

District Health Board
Emergency Physician, Dr C
Senior Medical Officer, Dr D

A Report by the
Health and Disability Commissioner

(Case 15HDC00417)



Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

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Executive summary

1. Mrs A had awoken with a tight chest, a dull ache in her left shoulder, and an inability to catch her breath. She had a recent history of a chesty cough, shortness of breath, and chest tightness. An ambulance was called and took Mrs A to the Emergency Department (ED) at the public hospital.
2. Mrs A was seen by a consultant emergency physician, Dr C. Dr C ordered a chest X-ray “for when available”. Dr C had not documented his clinical impression and the diagnoses he considered and/or excluded. When the shift changed, Mrs A’s care was handed over to Senior Medical Officer (SMO) Dr D.
3. Dr D reviewed the X-ray and thought that there were no new abnormalities shown. He made the decision to discharge Mrs A. At the time he made the decision to discharge Mrs A, a formal radiologist review of her X-ray had not yet been reported. Dr D made the decision to discharge Mrs A without any known cause as to her presentation.
4. Shortly after the decision had been made to discharge Mrs A, the formal radiology review of her X-ray identified a large left pneumothorax. This was sent electronically to Dr C’s inbox.
5. Dr D did not read the X-ray report, as it was sent only to Dr C and the GP, and he was not aware that it was ready for review. He went on to discharge Mrs A home with advice to follow up with her GP or to “come back if any concerns”.
6. Mrs A’s GP practice saw Mrs A’s discharge summary and X-ray result from the DHB’s ED, and contacted Mrs A to advise her to return to ED.
7. Mrs A returned to the hospital and was seen by SMO Dr E. Dr E arranged for a second chest X-ray to be performed to ascertain whether the pneumothorax was persisting. He further arranged for a CT scan of the chest to be performed to confirm the diagnosis.
8. The CT showed a large left pneumothorax. Dr E decided to drain the pneumothorax, and proceeded to insert a drain into Mrs A’s chest to re-inflate the lung.
9. When Dr E first attempted to place the chest drain, he aspirated air from the chest cavity and, on removing the syringe, did not hear an audible rush of air. He opened a second kit and, on entering the chest cavity he was able to withdraw air. However, Mrs A began to have difficulty breathing. Following the removal of the needle from her chest, Mrs A went into cardiac and respiratory arrest.
10. Sadly, Mrs A later passed away.

Findings

11. For discharging Mrs A without any known cause as to her presentation, Dr D was found to have breached Right 4(1) of the Code.
12. Adverse comment was made regarding Dr C’s documentation. It was found that it did not assist in ensuring the continuity of Mrs A’s care.

Recommendations

13. It is recommended that Dr D undertake an audit of the last three months of his clinical documentation, in order to identify any patients who may have been discharged without a presumed diagnosis, and whether adequate discharge instructions were provided. The results of the audit are to be reported back to this Office.
 14. Dr D is also to provide a written apology to Mrs A's family.
 15. It is recommended that the DHB evaluate the mechanisms by which follow-up and review of results occur, and report back to this Office regarding the evaluation.
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Complaint and investigation

16. The Commissioner received a complaint from Ms B about the services provided to her mother by a district health board (DHB). The following issues were identified for investigation:

- *Whether the DHB provided an appropriate standard of care to Mrs A in 2014.*
- *Whether Dr C provided an appropriate standard of care to Mrs A in 2014.*
- *Whether Dr D provided an appropriate standard of care to Mrs A in 2014.*

17. The parties directly involved in the investigation were:

Ms B	Complainant/consumer's daughter
DHB	Provider
Dr C	Emergency physician
Dr D	Senior medical officer

Also mentioned in this report:

Dr E	SMO
Dr F	Radiologist
RN G	ED staff nurse
Dr H	Emergency medicine specialist

18. Information was reviewed from:

The Coroner
Second district health board
ACC

19. Independent expert advice was obtained from an emergency medicine specialist, Dr Stuart Barrington-Onslow (**Appendix A**).
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Information gathered during investigation

Background

20. Mrs A, aged 58 years at the time of these events, had a complex medical history including a previous right lung pneumonectomy (removal of her entire right lung) and breast cancer.
21. During the early hours of the morning, Mrs A awoke with a tight chest, a dull ache in her left shoulder, and an inability to catch her breath, which was much worse when lying down.

Ambulance

22. An ambulance was called, and was dispatched at 2.55am, arriving at 3.14am. The ambulance patient report form documents that Mrs A's chief complaint was shortness of breath, and that recently she had had a viral chest infection and had finished a course of antibiotics for that. Her symptoms of waking up with a tight chest, a dull ache in her left shoulder, and being unable to catch her breath, particularly when lying down, were also documented.
23. Paramedics examined Mrs A and documented that she was conscious, alert, and mobile. It was noted that she had an increased respiratory rate of 24 breaths per minute, with other vital signs documented as being within acceptable limits, including oxygen saturation of 97% on air, pulse of 79 beats per minute (bpm), and blood pressure of 143/91mmHg. She was administered aspirin and glyceryl trinitrate¹ (GTN), but it was noted that this did not improve her chest tightness. During transport she was noted to be "comfortable en route".

Arrival at the public hospital Emergency Department (ED)

24. At 3.56am the ambulance arrived at the Emergency Department of the public hospital. An ED staff nurse, a registered nurse (RN), noted that Mrs A presented with shortness of breath and chest tightness. Mrs A was given a triage category of 3.² It is documented that Mrs A was speaking in short sentences, and previously had had her right lung removed, a lumpectomy of her left breast in 2011, and radiotherapy and chemotherapy in 2012. The RN organised for blood tests to be taken, and for an electrocardiogram³ (ECG), which was carried out at 3.58am. The results of the ECG were normal. A full set of vital signs showed an increased respiratory rate of 20 breaths per minute, and other vital signs within normal ranges (a pulse of 71bpm, blood pressure of 124/68mmHg, and oxygen saturation of 98% on room air).
25. By 4.30am it was noted that Mrs A was speaking in long sentences, and that she needed to sit upright to breathe normally.

Dr C

Diagnosis

26. At around 4.30am Mrs A was seen by a consultant emergency physician, Dr C. Dr C told HDC that he was the sole doctor on duty at the ED overnight, responsible for the care of 20–22 patients, 10 of whom arrived between midnight and 7am requiring assessment.

¹ A medicine used for the treatment of angina and heart failure.

² Presentation considered "potentially life-threatening, potential adverse outcomes from delay > 30 min, or severe discomfort or distress", to be seen within 30 minutes of presentation.

³ A diagnostic tool used to assess the electrical and muscular functions of the heart.

27. Dr C documented on Mrs A's medical record that Mrs A presented with tightness across her chest and shortness of breath. He also noted Mrs A's history of a chesty cough, shortness of breath, and chest tightness from the beginning of the previous month, and her more recent chest infection and treatment with antibiotics and steroids (prednisone), which had finished the previous day. He documented that her chest tightness resolved after about 20 minutes, which Mrs A told him she attributed to her sitting upright. This also improved her breathing, but not to her baseline level on arrival at the ED (which, as noted above, had been 20 breaths per minute).
28. The examination findings were noted as being decreased breathing on the right (secondary to her previous surgery), and decreased air entry on the left.
29. Dr C told HDC that during this presentation he also reviewed Mrs A's medical information collected thus far for this presentation, including her ambulance transport history, triage and nursing notes, and her past medical history from the DHB's computer system. He said that he reviewed the ECG that had been taken already, and stated that he checked on Mrs A several times with respect to her symptoms and to update her on test results.
30. Dr C also told HDC that he discussed with Mrs A "several conditions that might have been causing her symptoms and a plan to assess for these and other potential diagnoses". Although not documented in the clinical notes, Dr C told HDC that he had a diagnostic pathway. He told HDC:

"I remember having the conversation but not the exact words. In ED I have seen many patients with chest pain and shortness of breath. My discussion with [Mrs A] would have been consistent with my normal practice for patients with these symptoms and tailored to her history and exam. My updates to her on test results during her visit would likewise have included the impact of the results on the ongoing assessment for her diagnosis.

My initial discussion with [Mrs A] would have identified the most serious potential causes, such as a PE,⁴ ... and other more likely causes such as infection, lung effusion (fluid) and anaemia. It would not have included causes in either category that I could assess her for and determine as unlikely based on my history and exam alone ... It also would not have included less likely diagnoses for purposes of expediency ... based on her history, vital signs and exam. Nonetheless, I would have continued to assess for these and numerous other potential diagnoses during her visit."

31. Dr C told HDC that he considered and evaluated several diagnoses, including those mentioned above (infection, lung effusion, and anaemia), but he said that "none seemed to fit for [Mrs A] at the time".
32. Dr C stated: "My evaluation of potential diagnoses for [Mrs A's] condition was based on my experience and interpretation of the information in the Clinical Record." In addition, he told HDC: "[M]y basis for assessing potential diagnoses of [Mrs A's] symptoms is clear in my EDS [electronic discharge summary] and the rest of the Clinical Record as I interpreted it in the context of my interactions with [Mrs A]."

⁴ Pulmonary embolism — a blockage in one of the pulmonary arteries in the lung.

33. Dr C ordered a chest X-ray “for when available”. He told HDC that an X-ray is a standard test to assess for multiple potential diagnoses in a patient with chest tightness and shortness of breath.
34. A single troponin-T test⁵ was taken at 4.30am, 34 minutes after Mrs A’s arrival in ED. Dr C told HDC that this test was part of a predetermined⁶ request made by a nurse, owing to Mrs A presenting with chest pain. The result, which Dr C told HDC was noted at 6.00am, was <5ng/L.⁷ Dr C told HDC that this is the lowest possible reading, and that the result was normal.
35. Dr C said that a single troponin-T test can be clinically relevant with respect to assessing ED patients like Mrs A for ischaemic heart disease, with sufficient time between onset of symptoms and the test, and for other conditions. The test was not repeated.
36. A D-dimer test (a test used when there is a concern about blood clots, in this case pulmonary emboli or blood clots in the lungs) was also taken as part of the predetermined test request. The result was documented as positive (0.56mg/L,⁸ which was slightly elevated).⁹ There is nothing further documented regarding the result.
37. Dr C told HDC that laboratory abnormalities should be acknowledged in the ED notes, but only if they are significant and without other explanation apparent in the notes. In addition, he said that, due to Mrs A’s age, it would allow for adjusting her D-dimer upper limit of normal to 0.60mg/L. He said: “Even without adjustment, the test has such a low specificity ([a] high false positive rate) for various conditions [so] it is generally only useful when it is negative. ... I do not think a comment on [Mrs A’s] D-dimer result in the EDS ... would have provided any useful information relating to her ED care.”
38. Dr C told HDC: “This blood test was actually the only one of 29 [blood tests] for [Mrs A] that was outside [the public hospital’s] ED lab normal limits.”

Handover of care

39. At 7.00am the shift changed, and Mrs A’s care was to be handed over to the oncoming senior emergency doctor. Dr C documented that he would transfer Mrs A to the oncoming doctor for review of the arranged chest X-ray and to review Mrs A’s disposition. Dr C told HDC that the radiographer was not due on site until 7.30am.
40. Senior Medical Officer (SMO) Dr D was the on-coming senior doctor who took over Mrs A’s care.

⁵ A test taken to exclude ischaemic heart disease. Current guidelines state that two negative tests are required to exclude ischaemic heart disease. For example, BMJ 2015; 350:h15.

⁶ A predetermined group of medical tests carried out automatically as an aid in the diagnosis and treatment of a particular disease based on a patient’s presenting symptoms (in this case, chest pain). The various tests are typically related in some way by the medical condition they are intended to help diagnose.

⁷ Nanogram/litre.

⁸ Milligram/litre.

⁹ Normal being <0.50mg/L.

41. Dr C told HDC that he and Dr D had a formal face-to-face handover at approximately 7am. Dr C said that this consisted of all patients then in the ED, including Mrs A. The DHB stated: “This handover would have included her presenting complaint, past history, hospital course, assessment and plan.” It also said: “[Dr C] noted [Mrs A] was not reviewed at her bedside, because he believed at the time she was sleeping comfortably in a stable condition.”

42. Dr D told HDC:

“[Dr C] did hand the patient over to me with history of SOB
Multiple GP Visits and course of antibiotic and prednisone
She was waiting for chest X ray.”

43. At 7.45am, an RN documented in the nursing notes that Mrs A’s chest was still “a little tight”.

Chest X-ray reviewed

44. At 7.50am, a chest X-ray was taken and, shortly afterwards, it was reviewed by Dr D. Dr D thought that there were no new abnormalities shown on the X-ray. He documented, “No change from previous X-ray” (an X-ray had been taken a few weeks earlier).

Discharge

45. Dr D told HDC that based on Mrs A’s stable vital signs, independence with mobilising, no ongoing complaints or concerns, and her expressed wish to go home, he made the decision to discharge her. Dr D completed Mrs A’s EDS at 9.33am. Dr D told HDC that at the time he made the decision to discharge Mrs A, a formal radiologist review of Mrs A’s X-ray had not yet been reported. He said he assumed that the report would be followed up by Dr C when he was next on duty.

46. Shortly after the decision had been made to discharge Mrs A, the radiologist, Dr F,¹⁰ finalised his formal radiology review of Mrs A’s X-ray. He identified a large left pneumothorax.¹¹

47. At 9.49am Dr F’s radiology report noting “a large left pneumothorax” was sent electronically to Dr C’s inbox. The DHB told HDC: “This was probably a faster turn around than would normally be expected for the formal radiology report.” The DHB also told HDC that part of the ED process includes all results being checked by the ED staff who requested them, after they are reported formally. Therefore, a copy of the X-ray report was sent only to Dr C (the requesting clinician).

48. Dr F advised HDC that he cannot recall advising anyone verbally of the X-ray result, as he “presumed the patient was still in ED”. A copy was also automatically sent to Mrs A’s GP practice (the medical centre).

¹⁰ An external radiologist who provides remote radiology reporting services to the radiology service (which is contracted to provide all radiology services to the DHB).

¹¹ A pneumothorax is a collection of gas, usually air, which lies between the inner side of the chest wall and the outer side of the lung; it is often referred to as a “collapsed lung”.

49. Dr D did not read the X-ray report, as it was sent only to Dr C and the GP, and he was not aware that it was ready for review. At 10.00am Dr D discharged Mrs A home with advice to follow up with her GP or to “come back if any concerns”. Advice to her GP, as documented on the EDS, was to follow the radiology report and to recheck Mrs A the following week.

The DHB’s “Clinical Management of Tests and Investigations Policy”

50. The DHB’s relevant policy in place at the time of these events included the following paragraphs:

“Guiding Principles

9. The named clinician ‘will still be responsible for the overall management of the patient’ (MCNZ) including the review and actioning of any result of the tests/investigations in a timely manner.

...

Policy

11. The clinician has the primary responsibility to keep the patient informed regarding the reasons for the tests, the results and the actions that follow from the results.

...

Patients

...

13. Patients have the right to be informed of all (emphasis in original) test and investigation results.”

Second visit to ED

51. Mrs A’s usual GP at the medical centre was away on leave at the time of Mrs A’s first admission, and another doctor at the practice was responsible for checking his inbox. The second GP told HDC that she saw Mrs A’s discharge summary and X-ray result from the ED in the inbox.
52. The second GP asked her nurse to contact Mrs A to advise her to return to ED.
53. At 6.09pm that day, the nurse contacted Mrs A and explained to her that on the basis of the X-ray report, she needed to return to ED. The X-ray result was faxed from the medical centre to the ED reception at the public hospital.
54. As Dr C had completed his rostered shift at 7.00am, Mrs A’s X-ray results had not yet been checked by him (as the requesting clinician). Therefore, no one at the public hospital had reviewed Mrs A’s X-ray report prior to Mrs A’s GP practice reviewing the report and alerting Mrs A of the missed pneumothorax.
55. At 7.50pm, Mrs A arrived at the public hospital and was assessed by ED staff nurse RN G and given a triage category of 3. Her earlier visit was noted, as was the concern about a pneumothorax.

56. A full set of vital signs was carried out, which showed an increased respiratory rate of 22 breaths per minute and decreased oxygen saturation of 92% on room air. RN G also noted that Mrs A had moderate distress when breathing, although she was able to speak in full sentences. Her other vital signs remained within normal limits — including her pulse and blood pressure.
57. Mrs A was seen by SMO Dr E, who retook her history and re-examined her. Dr E arranged for a second chest X-ray to be performed. He indicated that this was to “[q]uery left-sided pneumothorax persisting”. The X-ray was taken at 8.52pm. Dr E documented in Mrs A’s medical record: “[Chest X-ray]: unclear if pneumothorax exists on the current film.” In view of this uncertainty, Dr E arranged for a CT scan of the chest to be performed to confirm the diagnosis. He told HDC: “Because I knew this patient had at baseline unusual lung anatomy¹² and no right lung, I wanted to make certain we were not dealing with a bleb¹³ or some other lung pathology that mimicked a pneumothorax.” It was noted that Mrs A was stable, and so it was presumed safe to proceed with a scan.
58. Dr E recorded in a statement to the Coroner:
- “[Mrs A] did not appear haemodynamically unstable¹⁴ but I was well aware that this was an urgent condition that required rapid analysis and management.
- ...
- [B]ecause she appeared haemodynamically stable with good oxygen saturations ... [m]y feeling was that the added 20 minutes or so to obtain this study was worthwhile in order to prevent the potentially inappropriate drainage of a chest in a patient with only one lung.”
59. The DHB also told HDC that obtaining a CT scan was worthwhile in order to prevent the potentially inappropriate drainage of a chest in a patient with only one lung.
60. A CT scan was performed at 9.25pm. Nursing notes document that [Mrs A] was transferred to and from the CT “with no problems. No complaints of pain.”
61. The CT showed a large left pneumothorax. Dr E decided to drain the pneumothorax. Following the decision, Dr E proceeded to insert a drain into Mrs A’s chest, to re-inflate the lung.
62. Dr E told HDC that at the time he initiated the chest drain insertion procedure, Mrs A was showing no signs of difficulty with her breathing. Contrary to this, however, ED staff nurse RN G’s nursing notes state: “Assisted [Dr E] ... with chest drain insertion — [Mrs A] struggling lying down flat as hard to breath — encouraged with deep breaths.” However, RN G told HDC that Mrs A remained stable and comfortable right up until the insertion of her chest drain. RN G said: “It was only when she was laid flat for the chest drain insertion that she became less comfortable but she was initially able to cope with reassurance.”

¹² Mrs A had surgical clips in place from when she had her right lung pneumonectomy.

¹³ A bubble, bulge, or protrusion of the plasma membrane of a cell.

¹⁴ Haemodynamic stability refers to blood pressure.

63. Inserting a chest drain involves inserting a hollow needle into the chest cavity, using a syringe to withdraw (aspirate) the air from the cavity, then advancing a dilator into the chest cavity to dilate the tissues to allow placement of a drain. The dilator is removed, and the drain is inserted and attached to the body.
64. In his statement to the Coroner, Dr E said that when he first attempted to place the chest drain, he aspirated air from the chest cavity and, on removing the syringe, did not hear an audible rush of air. Mrs A's clinical notes state that Dr E had difficulty with the first attempt owing to a kink in the guide wire (the wire is used to help guide the dilator into the chest cavity). He told HDC that, as the guide wire kinked, he was not certain that it was in the correct location, and therefore he "immediately opened a second kit" and, on entering the chest cavity (and placing the needle into the same hole), he "immediately was able to withdraw air". He told HDC that at this time Mrs A was still not showing any signs of difficulty with her breathing. He further said that he believes there were only one to two minutes between the first and second attempt at inserting the chest drain. RN G told HDC that she obtained the second chest drain kit from within the room.
65. With the second insertion, it was noted in the medical record that air was aspirated, and that when the syringe was removed, there was "an audible rush of air out of the needle lumen", indicating re-expansion of the lung. Dr E said: "This is the point at which I believe [Mrs A's] pneumothorax was either partially or completely drained, and also the point at which she began to have difficulty breathing. Her oxygen saturations dropped rapidly."
66. RN G told HDC:
- "It was during the second chest drain insertion that [Mrs A] suddenly became more acutely short of breath and very anxious. I relayed this to [Dr E] and said that she would need to be sat up. He said that he almost had the drain in but almost at that same moment, [Mrs A] went into a PEA [pulseless electrical activity] arrest.¹⁵ This was a very rapid and unexpected deterioration that took place over a period of about a minute."
67. Following the removal of the needle from her chest, Mrs A went into cardiac and respiratory arrest.
68. Dr E removed the needle from Mrs A's chest and ventilated her while another clinician was called to drain her chest. A surgical registrar successfully inserted a chest drain to release the trapped air. Mrs A then received CPR for 10–15 minutes, and was resuscitated and transferred to the intensive care unit (ICU) and ventilated overnight. The following morning, Mrs A was extubated.¹⁶ Over the next five days Mrs A remained in ICU, where she made slow progress. Her main complaint was a headache. A CT scan of her brain was carried out, and showed changes consistent with an infarction and a hypoperfusion injury.¹⁷
69. Mrs A was discharged to another hospital for further management by the cardiothoracic team. Mrs A experienced a cardiac arrest on the ward. She was resuscitated and intubated, but she passed away.

¹⁵ Also known as cardiac arrest.

¹⁶ Removal of the breathing tube used to ventilate Mrs A.

¹⁷ An inadequate supply of blood to the brain, which in turn causes oxygen deprivation.

Further information

70. The DHB's Department of Emergency Medicine reviewed these events at the department's Morbidity and Mortality meeting. A case review carried out by a consultant surgeon reported that after reviewing the post mortem report there is no evidence that would indicate whether the attempted insertion of the drain had caused damage that may have related to Mrs A's arrest. He concluded: "I can only assume that the arrest was on the basis of the chronic pneumothorax and that it had been present for at least 15 hours and it may have deteriorated at the time of the attempted insertion of the intercostal drain."
71. It was documented that the insertion of the chest drain was the appropriate treatment, and that the deterioration was an unpredictable and unfortunate consequence of Mrs A's unique anatomy, and the absence of a second unaffected lung as the affected lung re-expanded.
72. Following these events, the DHB made the following changes:
 - Incorporated the review of X-rays showing pneumothorax into the ED medical staff teaching programme.
 - Incorporated additional education on chest drain insertion into the ED medical staff teaching programme.
 - Lowered the threshold for requesting specialist review for hospital admission.
 - The ED changed the brand of wire-guided chest drain kits it stocks.
 - ED doctors are reminded to review delayed diagnostic test results such as radiology reports and culture results as quickly as possible after they become available.
73. The DHB said that it has considered the mechanisms by which follow-up of unexpected test results can and should be notified to referrers, and accepted that there may be further work to do in this regard. It said that its Radiology service verbally reports unexpected findings, but that Mrs A's result (of a pneumothorax) would not be considered an unexpected finding in the ED setting.
74. The DHB said that it acknowledged and apologises for its failure to detect Mrs A's pneumothorax and, by association, for her premature discharge after her first presentation to ED.
75. Dr C told HDC that he reiterated his condolences and apology to Mrs A's family for their loss. He said that he distinctly remembered admiring her for having faced the challenges of cancer and removal of her right lung, and continuing to live a full life with her work and family.
76. Dr D told HDC that following these events he made certain changes to his practice and service. Of particular relevance, he said: "I am ... more careful in the interpretation of x-rays and now have a lower threshold for seeking immediate review by a radiologist." He stated:

"I acknowledge that the review of X-rays is an integral part of the work of a senior emergency physician and I deeply regret that the pneumothorax was missed by me and I apologise unreservedly for this. I would like to extend my sincere condolences to [Mrs A's] daughter [Ms B] and her extended family for their loss."

Responses to provisional opinion

77. Ms B, Dr C, Dr D, the DHB, and all other relevant clinicians at the DHB were given the opportunity to respond to relevant sections of my provisional opinion.
 78. Ms B, the DHB, and Dr D responded, and their submissions were considered and incorporated as appropriate.
- Dr C*
79. Dr C provided a response including a report from Dr H, a vocationally registered specialist in Emergency Medicine.
 80. Dr H reviewed HDC's expert advice (obtained from Dr Stuart Barrington-Onslow — referred to below) and provided a number of comments.
 81. In relation to the role of an emergency physician in rural areas, Dr H noted that if emergency physicians were "required to document every diagnostic thought process and pathway they would not only write unnecessarily long notes but they would struggle to get through the job of treating patients". He also noted that the role of the emergency physician was "less one of diagnosis but more one of determining which patients require hospitalisation".
 82. In Mrs A's case, Dr H is of the opinion that it would not "be an expected standard of care to document a differential diagnosis, a diagnostic pathway or a definitive diagnosis in every case of shortness of breath and chest tightness — particularly when the symptoms had been 'on and off' for weeks". However, Dr H did note that "a notable omission from the EDS [recorded by Dr C] is the lack of a 'clinical impression'", although he further states that an X-ray was indicated in Mrs A's case and would have provided the "most contribution to the clinical impression".
 83. Regarding the results of Mrs A's D-dimer test, Dr H stated that, in his opinion, the level reported "can be considered within a normal range for a patient aged 58".
 84. Dr H expressed the view in relation to the troponin-T and the D-dimer tests — neither of which were requested by Dr C — that the results were irrelevant and correctly ignored by Dr C.
 85. In response to my provisional opinion, Dr C submitted that a provider is not in breach of the standards if they have taken reasonable actions to comply with their duties, and that in assessing whether reasonable action has been taken, consideration should be given to the resources available to the provider, and the clinical circumstances.
 86. In this regard, Dr C submitted that his situation was very different from "an Emergency Department in a tertiary hospital, where a consultant may have a number of registrars and house surgeons to delegate some or all of these tasks to", and that "there was a good hand-over where key information was verbally conveyed to all of those coming on to the morning shift".
 87. Dr C submitted in relation to MCNZ guidelines that they were used in my report "as if all of the steps set out by the council should have been completed in this two and half hours".

88. Dr C submitted that Dr Barrington-Onslow cited incorrect statements regarding the D-dimer test and did not consider age-related adjustment. Dr C highlighted instead Dr H's view that the D-dimer test "can be considered" within a normal range for Mrs A's age.
 89. In relation to the use of a single troponin-T test, Dr C cited Dr H's view that "it is correct to say that serial Troponin tests are used to exclude cardiac damage ... However they must be used intelligently and when indicated." In relation to documentation, Dr H said: "It is a counsel of perfection to document that the test was not indicated — but not to do so is not a significant variation from accepted practice."
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Opinion: Dr C — Adverse comment

90. Mrs A had had her right lung removed previously. During the early hours of the night, she woke up with a tight chest, a dull ache in her left shoulder, and an inability to catch her breath. An ambulance was called, and paramedics found her to have shortness of breath and an increased respiratory rate. The ambulance took Mrs A to the ED at the public hospital.
91. At around 4.30am, Mrs A was seen by a consultant emergency physician, Dr C. Dr C documented that Mrs A presented with tightness across her chest and shortness of breath. He noted that she told him that, since the beginning of the previous month, she had been experiencing a "chesty" cough, shortness of breath, and chest tightness, and that recently she had been treated for a chest infection.
92. Dr C documented that Mrs A's chest tightness resolved after about 20 minutes. His examination findings were noted as being decreased breathing on the right (secondary to her previous surgery) and decreased air entry on the left. He ordered a chest X-ray.
93. A troponin-T test had been ordered by a nurse as part of a predetermined test request, owing to Mrs A's presentation with chest pain. The result of the test, acknowledged at 6.00am, was normal. A second test was not undertaken. Dr C did not make any record in relation to this test.
94. I note that Dr C did not order the troponin-T test. Dr H, as part of his peer report provided to Dr C, stated that the test "can be ignored by a doctor who does not feel the test was indicated". Dr H stated that while it was a "counsel of perfection to document that the test was not indicated", he concluded that it was not a significant variation from acceptable practice not to so document.
95. As part of this investigation I obtained expert advice from an emergency medicine specialist, Dr Stuart Barrington-Onslow. Dr Barrington-Onslow advised me that a troponin-T test cannot be used to exclude ischaemic heart disease without being repeated, and that current guidelines require two negative tests to exclude the diagnosis.
96. Dr Barrington-Onslow acknowledged that EDs do occasionally take a battery of tests prior to the patient being seen, to expedite the patient's journey through the ED, but said that if this

were the case then he would expect Dr C to have documented that the test was not clinically indicated.

97. I note that both Dr H and Dr Barrington-Onslow note that Dr C could have recorded his view that the test was not clinically indicated, but there is a difference in opinion as to whether it is something that would be expected in usual circumstances.
98. A D-dimer test was also undertaken. The result was slightly positive (elevated) and recorded in the clinical notes, but nothing was documented by Dr C regarding the result and what consideration had been given as to the reason it was positive.
99. Dr C said that the result was not a significant laboratory abnormality, and that therefore it did not need to be acknowledged in the ED notes. He said that really the result would be useful only if it was negative. I note also Dr H's view that the D-dimer test "can be considered" within a normal range for Mrs A's age.
100. Dr Barrington-Onslow's advice is that a D-dimer test is not very specific and, therefore, the results can be elevated for multiple reasons. He noted that in this case the result was not acknowledged or commented on.
101. At 7.00am, Dr C transferred Mrs A's care to a senior emergency physician, Dr D. It was noted by Dr C that this was to review the arranged chest X-ray and to review Mrs A's disposition.
102. Dr Barrington-Onslow advised that "there is no clear diagnostic pathway followed to explain [Mrs A's] presentation to the Emergency Department". He advised that the standard of care was to exclude the life-threatening causes of breathlessness and chest tightness, and to determine other potential causes of her symptoms. He further advised that a person presenting with acute shortness of breath and chest tightness should have several significant diagnoses excluded, and that this does not appear to have occurred in this case.
103. Dr Barrington-Onslow advised that with such a presentation as Mrs A's, he would expect an emergency physician to exclude significant illnesses such as heart failure, ischaemic heart disease (angina or heart attack), pulmonary embolism (blood clot on the lungs), chest infection, and pneumothorax (collapse of a lung).
104. Dr C said that he had a diagnostic pathway, and that he discussed with Mrs A several conditions that might have been causing her symptoms, and a plan to assess for these and other potential diagnoses. He said:

"I remember having the conversation but not the exact words. In ED I have seen many patients with chest pain and shortness of breath. My discussion with [Mrs A] would have been consistent with my normal practice for patients with these symptoms and tailored to her history and exam. My updates to her on test results during her visit would likewise have included the impact of the results on the ongoing assessment for her diagnosis.

My initial discussion with [Mrs A] would have identified the most serious potential causes ... and other more likely causes ... It would not have included causes in either category that I could assess her for and determine as unlikely based on my history and

exam alone ... It also would not have included less likely diagnoses for purposes of expediency ... based on her history, vital signs and exam. Nonetheless, I would have continued to assess for these and numerous other potential diagnoses during her visit.”

105. Dr C said that his evaluation of potential diagnoses for Mrs A’s condition was based on his experience, his interpretation of the information in the clinical record, and his interactions with Mrs A.
106. In response to my provisional opinion, Dr C again outlined what he “would have discussed and assessed”. I note that this information may have been considered. However, I am critical that none of this was documented at the time.
107. While Dr H is of the view that it would not “be an expected standard of care to document a differential diagnosis, a diagnostic pathway or a definitive diagnosis in every case of shortness of breath and chest tightness — particularly when the symptoms had been ‘on and off’ for weeks”, he has said that the expected minimum standard of documentation would include “a record of relevant observations and examination findings, a list of relevant investigations, any procedures performed, relevant progress notes/management, clinical impression ...”. Dr H stated that, in this case, the lack of recording of a clinical impression in the notes is a “notable omission”. He goes on to note, however, that it was the X-ray that was not completed during Dr C’s shift that would have made the most useful contribution to that.
108. Dr H notes that it is common practice in EDs for care to be started by one clinician and completed by another. He states that in that case the responsibility rests with the handing over doctor to make it clear and to document expectations of the doctor taking over patient care. I note that there was no documentation of what Dr C considered to be the cause of Mrs A’s presentation, and what he had excluded (and why).
109. Professional and legal standards for clinical documentation are very clearly established. The Medical Council of New Zealand (MCNZ) publication *The Maintenance and Retention of Patient Records* (August 2008) notes the importance of clinical records for ensuring good care for patients, and requires doctors to keep “clear and accurate patient records that report: relevant clinical findings; decisions made; information given to patients; any drugs or other treatment provided”. Furthermore, the MCNZ publication *Good Medical Practice* outlines at standard 5 that doctors must keep clear and accurate patient records that report (amongst other things) the:
 - “relevant clinical information
 - options discussed
 - decisions made and the reasons for them
 - information given to patients
 - the proposed management plan”¹⁸
110. *Good Medical Practice* also discusses the importance of continuity of care. Standard 50 states that doctors must work “collaboratively with colleagues to improve care, or maintain good care for patients, and to ensure continuity of care wherever possible”. This includes that when transferring care of a patient to another practitioner, the doctor must provide his or her

¹⁸ Medical Council of New Zealand, *Good Medical Practice* (April 2013).

colleague with appropriate information about the patient and the patient's care; in addition, the doctor must document all transfers appropriately.

111. Even noting Dr H's statement that the role of the emergency physician is less diagnosis and more about determining whether hospitalisation is required, as Mrs A's initial health provider during her initial visit to the ED, Dr C was responsible for maintaining her continuity of care.
112. While Dr C and Dr D had a formal face-to-face verbal handover of all patients, including Mrs A, Dr C's clinical notes are inadequate, and provide little useful information to ensure the continuity of Mrs A's care.
113. In his response to my provisional opinion, Dr C stated that Dr Barrington-Onslow advocated for a "standard of excellence in note taking". Dr C also said that his situation was very different from "an Emergency Department in a tertiary hospital", a position supported by Dr H, who stated that if emergency physicians were required to document every diagnostic thought process and pathway, they would struggle to treat patients.
114. I note Dr Barrington-Onslow's comments agreeing that "it is not reasonable to expect an exhaustive differential diagnosis". Despite this, he comments: "[F]rom the notes ... I had no idea what the clinician thought was the cause of the presentation." I agree.
115. While I acknowledge the submissions above, documenting the presumed cause of a patient's presentation and supporting information to ensure continuity of care for that patient is a basic requirement in any setting. In my view, Dr C did not take reasonable actions to comply with his duties in regard to continuity of care and documentation.
116. Dr C has not documented his clinical impression and the diagnoses he considered and/or excluded. There is no clear diagnostic pathway documented and, therefore, nothing to guide other physicians in providing care to Mrs A. I am critical of the standard of Dr C's documentation, and consider that this did not assist in ensuring the continuity of Mrs A's care.

Opinion: Dr D — breach

Background

117. Mrs A had had her right lung removed previously. During the early hours of the night, she woke up with symptoms of a tight chest, a dull ache in her left shoulder, and an inability to catch her breath. An ambulance was called, and Mrs A was taken to the ED at the public hospital.
118. At 7.00am, the senior emergency physician, Dr D, took over the ED care of Mrs A at the public hospital. Mrs A had been under the care of Dr C who, when he ended his shift, transferred her care to the next incoming doctor.
119. At 7.45am Mrs A's chest was still a "little tight".

120. A chest X-ray, previously ordered by Dr C, was taken at 7.50am and reviewed by Dr D. Dr D thought that there were no new abnormalities on the X-ray.
121. As part of this investigation, I obtained expert advice from an emergency medicine specialist, Dr Stuart Barrington-Onslow. Dr Barrington-Onslow reviewed Mrs A's X-ray and advised: "[A]lthough we cannot expect perfection when Emergency Physicians review X-rays, it is an integral part of our work and I am surprised that the pneumothorax was not appreciated by a senior Emergency Physician on the X-ray image I received."
122. Dr D has said that he is now more careful in the interpretation of X-rays, and that he has a lower threshold for seeking immediate review by a radiologist.
123. I note Dr Barrington-Onslow's advice that the review of X-rays is an integral part of a senior emergency physician's work, and that he was surprised that the pneumothorax was not appreciated by Dr D. While I am pleased that Dr D has since lowered his threshold for seeking review by a radiologist, I am critical that, as a senior physician, Dr D failed to appreciate the pneumothorax identified on the X-ray.

Discharge

124. At around 9.30am, Dr D made the decision to discharge Mrs A. He said that this was because Mrs A's vital signs were stable, she was independent mobilising, she had no ongoing complaints or concerns, and she had expressed a wish to go home. Dr D completed Mrs A's EDS at 9.33am. At this stage, Mrs A's X-ray results had not yet been reported formally. Dr D said he assumed that the report would be followed up by Dr C when he was next on duty.
125. At 9.49am, the formal radiology report for the X-ray was made available electronically to Dr C's inbox (as he was the requesting clinician). The DHB said that this was "probably a faster turn around than would normally be expected for the formal radiology report".
126. The report identified a left pneumothorax. The radiologist, Dr F, did not advise anyone verbally of the X-ray result, as he presumed that Mrs A would still be in ED. I note that the DHB said that the result would not be considered an unexpected finding in the ED setting and, therefore, would not normally be reported verbally anyway.
127. I note Dr Barrington-Onslow's advice that it is normal in the ED setting that requesting clinicians are responsible for checking on their requested reports.
128. At 10.00am Dr D discharged Mrs A home with advice to follow up with her GP or to return to the ED if she had any concerns. The EDS that was sent electronically to Mrs A's GP advised her GP to follow the radiology report and to recheck Mrs A the following week.
129. Dr Barrington-Onslow said that it was not appropriate to discharge Mrs A from ED, as there was no explanation for her symptoms. He advised that there was no "obvious exclusion of significant diseases", and considered this to be a severe departure from accepted standards. Dr Barrington-Onslow also advised me that the discharge instructions were "vague being neither specific in time or circumstances", and that this was a moderate departure.
130. Dr D discharged Mrs A without any known cause as to her presentation. I am critical that Mrs A was discharged without the exclusion of significant diseases. There was no explanation of

what had been considered and excluded, and no documentation regarding her potential diagnosis. Furthermore, I am critical that little information was given to Mrs A regarding any discharge instructions. Mrs A had a complex medical history and presented with symptoms of shortness of breath and chest tightness, yet she was discharged with no clear diagnosis as to the cause of her presentation. Mrs A had the right to be provided services with reasonable care and skill. In my view, Dr D should not have discharged Mrs A in these circumstances, and I find that he breached Right 4(1) of the Code.

Opinion: District Health Board — other comment

Clinical care — no breach

131. Under the Health and Disability Commissioner Act 1994, employers are vicariously liable for the actions or omissions of their employees. At Mrs A's initial presentation to the DHB, she was reviewed by two senior clinicians. I consider that the relevant policies the DHB had in place were adequate, and that the DHB was entitled to rely on Dr D and Dr C to investigate the causes of Mrs A's presentation adequately, provide adequate discharge instructions, and ensure that their documentation was to standard. I therefore consider that the DHB had taken such steps as were reasonably practicable to prevent the acts and/or omissions of their employees.

The DHB's systems

132. At around 9.30am, Dr D made the decision to discharge Mrs A. At this stage, the results of an X-ray requested previously by Dr C had not been reported formally. Dr D reviewed the X-ray and did not note anything of concern, and assumed that the report would be followed up by Dr C when he was next on duty.
133. At 9.49am, before Mrs A was discharged, the formal radiology report for the X-ray was made available electronically to Dr C's inbox (as the requesting clinician). The DHB said that this was "probably a faster turn around than would normally be expected". The report identified a left pneumothorax.
134. Accordingly, the formal results of the X-ray were not made available to Dr D (the doctor overseeing Mrs A at that time). I note Dr Barrington-Onslow's advice that each department would have a mechanism to check on formal radiology reports, and that in the ED setting requesting clinicians are responsible for checking on their requested reports. Therefore, while Dr C expected Dr D to review Mrs A's X-ray, there was no expectation that Dr D would see the final report. Dr Barrington-Onslow also advised that Dr C was not expected to delegate the responsibility of reviewing the X-ray report to Dr D.
135. The DHB's policy for the clinical management of tests and investigations was in accordance with Dr Barrington-Onslow's advice that requesting clinicians are responsible for checking on the reports they have requested, and Dr Barrington-Onslow advised me that this policy was "good".

136. I note that the radiologist, Dr F, said that he did not advise anyone verbally of the X-ray result, as he presumed that Mrs A would still be in ED. I take this to mean that he assumed that the report would be seen prior to Mrs A's discharge.
137. I consider that systems should ensure that the right person at the right time will see the information necessary for his or her clinical decision-making. In this case, there was a relevant report available, yet the clinician making the key decisions in relation to this patient at that time was not provided with that report.
138. The DHB did not have a system in place to alert the clinician who had overall care of that patient at the time that a formal report relevant to that patient was available. I note that the DHB has acknowledged that there may be further work to do in evaluating the mechanisms by which follow-up of unexpected results occurs, and I consider this to be appropriate.

Second visit to ED — other comment

139. Mrs A re-presented to ED after her GP practice reviewed the DHB's X-ray report identifying the pneumothorax and told her to return.
140. Mrs A was seen by an emergency medicine physician, Dr E. Dr E arranged for a second chest X-ray and a CT scan of Mrs A's chest, to confirm the diagnosis of pneumothorax. He said that he wanted to make certain that they were not dealing with some other lung pathology that mimicked a pneumothorax. Mrs A was relatively stable at the time, and so it was presumed safe to proceed with a scan.
141. Dr Barrington-Onslow advised me that as Mrs A was noted as being stable, it was appropriate for Dr E to arrange for a CT scan to confirm the diagnosis.
142. The CT scan showed a large left pneumothorax. Dr E decided to drain the pneumothorax. He aspirated air from the chest cavity and, on removing the syringe, did not hear an audible rush of air. Dr Barrington-Onslow advised me that this suggests that Mrs A had no features of a tension pneumothorax at that time.
143. Dr E had difficulty, however, due to a kink in the guide wire. Because of this he was not certain that it was in the correct location, and therefore he tried again. This time, on entering the chest cavity he was immediately able to withdraw air. He said that at this time Mrs A was not showing any signs of difficulty with her breathing.
144. With the second insertion, it was noted that air aspirated, and that when the syringe was removed, air could be heard coming out of the needle, which indicated re-expansion of the lung. Dr E said: "This is the point at which I believe [Mrs A's] pneumothorax was either partially or completely drained, and also the point at which she began to have difficulty breathing."
145. Mrs A suddenly became short of breath and very anxious. Following the removal of the needle from her chest, Mrs A went into cardiac and respiratory arrest.

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146. Dr Barrington-Onslow advised me that the gush of air during Dr E's second attempt at drain insertion "would suggest that there was some degree of tension",¹⁹ and that therefore it is possible that a tension pneumothorax occurred between the first and second attempts at placing the chest drain. Furthermore, Dr Barrington-Onslow advised me that this may explain her subsequent cardiac arrest.
147. Mrs A received CPR, and was resuscitated and transferred to ICU. A CT scan of her brain was carried out and showed changes consistent with an infarction and a hypoperfusion injury.²⁰ Mrs A experienced a further cardiac arrest. She was resuscitated and intubated, but two days later Mrs A passed away.
148. Dr Barrington-Onslow advised me that the technique used for insertion of the drain was appropriate and correct, and that Mrs A's subsequent cardiac arrest was managed appropriately. He advised that the cardiac arrest experienced during the insertion of the chest drain was not predictable from her clinical picture, and therefore not preventable. I accept this advice.
149. Guided by my expert, I have no concerns about the care provided to Mrs A on her second presentation to ED.
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Recommendations

150. I recommend that Dr D undertake an audit of the last three months of his clinical documentation, in order to identify any patients who may have been discharged without a presumed diagnosis, and whether adequate discharge instructions were provided. Dr D is to report back to this Office regarding the audit within three months of the date of this report.
151. I recommend that the DHB evaluate the mechanisms by which follow-up and review of results occur, and report back to this Office regarding the evaluation, within three months of the date of this report.
152. I recommend that Dr D provide a written apology to Mrs A's family for the failings identified in this report. The apology is to be sent to HDC for forwarding, within three weeks of the date of this report.
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¹⁹ Dr Barrington-Onslow stated that a "tension pneumothorax" is a true clinical emergency, as it can lead to death. Pressure builds up on the side of the chest where the lung has collapsed, and this pressure prevents any blood returning to the heart. Treatment is immediate decompression of the affected side by insertion of a cannula or other instrument. Symptoms in the presence of a suspected pneumothorax include the patient appearing unwell and sweaty, with an increased heart rate and decreased blood pressure and oxygen saturations.

²⁰ An inadequate supply of blood to the brain, which in turn causes oxygen deprivation.

Follow-up actions

153. A copy of this report will be sent to the Coroner.
154. A copy of this report with details identifying the parties removed, except the expert who advised on this case, will be sent to the Medical Council of New Zealand, and the Council will be advised of Dr D's name.
155. A copy of this report with details identifying the parties removed, except the expert who advised on this case, will be placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

Appendix A: Independent advice to the Commissioner

The following expert advice was obtained from an emergency medicine specialist, Dr Stuart Barrington-Onslow:

“I have read and agreed to follow the guidelines for independent advisers provided by the office of the Health and Disability Commissioner.

I am an Emergency Medicine Specialist, qualifying as a doctor in 1988 at the University of London and becoming a Fellow of the Australasian College for Emergency Medicine in 2007. I have been practising Emergency Medicine since 1997 and I am currently employed as a full-time specialist at the Christchurch Hospital Emergency Department.

I have been asked to provide independent expert advice regarding the care provided to [Mrs A] in the Emergency Department of [the public hospital] during [2014]. To aid me in my advice I have received documentation from the commissioner’s office that includes:

- A copy of [Ms B’s] complaint.
- A copy of [the] District Health Board’s response, including reports to the coroner from medical staff involved.
- A copy of [Mrs A’s] clinical record from [the public hospital].
- A copy of [Mrs A’s] clinical record from [the second public hospital].
- Copies of related x-rays and CT scans.

Summary of Events

These are covered in the documents provided in the response by [the DHB].

Visit 1

[In 2014] an ambulance was dispatched at 02:55 hours to the home of [Mrs A]. The ambulance arrived at 03:14 hours with the lady’s chief complaint noted as SOB (shortness of breath). It was also noted that she had had a recent viral chest infection and had finished a course of antibiotics. That night she had woken with a tight chest, dull ache in her left shoulder, inability to catch her breath, which was much worse when lying down. On examination, it was documented that she had an increased respiratory rate (24 breaths per minute — one would expect an increased respiratory rate after the removal of a lung) with other vital signs within acceptable limits. Also it was noted that there was no improvement in her chest tightness after administration of aspirin and GTN (glyceric trinitrate).

She arrived at the Emergency Department of [the public hospital] at 03:56 hours. She was given a triage category of 3, with the complaint of SOB (shortness of breath) and chest tightness. It was commented that she was speaking in short sentences and had a previous history of removal of her right lung, a lumpectomy of her left breast in 2011 and radiotherapy and chemotherapy in 2012. A full set of vital signs at 04:30 hours showed an increased respiratory rate of 20 breaths per minute, with the other vital signs within normal ranges.

An ECG (electrical heart test) was taken at 03:58 hours and blood tests were taken.

The initial note was written by [Dr C], a consultant emergency physician. He noted [Mrs A] to have presented with tightness across her chest and shortness of breath. His notes state that the tightness resolved after about 20 minutes which the patient attributed to sitting upright. This also improved her breathing, but not to her baseline level on arrival at the Emergency Department. Note was made of her recent chest infection and treatment with antibiotics and steroids. Examination findings were significant for her lungs, 'decreased R' which I presume is decreased breath sounds on the right secondary to her previous noted surgery and 'L is — decreased entry' which I presume is decreased breath sounds on the left lung.

Blood tests were documented, and the ECG was correctly interpreted as normal.

At 07:00 hours the shift changed and [Mrs A's] care was handed over to [Dr D] for review of the arranged chest x-ray and disposition following said review.

Nursing notes at 07:45 hours state that [Mrs A's] chest was still 'a little tight'.

A chest x-ray was taken at 07:50 hours, was reviewed later that morning by [Dr D], who thought there were no new abnormalities and she was discharged home at 10:00 hours with advice to follow up with her GP or 'come back if any concerns'.

Issues

- 1) The appropriateness of the care provided during [Mrs A's] first presentation to ED
 - 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 you consider it is?
 - c. How will it be viewed by your peers?

The standard of care would be to exclude the life threatening causes of breathlessness and chest tightness and determine other potential causes of her symptoms.

My concern, when reading the notes provided, is that there is no clear diagnostic pathway followed to explain [Mrs A's] presentation to the Emergency Department. A person presenting with acute shortness of breath and chest tightness should have several significant diagnoses excluded, and this has not occurred in this case.

With such a presentation I would expect an emergency physician to exclude significant illnesses such as heart failure, ischaemic heart disease (angina or heart attack), pulmonary embolism (blood clot on the lungs), chest infection and pneumothorax (collapse of a lung).

Regarding ischaemic heart disease, a single troponin T was taken, and this cannot be used to exclude ischaemic heart disease (heart attack) as current guidelines require two negative tests to exclude this diagnosis. Occasionally, departments take a battery of tests prior to the patient being seen to expedite their journey through the Emergency

Department, but if this was the case I would expect the clinician to note that this test was not clinically indicated.

There is no such notation.

Also, a D dimer test was taken and this was positive. This test is used after risk stratification of patients where there is concern about blood clots, in this case pulmonary emboli (blood clots in the lungs). The result was placed in the clinical record, but again with no comment. The D dimer test is not very specific and is elevated in multiple conditions, but in [Mrs A's] case this was not acknowledged or commented on.

I have had the opportunity to review the chest x-ray, and although we cannot expect perfection when Emergency Physicians review x-rays, it is an integral part of our work and I am surprised that the pneumothorax was not appreciated by a senior Emergency Physician on the x-ray image I received.

The discharge instructions were also vague being neither specific in time or circumstances.

In summary, [Mrs A] was a lady in her late 50s, with a complex past medical history who presented with undifferentiated shortness of breath and chest tightness. I do not think it was appropriate to discharge her from the Emergency Department after this visit, as there was no explanation for her symptoms with concerning features in the history (the nursing note at 07:45 hours mentioning chest tightness) as well as no obvious exclusion of significant diseases.

Visit 2

There is no clear timing as to when the x-ray taken earlier that morning was reported, but it appears [Mrs A's] General Practitioner had been contacted, informed of the findings and had advised [Mrs A] to return to [the Emergency Department].

[Mrs A] arrived at 20:00 hours and was again given triage category of 3. The previous visit was noted as was the concern about a pneumothorax. A full set of vital signs was carried out which showed an increased respiratory rate of 22 breaths per minute and decreased oxygen saturation of 92% in room air. It was noted that she had moderate distress when breathing though was able to speak in full sentences.

She was seen by [Dr E] who retook the history and re-examined [Mrs A]. There is some discrepancy in the notes, as on [Dr E's] clinical note it is commented 'CXR: unclear if pneumothorax exists on the current film' whereas in his statement to the coroner (points 5) 'I reviewed this x-ray prior to her arrival and it was clear to me that she did in fact have a pneumothorax that morning.' He goes on to state that he arranged for a second chest x-ray to be performed on the arrival of [Mrs A] and 'reading this new radiograph myself without the aid of a radiologist, it was not entirely clear to me that there was a large pneumothorax.' (I have viewed the second film and confirm that it shows pneumothorax of similar size to the film taken earlier that day.)

In view of his uncertainty, [Dr E] arranged for a CT scan of the chest to be performed to confirm the diagnosis. His reasoning for this is appropriate and he commented that [Mrs A] was stable and so it was safe to proceed with the scan. This was performed at 21:25 hours and, following this, [Dr E] proceeded to insert a drain into the chest to reinflate the lung. He notes that he had difficulty with the first attempt due to a kink in the guide wire, but on the second successful attempt [Mrs A] had a cardiac and respiratory arrest. She was resuscitated after approximately 12 minutes and was transferred to the intensive care unit. During this time period a drain was inserted into her left chest.

Issues

- 2) The appropriateness of the care provided when [Mrs A] re-presented to ED:
- a. What is the standard of care/accepted practice?
 - b. If there has been a departure from the standard of care from accepted practice, how significant a departure you consider it is?
 - c. How will it be viewed by your peers?

The standard of care was to insert a drainage device into [Mrs A's] left chest cavity to drain the air.

A pneumothorax is a collection of gas, usually air, that lies between the inner side of the chest wall and outer side of the lung. They are said to be primary when there's no obvious precipitant, and secondary if there is associated lung disease. Therefore, [Mrs A] would have been considered to have a secondary pneumothorax, and as such the recommended treatment is drainage with a catheter placed through the chest wall.

(A tension pneumothorax is a true clinical emergency as it can lead to death. In this situation pressure builds up on the side of the chest where the lung has collapsed, and this pressure prevents any blood returning to the heart. It is a clinical diagnosis with patients appearing unwell, sweaty, increased heart rate, decreased blood pressure and oxygen saturations in the presence of a suspected pneumothorax. Treatment is immediate decompression of the affected side by either insertion of a cannula or other instrument.)

[Mrs A] had no features of a tension pneumothorax, but it is noted that there was a gush of air during [Dr E's] second attempt at drain insertion which would suggest that there was some degree of tension, which may explain her subsequent cardiac arrest.

The technique used for insertion of the drain is appropriate and correct.

The cardiac arrest was managed appropriately adhering to international guidelines.

Issues

- 3) Any other comments on the care provided?

[Dr E], in his statement to the coroner, mentioned the fact that with his first attempt at placing the chest drain, he aspirated air from the chest cavity and specifically mentions removing the syringe and not hearing an audible rush of air. (This would suggest that there was no tension pneumothorax at this time.) A drain was unable to be placed with this attempt due to a kink in the guide wire. He therefore requested a second drain set and on entering the chest cavity stated there was an audible 'rush of air out of the needle lumen.' This suggests that a tension pneumothorax occurred between the first and second attempts at placing the chest drain.

(The technique described of inserting a chest drain in this manner, in layman's terms, involves a hollow needle with a syringe that has the hollow tunnel. After appropriate local anaesthetic and using established landmarks on the chest wall, the needle is inserted into the chest cavity until air is withdrawn from the syringe. When this is achieved, a flexible wire is placed through the end of the syringe into the chest cavity. The needle and syringe are withdrawn and the wire is left in place. A hollow plastic device shaped like a pencil (a dilator) is placed over the wire and advanced into the chest cavity to dilate the tissues to allow placement of the drain. This dilator is removed, and the drain is then inserted over the guide wire into the chest cavity. The guide wire is removed and the chest drain is attached to an underwater seal as well as secured to the body, usually with stitches.)

The cardiac arrest that [Mrs A] suffered during the insertion of the chest drain was not predictable from her clinical picture and therefore not preventable.

References

- 1) Rosen's Emergency Medicine 8th ed Ch 88 Thromboembolism. Klein.
- 2) Rosen's Emergency Medicine 8th ed Ch 78 Acute Coronary Syndrome. Kurz.
- 3) British Thoracic Society Pleural Disease Guideline 2010."

The following information was provided by Dr Stuart Barrington-Onslow on 11 August 2015:

— No clear diagnostic pathway was followed and several significant diagnoses were not excluded. — SEVERE

— [Dr D] did not appreciate the pneumothorax on the X-ray. MODERATE

— The discharge instructions were vague. MODERATE

— It was not appropriate to discharge [Mrs A] after her first visit, as there was no explanation for her symptoms. SEVERE."

The following further comment was received from Dr Stuart Barrington-Onslow on 2 March 2016 after reviewing the DHB's relevant policies and the responses to his earlier advice from the DHB and the individual providers:

"1. The new information I have received does not change my opinion, though I do have some comments in response to the letter from the Head of Department dated 1st October 2015.

- a) The issue about diagnosis is simply that there is no comment in the notes from the first ED visit as to what the clinician thought was the cause of the patient's presentation. I agree it is not reasonable to expect an exhaustive differential diagnosis, but from the notes I received, I have no idea what the clinician thought was the cause of the presentation. Which brings me to the blood results.
- b) The D-dimer is positive (age related levels can be used if a pre test probability is calculated first, and there is no mention of this). My other comments regarding this are unchanged.
- c) A single negative highly sensitive troponin T cannot rule out cardiac damage (heart

attack) especially when it is taken 34 mins after the patient's arrival (arrived 0356, blood time 0430) and the medical notes document 'chest tightness resolved after — 20mins' There is no mention of the time of the chest tightness. (section 53)

2. DHB policy 'Clinical Management of Tests and Investigations'

The policy is good, but I would consider it being sent to the external radiology service with emphasis on section 18 and 19.

3. Regarding the above policy, please advise whether [Dr C] in this instance should have delegated the responsibility of reviewing the X-ray report to [Dr D].

No. Because of the nature of the work, Emergency Physicians tend to read their own films and act on them. Each department will have a mechanism to check on formal radiologist reports. I would, however, expect the radiologist reporting the film to contact the clinician for such an abnormality.

4. Comment on the highly sensitive troponin T level

The highly sensitive troponin T is a test of heart muscle damage or stress. It is a protein found in heart muscle cells that is released when the heart is damaged or stressed e.g. heart attacks. The level in the client was <5 ng/L which is normal. However, this test can not singly rule out cardiac damage in this instance. The test should be repeated — the timing of which is determined by risk stratification of the patient.

Dr Stuart Barrington-Onslow FACEM.”

The following clarification was received from Dr Stuart Barrington-Onslow on 7 February 2017:

“1 [Dr C] performed the initial assessment, and, in my opinion he has not excluded some potentially serious causes of [Mrs A's] symptoms.

2 Both [Drs C and D], in my opinion should have requested further observation, be that in the Emergency Department if an observation area is available, or if not then by an inpatient service. The reason for this is that [Mrs A] had a complex medical history and there was no clear diagnosis as to the cause of her presentation. Therefore, she should not have been discharged. She was in the department from 0314 hrs until 1000hrs when she was discharged, but had ongoing symptoms at 0745hrs, namely chest tightness, as documented in the nursing notes.

3 The lack of diagnosis was the responsibility of [Dr C].

4 The discharge responsibility is with the clinician who discharges the patient, in this case [Dr D], but, it depends on the information he was given by [Dr C]. Was it a matter of just check the x-ray and if it is normal she can go home, or, I do not know what is causing this lady's symptoms, can you check her x-ray and review her.”

[Dr D's] and [Dr C's] responses to point number 4 (above) were forwarded to Dr Stuart Barrington-Onslow. He provided the following clarification on 4 April 2017:

“In my opinion, with the other information provided, it is the responsibility of the doctor who discharges the patient to ensure they are safe for discharge.”