Auckland District Health Board

A Report by the
Deputy Health and Disability Commissioner

(Case 19HDC00017)

Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

Contents

Executive summary

1. This report concerns the services provided to a man by Auckland District Health Board (ADHB) in 2018 when he was admitted with pneumonia. The man's condition deteriorated and he was found to be struggling for breath and was unable to be resuscitated.

2. The report considers the monitoring of the man's condition, and whether the response to his deterioration was adequate. It highlights the importance of clinicians being alert to the deterioration of patients, including when patients suffer from chronic conditions that affect their normal vital signs, and of documentation being completed to a good standard to support care and decision-making.

Findings

3. The Deputy Commissioner found "a collection of connected errors by several relatively junior clinicians in the care provided to [the man]", and that "[a]s a consequence of these errors, opportunities were missed to escalate the man's care to more senior clinicians and to respond to the man's deteriorating condition more appropriately". Accordingly, the Deputy Commissioner found that ADHB breached Right 4(1) of the Code.

Recommendations

4. The Deputy Commissioner recommended that ADHB provide evidence to HDC that it has implemented a written policy requiring modifications of Early Warning Score triggers to be discussed with a senior medical officer; confirm that the reviews and audits recommended in ADHB's own Root Cause Analysis Report have been conducted; review its house officer education programme to ensure that safe use of hypnotic medication is covered, and that the training provided to registrars on modifying EWS triggers is appropriately rigorous; consider the merits of developing guidelines on the safe prescribing of sedatives for patients and on the appropriate timeframes for alerting patients' families to deterioration; and apologise to the man's family.

5. The Deputy Commissioner recommended that a respiratory registrar reflect on the issues in this case and report back to HDC on the changes to his practice and learning from further training since these events, and that a house officer undertake further training on recognising clinical deterioration.

Complaint and investigation

6. The Commissioner received a complaint from Mrs A about the services provided by Auckland District Health Board (ADHB) to her husband, Mr A. The following issue was identified for investigation:

- *Whether Auckland District Health Board provided Mr A with an appropriate standard of care in 2018.*

7. This report is the opinion of Deputy Health and Disability Commissioner Kevin Allan, and is made in accordance with the power delegated to him by the Commissioner.

8. The parties directly involved in the investigation were:

Mrs A	Complainant/Mr A's wife
ADHB	Provider/District Health Board
Dr B	Provider/respiratory physician
Dr C	Provider/night on-call house officer
Dr D	Provider/respiratory registrar
RN E	Provider/registered nurse

9. Independent expert advice was obtained from a respiratory physician, Dr Nicola Smith (Appendix A).

Information gathered during investigation

Introduction

10. This report concerns the services provided by ADHB and its staff to Mr A at a public hospital in 2018.

11. Mr A was in his seventies at the time of these events. In 2017, he had been admitted to the public hospital with a cough, breathlessness, and raised CRP.[1] Following investigation, Mr A was diagnosed with interstitial lung disease (ILD).[2] A respiratory physician noted that there was uncertainty about the exact nature of Mr A's ILD, but that "[i]t was thought most likely that he ha[d] a fibrosing organising pneumonia[3] [possibly] on an autoimmune basis".

12. ADHB's Root Cause Analysis Report (prepared some time after these events) described Mr A's condition as follows:

> "For [Mr A], there was no defined connective tissue disease and only a positive myositis[4] associated antibody[5] so one could suspect an autoimmune driver but he does not fit classification of any defined disease. The radiologic pattern is of fibrosing organizing pneumonia which is most commonly but not exclusively associated with a myositis antibody and hence an autoimmune aetiology.[6]"

[1] C-reactive protein levels. High amounts of CRP can indicate a bacterial infection.
[2] Interstitial lung disease is a broad term for a range of different disorders that can cause scarring of the lungs.
[3] The development of plugs of tissue in the airways of the lungs.
[4] Inflammation of the muscles.
[5] A type of protein used by the immune system to neutralise viruses and bacteria.
[6] Cause.

13. In 2018, the respiratory physician reviewed Mr A at ADHB's respiratory clinic and noted that his oxygen saturation on room air was 90%, which is lower than normal (95–100%) He also underwent a "6 minute walk test". This revealed an oxygen saturation of 93% while at rest.

14. Notwithstanding his ILD, at the time of these events Mr A was living an active life. Mr A's wife told HDC that he was working, and that he had planned to visit his family overseas later that year.

Day 1[7]

15. Mrs A told HDC:

> "[On Day 1, Mr A] began to feel ill in the evening around 1500 hours and came home from work at around 1600 hours. He came down with a very high temperature with uncontrollable shivering as well as dyspnea.[8] [Mr A] was transported to [the public hospital] via ambulatory service, where he was admitted to the Respiratory Unit."

16. ADHB told HDC that Mr A was admitted to the public hospital on Day 1 with fevers, breathlessness, and a cough. He was assessed by the Emergency Department (ED) doctor and referred to Respiratory Medicine and treated with intravenous antibiotics and hydrocortisone[9] for an infective exacerbation of his ILD.

17. At 7.35pm, the ED senior medical officer (SMO) documented his impression that Mr A had an infective exacerbation of his ILD (pneumonia) with probable early sepsis.[10] The SMO noted that Mr A's temperature was 40°C, his respiratory rate was 40 breaths per minute, his oxygen saturation was 97% (on 10 litres of oxygen via nasal prongs), his heart rate was 110 beats per minute (bpm), and his blood pressure was 108/76mmHg.[11] The SMO also documented: "[Mr A] looks very breathless but not in extremis.[12]" Mr A's supplementary oxygen was increased to 15 litres per minute.

18. Mr A was admitted under the care of the respiratory team. At 10.40pm, a respiratory registrar documented that if Mr A deteriorated overnight, his care should be discussed with the Intensive Treatment Unit (ITU).

Day 2 — night observations

19. At 1am on Day 2, the night registrar reviewed Mr A and documented that his systolic[13] blood pressure was 105 (his diastolic[14] blood pressure was not documented), his heart rate

[7] Relevant dates are referred to as Days 1–3 to protect privacy.
[8] Difficulty breathing.
[9] A medication used to provide relief from inflammation.
[10] A condition in which the immune system's response to an infection poses a threat to the organs.
[11] Normal vital signs for a healthy adult are as follows: temperature around 37°C; respiratory rate between 12 and 20 breaths per minute; oxygen saturation near 100% without supplementary oxygen; heart rate 60–100 beats per minute); blood pressure 90/60–120/80mmHg.
[12] Not extremely so.
[13] Blood pressure during a heartbeat.
[14] Blood pressure between heartbeats.

was 90bpm, his oxygen saturation was 95% on 15 litres of supplemental oxygen, and his respiratory rate was 23 breaths per minute.

20. At 3.30am, the PaR[15] nurse reviewed Mr A and documented that his Early Warning Score (EWS)[16] was 5, he was on 15 litres of supplemental oxygen, and his respiratory rate was 22.

Day 2 — vital signs at 8am

21. Mr A's vital signs chart records that at 8am his respiratory rate was 20, his oxygen saturation was 86% on the finger and 95% on the ear (on 10L/min of oxygen), his heart rate was 105bpm, his blood pressure was 132/70mmHg, his temperature was 36.7°C, and his EWS was 3.

Day 2 — Dr B's ward round

22. Dr B, a respiratory physician, told HDC:

> "I met [Mr A] for the first time at 10.30am on the post-acute ward round on [Day 2]. He was accompanied by his wife. I had reviewed his CXR[17] and blood results prior to this. I confirmed the history recorded in the medical notes and examined him. He was feeling better and his observations confirmed this."

23. Around 10.30am, Dr B documented:

> "Unwell for 3 days
> Shivering/fevers. Coughing, dry.
> ↑ SOB[18]
> Better today than yesterday
> Is on daily cotrimoxazole[19] 480mg."

24. Dr D, a respiratory registrar, was present when Dr B reviewed Mr A. Dr D stated: "Given the improvement, the plan was to discontinue the administration of intravenous fluids, to trial removal by catheter, and to change his antibiotics."

Day 2 — vital signs at 2.15pm

25. Mr A's vital signs chart records that at 2.15pm his respiratory rate was 32, his oxygen saturation was 84% on the finger and 88–95% on the ear (on 12L/min of oxygen), his heart rate was 110bpm, his blood pressure was 130/72mmHg, and his temperature was 36.9°C. His EWS was recorded as 8.

[15] Patient at risk.
[16] The Early Warning Score system is used by hospitals in New Zealand to trigger review by doctors and/or nurses when a patient's health is deteriorating. Patients are given a score between 0 and 10 based on their vital signs, with higher scores triggering reviews more frequently and from more experienced staff.
[17] Chest X-ray.
[18] Shortness of breath.
[19] An antibiotic used to treat several types of bacterial infection.

Day 2 — Dr D alters EWS triggers

26. Dr D stated that at approximately 2.15pm on Day 2, the nurse on Mr A's ward asked him to adjust Mr A's EWS triggers. Dr D told HDC that he recalls Mr A telling him that he felt "much better than he had before".

27. Dr D said that he recognised that Mr A's respiratory rate and oxygen requirements had increased since 8am, and he attributed the changes to a combination of Mr A's underlying ILD and the fact that Mr A had recently walked to and from the bathroom. Dr D stated:

> "In the absence of significant deterioration in any of his other vital signs, particularly blood pressure and temperature, I assessed that in spite of his EWS score, an escalation in his care (by calling for consultant or ICU registrar review) was not indicated."

28. Dr D adjusted the EWS triggers for Mr A's oxygen saturation and respiratory rate as follows:

Original EWS Score

O_2 Saturations	**>92%**	**EWS 2**
	85–92%	**EWS 3**
	80–85%	**EWS 3**
Respiratory Rate	**<25**	**EWS 2**
	25–30	**EWS 3**
	30–35	**EWS 3**

Modified EWS Score

O_2 Saturations	**>92%**	**EWS 0**
	85–92%	**EWS 1**
	80–85%	**EWS 3**
Respiratory Rate	**<25**	**EWS 0**
	25–30	**EWS 1**
	30–35	**EWS 3**

29. Dr D documented the modifications in the appropriate space on Mr A's vital signs chart. However, Dr D did not document his review of Mr A in the clinical notes, or the fact that he had modified Mr A's EWS triggers, or his rationale for doing so. Dr D also did not document any instructions regarding when to contact a doctor or PaR nurse if there was further concern about Mr A.

30. Dr D stated: "The effect of this modification was that on his vital sign readings as at 1415 hours, his EWS score was adjusted to 4 (being within the normal range)."

31. ADHB told HDC that Dr D's documentation of his modifications to Mr A's EWS triggers was incomplete, because it did not include a start time, Mr A's CPR status, or Dr D's reasons for the modification. ADHB stated that the modification "created a barrier to the escalation process and reduced the total EWS score from an 8 (which would trigger a compulsory PaR nurse and Registrar review within 30 minutes) to a 4 (which mandated only ward level escalation)".

Day 2 — evening

32. Mrs A told HDC:

> "[In the evening, the] staff within the ward were kind enough to bring in a Lay-Z-Boy so that I could stay in the room that night. However, [Mr A] insisted that he was feeling well, and asked me to go home and get some proper rest … I left the hospital at around 1945 hours and asked my husband to notify the hospital staff to call me if he begins to feel uncomfortable."

33. Mr A's vital signs chart records that at 8pm his respiratory rate was 28, his oxygen saturation was 91% (on 12L/min of oxygen), his heart rate was 79bpm, his blood pressure was 130/82mmHg, his temperature was 36°C, and his EWS (under the modified scoring) was 4.

Day 3 — RN E's observations between 12am and 1am

34. RN E told HDC that she "carried out intentional rounding at 0015 and found [Mr A] to be tachypnoeic[20]". She also noted that Mr A was "mouth breathing". She stated that she dealt with this by increasing his supplementary oxygen to 15 litres and by replacing his high-flow nasal prongs with a face mask.

35. Mr A's vital signs chart records that at 12.25am on Day 3 his respiratory rate was 30, his oxygen saturation was 93% (on 15L/min of oxygen), his heart rate was 110bpm, his blood pressure was 120/70mmHg, his temperature was 36.2°C, and his EWS (under the modified scoring) was 4.

36. Following this, the vital signs chart records no further observations of Mr A. RN E told HDC:

> "OBS [observations] were documented on handover sheet but not entered in the EWS chart, as was meant to be entered soon after but got caught up with other patient's

[20] Breathing rapidly.

> calls under my care and also the observations were within safe parameters. Patient's oxygen saturation and heart rate were constantly monitored with an oximeter."

37. ADHB told HDC that RN E's "hand over sheet was inadvertently destroyed without the information being transferred on to [Mr A's] vital signs chart". At the time, ADHB's "Nursing Bedside Documentation" procedure and the EWS system required patients with an EWS of between 1 and 5 to have their observations taken every four hours.

38. At 4.30am on Day 3 RN E documented retrospective notes about the care provided to Mr A, but these did not include reference to Mr A's vital signs.

39. RN E told HDC that she reviewed Mr A again at around 12.40am, and he reported that he was sweating and asked to take off the face mask. She replaced his face mask with high-flow nasal prongs, turned on the fan, and wiped his face with a wet flannel. She said that Mr A then reported that he was comfortable.

Day 3 — review by Dr C

40. RN E told HDC that Mr A rang the call bell at around 1am on Day 3 requesting another cold flannel wipe. Shortly after this, Mr A rang the call bell again to tell her that he felt exhausted. She responded by administering nebulisers to him (as charted) and asking the night on-call house officer to review him. RN E told HDC that Mr A's EWS was only 4, which did not necessitate a medical review, but she "asked for the review anyway due to his statement about feeling exhausted".

41. The night on-call house officer, Dr C, told HDC that he was called to review Mr A at around 12.50am, and saw him about 15 minutes after that time. Dr C stated: "There was no objective evidence of sudden deterioration in the hours preceding my review. [Mr A's] vital signs had been stable since the modification of the EWS."

42. Dr C documented in the clinical notes:

> "Alert, speaking short sentences. Tachypnoeic
> But not in respiratory distress
> States he breathes fast normally
> States he is feeling better. Difficulty sleeping and feeling anxious.
> [On examination] SpO2 93% On Airvo.[21] RR 28. Other obs stable.
> Tachycardic. Bibasal[22] crackles + wheeze
> No pedal oedema[23]
> [Impression] Infectious exacerbation ILD
> Anxiety"

[21] System for providing supplementary oxygen.
[22] Pertaining to the bases of both the left and right lungs.
[23] Accumulation of fluid in the feet and lower legs.

43. Dr C told HDC that he offered to prescribe Mr A "a ½ tablet of zopiclone[24] to help him sleep", and that Mr A agreed. Dr C stated:

> "I prescribed zopiclone at 3.75mg, the smallest dose, to help [Mr A] with feelings of sleeplessness. I understood the medication was to be used with caution in patients with respiratory disease. In this case I was aware he was being closely monitored and I advised further review if there were any further or on-going concerns.
>
> I had no immediate concern to escalate [Mr A] to my supervisor or another more senior staff member as there ha[d] been no objective change in his status. His saturations were within target and his observations had been stable since 2pm when his EWS score was modified. The only change was his heart rate of 100 which had been fluctuating throughout."

44. Dr C documented in Mr A's medication chart that he had prescribed Mr A "3.75 to 7.5 mg" of zopiclone once only, and two nasal sprays of midazolam[25] every two hours as required. In the body of the clinical notes, Dr C documented that he had prescribed Mr A half a zopiclone tablet (3.75mg). At 4.30am on Day 3, RN E retrospectively documented that Dr C asked her to "administer half [a] sleeping pill" and nasal spray as required.

45. Dr C told HDC that he prescribed "midazolam nasal spray at a dose of 2 sprays nasally 2 hourly as required to assist with feelings of breathlessness after the suggestion was made by experienced nursing staff". He stated:

> "I understood the effects of midazolam — to relieve the symptoms of breathlessness and anxiety and I understood the mechanism of action to be rapid. That is, if an adverse effect from the medication was to result, it would have been apparent immediately after administration. Furthermore, the patient had not had concomitant [26] administration of opioids, which are well known to decrease respiratory drive."

46. Similarly, ADHB told HDC:

> "[A]ny effect on respiratory drive from midazolam nasal spray would be reasonably immediate, with the onset of any reaction expected to be within 2 minutes, and maximum effect within 5 to 10 minutes."

47. Dr C stated:

> "My judgment at the time was that the medications I prescribed to relieve [Mr A's] symptoms would not cause a deterioration of his respiratory function in these circumstances. Given my assessment of a stable and clinically non-deteriorating patient, I thought it was reasonable to prescribe the medications for [Mr A's] symptoms at the time."

[24] A hypnotic medication used to help people to sleep.
[25] A medication used to relieve anxiety.
[26] Simultaneous.

48. ADHB stated:

> "ADHB concurs that midazolam and zopiclone should be used with caution in patients with compromised respiratory function and a lower dose should be given, however, these medications were not contraindicated in [Mr A's] case. ADHB believes that the [night on-call house officer] employed appropriate caution in prescribing midazolam and zopiclone to [Mr A]. This is evident from the doses prescribed and the plan put in place to repeat blood gasses if there were any signs of deterioration."

49. ADHB further stated:

> "[For patients with chronic respiratory conditions,] [a]nxiety leading to inappropriate rapid breathing leads to further physiological deterioration; hence controlling the anxiety does have a positive impact when used appropriately … it is ADHB's view that the prescribing of a short acting benzodiazepine such as intra-nasal midazolam was reasonable in [Mr A's] case."

Day 3 — administration of zopiclone and midazolam

50. RN E told HDC:

> "The [night on-call house officer] advised to administer some Midazolam nasal spray to aid with breathing and half a sleeping tablet. I stopped the nebuliser and [Mr A] appeared comfortable. Sleeping tablet was then administered as charted.
>
> …
>
> [Mr A] rang the bell again at 0210 hrs reporting that he was breathless. I administered the prescribed Midazolam nasal spray as charted with good effect, after which he stated that he felt better."

51. Mr A's records show that he was administered zopiclone at 1.30am and midazolam nasal sprays 2.10am. The records do not state how much zopiclone was administered.

52. RN E told HDC: "I repeated intentional rounding again at 0245hrs and Mr A appeared comfortable on 15L of oxygenation via high flow nasal prongs."

Day 3 — Mr A's death

53. RN E told HDC that she performed a routine check on Mr A at 3.05am and discovered him "in a gasping state with his high flow nasal prongs removed from his nose". She summoned the emergency team and performed CPR. The emergency team arrived at 3.08am and applied the defibrillator, administered adrenaline, inserted a laryngeal mask airway, and continued administering CPR. However, Mr A did not respond to the interventions, and CPR was discontinued at 3.30am.

54. Around 3.30am, a Department of Critical Care Medicine registrar documented:

> "Found by nurse on routine check to be gasping > Code immediately called. Hypoxic[27] (unrecordable sats) + no pulse. CPR in progress on my arrival …
>
> After discussion with Dr … + Code team decision made to stop CPR and on grounds of futility.
>
> Imp: Respiratory arrest w/PEA[28] arrest."

55. Mr A's "Medical Certificate of Cause of Death" states that he died of "Fibrosing Organising Pneumonia".

56. Mrs A told HDC:

> "It was 0319 hours when someone called me and asked that I get to the hospital immediately as [my husband] had collapsed. Upon hearing this, I rushed to the hospital very quickly, and unfortunately, I was too late."

57. RN E told HDC:

> "I did not contact [Mrs A] between 0015 and 0240 because [Mr A's] symptoms were controlled with medications and oxygen support to which he was responding well. And he clearly stated that he was feeling better … I did not contact [Mrs A] after 0240 because my priority was to stabilise [Mr A's] condition within safe parameters."

58. ADHB stated:

> "When [Mr A's] condition deteriorated staff were focussed on [Mr A's] emergent clinical situation and there was a delay in contacting his family. We would like to sincerely apologise to [Mrs A] for this delay and the distress which this has caused her."

ADHB's Root Cause Analysis

59. ADHB conducted a Root Cause Analysis of Mr A's death. The report found the following:

- "The nursing staff steadily increased [Mr A's] oxygen flow rate from 10L/min to 12L/min to 15L/min in order to maintain oxygen saturations above 92%. If the oxygen had been charted with an upper range of expected oxygen delivery, then this increasing flow rate may have triggered a more urgent senior review."
- "The documentation of the [EWS] modifications on the Adult Vital Signs was incomplete and did not include a start time, the CPR status or rationale for the modifications."
- "The [EWS] modifications created a barrier to the escalation process as it reduced the total EWS score from an 8, (which would trigger a compulsory PaR nurse and Registrar review within 30 minutes) to a 4 (which mandated only ward level escalation)."

[27] Insufficient oxygen.
[28] Pulseless electrical activity, meaning that there was electrical activity in the heart, but it was failing to produce normal heart activity.

- "The Registrar's review, [EWS] modifications, clinical rationale and an escalation plan were not documented in the clinical notes. The plan should include timeframes for the expected trajectory and guidance on when and how to escalate further. There was no system in place to ensure that the modification and planning were communicated to the charge nurse or coordinating senior nurse at the time they were made."
- "The National EWS scoring system does not accurately register medical concern regarding increasing oxygen requirements … A patient therefore scores 2 whether they are on 2L/minute or on 20L/minute in order to achieve target saturation and no additional score is given for escalating oxygen requirements. Therefore, [Mr A's] oxygen derived EWS score remained stable at 2 (as long as his target saturation was being reached) despite his increasing oxygen requirements."
- "The Registered Nurse covering the night shift explained that although she had taken [Mr A's] vital signs, she did not record these on the Adult Vital signs chart. These were written on her hand over sheet instead, which she inadvertently discarded without transferring the information. This meant that the emerging picture of clinical deterioration and respiratory fatigue demonstrated by the vital signs was not accessible for clinical staff and during the [night on-call house officer] review."
- "At 14:15 [Day 2] [Mr A's] respiratory rate was 32 and EWS was 8, which met the criteria for a PaR and Registrar review within 30 minutes. The Registered Nurse [contacted] the Registrar and asked him if he could modify the EWS triggers, but there was no escalation to PaR … Escalation to PaR would have provided an appropriate senior nurse review. PaR could have assisted with the development of an escalation plan and also advised on the appropriateness of any modifications made to the EWS."
- "The review team could not determine what impact the prescribing of both the zopiclone and midazolam had on [Mr A's] clinical condition. However, the prescribing of the zopiclone and midazolam at a low dose in patients with chronic respiratory conditions is not uncommon to alleviate insomnia and distressing symptoms. It was not unreasonable to prescribe them in [Mr A's] clinical state at the time."

Further information — ADHB

60. ADHB's "Mandatory Escalation Pathway" included the following:

- Between EWS 1 and 5, it would be appropriate to discuss the patient with a senior nurse.
- Between EWS 6 and 7, it would be appropriate to request house officer and PaR nurse review of the patient, and to take observations at least every hour.
- Between EWS 8 and 9, it would be appropriate to request registrar and PaR nurse review of the patient, and to take observations at least every half-hour.
- At EWS 10, it would be appropriate to summon the emergency code team.
- When a staff member is worried about a patient, it is appropriate to escalate care "regardless of vital signs or EWS".

61. At the time of these events, ADHB used the document "New Zealand Early Warning Score Chart Training" to help educate its staff to use Early Warning Scores correctly. The document states:

a) "Modifications may be appropriate in some chronic diseases where a patient's vital signs are normally 'mildly abnormal'. Examples are COPD (normal O2 sats are 88–92%), heart failure (normal [systolic blood pressure] 92mmHg) and athletes (not a chronic disease but they may have a 'normal' heart rate 44/min)."

b) "Modifications should not be made to stop the need for staff to call doctors and PaR team members."

c) "All modifications must be signed and dated with a clear duration identified."

d) "If your patient has had a recent Registrar review, has received a thorough assessment and has a treatment plan in place, they should also communicate a timeframe within which they will review your patient."

62. ADHB's Root Cause Analysis Report recommended the following:

a) That all modifications to EWS triggers on the respiratory ward must now be discussed with an SMO and communicated to ward staff.

b) That all patients with chronic respiratory disease must have an advance care plan established with their family/whānau in the respiratory outpatient clinic on diagnosis.

c) That the "Oxygen Weaning Chart" be renamed the "Respiratory Oxygen Chart" and include a field for the documentation of FiO2[29] and flow rates for patients receiving high-flow oxygen.

d) That ADHB conduct a hospital-wide review of modifications to EWS score triggers to determine the frequency and appropriateness of modifications.

e) That ADHB explore the feasibility of prescribing oxygen therapy with regular medications, including a mechanism to chart high-flow oxygen flows and rate.

f) That ADHB assess the barriers to point-of-care documentation on the respiratory ward.

63. As noted below in the "recommendations" section of the report, in response to my provisional report, ADHB told HDC that it has already made the following changes:

a) It has implemented the "Respiratory Oxygen Chart" recommended by the RCA report. It plans to audit the usage of this chart in January 2021.

b) It now requires all modifications of EWS triggers to be first discussed with an SMO.

c) It now requires all respiratory registrars to complete its EWS e-learning module.

64. In response to my provisional report, Dr B told HDC that ADHB staff offer advanced care planning materials to patients who are terminally ill. ADHB said that an advanced care plan

[29] The percentage of oxygen in air (room air has a FiO2 of about 21%).

is not compulsory, but all patients are offered the opportunity to complete a plan and, where appropriate, are encouraged to do so.

65. ADHB told HDC:

> "On behalf of ADHB and the respiratory service, I would like to extend our deepest condolences to [Mr A's] family for their sudden and unexpected loss. In addition, I would like to extend our apologies for the fact that we have not met the family's expectations in regard to explaining the sequence of events which led to [Mr A's] death, which has led to them having unanswered questions."

Further information — Dr D

66. Dr D told HDC:

> "I am dismayed to think that by making the modifications I did, my actions may have contributed to delays in the appropriate escalation of [Mr A's] care … I do acknowledge that there were deficiencies in the care, which I provided to [Mr A]. I take this opportunity to offer my sincere apologies to [Mrs A's] family for those deficiencies, and my condolences for their sad loss."

67. Dr D also told HDC that he feels that "registrars would benefit from more rigorous training on the modification of EWS triggers". He stated that this case prompted him to undertake ADHB's educational module for the NZEWS and to change his practice when modifying EWS triggers for patients with chronic conditions.

Responses to provisional opinion

68. Mrs A was given an opportunity to respond to the "information gathered" section of my provisional report. She told HDC:

> "[I and my family] feel very strongly that [Mr A] received subpar care from [the hospital], especially given that he was in an acute setting. Examples of this subpar care include: inadequate documentation from the treatment team(s), the inconsistency in the exact events that occurred, the delayed timing of updating patient charts/records, and potentially inadequate/inexperienced/overworked staff doing rounds."

69. ADHB was given an opportunity to respond to my provisional report. Its responses have been incorporated above where appropriate. Additionally, ADHB told HDC that it accepts the provisional decision and proposed course of action.

70. ADHB stated that Dr D, Dr C, Dr B, and RN E were provided with an opportunity to comment on my provisional report, and that Dr D, Dr C, and RN E did not wish to comment. Dr B's comments have been incorporated above where relevant.

Opinion: Auckland District Health Board — breach

Introduction

71. Under the Health and Disability Services Standards, organisations must ensure that "the day-to-day operation of [their] service is managed in an efficient and effective manner which ensures the provision of timely, appropriate, and safe services to consumers".[30] District health boards are responsible for the operation of the clinical services they provide, and it is incumbent on all DHBs to support their staff with systems that guide and support good decision-making and promote a culture of safety.

72. HDC obtained independent clinical advice from Dr Nicola Smith, a respiratory physician, on whether the care that ADHB and its staff provided to Mr A was reasonable in the circumstances.

73. I have found that during Mr A's admission there were several connected failures by multiple staff members. These failures to recognise risks, escalate care appropriately, make appropriate clinical decisions, and document the clinical decisions and care provided, had a serious and cumulative impact.

Modification of Mr A's EWS triggers

74. At 2.15pm on Day 2, Mr A's EWS was recorded as 8. In accordance with ADHB's EWS "Mandatory Escalation Pathway", the nurses contacted the on-call registrar, Dr D, who reviewed Mr A. Dr D noted that Mr A's respiratory rate and oxygen requirements had increased since 8am, and he attributed these changes to a combination of Mr A's underlying ILD and his recent walk to and from the bathroom. Dr D also noted that Mr A's other vital signs had not deteriorated significantly. Dr D concluded that an escalation of Mr A's care (such as calling for a consultant) was not indicated, and he adjusted Mr A's EWS triggers so that his EWS reduced from 8 to 4.

75. Dr Smith advised:

> "The response of the registrar called at 1415 on the afternoon of Day 2 when the EWS increased to 8 was inappropriate. An increase in EWS from 4[31] to 8, in a patient who had been assessed as improving by the consultant 4 hours earlier, should have resulted in re-assessment of the patient by the registrar or PAR team. The increase in EWS indicated [Mr A's] respiratory function was deteriorating. Discussion with the respiratory consultant should have occurred to clarify if further management was needed and if [Mr A] should be referred to ITU for escalation of respiratory support. It was documented by the admitting registrar, in discussion with the on-call consultant that [Mr A] should be reviewed by ITU in the event of a deterioration and this did not occur.

[30] Standards New Zealand, *Health and Disability Services (Core) Standards* (2008), NZS 8134.1.2.2.
[31] It is recorded in the clinical notes that the EWS increased from 3 (at 8am on Day 2) to 8 at 2.15pm.

> The EWS protocol allows early identification of the deteriorating patient, and escalation or modification of care. Whilst it can be appropriate to modify the EWS in a patient with chronic disease to prevent incorrectly triggering escalation (such as a patient who has oxygen sats of 88% when well in the community) this was not the situation. A 6 min walk test performed by [Mr A] in [2018] indicated that his usual oxygen saturation when well was 93% at rest.
>
> The modification of the EWS resulted in a House Officer being called to assess [Mr A] at 0120 on [Day 3]. If the unmodified EWS had been in place the higher score would have triggered a call to a more senior doctor (the night registrar) or the PAR team, instead of a house officer with less experience in assessing patients with unstable respiratory disease."

76. ADHB's Root Cause Analysis Report similarly found that Mr A's EWS modification "created a barrier to the escalation process", and ADHB accepted this finding.

77. I note Dr D's points that Mr A had underlying ILD, that he had recently walked to and from the toilet, and that his other vital signs (such as his blood pressure and temperature) had not deteriorated. However, I accept Dr Smith's advice that it was not appropriate for Mr A's EWS triggers to be modified in these circumstances; his increased EWS (up from 3 at 8am to 8 at 2.15pm) was driven by a significant increase in his respiratory rate from 20 to 32, and by a decrease in his oxygen saturation from 95% to between 88% and 95%. These changes had occurred despite, and in addition to, Mr A's supplementary oxygen having been increased from 10 litres to 12 litres — a fact that was apparent from Mr A's vital signs chart even if it did not factor into his EWS.

78. I agree with Dr Smith that the increase in Mr A's EWS to 8 indicated that his respiratory function was deteriorating. This deterioration should have been recognised and acted upon. I accept Dr Smith's advice that Dr D should have discussed Mr A's case with the respiratory consultant to clarify whether further management was needed (including whether referral to the Intensive Care Unit was appropriate).

79. Dr Smith advised: "I would describe [Dr D's] decision to modify [Mr A's] EWS triggers as a mild to moderate departure from the standard of care." I accept this advice and am critical of the modification.

80. I understand that Dr D's interpretation of Mr A's vital signs was influenced by his underlying ILD, and that this in turn influenced Dr D's decision to modify the EWS triggers. However, the purpose of the EWS system is to detect deterioration, and where a patient's EWS has increased, staff must consider whether the patient has deteriorated, irrespective of any chronic conditions the patient may have.

81. Since these events, ADHB has implemented a policy that "all modifications to Early Warning Scores triggers on the respiratory ward must now be discussed with an SMO and communicated to ward staff". I welcome this change.

Omission to escalate care to PaR nurse

82. ADHB's "Mandatory Escalation Pathway" states that where a patient's EWS is between 8 and 9, it is appropriate to request both registrar and PaR nurse review of the patient. However, when Mr A's EWS reached 8 at 2.15pm on Day 2, the nurse escalated Mr A's care only to a registrar, Dr D, and not also to a PaR nurse. The Root Cause Analysis Report noted:

> "Escalation to PaR would have provided an appropriate senior nurse review. PaR could have assisted with the development of an escalation plan and also advised on the appropriateness of any modifications made to the EWS."

83. I am critical that Mr A's care was not escalated to a PaR nurse as well as a registrar when his EWS reached 8, as per ADHB's escalation pathway. A PaR nurse could have assisted Dr D with making an appropriate decision in response to Mr A's increased EWS.

Documentation

Failure to follow ADHB's documentation policy

84. ADHB uses the document "New Zealand Early Warning Score Chart Training" to help educate its staff to use Early Warning Scores correctly. The document states that "[a]ll modifications must be signed and dated with a clear duration identified", and that following a registrar's review of a patient, the registrar should "communicate a timeframe within which they will review [a] patient".

85. Following the modification of Mr A's EWS triggers, Dr D did not document a timeframe within which he would review Mr A again, his rationale for modifying the EWS triggers, or instructions regarding when to contact a doctor or PaR nurse if there was further concern about Mr A. Dr Smith advised HDC that these omissions were "well below the standard expected of medical staff". I accept Dr Smith's advice, and am critical of the lack of documentation concerning the EWS trigger modifications.

Omission to document review of Mr A

86. On Day 2, Dr D did not document his review of Mr A in the clinical notes. This is contrary to the Health and Disability Services Standards, which state that consumer information must be "accurately recorded".[32] It is also contrary to the Medical Council standard "The Maintenance and Retention of Patient Records", which states that medical practitioners "must keep clear and accurate patient records that report relevant clinical findings, decisions made, information given to patients, any drugs, or any other treatment prescribed", and that medical practitioners must "[m]ake these records at the same time as the events [they] are recording or as soon as possible afterwards".[33]

87. I am critical that the relevant documentation standards were not met.

[32] Standards New Zealand, *Health and Disability Services (Core) Standards* (2008), NZS 8134.1.2.9.
[33] Medical Council of New Zealand, *The Maintenance and Retention of Patient Records* (August 2008), Standard 01.

Omission to document vital signs after 12.25am on Day 3

88. ADHB's "Nursing Bedside Documentation" procedure and the EWS system required patients with an EWS of between 1 and 5 to have their observations taken every four hours. At 12.25am on Day 3, Mr A's EWS was 4.

89. RN E stopped recording Mr A's vital signs on his vital signs chart after 12.25am on Day 3. She recorded further vital sign observations on a handover sheet, but this sheet was destroyed inadvertently before the records could be transferred to the vital signs chart.

90. I note that as Mr A's EWS was less than 5, and as Mr A died less than four hours after 12.25am, ADHB's policy did not require RN E to take further vital signs. However, I note that the Health and Disability Services Standards require consumer information to be "accessible when required"[34]; I also note that the Nursing Council standard "Competencies for registered nurses" states that registered nurses should maintain "clear, concise, timely, accurate, and current health consumer records".[35]

91. The ADHB Root Cause Analysis Report stated that the omission to document Mr A's vital signs on the vital signs chart "meant that the emerging picture of clinical deterioration and respiratory fatigue demonstrated by the vital signs was not accessible for clinical staff and during the [night on-call house officer] review". I am critical that information relevant to Mr A's deteriorating respiratory function was being collected but was not made accessible to the night on-call house officer when he reviewed Mr A.

Failure to recognise clinical deterioration

92. At about 1am on Day 3, Mr A reported "feeling exhausted". RN E administered nebulisers to Mr A and called the night on-call house officer, Dr C, to review him. Dr C assessed that "[t]here was no objective evidence of sudden deterioration in the hours preceding [his] review", and that "Mr A's vital signs had been stable since the modification of the EWS". Dr C documented that Mr A was "[t]achypnoeic" but "not in respiratory distress", that he was having "[d]ifficulty sleeping", and that he was "feeling anxious".

93. Following this assessment, Dr C prescribed Mr A 3.75–7.5mg of zopiclone (with verbal instructions to RN E to administer only 3.75mg), and two nasal sprays of midazolam every two hours as required.

94. Dr Smith advised:

> "Nasal Midazolam is commonly used in patients with advanced lung disease for relief of breathlessness and anxiety. There is a small evidence base indicating that intranasal midazolam does not cause significant sedation in a population of stable patients with terminal breathlessness, but as far as I am aware it has not been studied in patients with acute severe respiratory disease. The MedSafe datasheet for Midazolam states that the concomitant use of Midazolam with other central nervous system

[34] Standards New Zealand, *Health and Disability Services (Core) Standards* (2008), NZS 8134.1.2.9.
[35] Nursing Council of New Zealand, *Competencies for registered nurses* (December 2007), Competency 2.3.

depressants should be avoided, as this has the potential to increase the clinical effects of Midazolam, including severe sedation.

Zopiclone is a commonly prescribed sleeping tablet on hospital wards. Long term administration of Zopiclone has been studied in patients with severe but stable lung disease (ie Chronic Obstructive Pulmonary Disease) and demonstrated no negative effect on respiratory blood gases. As far as I am aware it has not been studied in patients with acute severe respiratory disease. The MedSafe datasheet for Zopiclone states that it is contraindicated when there is severe impairment of respiratory function as it has the capacity to decrease respiratory drive. In addition additive central nervous system depressant effects should be expected if Zopiclone is administered concurrently with benzodiazepines (such as Midazolam) and respiratory depression has been reported.

In my opinion it was not appropriate to prescribe both Midazolam and Zopiclone to [Mr A], due to the potential for respiratory depression in a patient who, although reporting he was feeling improved, had vital signs indicating unstable respiratory disease."

95. Dr C told HDC that given his assessment of a "stable and clinically non-deteriorating patient", he thought it was reasonable to prescribe the medications for Mr A's symptoms at the time. ADHB told HDC that it accepts that "midazolam and zopiclone should be used with caution in patients with compromised respiratory function". However, it submitted that "these medications were not contraindicated in [Mr A's] case", and that Dr C's prescriptions were a reasonable response to Mr A's anxiety. ADHB stated that Dr C "employed appropriate caution in prescribing midazolam and zopiclone to [Mr A]".

96. ADHB also submitted that midazolam is a fast-acting medication, and that any effect on respiratory drive from midazolam nasal spray would have become apparent soon after he took it.

97. Dr Smith advised:

"I agree with ADHB that the effect of the Midazolam nasal spray would have been reasonably immediate, within minutes, and the maximum effect within 5 to 10 minutes. The effect of the Zopiclone would have been longer acting. Zopiclone reaches Tmax (peak plasma concentration) around 1 hour after administration (Tmax reported in the literature as 0.5–2 hrs). It has a half-life of 3.5–6.5 hours.

Zopiclone was administered to [Mr A] at 01.20. It can be estimated that it would have reached peak plasma concentration (and therefore maximal effect) between 2 and 3 am.

The response from ADHB appears to assess the appropriateness of these two medications separately. The view of ADHB that 'the prescribing of a short acting benzodiazepine such as intra-nasal midazolam was reasonable in [Mr A's] case' does not take into account that the Midazolam was not prescribed in isolation, but as well as Zopiclone."

98. Dr Smith also advised:

> "Whilst [Dr C] appears reassured in his statement that [Mr A] was 'a stable and clinically non-deteriorating patient', the clinical observations indicated the opposite — a worsening respiratory condition with a RR of 28/min, an increasing heart rate, and an increasing oxygen requirement of 15L to maintain oxygen sats of 93%.
>
> …
>
> [Dr C] did not recognise that [Mr A] had unstable respiratory disease, with objective signs of increasing respiratory distress, and therefore the prescription of medications which can cause respiratory depression was a relative contraindication."

99. I accept Dr Smith's advice that when Dr C reviewed Mr A at around 1am, there were objective signs of increasing respiratory distress. Mr A's respiratory rate at 12.25am was 30, up from 28 at 8pm, his heart rate was 110bpm, up from 79 at 8pm, and his supplementary oxygen had been increased from 12 litres to 15 litres. Irrespective of what Mr A's EWS was at the time, I am troubled that Mr A was not recognised to be deteriorating. It follows that I am critical that Dr C based his clinical decision-making — including his decision to prescribe midazolam and zopiclone — on an inaccurate assessment that Mr A was "stable and clinically non-deteriorating".

Failure to chart intended prescription correctly

100. Dr C instructed RN E to give Mr A half a zopiclone tablet (3.75mg), and documented this in the clinical notes. However, in Mr A's medication chart, Dr C documented that he had prescribed Mr A "3.75 to 7.5 mg" of zopiclone. Dr Smith advised:

> "The dose of Zopiclone prescribed by [Dr C] is 3.75–7.5mg. When a medication is prescribed in this manner the dose administered within this range is left to the discretion of the nursing staff, whom in this case did administer the lower dose. [Dr C's] prescription however, would have allowed the higher dose to be administered.
>
> …
>
> [Dr C's] prescribing could have allowed for 7.5mg of Zopiclone and intranasal Midazolam to be given together. This is not appropriate prescribing for a patient with unstable and worsening respiratory disease."

101. I accept Dr Smith's advice. Notwithstanding the fact that Mr A was given only 3.75mg of zopiclone, Dr C's charted prescription could have allowed a nurse to give him 7.5mg. I am critical of Dr C's failure to chart his intended prescription precisely.

Conclusion — failure to provide services with reasonable care and skill

102. During Mr A's final admission to hospital, a number of connected errors by several relatively junior clinicians occurred in the care provided to Mr A. These included:

- Dr D inappropriately chose to modify Mr A's EWS triggers in response to an increase in his EWS, rather than escalating his care to a respiratory consultant.
- Mr A's care was escalated only to a registrar, and not to a registrar and a PaR nurse together.
- Dr D did not follow ADHB's policy on documenting EWS modifications.
- Dr D did not document his review of Mr A on Day 2.
- RN E took Mr A's vital signs after 12.15am on Day 3, but did not document these on Mr A's vital signs chart.
- Dr C failed to recognise that Mr A had been deteriorating clinically, despite objective signs of increasing respiratory distress, and so based his clinical decision-making on an inaccurate assessment that Mr A was stable.
- Dr C failed to chart his intended prescription of 3.75mg of zopiclone correctly.

103. As a consequence of these errors, opportunities were missed to escalate Mr A's care to more senior clinicians and to respond to Mr A's deteriorating condition more appropriately. For these reasons, I find that ADHB failed to provide services to Mr A with reasonable care and skill, and therefore breached Right 4(1) of the Code of Health and Disability Services Consumers' Rights (the Code).[36]

Other comment — decision to prescribe midazolam and zopiclone

104. I note that Dr Smith and ADHB disagree substantially on the appropriateness of prescribing midazolam and zopiclone together to a patient with a chronic respiratory condition. In this case, as stated above, I find that Dr C's decision to prescribe midazolam and zopiclone together to Mr A was inappropriate because it was based on his incorrect assessment that Mr A was "stable and clinically non-deteriorating".

105. I have not made a determination about the broader appropriateness of prescribing sedatives to patients with chronic respiratory conditions. However, this case highlights the importance of safe prescribing of sedatives, and I have made a recommendation concerning this.

Other comment — not contacting Mr A's family

106. RN E found Mr A in severe distress at 3.05am on Day 3; despite the efforts of staff he died at 3.30am. Mrs A was contacted at 3.19am, and did not arrive in time to see Mr A before he died.

107. RN E told HDC that she did not contact Mrs A before 3.05am because Mr A's symptoms appeared to be "controlled with medications and oxygen support to which he was responding well", and because Mr A "clearly stated that he was feeling better". Staff did not contact Mrs A between 3.05am and 3.19am because their urgent priority was trying to save Mr A's life.

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

108. During Mr A's admission, Mrs A spent time with him at the hospital. Before she left for the night on Day 2, she asked him "to notify the hospital staff to call [her] if he [began] to feel uncomfortable". The fact that Mrs A was not able to be with her husband in his final moments was tragic.

109. I note that it is not common practice in New Zealand for hospitals to have policies on what is an appropriate timeframe for alerting a patient's family to a patient's deterioration. I am not critical of ADHB for not having such a policy, but I believe that the subject deserves further consideration, and have recommended that ADHB consider whether to develop such a policy.

Recommendations

110. In response to the recommendations made in my provisional report, ADHB advised HDC that it has already made the following changes:

- It has implemented the "Respiratory Oxygen Chart" recommended by the RCA report and plans to audit the usage of this chart in January 2021.
- It now requires all modifications of EWS triggers to be first discussed with an SMO.
- It now requires all its respiratory registrars to complete its EWS e-learning module.
- It offers all patients the opportunity to complete an advanced care plan, and encourages appropriate patients to do so.

111. In addition, I also recommend that ADHB:

a) Confirm that the reviews recommended in ADHB's Root Cause Analysis Report have been conducted, and report back to HDC on the outcomes of those reviews within six months of the date of this report. The reviews include:

   i. The hospital-wide review of modifications to EWS triggers (which the Root Cause Analysis Report proposed to determine frequency and appropriateness of modifications).

   ii. Exploration of the feasibility of prescribing oxygen therapy with regular medications, including a mechanism to chart high-flow oxygen flows and rate.

   iii. The assessment of the barriers to point-of-care documentation on the Respiratory Ward.

b) Review the house officer education programme to ensure that safe use of hypnotic medication is covered, and report back to HDC on the outcome of that review within six months of the date of this report.

c) Review the training provided to registrars on modifying EWS triggers to ensure that it is appropriately rigorous, and report back to HDC on the outcome of the review within six months of the date of this report.

d) Consider whether a guideline on safe prescribing of sedatives for patients is required, and report back to HDC on the outcome of its consideration within six months of the date of this report.

e) Consider whether a policy is required on the appropriate timeframes for alerting patients' families to deterioration, and report back to HDC on the outcome of its consideration within six months of the date of this report.

f) Provide a written apology to Mr A's family. The apology is to be sent to HDC within three weeks of the date of this report, for forwarding to Mr A's family.

112. I recommend that Dr D:

a) Reflect on the issues in this case and provide a written report to HDC on his reflections and the changes to his practice he has instigated as a result of this case, within six months of the date of this report. Dr D's report should include:

   i. An explanation of the changes he has made to his practice when modifying EWS triggers.
   ii. A summary of what he learned from the module "NZEWS for ADHB".

b) Complete the Early Warning Score e-learning module on the "Ko Awatea LEARN" website, and report back to HDC on what he has learned from that module, within six months of the date of this report.

113. I recommend that Dr C undertake the ALERT (Acute Life Threatening Events Recognition and Treatment) course, and report back to HDC on what he has learned from that education, within six months of the date of this report.

Follow-up actions

114. A copy of this report with details identifying the parties removed, except the expert who advised on this case and ADHB, will be sent to the Medical Council of New Zealand, the Royal Australasian College of Physicians, the New Zealand Pharmacovigilance Centre, and the New Zealand Medicines and Medical Devices Safety Authority, and placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

115. A copy of this report with details identifying the parties removed, except the expert who advised on this case and ADHB, will also be sent to the Health Quality & Safety Commission (HQSC). I will be writing to HQSC to suggest that it consider, in light of this case (including the expert advice provided), whether the Early Warning Score system should be modified to reflect deteriorating cardiac or respiratory status together with escalating oxygen requirements.

Appendix A: Independent advice to the Commissioner

The following expert advice was obtained from Dr Nicola Smith on 14 June 2019:

"I have been asked to provide an opinion to the Commissioner on case number C19HDC00017 and have read and agree to follow the Commissioner's Guidelines for Independent Advisors.

My name is Dr Nicola Smith. I am a Respiratory Physician and have been employed for 8 years in that role at Capital and Coast DHB. My undergraduate training was in Auckland at the University of Auckland, and my advanced training in respiratory medicine was completed at Wellington Regional Hospital and Sir Charles Gairdner Hospital, Perth, Australia. I have the following qualifications and professional memberships — MBChB, BHB, Dip Ch Health, FRACP. My clinical and research interests include pleural malignancy and pleural infections.

The advice requested was to provide comment on:

The standard of [Mr A's] care during his admission to [the public hospital] on [Day 1].

The appropriateness of prescribing Midazolam and Zopiclone on [Day 3].

Actions taken by staff once [Mr A's] condition began to deteriorate on [Day 3].

Sources of information reviewed:

Clinical records from Auckland District Health Board covering the period [Day 1] to [Day 3]

Letter of Complaint dated 2 January 2019

Auckland District Health Board's response dated 5 March 2019

Clinic letters from 10 October 2017 onwards

Factual Summary

[Mr A] was admitted to [the public hospital] on [Day 1]. It was documented that he was severely unwell with an infective exacerbation of his underlying interstitial lung disease, and early sepsis. Input was sought from the Infectious Diseases team as to the best choice of antibiotic and the admission was discussed with the on-call respiratory consultant. It was agreed that [Mr A] should be discussed with the Intensive Treatment Unit (ITU) if he deteriorated.

After admission to the ward [Mr A] was regularly reviewed, first by the Night Registrar at 0100, and subsequently by the PAR nurse at 0330.

The consultant ward round occurred on [Day 2] at 1030. The history and investigations were reviewed and the initial improvement since admission was noted.

The recorded observations available at the time of the consultant review were from the 0800 recordings (Respiratory Rate 20/min, Oxygen Sats 95% on Oxygen 10 L/min. Early warning score (EWS) 3.) This was an improvement from admission. The consultant confirmed that infection was the most likely diagnosis, and that PCP infection was unlikely given the cotrimoxazole prophylaxis. The antibiotics were modified appropriately, and IV fluids stopped.

Following the consultant ward round there is no further documentation of review by medical staff until [Dr C] is called at 0120 on [Day 3].

Throughout the course of the day on [Day 2] [Mr A's] respiratory rate (RR) and oxygen saturations progressively deteriorated. By 1415 the RR had increased to 32/min and oxygen sats were variable — recorded as 84% on the finger, and 88–95% on the ear. The EWS has increased to 8. The EWS protocol is that a patient with a EWS of 8–9 is reviewed by a registrar and PAR team within 30mins. The nursing notes document that the registrar was called. It is not clear what the nurse's request of the registrar was — specifically if the call was for medical review of the patient or modification of the EWS. The nurse's documented response from the registrar is that he would modify the EWS when he returned to the ward. There is no documentation of [Mr A] being reassessed by a registrar or by the PAR team after the EWS increased from 3 to 8. The EWS was modified however, with adjustment of scores for oxygen sats and RR. The oxygen sats score was altered so that oxygen sats between 85% and 91% would score 1 instead of 3. The RR score was altered so that a RR of 28/min would score 1 instead of 3. As a result of the modification of the score the same observations scored 4 (within the normal range, and a score which does not require medical review or PAR team notification).

After 1415 the RR remained high (28–32/min) and the hypoxia persisted (02 sats 84–93%) despite the oxygen flow being increased from 10 to 12 L/min. The EWS did not increase above 5 therefore no further action was taken by the nursing staff. Despite the deteriorating observations [Mr A] is described in the letter provided by family members to be 'feeling comfortable and was his usual cheerful self'.

At 0015 on [Day 3] the nurse notes that the RR is 30/min. She places [Mr A] on the high flow oxygen (Airvo) and increases the flow from 10 to 15L/min. The nurse reviews [Mr A] at 0040 and again at 0100. At 0100 [Mr A] states that he is exhausted. He is given a nebuliser and the nurse calls [Dr C]. [Dr C] reviews [Mr A] at 0120. His notes record that the reason he has been called is that the respiratory rate was 30/min. He documents that [Mr A] is breathing rapidly and [Mr A] states he often breathes fast, is feeling better, having difficulty sleeping and feeling anxious. [Dr C] noted the RR of 28/min and sats 93% on 15 L/min oxygen, but has not documented that these are a deterioration. Following his assessment of [Mr A] [Dr C] prescribed both intranasal Midazolam (2 sprays every 2 hours as required) and oral Zopiclone (3.75–7.5mg as a once only medication). The prescription was for these medications to be given PRN (as required). The Zopiclone was given at 0130 and the Midazolam at 0210.

At 0305 [Mr A] is found gasping. A Code Blue is called and resuscitation attempted. Sadly this is not successful and [Mr A] dies at 0330.

Issue 1 The standard of [Mr A's] care during his admission to [the public hospital] on [Day 1].

The standard of [Mr A's] care during his admission to [the public hospital] on [Day 1] from the time of presentation until the conclusion of the consultant ward round at 1030 on [Day 2] was of a high standard and did not depart from accepted practice.

There was appropriate recognition of a significantly unwell patient, appropriate treatment, and regular review after admission.

Following that time point, in my opinion there has been a departure from the accepted standard of care.

The response of the registrar called at 1415 on the afternoon of [Day 2] when the EWS increased to 8 was inappropriate. An increase in EWS from 4 to 8, in a patient who had been assessed as improving by the consultant 4 hours earlier, should have resulted in re-assessment of the patient by the registrar or PAR team. The increase in EWS indicated [Mr A's] respiratory function was deteriorating. Discussion with the respiratory consultant should have occurred to clarify if further management was needed and if [Mr A] should be referred to ITU for escalation of respiratory support. It was documented by the admitting registrar, in discussion with the on-call consultant, that [Mr A] should be reviewed by ITU in the event of a deterioration and this did not occur.

The EWS protocol allows early identification of the deteriorating patient, and escalation or modification of care. Whilst it can be appropriate to modify the EWS in a patient with chronic disease to prevent incorrectly triggering escalation (such as a patient who has oxygen sats of 88% when well in the community) this was not the situation. A 6 min walk test performed by [Mr A] in [2018] indicated that his usual oxygen saturation when well was 93% at rest.

The modification of the EWS resulted in a House Officer being called to assess [Mr A] at 0120 on [Day 3]. If the unmodified EWS had been in place the higher score would have triggered a call to a more senior doctor (the night registrar) or the PAR team, instead of a house officer with less experience in assessing patients with unstable respiratory disease, the consequence of which is discussed below.

Recommended Improvements

I recommend that [the public hospital] undertake a review of the practice of modification of Early Warning Scores to ensure that this is being done appropriately.

Issue 2 The appropriateness of prescribing Midazolam and Zopiclone on [Day3].

The prescribing of Midazolam and Zopiclone on [Day 3] was inappropriate and a significant departure from the accepted standard of care.

Nasal Midazolam is commonly used in patients with advanced lung disease for relief of breathlessness and anxiety. There is a small evidence base indicating that intranasal midazolam does not cause significant sedation in a population of stable patients with terminal breathlessness, but as far as I am aware it has not been studied in patients with acute severe respiratory disease. The MedSafe datasheet for Midazolam states that the concomitant use of Midazolam with other central nervous system depressants should be avoided, as this has the potential to increase the clinical effects of Midazolam, including severe sedation.

Zopiclone is a commonly prescribed sleeping tablet on hospital wards. Long term administration of Zopiclone has been studied in patients with severe but stable lung disease (ie Chronic Obstructive Pulmonary Disease) and demonstrated no negative effect on respiratory blood gases. As far as I am aware it has not been studied in patients with acute severe respiratory disease. The MedSafe datasheet for Zopiclone states that it is contraindicated when there is severe impairment of respiratory function as it has the capacity to decrease respiratory drive. In addition additive central nervous system depressant effects should be expected if Zopiclone is administered concurrently with benzodiazepines (such as Midazolam) and respiratory depression has been reported.

In my opinion it was not appropriate to prescribe both Midazolam and Zopiclone to [Mr A], due to the potential for respiratory depression in a patient who, although reporting he was feeling improved, had vital signs indicating unstable respiratory disease. [Mr A] subsequently had a respiratory arrest and the administration of Midazolam and Zopiclone in the hour preceding the arrest may have contributed to this.

Recommended Improvements

Junior medical staffs are commonly requested to prescribe sedative medications during night shifts. I would recommend a review of the House Officer education programme to ensure that safe use of hypnotic medication is covered, and that [the public hospital] consider producing a guideline on safe prescribing of sedation for patients.

Issue 3. Actions taken by staff once [Mr A's] condition began to deteriorate on [Day 3].

I have reviewed the actions of staff once the acute deterioration was noted by the nurse at 0305 on [Day 3] and the subsequent Code Blue call. Based on the information available the response was appropriate and at an accepted standard of care."

The following further expert advice was obtained from Dr Smith on 14 November 2019:

> "Thank you for providing me with Auckland DHB's response to my expert report on Case 19HDC00017. I have read both the report dated 6/9/19 including six appendices and Auckland DHB's Root Cause Analysis on this matter dated 22 August 2019.
>
> I have been asked to advise:
>
> Whether the new information causes any change in my original advice in any way, and why or why not?
>
> Whether this information raises any new issues, and why or why not?
>
> Whether there are any other matters in this case that you consider warrant further comment?
>
> Sources of information reviewed:
>
> Clinical records from Auckland District Health Board covering the period [Day 1] to [Day 3]
>
> Letter of Complaint dated 2 January 2019
>
> Auckland District Health Board's response dated 5 March 2019
>
> Auckland District Health Board's response dated 6 September 2019
>
> [ADHB] Root Cause Analysis Dated 22 August 2019
>
> In my report dated 14 June 2019 I made two key recommendations:
>
> That [the public hospital] undertake a review of the practice of modification of Early Warning Scores to ensure that this is being done appropriately.
>
> That [the public hospital] review the House Officer Education programme to ensure that safe use of hypnotic medication is covered, and that
>
> [The public hospital] consider producing a guideline on safe prescribing of sedation for patients.
>
> The subsequent information provided by [ADHB] does not cause any significant change to these recommendations.
>
> In ADHB's response dated 6 September 2019 the DHB accepts that modification of the EWS chart should have been documented, and a plan to modify the EWS should have included a time frame for the expected clinical trajectory for [Mr A] and guidance on when and how to escalate further.
>
> The DHB has proposed comprehensive changes to practice for modifications to early warning scores including:
>
> Discussion of modification of EWS with an SMO and adequate documentation of this.

A hospital-wide review of modification to EWS triggers to determine frequency and appropriateness of modification

Changes to the respiratory oxygenation chart.

ADHB has also provided a copy of the ADHB training information regarding the NZ Early Warning Score including an online learning module for clinical staff to learn how to correctly apply and modify the EWS. This training has been available to staff since 2017.

The training already in place for staff, and the proposed changes, should ensure that the Early Warning Score system is being used appropriately within the DHB.

ADHB disagrees with my assessment that the prescribing of both Midazolam and Zopiclone on [Day 3] was inappropriate.

The disagreement is twofold:

Firstly that [Mr A] was prescribed half a tablet (3.75mg) of Zopiclone. I have reviewed again [Mr A's] prescription chart provided by ADHB. The dose of Zopiclone prescribed by [Dr C] is 3.75–7.5mg. When a medication is prescribed in this manner the dose administered within this range is left to the discretion of the nursing staff, whom in this case did administer the lower dose. [Dr C's] prescription however, would have allowed the higher dose to be administered.

As far as I can ascertain from reviewing the prescription chart and the clinical notes the Zopiclone and Midazolam were prescribed at the same time. There is no direction on the prescription chart which medication should be given first, or direction not to give the two medications together.

[Dr C's] prescribing could have allowed for 7.5mg of Zopiclone and intranasal Midazolam to be given together. This is not appropriate prescribing for a patient with unstable and worsening respiratory disease.

The ADHB Root Cause Analysis finds 'that as [Mr A] reported that he was feeling better and his EWS had remained stable, it was a reasonable decision at the time to provide a low dose sleeping tablet.' Whilst [Dr C] appears reassured in his statement that [Mr A] was 'a stable and clinically non-deteriorating patient', the clinical observations indicated the opposite — a worsening respiratory condition with a RR of 28/min, an increasing heart rate, and an increasing oxygen requirement of 15L to maintain oxygen sats of 93%, therefore I disagree with ADHB's response that 'it was a reasonable decision at the time to provide a low dose sleeping tablet'.

Secondly ADHB responds that 'Dr Smith states that Midazolam and Zopiclone were administered in the hour preceding [Mr A's] arrest: however [Mr A] received Zopiclone at 01:20 hours and Midazolam 50 minutes later at 02:10 hours. His arrest occurred at 03:05 hours'. I have reviewed the clinical notes and this is correct, the

Zopiclone was administered 1 hour and 40mins prior, and the Midazolam 1 hour prior to [Mr A's] respiratory arrest.

I agree with ADHB that the effect of the Midazolam nasal spray would have been reasonably immediate, within minutes, and the maximum effect within 5 to 10 minutes. The effect of the Zopiclone would have been longer acting. Zopiclone reaches Tmax (peak plasma concentration) around 1 hour after administration (Tmax reported in the literature as 0.5–2 hrs). It has a half-life of 3.5–6.5 hours.

Zopiclone was administered to [Mr A] at 01.20. It can be estimated that it would have reached peak plasma concentration (and therefore maximal effect) between 2 and 3 am.

The response from ADHB appears to assess the appropriateness of these two medications separately. The view of ADHB that 'the prescribing of a short acting benzodiazepine such as intra-nasal midazolam was reasonable in [Mr A's] case' does not take into account that the Midazolam was not prescribed in isolation, but as well as Zopiclone.

I have not been requested, and am not able, to comment on the possible impact of the administration of Zopiclone and Midazolam on the subsequent poor outcome. The Commissioner may wish to seek the opinion of a Clinical Pharmacologist if he requires clarification on this issue. I have been requested to comment on the appropriateness of prescribing both these mediations and my finding that it was not appropriate to prescribe both Midazolam and Zopiclone to [Mr A] is based on 3 factors:

[Dr C] did not recognise that [Mr A] had unstable respiratory disease, with objective signs of increasing respiratory distress, and therefore the prescription of medications which can cause respiratory depression was a relative contraindication.

[Dr C] did not prescribe only a 'low dose' of Zopiclone, he prescribed 3.75–7.5mg.

Both Zopiclone and Midazolam were prescribed.

My recommendation remains that ADHB review the House Officer education programme to ensure that safe use of hypnotic medication is covered, and that [the public hospital] consider producing a guideline on safe prescribing of sedation for patients.

Subsequent to my initial report I have been provided with [Dr C's] statement (appendix 2). [Dr C] states that he was aware that Zopiclone and Midazolam should be used with caution in patients with respiratory disease. He was unable to recognise that [Mr A] was clinically deteriorating and that his respiratory disease was unstable. In addition to my initial recommendation I recommend that [Dr C] receive further education around recognising an acutely ill or deteriorating patient such as the ALERT course (Acute Life Threatening Events Recognition and Treatment)."

The following further expert advice was obtained from Dr Smith on 24 February 2020:

> "I have been asked to provide a further opinion to the Commissioner on case number C19HDC00017 and have read and agree to follow the Commissioner's Guidelines for Independent Advisors.
>
> My name is Dr Nicola Smith. I am a Respiratory Physician and have been employed for 9 years in that role at Capital and Coast DHB. My undergraduate training was in Auckland at the University of Auckland, and my advanced training in respiratory medicine was completed at Wellington Regional Hospital and Sir Charles Gairdner Hospital, Perth, Australia. I have the following qualifications and professional memberships — MBChB, BHB, Dip Ch Health, FRACP.
>
> I have provided two previous reports on case number C19HDC00017, dated 14/6/19 and 9/11/19.
>
> I have been asked to provide further comment on two issues:
>
> 1. The appropriateness of Auckland DHB's staff's responses to [Mr A's] increasing oxygen requirements.
>
> 2. The appropriateness and sufficiency of the 'New Zealand Early Warning Score Chart Training' document as a tool for educating staff about Early Warning Scores.
>
> <u>The appropriateness of Auckland DHB's staff's responses to [Mr A's] increasing oxygen requirements.</u>
>
> In my report dated 14/6/19 I describe that over the course of [Day 2] [Mr A's] clinical condition deteriorated with an increase in his respiratory rate and oxygen requirements. Accepted practice in this situation would be for nursing staff to notify the medical team of the increased oxygen requirement and deteriorating respiratory observations. This would usually result in a physical review of the patient, and possible further investigation as to the cause of the increasing oxygen requirement, or escalation of management including ICU referral if appropriate. In the admission note it was recorded that [Mr A] should be discussed with DCCM if the respiratory rate increased or the oxygen requirement increased.
>
> Nursing notes from 1450 on the afternoon of [Day 2] record that [Mr A's] nurse responded appropriately to the increased EWS by contacting the respiratory registrar ([Dr D]) for review. It is difficult to comment fully on the appropriateness of [Dr D's] response due to the lack of clinical documentation. Whilst the [ADHB] Root Cause Analysis (RCA) report (pg 10) and [Dr D's] statement record that [Dr D] did review [Mr A] there is no documentation of this in the clinical record. The RCA and statement record that [Dr D] modified the EWS parameters to take into account [Mr A's] background lung disease. It is ADHB policy (ADHB EWS chart training Pg 11) that if the EWS is modified following registrar review that the registrar should document a timeframe within which they will review the patient, and instructions regarding when to contact the doctor or PaR nurse earlier if there is concern. This has not been

documented in [Mr A's] medical record. The lack of clinical documentation is well below the standard expected of medical staff.

This is an individual issue and [Dr D's] statement acknowledges that in hindsight the decision to modify the EWS was inappropriate. [Dr D] has reflected deeply on this event, completed the EWS e-learning and modified his practice accordingly.

Nursing notes, written in retrospect at 0430 on [Day 3] record that at 0015 that morning [Mr A's] oxygen requirement was again increasing. The nurse documents changing the oxygen delivery mode (from nasal prongs to face mask, and back again) and then appropriately calls the NOCHO ([Dr C]) for medical review.

In my report dated 14/6/19 I found that [Dr C] did not recognise [Mr A's] deteriorating clinical condition and the response was inappropriate.

This is an individual issue. The recommendation made in my previous report that [Dr C] receive further education around recognising an acutely ill or deteriorating patient, would help prevent a similar occurrence in the future.

2. The appropriateness and sufficiency of the 'New Zealand Early Warning Score Chart Training' document as a tool for educating staff about Early Warning Scores.

The [ADHB] resource 'New Zealand Early Warning Score Chart Training' is a comprehensive 42 page document. This document provides an overview of the NZEWS chart, the mandatory escalation pathway, a guide to modifying the EWS triggers and appropriate documentation. It is clear, concise and easy to understand. Of relevance to this case review it clearly explains when modifications to the EWS triggers can be made, and the potential clinical risk that can arise when an abnormal vital sign is 'normalised'. Documentation of modifications is also covered, stipulating that all modifications must be signed and dated with a clear duration identified, and that incomplete modifications should be ignored. Examples are provided of patient groups in whom it may be appropriate to modify the EWS, with chronic respiratory disease being one of the examples given.

The resource also directs readers to the Early Warning Score e-learning module available in Ko Awatea LEARN — an on-line learning platform.

Staff who are provided with this document, and given access to the e-learning module, would have received sufficient training to be able to use the EWS effectively and safely.

[ADHB] may wish to consider making this e-learning module mandatory for appropriate staff to ensure adequate uptake.

Dr Nicola Smith

24/2/20"

The following further expert advice was obtained from Dr Smith on 12 May 2020:

> "I would describe [Dr D's] decision to modify [Mr A's] EWS triggers as a mild to moderate departure from the standard of care."