rigid spine.'

Changes made

15. Health NZ made several changes after these events and its subsequent AER:

- Education was provided to all ED, radiology, and transit care staff regarding the risk posed by AK and other fixed-spine deformities, and wider education was provided to the emergency medicine community.
- Ongoing education is being provided to the ED regarding Best Care Bundles (BCBs) for c-spine injury (and others).
- The ED and radiology department developed physical resources for maintaining c-spines in a neutral position.
- The Radiology department developed a protocol for the positioning of patients with fixed-spine deformities when requiring a supine position in CT, especially those requiring assessment for possible C-spine injury.
- The ED 'suspected c-spine' BCBs were updated, with high-risk conditions clearly identified and positioning and immobilization requirements made more apparent.
- Training is consistent regarding moving patients with possible spinal injuries; log-roll and spinal precautions training is mandatory for all staff involved in moving patients.

Responses to provisional opinion

16. Mr A and his family were given the opportunity to respond to the 'information gathered' section of the provisional report. Where relevant, their comments have been incorporated into this report. Mr A and his family said that he remained 'mobile, ambulant, and neurologically functional, and that the catastrophic deterioration occurred only after medical intervention at North Shore Hospital.' Mr A's family report that Mr A's loss of independence has devastated him and that his diagnosis has had a profound impact on many aspects of the family's lives.

Analysis

Introduction

17. As part of my assessment of this complaint, I sought independent clinical advice from ED specialist Dr Richard Highstead. In his initial advice, Dr Highstead identified a number of departures from accepted practice that are not outlined in detail below but are included in

[5] An excessive, abnormal forward rounding of the upper back, exceeding the normal 20- to 40-degree curve.

Appendix A. On receipt of further information from Health NZ, Dr Highstead provided an updated version of his advice, which I have taken into consideration when forming my opinion on the care provided to Mr A.

18. At the outset, it is important to note that both Dr Highstead and the external AER reviewer agree that it is likely that the spinal cord injury occurred when Mr A was laid flat on the CT table and that earlier recognition of his symptoms would not have changed his outcome. Irrespective of whether the outcome may have been different, it is my role to assess whether Health NZ provided Mr A with an appropriate standard of care at the time of the events with the information available to the clinicians at the time.

19. Dr Highstead highlighted that, when evaluating the events of 1 May 2020, it is reasonable to view the challenges of an emerging pandemic and rapidly changing processes and protocols as relevant mitigating factors. I agree and I have taken these circumstances into account when forming my opinion.

Triage and initial assessment

20. The AER states that, after triage, where Mr A reported no limb numbness, he had a yellow lanyard placed around his neck to alert staff of a potential spinal injury that had not yet been assessed and cleared. In contrast, Mr A told HDC that nothing was placed around his neck, which is supported by the absence of a mention of a lanyard in the clinical notes. Mr A said that he then transferred himself onto the stretcher, which is also noted in the AER. However, the clinical notes state that Mr A was log-rolled onto the stretcher.

21. Dr Highstead advised that it was not standard practice at the time of the events[6] to place a lanyard on a patient with no neck pain and no neurological symptoms and that not placing it would not represent a departure from accepted standards. However, Dr Highstead advised that, if a yellow lanyard was placed, it means there is a presumption of spinal injury until cleared and so Mr A should have been assisted in transferring onto the ED stretcher and that the failure to do so would then represent a mild to moderate departure from accepted standards.

22. I have taken into account the differing versions of events about both the yellow lanyard and Mr A's transfer to the ED stretcher. I have considered the evidence, including that Mr A does not recall a lanyard being placed, there is no corroborating documentation that one was placed, and that it would not have been standard practice in the circumstances to place one on a patient with Mr A's presentation, noting that his diagnosis of AK was not known by clinicians at the time. I find it more likely that a yellow lanyard was not placed and accept Dr Highstead's advice that this does not represent a departure from the accepted standards of care. With respect to Mr A's transfer to the ED stretcher, as I have found that it is more likely that Mr A did not have a yellow lanyard placed, it seems less likely that such precautions were taken with a log-roll onto a stretcher. As those involved do not recall this action, I find it more likely than not that Mr A was not log-rolled at that time. However, as I do not

[6] In recent years, New Zealand has started to follow international standards in treating simple falls in the elderly as potentially high-risk events, but this was not the case in early 2020.

consider there to be a departure from accepted practice with respect to the lanyard, I cannot find the subsequent actions a departure in relation to this aspect of Mr A's care.

Neurological assessment

23. The ED registrar's review of Mr A noted his history of AK, that he was moving both legs without concern, and that he had no limb weakness. On examination, Mr A's legs had normal power and he had discomfort over his cervical spine but no pain or spinal tenderness. His perianal sensation was also intact, but myotomes and dermatomes were not formally tested. The ED registrar's impression was of a possible upper thoracic spine injury, and a CT scan was ordered. While waiting for the CT scan, Mr A reported numbness and burning in his right ring finger, which was examined by the ED registrar, who noted that the finger had a full range of motion. The AER notes that the ED registrar did not suspect a neurological cause of Mr A's symptoms at this time.

24. Dr Highstead advised that it is unclear whether AK was recognised as a condition that carried a high risk of significant injury when clinicians became aware of Mr A's diagnosis. Dr Highstead advised that the Royal Australasian College of Surgeons trauma training programme, 'Early Management of Severe Trauma' (EMST) and the American College of Surgeons Advanced Trauma Life Support (ATLS) programmes are well recognised training programmes for the management of trauma in regional hospitals. Both programmes include an assessment of gross motor and sensory function as part of the primary survey, except when a spinal injury is suspected, in which case a more detailed neurological assessment is indicated. Otherwise, a detailed neurological examination is performed as part of the secondary survey.

25. Dr Highstead advised that, in light of the delay in Mr A receiving a CT scan, there would have been an opportunity to perform a secondary survey before transferring to the CT suite. At this stage, Mr A had reported upper T-spine tenderness, and his diagnosis of AK was known. In addition, his perianal sensation was checked to evaluate spinal cord injury (which I acknowledge was reassuring). Dr Highstead advised that Mr A's examination was performed in a manner that indicated a spinal cord injury was considered as a possibility and had not been ruled out. EMST and ATLS algorithms both indicate that re-evaluation is indicated if a patient develops new symptoms. Dr Highstead advised that Mr A's neurological evaluation was incomplete in the first instance during the ED registrar's examination, and it was not adequately addressed in the second instance when Mr A developed new pain in his finger. Dr Highstead considered that Mr A's report of new sensory changes in his finger should have prompted reassessment of the neurological examination. Dr Highstead advised that the incomplete neurological examination constitutes a moderate departure from accepted practice, and I agree.

26. Given the likelihood that Mr A's injury occurred when lying flat in the CT scanner, I have considered the appropriateness of ordering a CT scan. I have considered the fact that the AER and Health NZ's independent reviewer agreed that the CT scan was a necessary step in further investigating Mr A's symptoms, and I note that Dr Highstead has not found the ordering of a CT scan to have been inappropriate in this case. On that basis, I accept that it was appropriate for clinicians to order a CT scan to further investigate Mr A's symptoms.

Transfer to CT scanner

27. At 7.45pm, Mr A was taken for his CT scan. Accounts of how Mr A mobilised onto the CT table are conflicting. Mr A said that he walked independently to the CT table, which is supported by the clinical notes. In contrast, the AER states that six staff within the radiology department log-rolled Mr A onto the CT table. Mr A said that he raised concerns about his AK, pain levels, and mobilisation with radiology staff but was not listened to.

28. Given that the AER was conducted after the events, I am of a mind to rely on the contemporaneous documentation, which is supported by Mr A's recollection, and find it more likely than not that Mr A mobilised independently to the CT table. Dr Highstead advised that Mr A's spine tenderness on examination and new finger sensory changes in the setting of a known background of AK makes his mobilising independently to the CT table concerning. I agree. With respect to what was communicated between Mr A and radiology staff before the scan, I am unable to make a finding because of the lack of evidence. However, I do not consider this finding material to my decision as it is already established that staff were aware at that stage of Mr A's AK.

29. Dr Highstead noted that Mr A was a patient over the age of 65 years who suffered a fall with associated loss of consciousness and who was experiencing spinal discomfort in the setting of AK and went on to develop new neurological changes while in the ED. Dr Highstead advised that, in these circumstances, Mr A should have been under spinal precautions and should not have mobilised to the CT table. Dr Highstead advised that this failure represents a severe departure from accepted standards, and I agree.

Conclusion

30. Right 4(1) of the Code states that every consumer has the right to have services provided with reasonable care and skill. In my view, by both failing to complete a comprehensive neurological examination in light of Mr A's presentation and risk factors and by allowing Mr A to transfer independently to the CT table despite his spinal tenderness and new onset of neurological symptoms, Health NZ failed to provide services with reasonable care and skill to Mr A and breached Right 4(1) of the Code.

31. I acknowledge Dr Highstead's comments that the recommendations for change and improvement documented in the AER are appropriate and that significant steps have already been made to improving the care that Health NZ provides. I commend Health NZ for the changes made since these events.

Follow-up actions

32. A copy of this report with details identifying the parties removed, except North Shore Hospital, Health New Zealand | Te Whatu Ora Waitematā, and the expert who advised on this case, will be sent to the Australasian College for Emergency Medicine and Royal New Zealand College of Urgent Care, and placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

Dr Vanessa Caldwell
Deputy Health and Disability Commissioner

Appendix A: Independent clinical advice to the Commissioner

The following independent advice was obtained from emergency medicine specialist, Dr Richard Highstead:

Complaint:	**Mr [A]/Health New Zealand | Te Whatu Ora – Waitemata**
Our ref:	**C22HDC00135**
Independent advisor:	**Dr Richard Grant Highstead**

I have been asked to provide clinical advice to HDC on case number **C22HDC00135**. I have read and agree to follow HDC's Guidelines for Independent Advisors.

I am not aware of any personal or professional conflicts of interest with any of the parties involved in this complaint.

I am aware that my report should use simple and clear language and explain complex or technical medical terms.

Qualifications, training and experience relevant to the area of expertise involved	Medical Doctorate (2006) Advanced Trauma Life Support Instructor 2007–2016 Emergency Medicine Specialist board certification 2015–present Fellow of the Australasian College for Emergency Medicine 2018–present Specialist Consultant in Emergency Medicine 2018–present
Documents provided by HDC	1. Letter of complaint dated 15 January 2025 2. Health New Zealand | Te Whatu Ora's response dated 1 August 2022 3. Clinical records from May 2020 covering the period April 2021
Referral instructions from HDC	Health New Zealand | Te Whatu Ora – Waitemata • Was there an appropriate triage assessment and triage categorisation of [Mr A] following his arrival in the ED? • Was there appropriate initial consideration and management of a potential cervical spine injury following the triage assessment? • Was the initial assessment of [Mr A] by the ED medical officer (MO) consistent with accepted practice, taking into account his mechanism of injury, history of AK, and current symptoms and mobility? • Was the management plan documented by the MO following her assessment of [Mr A] consistent with accepted practice given the clinical scenario presented by Mr [A]? • Were adequate and appropriate steps taken to protect Mr [A]'s cervical and thoracic spine following the MO assessment, including during the transfer to the CT suite and placement on the CT scanner?

	• Consideration of the scenario that [Mr A] self-mobilised to the CT versus being transported on a trolley. • Was the management of [Mr A] following his reporting of new sensory symptoms involving his right ring finger prior to transfer to the CT suite consistent with accepted practice? • Was Mr [A]'s management in ED following development of more extensive neurological symptoms and signs while on the CT scanner consistent with accepted practice? • Any additional comments on Mr A's management while he was in the ED?

Factual summary of clinical care provided complaint:

Brief summary of clinical events:	

Question 1: Was there an appropriate triage assessment and triage categorisation of [Mr A] following his arrival in ED?	
List any sources of information reviewed other than the documents provided by HDC	No additional resources used
Advisor's opinion	No triage documentation was provided. I have requested any triage documentation to be sent separately but have not received such.
What was the standard of care/accepted practice at the time of events? Please refer to relevant standards/material.	Northern Region Trauma Network (NRTN) guidelines do not specifically address c-spine trauma. Waitematā District Health Board (DHB) trauma guidelines indicate any suspicion for spinal cord injury should follow trauma guidelines, including specific c-spine trauma guidelines.
Was there a departure from the standard of care or accepted practice? • No departure; • Mild departure; • Moderate departure; or • Severe departure.	According to the documentation provided (see limitations below), at the time he presented to the ED, [Mr A] was ambulatory and noted back pain, not neck pain. He had no demonstrated neurological deficits. Given the low-speed mechanism and no red flag features at presentation, my conclusion is that there was no departure from the standard of care or accepted practice at triage.

How would the care provided be viewed by your peers? Please reference the views of any peers who were consulted.	Care was appropriate based on information provided and guidelines in place at Waitematā DHB at the time of injury.
Please outline any factors that may limit your assessment of the events.	No triage documentation provided. Conclusion is based on information inferred from nursing notes, ED Registrar notes, and Orthopaedic registrar notes.
Recommendations for improvement that may help to prevent a similar occurrence in future.	Expand trauma inclusion criteria, or create two-tier trauma triage categories, to include head injury with loss of consciousness in patients over the age of 65, patients with prior cervical spine pathology or other high-risk comorbidities, and similar lower risk "trauma" (e.g. from standing in an elderly patient).
Question 2: Was there appropriate initial consideration and management of a potential cervical spine injury following the triage assessment?	
List any sources of information reviewed other than the documents provided by HDC	Carpenter CR, Arendts G, Hullick C, Nagaraj G, Cooper Z, Burkett E. Major trauma in the older patient: Evolving trauma care beyond management of bumps and bruises. Emergency Medicine Australasia. 2017;29(4):450-455.
Advisor's opinion	There are discrepancies in the record. [Mr A]'s complaint indicates that he noted neck and back pain and was not given a c-spine precaution lanyard. The nursing assessment note does not indicate [Mr A] had neck pain and does not indicate he was in c-spine precautions. The ED registrar note indicates T-spine pain, especially no c-spine pain, and no indication that a lanyard was in place. The Ortho note does indicate a lanyard. As such, it is not clear that there was appropriate initial consideration and management of a potential c-spine injury.
What was the standard of care/accepted practice at the time of events? Please refer to relevant standards/material.	Standard of care/accepted practice would not usually involve c-spine precautions in a patient with a minor fall who is ambulatory, not complaining of neck pain and not demonstrating neuro deficits; however, Waitematā DHB C-Spine Trauma and C-Spine Imaging guidelines both state prior history of c-spine injury/surgery or history of AK as special considerations.

Was there a departure from the standard of care or accepted practice? • No departure; • Mild departure; • Moderate departure; or • Severe departure.	Waitematā DHB C-spine Trauma guidelines indicate that, in a patient with red flags, an SMO or Senior Registrar should be directly involved in care. I have asked for and not received clarification on the seniority level of the ED Registrar involved in the care of this patient. I would expect a "Senior Registrar" to refer to an Emergency Medicine Training Registrar in at least their second year of training. In this particular incident, c-spine injury was not suspected or discovered until after the patient had been to CT and developed neuro symptoms. Had the patient's history of AK been considered, there likely would have been a heightened awareness of the potential for significant spinal injury prior to the onset of symptoms. As such, I would consider this incident to represent a mild to moderate departure in the standard of care.
How would the care provided be viewed by your peers? Please reference the views of any peers who were consulted.	Questions raised included: Was [Mr A] in spinal precautions or not? This has not been documented either way. (Note: the CMO report of 1/8/22 states staff interviewed 3 months after the fact recalled a yellow lanyard being in place.) Orthopaedic note indicates that [Mr A] walked to CT (presumably from his treatment room). This would be unusual practice in someone with injuries and history sufficient to require CT imaging.
Please outline any factors that may limit your assessment of the events.	As mentioned previously, and as recognised in the CMO letter, documentation of this event appears incomplete at several levels, including triage, nursing care, and ED MO care.
Recommendations for improvement that may help to prevent a similar occurrence in future.	Developing pathways that allow for escalation of care (early involvement of senior decision-makers) and that recognise that even relatively minor falls in patients over 65 years old can result in significant, life-altering injuries. Carpenter CR, Arendts G, Hullick C, Nagaraj G, Cooper Z, Burkett E. Major trauma in the older patient: Evolving trauma care beyond management of bumps and bruises. Emergency Medicine Australasia. 2017;29(4):450-455.

Question 3: Was the initial assessment of [Mr A] by the ED MO consistent with accepted practice, taking into account his mechanism of injury, history of AK, and current symptoms and mobility.	
List any sources of information reviewed other than the documents provided by HDC	No additional resources used.
Advisor's opinion	The ED MO's initial assessment of [Mr A] was moderately departed from the accepted practice, taking into consideration limitations listed below.
What was the standard of care/accepted practice at the time of events? Please refer to relevant standards/material.	Documentation provided indicates that [Mr A] did not complain of neck pain at the time of presentation, was ambulatory, and had no neuro deficits. As such, the standard of care would not have included a trauma or c-spine trauma pathway to be invoked. [Mr A] disputes this and states that he did complain of neck pain. If that is so, the c-spine trauma pathway should have been followed, including early involvement of an SMO or Senior Registrar.
Was there a departure from the standard of care or accepted practice? • No departure; • Mild departure; • Moderate departure; or • Severe departure.	If [Mr A] did not complain of neck pain at his initial presentation, then there was a moderate departure from the standard of care (as per ED MO's note, a neuro exam was incomplete prior to [Mr A] ambulating to CT suite). If [Mr A] did, in fact, complain of neck pain at presentation, then there was a severe departure (i.e. he should have been identified as high risk for potential c-spine injury and placed on the c-spine trauma pathway).
How would the care provided be viewed by your peers? Please reference the views of any peers who were consulted.	Colleagues consulted were concerned that triage documentation was not included for review and concerned that the SMO did not appear to be involved in Mr [A]'s care until after being informed that he had developed neurological deficits whilst in the CT suite.
Please outline any factors that may limit your assessment of the events.	• Assessment is limited by lack of inclusion of triage notes in provided documents. I have requested the triage notes separately, but they have [not been] provided at the time of this opinion. • The ED MO's level of training/responsibility is unclear (non-training registrar, provisional trainee, senior trainee). I have requested this information,

	but it has not been provided. Affects what would be acceptable in terms of SMO involvement.
Recommendations for improvement that may help to prevent a similar occurrence in future.	• Clear and appropriate triage documentation on each and every patient who presents to ED • Early involvement of SMO/Senior Registrars in care of potentially high-risk injuries • C-spine and spinal precautions for patients who present with neck or back injuries • Recognition that patients >65 years old can have significant traumatic injuries from what might present as relatively minor falls.
Question 4: Was the management plan documented by the MO following her assessment of [Mr A] consistent with accepted practice given the clinical scenario presented by Mr [A]?	
List any sources of information reviewed other than the documents provided by HDC	No additional resources used.
Advisor's opinion	The management plan was consistent with accepted practices for injuries as documented; however, neuro exam was incomplete and therefore plan represents a moderate departure from standard of care.
What was the standard of care/accepted practice at the time of events? Please refer to relevant standards/material.	The assessment plan was for analgesia and CT imaging. In a patient with a fall such as this one, brief loss of consciousness (LOC), ambulatory to the ED, and no neuro deficits, management was appropriate. However, as noted, the initial neuro exam was incomplete. Standard of care would include a thorough neuro exam in a patient with fall and LOC presenting with complaint of back (+/- neck) pain.
Was there a departure from the standard of care or accepted practice? • No departure; • Mild departure; • Moderate departure; or • Severe departure.	As discussed above, plan was based on an incomplete examination and represents a moderate departure from the standard of care.
How would the care provided be viewed by your peers?	Exam was incomplete and patient presentation, exam findings, and plan do not appear to have been discussed

Please reference the views of any peers who were consulted.	with the ED SMO until after significant symptoms had developed.
Please outline any factors that may limit your assessment of the events.	As previously mentioned, documentation appears to be incomplete or missing.
Recommendations for improvement that may help to prevent a similar occurrence in future.	• Following best practices and documenting care contemporaneously. Early involvement/discussion with senior decision-maker regarding findings and plan and documenting at time of discussion. • Ensuring appropriate exam completed and documented prior to initiating care plan.
Question 5: Were adequate and appropriate steps taken to protect Mr [A]'s cervical and thoracic spine following the MO assessment, including during the transfer to the CT suite and placement on the CT scanner?	
List any sources of information reviewed other than the documents provided by HDC	No other resources used.
Advisor's opinion	At the time of the injury and presentation, [Mr A] was a patient aged >65 years who suffered a fall with associated LOC and complaining of spinal pain in the setting of a high-risk comorbidity. While he had been ambulatory prior to presentation, he should have remained in spinal precautions in the ED until cleared and should not have ambulated to the CT suite. Failure to enact care at this level represents a severe departure from the standard of care.
What was the standard of care/accepted practice at the time of events? Please refer to relevant standards/material.	See above.
Was there a departure from the standard of care or accepted practice? • No departure; • Mild departure; • Moderate departure; or	Severe departure from standard of care. See above.

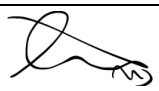
• Severe departure.	
How would the care provided be viewed by your peers? Please reference the views of any peers who were consulted.	Seen as a severe departure from standard of care.
Please outline any factors that may limit your assessment of the events.	As previously stated, documentation is incomplete and/or missing.
Recommendations for improvement that may help to prevent a similar occurrence in future.	[Mr A] was not identified as a c-spine trauma or as a trauma patient. Severe injuries are commonly under-triaged or missed completely in patients aged >65 years. Updating trauma protocols to include this group and highlighting high-risk presentations, including but not limited to AS, in existing protocols might help to prevent similar occurrences.
Question 6: Consideration of the scenario that [Mr A] self-mobilised to the CT versus being transported on a trolley.	
List any sources of information reviewed other than the documents provided by HDC	No additional resources used.
Advisor's opinion	See previous answers and explanations. [Mr A] had potentially significant injuries based on risk factors, LOC, and tenderness at the time of injury and on examination. He developed new neuro changes whilst in the ED. He should have been in full spinal precautions and not self-mobilised [to] the CT.
What was the standard of care/accepted practice at the time of events? Please refer to relevant standards/material.	See previous answers above.
Was there a departure from the standard of care or accepted practice? • No departure; • Mild departure; • Moderate departure; or • Severe departure.	Severe departure. See answers and explanations above.

How would the care provided be viewed by your peers? Please reference the views of any peers who were consulted.	
Please outline any factors that may limit your assessment of the events.	Poor documentation. See answers and explanations above.
Recommendations for improvement that may help to prevent a similar occurrence in future.	See answers to Question 5 above.
Question 7: Was the management of [Mr A] following his reporting of new sensory symptoms involving his right ring finger prior to transfer to the CT suite consistent with accepted practice?	
List any sources of information reviewed other than the documents provided by HDC	No other sources used.
Advisor's opinion	New neuro symptoms in the setting of head injury with LOC and spinal tenderness, particularly in a high-risk patient, should have resulted in a complete reassessment of the neuro exam.
What was the standard of care/accepted practice at the time of events? Please refer to relevant standards/material.	The standard of care in this setting would include reassessment and documentation of complete neuro exam and a heightened concern for spinal cord injury.
Was there a departure from the standard of care or accepted practice? • No departure; • Mild departure; • Moderate departure; or • Severe departure.	New neuro symptoms in a high-risk injury should have prompted reassessment and documentation of complete neuro exam. ED MO's note indicates range-of-motion testing of the affected finger only. This represents a severe departure from the standard of care.
How would the care provided be viewed by your peers? Please reference the views of	Seen as a severe departure from the standard of care.

any peers who were consulted.	
Please outline any factors that may limit your assessment of the events.	
Recommendations for improvement that may help to prevent a similar occurrence in future.	Formal and/or informal training sessions in the style of ATLS, NetworkZ, or similar, which emphases a systemic approach to the management of trauma/injuries and re-evaluation/re-examination after new changes are identified. This can be accomplished through didactic and bedside teaching and would be enhanced if department-wide simulations were included.
Question 8: Was the management of [Mr A] following his reporting of new sensory symptoms involving his right ring finger prior to transfer to the CT suite consistent with accepted practice?	
List any sources of information reviewed other than the documents provided by HDC:	This question is identical to Question 7 above.
Advisor's opinion:	
What was the standard of care/accepted practice at the time of events? Please refer to relevant standards/material.	
Was there a departure from the standard of care or accepted practice? • No departure; • Mild departure; • Moderate departure; or • Severe departure.	
How would the care provided be viewed by your peers? Please reference the views of any peers who were consulted.	

Please outline any factors that may limit your assessment of the events.	
Recommendations for improvement that may help to prevent a similar occurrence in future.	
Question 9: Any additional comments on Mr [A]'s management while he was in ED?	
List any sources of information reviewed other than the documents provided by HDC:	No other resources were used.
Advisor's opinion:	The unfortunate outcome for [Mr A] resulted at least in part from an all-too-common problem in EDs, not only in Australia and New Zealand but internationally. Patients over 65 years old with seemingly minor falls can present with significant injuries that are under- or misidentified. This occurrence is even more common when they self-present to the ED through the front door rather than arrive by medical transport (ambulance, helicopter, etc.). The key event seems to have occurred when lying down/positioning for CT imaging, and I am not qualified to comment on the processes within the CT suite that appear to be the proximate cause of Mr [A]'s spinal cord injury. Given that [Mr A] was ambulatory and asymptomatic other than pain at his initial presentation and examination, it is likely that identifying and managing his risks early would not have changed his outcome. However, that is not to absolve his ED care from all responsibility. The review of this event was complicated by missing and incomplete documentation. It is unclear what occurred at the time of his triage in the department. The level of involvement of an ED SMO or other senior decision-maker is unclear. Timestamps on the documents were difficult to correlate with progression of Mr [A]'s care within the ED. His examination and progression of care appear to have been incomplete and/or poorly documented. There are conflicting histories provided by Mr [A], the ED MO, and

	the CMO letter, and all but the ED MO note appear to have been collated quite some time after the incident, making memories and recollections less reliable.
What was the standard of care/accepted practice at the time of events? Please refer to relevant standards/material.	
Was there a departure from the standard of care or accepted practice? • No departure; • Mild departure; • Moderate departure; or • Severe departure.	
How would the care provided be viewed by your peers? Please reference the views of any peers who were consulted.	
Please outline any factors that may limit your assessment of the events.	
Recommendations for improvement that may help to prevent a similar occurrence in future.	My recommendations include: 1. A review of documentation processes to ensure that notes are written contemporaneously, time-stamped, and complete. 2. Early involvement of senior decision-makers to ensure exams are appropriate and complete and that care plans address both the most likely diagnosis/diagnoses and the high-risk differentials. 3. Department-wide exposure to education, training, simulations, etc. to address low-incidence but high-risk presentations. 4. A review and updating of processes and pathways to address high-risk populations, including comorbidities and age-associated risks.

By signing this report, I agree to HDC correcting any formatting, spelling, or grammar issues on the proviso that the substance of the report and any quoted material remains unchanged.
Signature: 
Name: Dr Richard Grant Highstead
Date of Advice: 23 March 2025

Dr Highstead provided further clinical advice to HDC on 17 October 2025:

17 October 2025

[…]

Senior Investigator

Health and Disability Commissioner

Ref: 22HDC00135

Tēnā koe […]

Thank you for providing me the opportunity to respond to Dr […]'s concerns regarding my assessment submitted 23 March 2025.

As you are aware, the complainant ([Mr A]) suffered a fall from a motorised scooter on 1 May 2020. He had a brief period of LOC, then ambulated home where he cleaned up and then presented to the ED at North Shore Hospital. He was seen and assessed in triage and moved to a resuscitation room for further evaluation and management. There were concerns regarding the nature of his injuries, and CT imaging was organised. Unfortunately, because of volume and acuity in the ED at the time, and complicated by processes associated with the burgeoning COVID pandemic, there was a prolonged delay in obtaining imaging. During this period, [Mr A] displayed no gross motorsensory deficits other than a late-developing burning sensation in his right index finger. Once in the CT suite, [Mr A] was asked to lie flat for imaging, whereupon he developed severe neck pain and neurological deficits. The injuries resulted in life-altering tetraplegia.

I was asked to evaluate [Mr A]'s care in the ED and CT suite from the moment of triage through to the onset of symptoms, including the immediate care after symptoms developed. I was provided with the contemporaneous ED clinical notes and the Orthopaedic Registrar's note on which to base this assessment. During my initial investigation, I requested and received other documents, including local pathways, and I reviewed New Zealand and Australasia pathways, protocols, and recommendations relating to [Mr A]'s care in the ED. I also requested the triage note from his initial encounter. This was, in fact, included in the original documentation I received, but I did not recognise it as a triage note as it was in an

unfamiliar local format. I based some of my assessment on the assumption that I had not been provided with the triage documents, and I apologise for this shortcoming.

The Chief Medical Officer for Health New Zealand – Waitematā, Dr […], raised several concerns regarding my assessment, including my evaluation of [Mr A]'s care in triage. In his reply, Dr […] referred to a previous independent investigation conducted by Dr [C] in November 2020. He also noted an Adverse Events Committee report that was concluded in October 2020. I was not provided these documents at the time of my initial evaluation in March 2025.

The remit for my reassessment includes a review of the additional documents and questions as follows:

Documents

- Health NZ Waitematā response to your initial advice dated 11 June 2025
- Health NZ Waitematā Adverse Event Investigation Report (AEIR) dated 8 December 2020
- Independent clinical review by Dr [C] (obtained by Health NZ Waitematā) dated 6 November 2020
- Summary of meeting between Health NZ Waitematā and [Mr A] dated 30 July 2020
- Further comments provided by Ms [A] dated 3 July 2025.

Questions

- Please review this further information and consider whether it changes your initial advice. Please also provide your reasoning.
- If there are conflicting versions of events, please present your advice in the alternative (e.g. if A was done, I consider... Alternatively, if A was not done I consider...).
- Please also comment on the appropriateness of the recommendations outlined in the AEIR.

My approach to this review was to take a fresh look at all of the documents, including those provided for my initial assessment. My first step was to read the contemporaneous notes and extract the factual statements from the clinical documents. I have attached this summary as attachment A1 – Summary of Factual Statements. I have attempted to focus on factual statements only, rather than opinions, and I have limited my own commentary except in instances where these statements conflict.

I next turned my attention to the AEIR that was completed in October 2020 and finalised/closed in December 2020. I provide a detailed commentary on the report in attachment A2 – Review of Adverse Event Investigation. Event reviews are limited by their temporal distance from the event itself and rely on participants accurately remembering the sequence of events. In a busy, chaotic environment such as an ED, and one in which policies and procedures are rapidly changing, as happened in the early phases of the COVID pandemic, an accurate accounting of events can be difficult to obtain. Despite these limitations, post hoc analysis and reflection can provide significant value. That being said, contemporaneous documentation provides an inherently more reliable accounting of events. I have three primary concerns that are discussed in detail in attachment A2.

1. Throughout the report, it is stated that [Mr A] was provided with a yellow "C-spine not cleared" lanyard. These statements are not supported by the contemporaneous documentation and are disputed in [Mr A]'s HDC complaint dated 15 January 2022.
2. The AEIR states [Mr A] "had normal power and sensation of his limbs." This statement is only partially correct. [Mr A] was ambulatory and was able to use his smart phone, indicating that power and sensation were grossly normal; however, a detailed neurology exam was not performed until after [Mr A] developed symptoms on the CT table.
3. The AEIR determined that [Mr A] was log-rolled onto the CT table maintaining appropriate spinal precautions throughout. This is in direct contrast to the Orthopaedic Registrar's contemporaneous clinical note in which they stated "Handed over that the patient walked to the CT scanner" and disputed in [Mr A]'s HDC complaint.

Unfortunately, there is no discussion of these contradicting accounts within the AEIR.

Within the limitations of a post hoc assessment, the AEIR is an otherwise well-researched and well-written document. I find the recommendations in the AEIR largely appropriate and in line with the recommendations made in my initial evaluation. I also note that I have been provided with updated C-spine injury Best Care Bundle documents dated 12/9/2023 and a patient information leaflet dated 6/7/2023 in which many of these recommendations have been implemented.

For my initial evaluation, I was not provided with Dr [C]'s independent clinical review. I was asked to make an independent assessment based on the documentation at the time of the event. I have since read Dr [C]'s review and find that it largely follows the AEIR. I have the same concerns for the three discrepancies as discussed in my comments on the AEIR. In Dr [C]'s preamble, he states "It is not in my brief to challenge any of the factual material content of the Clinical Notes (detail or times) or the Adverse Event Investigation Report" which is a reasonable approach to his review. I note that it would not be challenging the facts of either account nor unreasonable to discuss where they diverge as these are potentially areas of concern.

In discussing [Mr A]'s evaluation in the resuscitation area, Dr [C] notes that [Mr A] transferred himself from the wheelchair to the ED stretcher, removed his shirt, and was assisted with removing his trousers. It is stated that [Mr A] was wearing a yellow lanyard at the time. Dr [C] comments that "The documented care at this stage is all consistent with normal practice and appropriate to the presentation." I disagree with Dr [C]'s conclusion on this point.

While there is extensive literature on the management and handling of patients who have a yellow lanyard placed to indicate their c-spine has not been cleared in the pre-hospital setting, there is very little to guide management within the ED. The 2018 New Zealand National Trauma Network Position Statement on In-hospital Clearance of Potential Cervical Spine Injury (attachment A3) notes that patients should be managed under an assumption that a c-spine injury exists until they can be clinically or radiographically cleared. Allowing

[Mr A] to self-transfer and partially undress would not be in alignment with the standard of care in this setting.

Much of this discussion is dependent on whether or not [Mr A] was provided with a yellow lanyard. It is reasonable to state that a yellow lanyard was not indicated at [Mr A]'s initial presentation to the ED. At triage, [Mr A] noted that he suffered a fall. He complained of headache and upper T-spine pain. He had no gross neurological deficits and his history of AK was not captured until he was evaluated in the resuscitation area. In his initial triage evaluation, a yellow lanyard appropriately might not have been considered. Allowing [Mr A] to mobilise and remove his own clothing would not be a deviation from the standard of care if he was not wearing a yellow lanyard at that point; however, once a yellow lanyard was placed, management procedures for c-spine precautions would apply.

The summary of the meeting between Health NZ Waitematā and [Mr A] dated 30 July 2020 clearly demonstrates North Shore Hospital's openness, concern, and willingness to engage with [Mr A] and his family. The report appears reasonable and complete. I have no specific comments regarding the contents of the report, and it does not change my initial or subsequent evaluation.

With respect to the further comments provided by […] dated 3 July 2025, I have reviewed the questions and have provided my thoughts where appropriate below. Several questions are outside my scope as an Emergency Medicine Specialist and would be better addressed by a radiologist and/or spinal injury specialist (neurosurgery or orthopaedics).

I. Comments on Meeting Notes

1. X-ray vs CT – missed opportunity

At his initial presentation to the ED, [Mr A] was appropriately not triaged as a trauma (in recent years, NZ has begun to follow international standards in treating simple falls in the elderly as potentially high-risk events, but this was not the case in early 2020). In the instance of managing injuries that do not rise to the level of a trauma and do not include focal neurological deficits, it would be usual practice not to obtain portable X-rays in the resuscitation bay, but rather to wait for CT imaging. This is particularly true in a small, low-resourced ED such as the one at North Shore Hospital.

2. Post-CT inaction and delayed neurological assessment

This was an appropriate decision by the team at the time. The CT suite is an area of inherently limited resources, and it was appropriate not to move [Mr A] until additional personnel could be present to protect [Mr A]'s c-spine and perform an appropriate neurological evaluation.

It is likely that the initial injury occurred at the time of [Mr A]'s fall and either progressed as a result of increasing spinal oedema or when being positioned on the CT table. Whether or not a more timely neurological evaluation would have changed the outcome is best answered by a spinal injury specialist.

3. Positioning on CT table

This question is best addressed by a radiologist and/or spinal injury specialist.

I would like to note that it would be somewhat unreasonable to expect small regional EDs to stock specialised equipment for rare presentations such as spinal fractures in patients with fixed spinal pathology.

II. Discharge summary comments

1. Mr [A] walked to the CT scanner

This statement is taken from the contemporaneous documentation but is disputed by statements made in the AEIR; however, on balance, I am compelled to give greater weight to the contemporaneous documentation.

If [Mr A] did walk to the CT scanner, this is concerning given his identified T-spine tenderness on examination and new right index finger sensory changes in the setting of a known background of AK.

As stated previously, it is uncertain that the outcome would have been any different if all standard procedures and protocols had been followed, and this question is best answered by a spinal injury specialist.

III. Comments on final North Shore Hospital report

1. Where was the neck protection?

There are conflicting accounts in the record regarding if and when neck protection was initiated.

2. [Mr A] was asked to lie flat ... The bed was elevated ... Red flag

[Mr A]'s bed was raised to a position of comfort, which was appropriate care given the presentation and findings at the time

3. Dr […] did not suspect a neurological cause for new sensory changes

New sensory changes should have prompted a reassessment of the neurological exam.

4. Actually, he was screaming in pain

There are conflicting accounts, neither of which are represented in the contemporaneous documentation.

5. Even minor injuries in AS patients can cause spinal fractures

This is a correct statement. AS was not noted at triage. Once noted at the time of evaluation by the ED Registrar, it is unclear if this was recognised as a condition at high risk for significant injury.

6. [Mr A]'s burning hand sensation ... early sign of spinal cord injury

New sensory changes should have prompted a reassessment of the neurological exam.

7. Radiology relies on spinal precautions from ED

Updated protocols have since been developed and put in place.

8. *8–12: questions and statements related to guidelines and risk recognition*
Updated protocols have since been developed and put in place.

It is unreasonable for a small ED to keep specialised equipment for rare events

9. *Recommendations on Pages 10 and 11*
Protocols have been updated to help decrease the likelihood of similar events in the future.

Given the severity of [Mr A]'s injuries, it is possible that this outcome was not preventable.

10. *Cervical collars are unsafe in AS/rheumatoid arthritis.*
This statement is generally true. For this specific incident, it is best addressed by a spinal injury specialist.

Lastly, I would like to thank Dr […] for his thoughtful review of my assessment submitted 23 March 2025 and thank the Health and Disability Commissioner for allowing me the opportunity to review the remaining documents and provide my thoughts and comments. I largely agree with the findings of the AEIR, Dr [C]'s review, and Dr […]'s reply other than in those areas I have already discussed. I have addressed many of Dr […]'s concerns in previous sections of this report but will reply to some of them specifically in this section.

The HDC provides a framework when determining whether or not there has been a departure from the standard of care or accepted practice. When evaluating the events of 1 May 2020, it is reasonable to view the challenges of an emerging pandemic and rapidly changing processes and protocols as relevant mitigating factors.

No Departure	The care provided was consistent with standards and accepted practice in all respects.
Mild Departure	While generally acceptable, the care provided did not meet some standards or accepted practice to a minor extent.
Moderate Departure	The care provided did not meet a particular standard or accepted practice but there were relevant mitigating factors present and considered.
Severe Departure	The care provided fell well below an acceptable standard in respect of an essential aspect of the consumer's care, and there was an absence of relevant mitigating factors.

Each of the reports and assessments provided for review have acknowledged that the contemporaneous clinical records for the events of 1 May 2020 did not include certain information of some value. With an incomplete record, we are left to fill in the gaps with temporally distant interviews and some level of supposition and speculation. I do not take the common stance of "if it was not written, it did not happen" because of a recognition that ED care is often messy and chaotic. However, it is important to acknowledge that making

sense of the chaos is part of ED care, and timely accurate documentation is part of good patient care.

1. I did not recognise the triage note as it appeared to be an ongoing nursing note rather than something that was started in triage. I apologise again for misinterpreting this document.
2. "Registrar" is a relatively non-descriptive title with different expectations. For example, I would not expect an off-service registrar rotating through the ED to recognise AK as a risk factor for significant spinal injury in minor falls, whereas I would expect that level of knowledge from a registrar on an Emergency Medicine training track. I would have similar expectations for recognising that new neuro symptoms should prompt a more thorough re-evaluation of the primary and secondary surveys.
3. The triage documentation changes my assessment. [Mr A] presented to the ED after suffering a low-speed fall with brief LOC. He complained of a headache and upper back pain. He had no gross neurological deficits. I agree that it was appropriate to not call a trauma at the time of [Mr A]'s initial presentation as it was not the standard of care in Australasia at the time. [Mr A]'s assessment in triage had No Departure from the standard of care.

   In a patient with [Mr A]'s presentation, no neck pain, and no neuro symptoms, placing a yellow "c-spine not cleared" lanyard would not have been indicated, and not placing one would not have been a departure from the standard of care. Indeed, [Mr A] states that one was not placed at the time.

   However, if a yellow lanyard was placed, then there is a presumption of some degree of spinal injury until cleared clinically or radiographically. If a yellow lanyard was placed, then [Mr A] should have been assisted in transferring from his wheelchair to the ED trolley, he should have been instructed to minimise neck movement, and some type of visible barrier (foam blocks, rolled towels, saline bags, etc.) should have been placed on either side of his head as a reminder to [Mr A] and ED staff that he had a potential c-spine injury. Allowing [Mr A] to ambulate, assist with partially undressing, and mobilise unassisted onto the ED trolley would represent a Mild to Moderate Departure from the standard of care.

   [Mr A]'s neurological assessment was incomplete. The Royal Australasian College of Surgeons trauma EMST and the American College of Surgeons ATLS programmes are well-recognised training programmes in Australasia for the management of trauma in small rural and regional hospitals. They both follow the ABCDE (or CABCDE) algorithm in which "D" stands for "Disability" (or neurological deficits). The primary survey typically consists of an assessment of gross motor and sensory function except when a spinal injury is suspected, in which case a more detailed neurological assessment is indicated. Otherwise, a detailed neurological exam is performed as part of the secondary survey. Given [Mr A]'s prolonged delay for CT, there would have been opportunity to perform a secondary survey before

transferring to the CT suite. The tertiary survey is usually conducted after the patient has been admitted and after all of the imaging and laboratory results are returned. It is typically performed up to 24 hours after admission to reduce the chances of a missed injury and delayed diagnosis.

[Mr A] was log-rolled in the ED and found to have upper T-spine tenderness. The ED registrar checked perianal sensation to evaluate for spinal cord injury. At this point, his history of AK had been noted. His physical exam was performed in a manner that indicates that a spinal cord injury was considered as a possibility and not ruled out. If he also had a yellow lanyard in place, then there was some concern for a cervical spine injury.

EMST and ATLS algorithms both indicate that if a patient develops new symptoms, then a re-evaluation is indicated. [Mr A]'s neurological evaluation was incomplete in the first instance and was not adequately addressed in the second instance when he developed new burning pain in his right ring finger. There is no change to my assessment of a Moderate Departure from the standard of care.

4. The Orthopaedic Registrar's contemporaneous note states "Handed over that patient walked to the CT scanner" and this is consistent with [Mr A]'s recollection of events. The AEIR notes a detailed recollection of a log-rolling transfer to the CT table. If all appropriate c-spine precautions were maintained as described by the MIT [medical imaging technologist], then there was No Departure from the standard of care. If the events were as described by the Orthopaedic Registrar and [Mr A], then my assessment does not change and there was a Severe Departure from the standard of care.

I want to thank Dr […] again for his thoughtful consideration of my earlier report and for providing additional information for evaluating the steps and processes involved in [Mr A]'s care. I also want to thank the Health and Disability Commissioner for providing me the opportunity to review the case in light of this additional information. Finally, I would like to commend the staff at North Shore Hospital for providing a high level of care under very trying circumstances. The time and resources committed to following up with [Mr A]'s family, performing an internal investigation, and soliciting an external investigation is a testament to their desire to get it right. The recommendations for change and improvement documented in the AEIR are appropriate and in line with my previous recommendations, and they have already made significant steps to improving the care they provide now and into the future.

Nāku noa, nā

R. Grant Highstead, MD, MPH, FACEM, AFRACMA

A1: Summary of Factual Statements

C22HDC00135

Date of Event – 1 May 2020

ADULT ED/ADU ASSESSMENT (1 May 2020, 16:44 *updated 18:15*)

- History & Examination
  - "fall from electric scooter approx 20km/hr onto head approx. 5min LOC"
  - "contusion to head + Tspine pain. mobilized at scene, wife has him driven to hospital"
  - PMH: Cardiac, Hypertension
  - *No other relevant PMH (i.e. Ankylosing spondylitis) noted*
- Risk Assessment & Interventions
  - Cognitive state "normal"
  - *No other injuries (i.e. facial contusions/abrasions) noted*

- Obs & Nursing Notes (1640-2216)
  - Normal obs with single episode of bradycardia (HR 50s)
  - EWS 0-1

ED REGISTRAR ADMISSION NOTE (1 May 2020, 18:10 *amended 22:07*)

- History & Presenting Complaint
  - Riding electric scooter downhill and fell off at approx 20kph
  - "LOC for ?few minutes"
  - Walked approx 40m and driven to hospital by wife
  - On presentation, complains of headache and T-spine pain
  - No vomiting or limb weakness
- Observations & Examination
  - Chest/Abdo/Pelvis exam normal
  - Moving legs normally with normal power, no visible abnormalities
  - "Stood up and mobilized in dept."
  - Head and hand abrasions
  - "No c-spine pain"
  - "Discomfort over T2-3 on log roll. No other spinal tenderness."
  - Perianal sensation intact
- Past Medical History
  - IHD w/ stent, daily aspirin
  - HTN
  - "Ankylosing spondylitis – neck and back."
  - OSA
- Amendment
  - Notes being called to CT for abnormal findings, discussing w/ ED SMO and Orthopaedics, additional imaging, and decision to leave [Mr A] on CT table pending ortho review
  - Notes that [Mr A] stood from ambulance stretcher, mobilized, undressed self
  - "I did not formally test myotomes or dermatomes on my initial assessment."
  - Notes that [Mr A] c/o Right ring fingertip "burning" pain and on examination had normal ROM in that finger

ORTHOPAEDIC REGISTRAR ADMISSION NOTE (1 May 2020, 22:07)

- HPI, O/e, PMH copied from ED Registrar note
- Clinical Management
    - Summarises mechanism of injury
    - Notes examining [Mr A] on scanner table
    - "Handed over that patient walked to the CT scanner."
    - "Reported tingling in C6 distribution on mobilizing to CT scan."
    - "Layed flat for CT-head and C-spine."
- Notes that [Mr A] reported neuro changes (tingling and sensory loss) Orthopaedic Registrar Note (Physical Exam)
    - Patient unable to move legs on demand but wiggling toes spontaneously
    - No sensation in lower legs
    - Plantar reflexes normal
    - No anal tone or bulbocavernosus reflex
    - Follows w/ detailed motorsensory exam from C5 and below

WAITEMATĀ DHB ADVERSE EVENT INVESTIGATION (Completed 30 October 2020)

- *Reviewed separately. See attachment A2 Review of Adverse Event Investigation.*

[Mr A] HDC COMPLAINT (Submitted 15 January 2022)

- Fell off electric scooter at 20kph
- LOC "for a few seconds"
- Stood and mobilized, pushing scooter 40m
    - Neighbour assisted and he walked home an additional 300m
- Presented to ED, head wound cleaned and dressed, seated in wheelchair
    - "No neck protection was placed around my neck, nor did they place anything around my neck to state that I am a potential neck injury patient ... "
- Was asked to lie flat
    - Informed staff he was unable to do so because of pain associated with ankylosing spondylitis
    - Head of bed raised to 30 degrees
- Developed numbness / burning pain in Right ring finger
- During prolonged wait for CT scan was able to use smartphone ... Facebook, answer phone, SMS texts
    - Disputes claim that he was log-rolled him onto CT table
    - States he climbed onto CT table unassisted
- Was asked to lie flat on CT table and developed severe neck pain
- Developed whole-body numbness and subsequently lost sensation and motor function

CMO RESPONSE TO HDC COMPLAINT (1 August 2022)

- Summarises events surrounding injury and presentation to ED
    - *Consistent with [Mr A]'s description and triage note*
- "Past medical history was noted which included ankylosing spondylitis ... "
    - *Consistent with [Mr A]'s statement but not consistent with triage note ... Ankylosing spondylitis not mentioned in contemporaneous documentation until after [Mr A] seen by ED Registrar*
- Summarises ED Registrar examination
- Summarises events and care following CT findings and development of neuro changes

- Disputes [Mr A]'s claim that he was not given a c-spine precaution lanyard nor log-rolled onto CT table
    - *Not supported by contemporaneous documentation*
    - *Based on statements from Adverse Event investigation and report*
- Discusses review by [Dr C] MBChB, FRCEM, FACEM on 6 November 2020
    - *Reviewed separately. See attachment A3*

- *The remainder of Dr […]'s response is outside the remit of the questions posed for this report.*

A2: Review of Adverse Event Investigation

C22HDC00135

Date of Event – 1 May 2020

Date Event Reported – 5 May 2020

Investigation Approved – 30 October 2020
Approved by AEC – 8 December 2020

The initial questions I was asked to address in March 2025 did not include a review of the Adverse Event Investigation Report, and indeed the report was not included in the documentation provided to me. I have been asked to review the additional information and consider whether it changes my initial advice.

> A brief discussion on the nature of memory and its effect on post hoc descriptions of events.
>
> Rather than a continuous reel, our brains organise sensory experiences into individual segments that are stored and retrieved as distinct episodes.[1] Additionally, memories do not exist in isolation. They are influenced by proactive interference (past experiences) and retroactive interference (newer experiences).[2] Where there are gaps in memory, the brain subconsciously constructs pieces to fill the gaps and create a continuous memory.[1] This is not to suggest that the statements made to the Adverse Events Committee were intentionally false or misleading. Quite the contrary; as we gain more temporal distance from the event, more of our recollection is built from general knowledge, i.e. accumulated intact knowledge. Most of the information used to reconstruct events is built from an active pool of past and new reactions and experiences.[3,4] As such, the greatest weight must be given to contemporaneous documentation, and where the documentation conflicts with recalled events, I have been compelled to favour the former over the latter.

<u>Event Overview</u>

- Brief summary is consistent with contemporaneous documentation other than the following statement: 'A C-spine "lanyard' was placed around his neck ... '
  - *There is no information in the contemporaneous documentation to support this statement.*
  - *Statement is disputed in [Mr A]'s complaint dated 15 January 2022*
- Patient was taken to Resus 2
  - "As per the ED trauma guidelines RN8 placed a yellow *lanyard* around his neck ... "
    - *Statement not supported by contemporaneous documentation*
    - *Statement is disputed in [Mr A]'s complaint dated 15 January 2022*
  - "[Mr A] transferred himself onto the ED stretcher and took off his T-shirt"
  - Head of bed elevated to 30o and pillow placed behind his head
  - "[Mr A] informed RN 1 that he had chronic neck pain and was unsure if the fall had made it any worse"

- Dr […] continued her assessment ... statement consistent with Dr […]'s contemporaneous documentation except for the following statement: "... he had normal power and sensation of his limbs."
  - Dr […]'s note states "Power grossly normal." and "perianal sensation intact."
  - Dr […]'s note further states "I didn't formally test myotomes or dermatomes on my initial assessment."
    - *Based on review of contemporaneous documentation, sensation of limbs was not tested and therefore not known at the time of initial evaluation. [Mr A]'s complaint dated 15 January 2022 notes that he was "... using my smartphone. I was able to use Facebook, answer the phone, and SMS's."*
  - AE Report also notes "While waiting in Resus he was texting his wife and friends."
    - *Based on the two statements above, it is reasonable to conclude that [Mr A] had no gross motorsensory deficits in his upper limbs; however, less severe sensory changes and unilateral differences might not be recognised under these circumstances.*
- Description of initial spinal vertebral examination, including log-roll, is consistent with contemporaneous documentation.
- [Mr A]'s complaint of right ring finger neurological changes is consistent with contemporaneous documentation.

<u>Events in Radiology Department</u>

- "... advised the Transit Nurse (TN) and Orderly to proceed to take [Mr A] to the Radiology Department."
- "After a short delay in the Radiology Department waiting area, [Mr A] was transferred from the ED trolley onto the CT table. The TN's statement to the AEC based on their recollection of events says, 'I led the Log roll from the head, using the standard log roll procedure, this does include putting the patient flat. I did not put the stretcher flat as I was already stabilising the neck and head at this stage with my hands and forearms. I recall the pillow being left behind his head during the transfer. The log roll was carried out with the assistance of six people.'
  - *These statements are in direct contradiction to contemporaneous documentation by the Orthopaedic Registrar that notes "Handed over that the patient walked to the CT scanner" and [Mr A]'s complaint dated 15 January 2022 in which he states, "I actually climbed onto the table myself!"*
  - *Subsequent events and care that followed transfer to the CT scanner are outside the remit of what I have been asked to comment on.*

<u>Comments on Discussion</u>

- *The discussion appropriately summarises the mechanism of injury and events surrounding the initial presentation to ED*
- *This is an excellent description of Ankylosing Spondylitis and similar conditions*

Initial Management

- The decision not to make a Trauma Call at the time of [Mr A]'s presentation was appropriate, and the described decision-making around this is consistent with the standard of care and accepted practice.
- The use of a lanyard to indicate that a possible cervical spine injury has not been cleared either clinically or radiographically is a well-documented practice in Australasia and internationally.
- The statement "The purpose of the lanyard is to provide a visual reminder that the C-spine had not been "cleared", but there is a low suspicion for C-spine injury" is incomplete.
    - *A c-spine lanyard is also appropriate for a patient in whom a c-spine injury is suspected but use of a rigid or semi-rigid cervical collar is contraindicated, such as a patient with AK or other similar conditions (e.g. DISH [diffuse idiopathic skeletal hyperostosis], rheumatoid arthritis, severe osteoarthritis).*
    - *Standard of care for a patient wearing a yellow lanyard would be to assume a c-spine injury until cleared clinically or radiographically. As previously noted, the statements "[Mr A] had a yellow lanyard placed around his neck" and "In this instance, a lanyard was placed appropriately, and the patient was asked not move his head" are not supported by contemporaneous documentation, are based on interviews with personnel involved in [Mr A]'s care as part of the post hoc investigation and are disputed in [Mr A]'s statements.*
- The AEC report refers to the Best Care Bundle (BCB). Copies of the BCB pathways have been provided, and the AEC report is consistent with the contents of the BCP pathways.
    - *No BCB completed pathway forms were included in the documents provided, and there is limited mention of BCB components being completed or addressed in the contemporaneous notes.*
    - *This is noted in the AE report under Contributory Factors (10).*
- "There is no specific physical apparatus readily available in the in the ED for maintaining a neutral spine position while lying flat, except pillows or towels."
    - *Rolled towels, IV saline bags, pillows, foam wedges, etc. are recognised tools for minimising the head movement of patients who are under spinal precaution protocols and/or have fixed c-spine pathology. I agree that none of these tools would directly restrict head and neck movement nor keep the patient's head and neck in neutral alignment.*

Neurological deterioration

- "It is extremely uncommon that a patient who has mobilised freely after an accident, without neck pain or neurological symptoms would subsequently go on to have such severe neurological deterioration. It is unclear whether his neurological deterioration was abrupt or if this was a gradual deterioration."
    - *This is an accurate description and reasonable assumption*

- "At all other times when laid supine, [Mr A]'s head and neck were manually supported. The pillow behind his head was kept in place during transfers and on the CT table."
    - *This statement is not supported by the contemporaneous documentation and is disputed in [Mr A]'s complaint.*

Cervical Spine Immobilisation

- *The statements made in this section are true, evidence-based, accurate, and consistent with the body of knowledge.*
    - *Of note, the National Trauma Network | Te Hononga Whētuki ā-Motu published a July 2018 Position Statement on In-hospital Clearance of Potential Cervical Spine Injury (attachment A3) which states:*

> "If clearance of the cervical spine has not occurred by the time the patient is transferred out of the Emergency Department as an inpatient, then a properly fitted orthotic collar should be placed. Lanyards should not move beyond the Emergency Department (or radiology whilst under Emergency Department care)."

    - *This would support the practice of assuming a patient wearing a lanyard has a c-spine injury until cleared either clinically or radiographically.*

Standard of Care

- "It is difficult to determine an appropriate Standard of Care for such rare circumstances. There are no existing guidelines in WDHB for spinal protection specific to patients with Ankylosing Spondylitis (beyond how to image). Additionally, there are no specific apparatus for maintaining C-spines in neutral/ slightly flexed position that are readily available. Radiology at WDHB have no standard protocols or polices regarding the positioning of patients with AS or similar conditions. In this case, the care was of reasonable standard given staff behaved according to existing guidelines."
    - *This is an overly broad statement. While WDHB did not have the noted guidelines at the time of [Mr A]'s presentation to the ED, standard of care is not based solely on local practice but needs to be considered from a broader context. Additionally, the standard of care should be considered at each phase of the process.*
    - *When [Mr A] presented to triage, he was ambulatory, had no gross neurological deficits, and was complaining of headache and upper T-spine tenderness. While seemingly minor falls in elderly patients have long been recognised as potentially high-risk incidents internationally, and starting to be recognised as such in Australasia, they were not considered high risk at the time of [Mr A]'s initial presentation to the ED. It was within the standard of care and accepted practice to not triage [Mr A] as a trauma at his initial presentation. While there are differing accounts of whether a lanyard was placed around his neck at triage, a lanyard would not have been indicated at*

his initial presentation, and it would be within the standard of care and accepted practice to not place one at that point in his care.

- *As noted previously "[Mr A] transferred himself onto the ED stretcher and took off his T-shirt". It appears unlikely based on contemporaneous documentation that [Mr A] was given a yellow c-spine lanyard at triage, and it would not have been indicated as noted above. If, as stated in the post hoc investigation, he was provided a lanyard at that point, it would have been outside of the standard of care for [Mr A] to be mobilizing in the ED and undressing himself as placement of a yellow lanyard is a visual indication for the patient and carers to exercise additional caution in the setting of a possible c-spine injury.*
- *[Mr A] was evaluated by an ED Registrar who documented an absence of c-spine pain, "discomfort" over T2-3 on log roll, and normal perianal sensation. They also noted a history of AK. The combination of spinal vertebral tenderness in a high-risk patient who suffered a significant fall (20 kph with head injury and brief LOC) should have prompted a more thorough neurological exam. The ED Registrar's note specifically states, "I didn't formally test myotomes or dermatomes on my initial assessment."*
- *[Mr A] complained of sensory changes in his right index finger just prior to transferring to the CT suite. The ED Registrar note indicates a normal motor exam of that finger. This was a second missed opportunity to perform a more thorough neurological exam.*
- *There are conflicting accounts of [Mr A]'s care in CT. While the post hoc investigation concluded that [Mr A] was log-rolled onto the CT scanner and spinal precautions were followed throughout, contemporaneous notes and [Mr A]'s recollection of events indicate that he self-mobilised to the CT scanner. This would have been a breach of standard of care in an elderly patient with spinal vertebral tenderness and possible neurosensory changes.*

<u>Findings</u>

- *The statements in this section are reasonable and accurate.*

<u>Conclusion</u>

- "Was there anything that could have prevented this event from occurring?
  - "There is no evidence that this event could have been prevented. The potential impact of maintaining the neck in a neutral position 100% of the time is at best uncertain."
    - *The questions posed to the Independent Advisor have to do with departures from the standard of care and accepted practice. At several points in [Mr A]'s care, the standard of care and accepted practice were not followed. I agree that the outcome would likely have been the same; however, this does not mitigate the need for improved processes and documentation that follow the standard of care and accepted practice within Australasia.*

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Te Hononga Whētuki ā-Motu
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July 2018

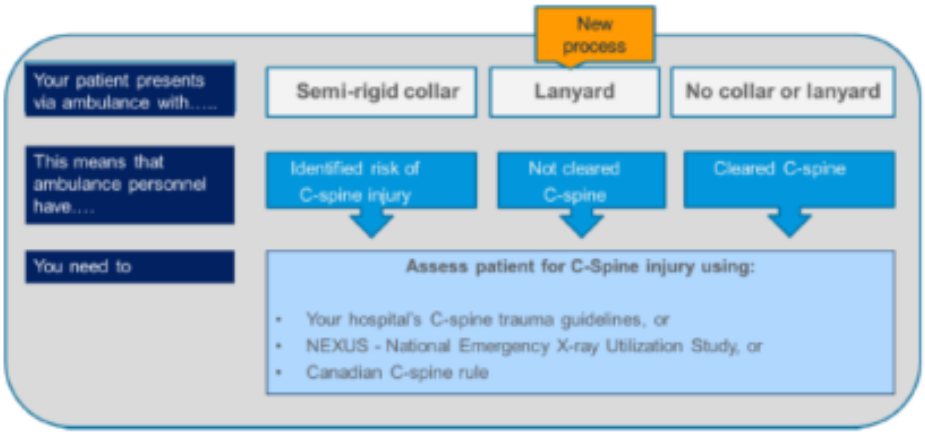
Position statement on
In-hospital clearance of potential cervical spine injury

The Major Trauma National Clinical Network has formulated this position statement to clarify in-hospital clearance of the cervical spine in trauma patients. The 2017 introduction of the new Cervical Spine Immobilisation guidelines by ambulance services has resulted in some confusion and variation in practice for how patients are managed once they reach hospital. The confusion has occurred largely because of the new process whereby ambulance services have moved away from routine placement of cervical collars and instead use a lanyard to indicate a patient they have not been able to clear clinically from a cervical spine injury. In principle there should be alignment of the pre-hospital, emergency department and in-hospital processes of assessment and clearance for the potential cervical spine injured patient.

All trauma patients who arrive in the Emergency Department should have their spinal clearance status reassessed.

If the spine is unable to be clinically cleared (i.e. NEXUS or Canadian C-spine rules), then the patient will require imaging according to local guidelines. For alert and cooperative patients, a visual indicator such as a lanyard may be all that is required while awaiting clearance. For others, measures to restrict cervical spine motion may be used during this process. The nature of these measures (log rolls, sandbags, tape, or placement or a cervical collar) will depend on the clinical state of the patient and the assessed risk of cervical injury.

If clearance of the cervical spine has not occurred by the time the patient is transferred out of the Emergency Department as an inpatient, then a properly fitted orthotic collar should be placed. Lanyards should not move beyond the Emergency Department (or radiology whilst under Emergency Department care).



Appendix B: Summary of findings of independent AER review

- The spinal cord injury did not occur immediately at the time of the accident, but at some time during the treatment and investigation of Mr [A]'s injuries at hospital.
- The triage process was appropriate, including the placing of a yellow lanyard on Mr [A]'s neck to indicate possible neck injury.
- Documentation reflects a thorough initial clinical assessment by the ED registrar with appropriate caution for a cervical spine injury. There was no mention of neck pain to alert the clinical team to a spinal fracture at this stage.
- Cervical spine fractures are unlikely to be visible on a chest X-ray.
- When [Mr A] was log rolled during the ED registrar's examination, correct technique was used and there was no deterioration neurologically during the movement.
- The investigations ordered by the ED registrar were appropriate. Prior plain x-rays might have identified the fractures prior to displacement. Subsequent CT would have been required, and the outcome would almost certainly have been the same as he would have needed to lay flat.
- A wait of two hours for semi-urgent CT would not be unusual in other EDs around NZ for cases that are not major trauma and without evidence of neurological deficit.
- Even if spinal cord involvement had been suspected when [Mr A] reported pain in his right ring finger, there would not be any alteration in the need for CT imaging with spinal precautions.
- It is likely that [Mr A] suffered displacement of his fracture when lying on the CT table, as it was likely the first time that he was required to extend his neck (despite the support of a pillow).
- There is no device available to allow the cervical spine to be held in a flexed position during CT scan of the spine under spinal precautions.
- Once the severe C6-7 fracture displacement was identified on the CT, care was escalated, and he was not moved until assessed by the Orthopaedic Registrar.
- Ankylosing spondylitis is recorded in the literature as a risk factor for spinal cord injury after cervical spine fracture, but it is still very rare. However, because ankylosing spondylitis is seen as a risk factor for cervical spine fracture after minor injury – it is often included in clinical guidelines as a red flag so staff have additional awareness of the potential for injury.
- There is no device available to allow the cervical spine to be held in a flexed position during CT scan of the spine under spinal precautions.