

**Medical Centre
District Health Board (now Te Whatu Ora)
Dr B**

**A Report by the
Health and Disability Commissioner**

(Case 19HDC00853)

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Executive summary

1. This report concerns the care provided to a three-year-old girl when she presented to a medical centre with her mother for asthma symptoms in 2019. In particular, it considers whether the care provided was adequate both before and after the girl suffered a respiratory arrest.

Findings

2. The Commissioner found several failures in the care provided: staff members did not provide oxygen to the girl when her oxygen saturations were well below the 92% threshold, despite the district health board (DHB) (now Te Whatu Ora) pathway and standing orders in place; drug dosages were not checked against the published norm for the age group, and were not questioned or challenged by any of the staff assisting in the resuscitation; and there was staff confusion on how to seek external assistance in the event of an emergency.
3. The Commissioner found the medical centre and the DHB in breach of Right 4(1) of the Code.
4. The Commissioner considered that the care provided to the girl by an individual clinician was below an acceptable standard, in that he did not arrange for the girl to be given oxygen prior to her collapse, the girl was given a dose of adrenaline that amounted to almost six times the dose she should have received, and there were several inaccuracies in the coordination of her resuscitation effort. The Commissioner found the doctor in breach of Right 4(1) of the Code.

Recommendations

5. The Commissioner recommended that Te Whatu Ora and the medical centre provide HDC with an update on the implementation of the recommendations outlined in the Serious Event Review; consider making printed resources (such as asthma management plans) available at the facility; provide evidence to HDC that a co-designed governance structure has been finalised, and that clear roles and responsibilities have been agreed upon; develop a training plan for each clinical staff member; develop a clear co-designed communication pathway detailing the process to be followed by staff to contact external support systems; develop a set of standing orders with which all non-prescribing staff are familiar and are supported to use, or provide training to staff on any existing but unused standing orders; and provide the family with a written apology for the deficiencies in the care provided to the girl.
6. The Commissioner recommended that the doctor report to HDC on any further training sessions he has attended or changes he has made to his practice, and provide the family with a written apology. The Commissioner also recommended that the Medical Council of New Zealand consider whether a competence review of the doctor is warranted.

Complaint and investigation

7. The Health and Disability Commissioner (HDC) received a complaint from Mrs A about the services provided by a medical centre. At the time of events, the medical centre provided services under a contract with the DHB (now Te Whatu Ora).¹ The services that the DHB provided from within the rural health facility (and for which medical cover was provided by the medical centre) were aged residential care, maternity services, and acute and inpatient services. While the medical centre employed its own nurses who worked in the general practice, the DHB also employed nursing staff to work from the rural health facility, and these were the nurses involved in this case. The doctors involved in this case were employed by the medical centre.
8. The medical centre told HDC that “rural health facility” describes both the facility and also the integration of services between the medical centre and the DHB. The rural health facility is owned by Te Whatu Ora — Health New Zealand.
9. The following issues were identified for investigation:
 - *Whether the medical centre provided Miss A with an appropriate standard of care in Month1² and Month2.*
 - *Whether Dr B provided Miss A with an appropriate standard of care on 5 Month2.*
 - *Whether the district health board provided Miss A with an appropriate standard of care in Month1 and Month2.*

10. The parties directly involved in the investigation were:

Mrs A	Complaint/mother of Miss A
Medical centre	Provider
Rural health facility	Health facility
DHB	Provider
Dr B	Provider/doctor

11. Further information was received from:

Dr C	General practitioner (GP)
RN D	Registered nurse (RN)
RN E	Registered nurse
RN F	Nurse manager
RN G	Clinical charge nurse

¹ On 1 July 2022, the Pae Ora (Healthy Futures) Act 2022 came into force, resulting in all district health boards being disestablished. Their functions and liabilities were merged into Te Whatu Ora — Health New Zealand. All references to the DHB in this report now refer to Te Whatu Ora.

² Relevant months are referred to as Months 1–2 to protect privacy.

12. Independent expert advice was obtained from GP Dr Liz Humm (Appendix A) and RN Sharon Hansen (Appendix B).
13. An independent Serious Event Review of the events in this case was commissioned by the DHB and the medical centre. The findings and recommendations are included as Appendix C.

Information gathered during investigation

Background

14. This report concerns the care provided to Miss A (aged three years at the time of events) when she presented to a rural health facility with her mother (Mrs A) for asthma symptoms in the early hours of 5 Month². In particular, it considers whether the care provided at the facility was adequate both before and after Miss A suffered a respiratory arrest.
15. Sadly, Miss A died that morning. I take this opportunity to express my deepest sympathies to Miss A's family for the loss of their daughter.

Care provided to Miss A

4 Month²

16. In early Month², Miss A developed a cough, and on the evening of 3 Month², Miss A's cough became worse and she developed a wheeze. After contacting the facility at 11.45pm and explaining that Miss A's cough had not been responding to the medication that they had at home, it was arranged that Miss A and Mrs A would present to the facility.
17. Miss A and Mrs A arrived at the facility in the early hours of 4 Month², and were met by the on-call doctor, Dr C, who noted Miss A's two-day history of a worsening cough and took her vital signs. Miss A was given 2.5mg of salbutamol (a medication that opens up the medium and large airways in the lungs) via a nebuliser,³ as well as salbutamol in a spacer,⁴ and it was noted in the clinical records that her coughing settled quickly.
18. By 1am, Miss A's vital signs had improved and she was noted to be "perking up ++" and was talking. Mrs A told HDC that Dr C thought that Miss A had a bit of asthma, and Dr C gave them an inhaler and another spacer to take home in case Miss A started to cough again. Dr C attempted to print off an asthma action plan to give to Mrs A, but was unsuccessful because of printer issues at the health facility at the time. As such, Mrs A was not given an action plan but was instructed verbally to call or bring in Miss A again if she had any further concerns.

³ A machine that turns liquid medicine into a fine mist that can be breathed in through a mask or a mouthpiece.

⁴ A holding chamber for medication in an inhaler device.

19. Throughout the rest of the day on 4 Month2, Miss A was reportedly well with lots of energy, and no coughing or wheezing. Mrs A told HDC that she had no concerns at this time.

5 Month2

20. Around midnight on 5 Month2, Miss A became unwell and was waking with intermittent coughing and trouble breathing. Mrs A felt that giving Miss A the inhaler through the spacer was not having an effect, and so contacted the facility for advice at approximately 6.30am. She spoke with the on-call doctor, Dr B, who advised them to present to the facility. Dr B then rang RN D (who was already at the facility) and gave a verbal order to commence a salbutamol 2.5mg nebuliser and observations on Miss A's arrival.
21. Mrs A and Miss A arrived at the facility at approximately 6.50am, and were met by RN E. RN E noted that Miss A appeared to be deeply decompensated, with distressed breathing needing immediate attention. Another patient was in the resuscitation room with chest pain at the time of Miss A's arrival, so Mrs A and Miss A were seen in the facility's procedure room.
22. RN D and RN E took Miss A's observations, and noted that her oxygen saturations were low at approximately 86%. Together, the nurses prepared the nebuliser treatment, which was delivered to Miss A using a portable air compressor.
23. Dr B arrived at around 7am. His impression was that Miss A had severe asthma that was not settling with an inhaler, and so the decision was made to administer Miss A with 5000mcg adrenaline via a nebuliser. By this time, Miss A's oxygen saturations had improved to 93%.
24. While being given the nebuliser with adrenaline, Miss A became acutely agitated. Shortly afterwards, she became visibly cyanosed (she had a bluish-purple hue to her skin) and stopped breathing. After a short convulsion, Miss A then became limp and unresponsive. The emergency button was activated by RN E, and Dr B commenced resuscitation by way of mouth-to-mouth breathing and tilting Miss A's head to maintain her airway.
25. The resuscitation attempt of Miss A lasted around one and a half hours, and was coordinated by Dr B. The key issues that occurred throughout the resuscitation that are relevant to this opinion are as follows:
- Two different staff members attempted to use the wall oxygen, forgetting that it had been turned off.
 - Initially, thumbs were used to conduct the cardiac compressions on Miss A; however, for a child of Miss A's age, the heel of one hand should be used to conduct cardiac compressions.
 - The rate of compressions to breaths for the first 30 minutes of CPR was incorrect, at 30:2 (compressions then breaths) instead of 15:2.
 - A helicopter transfer to the main centre was called for by an ambulance officer (after being asked by staff) who happened to be on site at approximately 7.15am, and who then

joined the resuscitation attempt. The estimated time of arrival for the helicopter was 50 minutes.

- At around 7.40–8.00am, RN G (the Clinical Charge Nurse) attempted to video call the ICU at the public hospital, but was unable to work the video unit. Mrs A told HDC that the family feel that in this situation, this was a waste of time with people going in and out and taking up room in a small space.
- Sometime between 8.05–8.24am, the public hospital’s ICU was telephoned for further assistance, and Dr B called the ambulance service’s Clinical Desk for advice.
- Around 8.30am, a paediatric intensive care specialist from a main centre was contacted for advice.
- Adrenaline was administered to Miss A a further five times,⁵ all at the dose of 1000mcg. For Miss A, a 17kg child, the dose should have been 170mcg.⁶ Dr B told HDC that despite trying his best to remember, he honestly does not recall why he chose that dose. However, he stated that the likely explanation is that his training and experience had been almost exclusively in adult resuscitation.

26. Around 8.40am, the helicopter team arrived, and the two intensive care paramedics on board assisted with the resuscitation. After about 10 minutes, it was concluded that no further resuscitation efforts were likely to succeed. The decision was made to cease further resuscitation, and Miss A was declared deceased at 8.53am.

Policies and pathways

Asthma community health pathway

27. At the time of the events, the DHB had a community health pathway in place for the management of asthma. It stipulated:

“The severity of asthma is classified as ‘mild, moderate, or severe’ [see below]. Wheeze is not a good indicator of severity. If moderate or severe, measure oxygen saturation.

The red flags are:

- Unable to speak, or only able to speak in single words
- Silent chest, cyanosis, poor respiratory effort
- Hypotension, exhaustion, drowsiness, confusion, coma
- Deterioration despite maximal therapy”

28. The pathway stated that in the event of moderate or severe asthma, with an oxygen saturation of less than 92%, oxygen is to be given.

⁵ Administered intramuscularly twice and intravenously three times.

⁶ As per the Australian and New Zealand Committee on Resuscitation guidelines.

Standing orders for oxygen

29. Ordinarily, oxygen is required to be prescribed. However, a prescription (or charting) is not required where there are standing orders.
30. The above asthma pathway contains nursing standing orders, such as the delivery of oxygen in children, to help facilitate the timely management of the condition. The pathway states:
- “Follow nurse standing orders for:
- Acute asthma in children.
 - Oxygen”
31. This means that nursing staff treating Miss A could have administered oxygen to her without a prescription if she met the criteria in the standing orders.
32. The Serious Event Review (discussed in more detail below) found that it was unclear whether the DHB or nursing staff at the general practice facility were aware of, and actively accessed, community health pathways to assist them in providing care.
33. In a statement to HDC, RN E said that she was not aware of the standing order as authority to provide oxygen without prescription, and stated that while she was aware of the existence of community health pathways, she had not had cause to use them as she had not been working in the acute area of the facility. She stated: “It has always been the practice in the facility that a verbal order is provided for the use of oxygen.”

Clinical emergencies

34. At the time of events, the DHB had a pathway for clinical emergencies. It stipulated:
- “1. Summon immediate help from surround staff
2. To activate the clinical emergency team press the clinical emergency button
3. If there is no clinical emergency button:
- At a site with a 777 facility, dial 777, identify yourself, state ‘clinical emergency’, give your exact location and details of events, including type of clinical emergency.”
35. The 777 number connects staff to the public hospital to obtain support in the event of a clinical emergency.
36. The pathway listed a number of hospitals that had access to the 777 number, but the facility was not on the list. The DHB told HDC that staff were not aware that they could dial 777 from a landline to request support and advice from a paediatrician on call.
37. The policy “Medical Emergency” also did not refer to the availability of the 777 number at the facility. While the medical centre had another document on “Emergency Management” that suggested the use of the 777 number, the medical centre told HDC that it believed that the number was no longer available for use at the facility.

Serious Event Review

38. Following Miss A's death, both the DHB and the medical centre agreed jointly for a Serious Event Review ("the Review") into the events of this case to be conducted by an independent team (see Appendix C). In response to the provisional opinion, the medical centre told HDC that the purpose of the Review was to look at what was in place and what could be put in place to prevent another occurrence of this kind. The medical centre stated that this was not a fault-finding exercise.
39. The Review identified systems issues that impacted on the care provided to Miss A. These findings are consistent with the evidence gathered in the course of my investigation. I have summarised key issues and facts below.

Team/training

40. At the time of events, an educational needs assessment framework for nurses was not in place to identify ongoing education/training needs of staff. A staff orientation programme covering both the DHB and GP practice aspects of the facility was still in development. At the time, there was a lack of staff knowledge around the use of the 777 number, and regular resuscitation training for staff had diminished. No paediatrician specialists' clinics were conducted at the facility at the time (as they were in other rural locations).
41. An attempt to use the video conference machine to seek help when Miss A collapsed was unsuccessful, as staff had not been trained on how to use the machine. The medical centre accepted that newer staff involved in this event may not have had training on the use of the machine, and told HDC that this machine is no longer being used in such events.
42. In response to the provisional opinion, the medical centre told HDC that while the ultimate goal across the facility was for a joint staff orientation programme, at the time each provider (the medical centre and the DHB) had its own orientation programme for staff at the facility when they worked in each area. The medical centre stated that the DHB's health pathways were discussed with Dr B during his induction.

Equipment

IT

43. Staff continually experienced technical issues with the printers. As a result, the doctor who saw Miss A the day before her collapse was unable to print off an asthma action plan⁷ to give to Mrs A. The DHB noted that there was no onsite IT support available, and technicians were unable to be contacted after business hours.

Oxygen

44. The facility had piped oxygen and suction with fittings on the wall. In Month1, there was a suspected leak in the piped oxygen circuit, and the oxygen was turned off to enable investigation. Staff were informed to use an oxygen cylinder located in the resuscitation room if oxygen was required. However, no signs were placed on the oxygen outlets to note

⁷ See https://www.asthmafoundation.org.nz/assets/documents/172460-Child-Asthma-Plan_ASTH10_web.pdf for an example of an asthma action plan.

that the supply had been turned off. As noted above, two different staff members attempted to use the wall oxygen, forgetting that it had been turned off.

Organisation and management

45. The DHB and the medical centre both have separate policies and procedures and, despite the facility being an integrated facility, the policies and procedures remain separate, with no one standard for the nursing staff to refer to and ensure that practice expectations are the same.
46. At the time of events, the DHB and the medical centre were negotiating a governance structure. This meant that the staff were operating under a contract that had less detail about general governance, clinical governance, roles, responsibilities, and medical services. The Review found that the lack of a timely co-designed governance structure between the DHB and the medical centre led to the following:
- Pathways for management of an acutely unwell paediatric admission were not defined.
 - The facility was not recognised as providing first responder emergency services, which led to nursing staff being unable to access appropriate training.
 - There was an absence of a co-designed communication pathway for medical centre staff to gain assistance locally and escalate care to obtain support from the public hospital. This meant that staff contacted a number of different agencies to gain advice on how to manage the situation, leading to a delay in requesting transport to the main centre.
 - There was a lack of awareness and a lack of endorsement of the use of community health pathways by all clinical staff, which led to a missed opportunity to utilise standing orders for oxygen.
47. As a result of the Review, the DHB and the medical centre set multiple recommendations for change (see Appendix C).

Further information

The family

48. Mrs A told HDC that she felt that there was panic and a slow response to Miss A's sudden collapse. Mrs A said: "I felt nobody took charge of the unfolding situation until [the] helicopter service arrived (at least 45 minutes later)." She stated:

"The effort of CPR those specific people put in for [Miss A] was outstanding, and I appreciate every second of effort they put in to her, but the fumbling and panicked reaction and organisation of the start and sometimes during this procedure was definitely not up to what I feel is of New Zealand hospital standard."

Te Whatu Ora

49. Te Whatu Ora stated that it continues to offer its sincere condolences to the family for the passing of Miss A. It said that both Te Whatu Ora and the medical centre are committed to implementing the recommendations outlined in its Review, and noted that many have already been completed.

Medical centre

The medical centre told HDC that, as a practice, it has reflected on this event at length, and stated:

“It has affected all staff who were involved, both clinical and administrative. As a result, much of our education has been focused on restoring staff confidence in our ability to manage situations like this. We welcome further review of this event. We want to ensure that as a practice, we have learnt everything we can to try and take something positive from what is otherwise a tragic event.”

50. The medical centre told HDC that the whole team was traumatised and saddened by Miss A’s death, and reiterated its condolences to Miss A’s family.

Dr B

51. Dr B noted the changes made as a result of the Review, and told HDC that he has participated in all of the process changes, and believes he is now better prepared for an event such as this than he was at the time. He stated:

“I have learned that I need to stop and double check my responses more carefully, recognising that I may revert to familiar procedures when faced with an unfamiliar crisis.

My heart goes out to [Miss A’s] family; I cannot begin to imagine their suffering. They have my deepest condolences. I am committed to learning from this terrible tragedy and doing everything I can to avoid such an outcome in the future.”

Responses to provisional opinion

52. Mrs A was provided with the opportunity to comment on the “information gathered” section of the provisional opinion.
53. The DHB was provided with the opportunity to comment on the full provisional opinion, and its comments have been incorporated into this report where appropriate.
54. The DHB stated that issues with the resuscitation technique in this case (the rate of compressions and the thumbs being used) speaks to the pressures of such a situation. The DHB said that the only way inexperience can be addressed is by repeated exposure, which cannot be practised. It stated:

“It is unclear what more can be done for a person to train them for this scenario as their exposure to real-time paediatric resuscitation events is totally dependent on these situations arising when they are working.”

55. The medical centre was provided with the opportunity to comment on the full provisional opinion, and its comments have been incorporated into this report where appropriate. The medical centre submitted that the integration of systems, or lack thereof, did not contribute significantly to this event. It submitted that all staff knew the system in place and were

aware of the processes and procedures and equipment to use for resuscitation. The medical centre considers that no failings were due to governance systems.

56. In response to my provisional opinion, both the DHB and the medical centre submitted that undue weight has been placed on the Review in this case. I address this submission below.
57. Dr B was provided with the opportunity to comment on the sections of the provisional opinion that relate to him, and he had no further comments to make.
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Opinion: Preliminary comment

58. From the outset, I acknowledge how difficult this situation would have been for the family, and I reiterate my sincerest condolences to them. It is clear that Miss A's death was unexpected and was felt strongly by the staff involved, who tried valiantly to save her. Both the individual clinicians and the group providers have reflected greatly on the care they provided.
59. It is also important to note that it is not my role to determine Miss A's cause of death. Any findings in this report about the standard of care provided are not intended to imply that Miss A's death was caused by the actions of any one person. This investigation considers whether Miss A was provided with an appropriate standard of care, and whether recommendations to improve standards of care in the future can be made.
60. I also acknowledge the rural context in which care was provided to Miss A. My independent rural GP advisor, Dr Liz Humm, noted that currently rural general practice is facing something of a crisis with a shortage of staff and GP burnout. This is also noted in the DHB's Serious Event Review, as follows:
- "Rural GPs have enrolled patients but are also rostered 24/7 to provide emergency care across their coverage area at any time, regardless of their patient's enrolment status. No matter what the event or emergency the rostered GP is the one who is called and expected to respond. Rural GPs are often working at the top of their scope, managing heightened risk, in remote locations many hours from secondary or tertiary care ... This creates a stressful work environment and is the reason it is so difficult to recruit and retain rural GPs."
61. Nonetheless, I consider that such a facility should have appropriate processes and supports in place to assist staff to manage emergency situations, particularly when the facility deals with after-hours, acute emergency situations.
62. This report highlights the importance of ensuring that facilities are fit for purpose, and that staff are trained and supported to provide appropriate care in stressful emergency situations such as this.

63. In addition to the advice provided by Dr Humm, I obtained independent advice from RN Sharon Hansen to assist my investigation of the care provided to Miss A.
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Opinion: DHB and rural health facility — breach

Introduction and preliminary matters

Service provision

64. Two specific legal entities were responsible for the healthcare service provided to Miss A — the DHB and the rural health facility.
65. As noted earlier in this report, “the rural health facility” describes both the facility and also the integration of services between the medical centre and the DHB. The DHB owned the facility, from which it provided aged residential care, maternity services, acute services, and inpatient services, and it employed nursing staff. The medical centre operated from the facility as a general practice, and also provided medical cover (i.e., doctors) for the services that the DHB provided at the facility. The DHB employed the nurses involved in this case, and Dr B and Dr C were employed by the medical centre.
66. From my review of these events, it is clear that consumers who accessed services from the rural health facility would have seen doctors and nurses working jointly in delivering a unified service.
67. For the purpose of this opinion, noting their collaboration in the delivery of health care, including acute services, I consider the two group providers to be jointly responsible for the service provided to Miss A in Month2.

Response to submissions

68. In response to my provisional opinion, the medical centre took issue with my reliance on advice from my independent expert advisor, RN Hansen, to support criticisms of the medical centre. It stated that as the medical centre did not employ any of the nurses involved, conclusions made regarding the medical centre cannot be based on this advice.
69. I disagree with this submission. While I have assessed the relevant individual providers’ care against the advice provided by their respective peer, I have taken into account both experts’ advice (which is clearly relevant), together with the Review, and totality of other evidence gathered, when assessing the overall service provided to Miss A by the medical centre and the DHB. While expert advice can be useful, it is not necessarily determinative when the facts themselves, and reasonable inference, disclose a system that did not work as it should.
70. It was the responsibility of both the DHB and the medical centre to work together to provide this service, and in such a situation, where failings occur in one entity, they affect the care provided by the joint service. Additionally, as I discuss below, there are failings that are attributable to the general practice staff who were employed by the medical centre.

71. Also in response to my provisional opinion, the DHB and the medical centre both submitted that undue weight has been placed on the Review in this case. However, the Review was only one aspect of the evidence and information gathered that I considered. It is clear that some of the systemic issues at the rural health facility that are identified in the Review are also identified by my independent advisors as having fallen below accepted standards. I note further that some of systems issues identified in the Review were also identified in the providers' responses to my investigation. It is in this context that I have referred to the Review in my opinion, and I do not accept that it is being unduly relied upon to determine a breach of the Code of Health and Disability Services Consumers' Rights (the Code).
72. I also understand and accept that the Review was driven by the need to identify systemic errors and to identify areas for improvement, and I strongly encourage both entities to take on board the recommendations and feedback from this Review, at a systems level, to ensure future improvement in the joint service they provide.

Care provided to Miss A at the medical centre

Prior to Miss A's collapse

73. The facts pertaining to the care provided to Miss A before her collapse are set out at paragraphs 16–24 of this report. They are not in dispute.
74. At the time of events, the DHB's asthma community health pathway stipulated that in the event of an oxygen saturation under 92%, oxygen was to be given. As per this pathway, Miss A's oxygen saturation prior to her collapse warranted the use of supplementary oxygen. The pathway also contained standing orders for the use of oxygen without a prescription. Despite the pathway being in place, it was not adhered to by any staff member at the facility prior to Miss A's collapse. Dr B did not order the administration of oxygen, and nursing staff did not challenge this decision, and nor did they utilise the standing order. As a result, Miss A was not provided with oxygen when clearly it was clinically indicated.
75. My independent rural nursing advisor, RN Hansen, noted that at Miss A's second presentation on 5 Month2, prior to her collapse, her oxygen saturations dropped as low as 86%, but oxygen was not provided. RN Hansen considered that failing to provide Miss A with oxygen was "a serious departure of standard practice". RN Hansen also noted that no paediatric early warning score was used, and she considers that had it been used, it would have prompted escalation to use supplementary oxygen. I accept this advice.
76. Similarly, my independent rural GP advisor, Dr Humm, indicated that oxygen should be administered to a patient with severe asthma.
77. The DHB's Serious Event Review noted that the nursing staff involved, while having varied backgrounds and experience, appear to have been more exposed to an elderly population and conditions prevalent within that group. This, in conjunction with the temporary unavailability of piped oxygen within the facility, the lack of a needs assessment framework for the nurses to identify their ongoing training needs, and the ambiguity around whether or not staff were aware of and actively accessed community health pathways to assist them,

were noted to be contributing factors for the lack of oxygen provided to Miss A prior to her collapse.

78. In addition, the Review identified that the use of compressed air (rather than oxygen) to drive nebuliser therapy appeared to be common practice amongst nursing staff at the facility, and that unawareness of the use of community health pathways by all clinical staff through governance at the facility led to a missed opportunity to utilise standing orders for the administration of oxygen to Miss A following the identification that she had oxygen saturations of less than 92%. I also note RN E's statement to HDC that she was not aware of the authorities in place to provide oxygen without prescription, and that while she was aware of the existence of community health pathways, she had not had cause to use them, as she had not been working in the acute area of the facility.
79. Having considered the totality of evidence, I have reached the view that there was systemic failure in the care provided to Miss A prior to her collapse, which meant that a reasonable standard of care was not met. I am particularly concerned that on 5 Month2, when Miss A was clearly hypoxic with oxygen saturations that warranted it, not one staff member involved considered that administration of oxygen was necessary. Oxygen was not considered until after Miss A's collapse. The fact that in this case no staff member utilised community health pathways or standing orders to provide Miss A with oxygen when it was clinically warranted, indicates either a lack of awareness of the pathways in place (for which training would be indicated), or a failure to adhere to these pathways.

After Miss A's collapse

80. The facts pertaining to the care provided to Miss A after she collapsed are set out at paragraphs 24–26 of this report.
81. I note that Miss A was unable to be moved into the resuscitation room after her collapse, as it was being used by another patient. RN Hansen considers that there was no departure from standard care in not moving Miss A after she collapsed, and noted that the action of trying to sort out two patients would have wasted time and further complicated the situation, and would have created more stress.
82. However, RN Hansen advised that there were departures from the accepted standard of care at several junctures during the resuscitation attempt. In particular, she noted that the resuscitation was hampered by inappropriate medication doses, inadequate adherence to resuscitation guidelines (eg, compressions, both depth and initially amount/breaths, and timing of IV access), and the late involvement of experienced staff able to intubate.⁸ She also noted that it was an ambulance officer who happened to be present who activated the emergency alert system, which in turn activated the air retrieval team, and stated that it was not clear how the staff at the facility would have been able to activate the emergency line to the public hospital.

⁸ Insert a tube through the mouth or nose into the airway to aid breathing.

83. As noted above, both the DHB and the medical centre told HDC that staff were unaware that they could use the DHB emergency 777 number for assistance (a number that connects staff to the public hospital to obtain support in the event of a clinical emergency). In addition, the Review noted that widespread hands-on training for staff to learn to operate the video conference machine — which staff unsuccessfully attempted to use on 5 Month2 — had not occurred.
84. RN Hansen stated:
- “Staff at the time undertook the actions that they deemed correct, they were hampered with a system that did not support them, flow diagrams either not available or not utilised, equipment that was not working or mixed up and too much reliance on a TV communication system which was difficult to get going in the heat of the moment.”
85. Dr Humm also noted that having easily identifiable and available charts for resuscitation purposes (including doses of adrenaline) is important for any practice, even if cardiorespiratory arrest is very infrequent. The medical centre and the DHB told HDC that there were paediatric resuscitation charts available to staff (either on the resuscitation trolley at the time, or on the wall of the room (as indicated by the Review)). I acknowledge this, but note that regardless, the charts were not referred to, or followed, by relevant staff. As this Office has emphasised previously, without staff compliance, policies and guidelines become meaningless.
86. RN Hansen considered that the preparation and administration of the incorrect dose of adrenaline given to Miss A was a severe departure from accepted practice, and that the failure of the nursing staff to question the dose was a moderate departure. Dr Humm also considered that there was a moderate departure in the administration of the incorrect dose of adrenaline. Both advisors noted that the drug dosages were not checked against the published norm for this age group, and they were not questioned or challenged by nursing staff, or any of the other staff assisting in Miss A’s resuscitation.

Conclusion

87. I acknowledge the level of stress under which the clinicians were operating at the time of Miss A’s collapse, and their earnest, best efforts to resuscitate her. However, it is the ultimate responsibility of the group provider to ensure that the system in which its staff operates is adequate and supports good clinical decision-making. In this case, I consider the following to be key failings in the care provided to Miss A that collectively fell below the expected standard of care:
- Staff members failed to provide oxygen to Miss A on 5 Month2 when her oxygen saturations were well below the 92% threshold, despite the DHB pathway and standing orders in place.
 - Drug dosages were not checked against the published norm for Miss A’s age group, and were not questioned or challenged by any of the staff assisting in Miss A’s resuscitation. In addition, paediatric resuscitation charts (apparently available to staff) were not utilised to assist the optimal delivery of resuscitation.

- Attempts to seek external assistance were hampered by a lack of staff training on the equipment available, and there was a lack of knowledge around the 777 number.

88. For the reasons outlined above, I consider that these are failures for which both the medical centre and the DHB were responsible.

89. While the rural context of this case and the rarity with which staff at the facility were presented with emergency situations such as this are clearly relevant, I consider that such context makes the system for health care provided by the facility even more vital. For many people living in the area, the facility is the closest option for patients, and they should be able to rely on the facility to provide them with an appropriate standard of care.

90. I find that for the failures in the care provided to Miss A, both before and after she collapsed, the rural health facility (the medical centre and the DHB) breached Right 4(1) of the Code.⁹

No written information on 4 Month2 — other comment

91. RN Hansen noted the failure to offer written information on asthma exacerbation to Mrs A on 4 Month2, and considered that this may have affected Miss A's early access to oxygen. RN Hansen acknowledged the printer issues faced by staff, but noted that if the practice did not have standard written information on asthma exacerbation to hand, then a handwritten instruction would have sufficed, or a written URL address for a website such as the Asthma Foundation.

92. The Review also noted that printer issues at the facility continued to be experienced by staff regularly because the computers operated over two server platforms. This led to staff being unable to print important information for Mrs A on 4 Month2.

93. The printer issues experienced by staff did not facilitate good clinical practice, and were not unknown to the facility. No written advice was given to Mrs A, which was a missed opportunity for her to be better informed with a plan on what to do when Miss A became seriously unwell on 5 Month2.

Governance structure — other comment

94. As noted above, the Review, together with several of the provider responses to my investigation, identified issues with the governance at the rural health facility at the time of these events. Specifically, staff were operating under a contract that was lacking in detail about general governance, clinical governance, roles, responsibilities, and medical services.

95. In addition, the DHB and the medical centre both had separate policies and procedures, with no one standard for staff to refer to and ensure that practice expectations were the same. In response to the provisional opinion, the medical centre told HDC that in the interim and before systems were integrated, it had been agreed that each area would operate as it always had, using its own policies and procedures, as processes were being worked through. The medical centre stated that all urgent presentations involving DHB staff would follow

⁹ Right 4(1) states: "Every consumer has the right to have services provided with reasonable care and skill."

DHB processes, as would any medical centre staff if they were providing acute care or joining a resuscitation event.

96. The medical centre also submitted in response to the provisional opinion that the integration of systems, or lack thereof, did not contribute significantly to this event. It submitted that all staff knew the system in place and were aware of the processes and procedures and equipment to use for resuscitation. The medical centre considers that no failings were due to governance systems, and pointed to a previous incident that happened prior to these events, in which the system allegedly operated effectively.
97. While I acknowledge the medical centre's submission, in my view, and evidenced by the fact that no staff followed relevant policies in Miss A's case, as discussed above, the structure in place had the potential to be confusing and disjointed. Two entities were delivering both discrete services and services in collaboration. Although the medical centre stated that the DHB was responsible for providing acute care services, doctors employed by the medical centre also provided those services. Similarly, in response to the provisional opinion, the medical centre stated that its doctors, who ordinarily would be obliged to follow medical centre policies and procedures, would follow DHB policies when providing care contracted to the DHB, such as acute presentations. The medical centre has made it clear that staff needed to be aware of two organisations' policies, understand when either applied, and switch between them when relevant. I agree with the findings of the Review that as a result of having two sets of policies, there may have been a lack of clarity around roles, responsibilities, and medical services. I have recommended that the medical centre and the DHB finalise and implement a unified system with clearly identified roles and pathways for delivering services across the facility, to help avoid any potential for disjointed care in future.
-

Opinion: Dr B — breach

98. Dr B was the on-call doctor who saw Miss A when she presented to the facility on the morning of 5 Month2. While both this report and the Review outline significant systems issues at play at the medical centre, I consider that there is individual accountability for the actions taken by Dr B in response to Miss A's presentation.

Care provided to Miss A before collapse

99. Miss A presented to the facility on 5 Month2 as she was coughing and having trouble breathing. Dr B arranged for observations to be taken and for the administration of a salbutamol 25mg nebuliser upon Miss A's arrival. When Dr B arrived, the decision was made to administer Miss A with 5000mcg adrenaline via a nebuliser. By this point, Miss A had not responded well to the treatment given at home, and had had an incomplete response to the treatment given on her arrival at the medical centre. Oxygen was not suggested or given to Miss A at any point prior to her collapse. By the time Dr B reviewed Miss A, her oxygen saturation rate had improved from 86% to 93%.

100. My independent rural GP advisor, Dr Liz Humm, advised that in the community health pathways, the treatment for moderate asthma states to give oxygen when oxygen saturations are less than 92%, and noted that by the time Miss A was seen by Dr B, her oxygen saturations were 93–97%. However, Dr Humm stated that putting together the history Dr B obtained (the low oxygen saturation on arrival plus Miss A’s tachycardia, high respiration rate, and the general examination findings), a picture of a very unwell child is painted.

101. Dr Humm stated:

“[Dr B’s] notes describe what I assume is the description [Dr C] gave [Dr B] as ‘Couldn’t talk for SOB, chest sucking in with every breath and lips and face blue’. This is certainly a description of a child with severe or even life threatening asthma. [Dr B’s] notes state [Miss A] had ‘severe asthma refractory to inhaler or steroids’. Severe asthma should be treated with oxygen as per several NZ guidelines (although I note that Starship guidelines for severe asthma are somewhat looser stating oxygen ‘as required’). For life threatening asthma Starship guidelines state ‘give high flow oxygen via mask (eg 15L/min)’.”

102. I agree with the advice provided by Dr Humm. While Dr B may have been reassured by the rise in Miss A’s oxygen level to 93%, I consider that Miss A’s presentation was consistent with severe asthma (as noted by Dr B himself), and warranted the administration of oxygen. This should have been ordered by Dr B prior to her collapse, but it was not given until after Miss A’s respiratory arrest.

Care provided to Miss A after collapse

103. Shortly after Dr B arranged for Miss A to have nebulised adrenaline, she became agitated, stopped breathing, and collapsed. First, I wish to discuss the CPR given to Miss A once she collapsed. While Dr B did not undertake the CPR himself, he was coordinating it and, as the most senior clinician on site at the time of Miss A’s collapse, he bears responsibility for how it was conducted.

104. There are conflicting accounts regarding the rate of chest compressions undertaken during the CPR. Dr B’s documented notes state that they were done at 60 compressions per minute. However, the clinicians who were present on 5 Month2 (including Dr B) do not recall the compressions being that slow. RN D and RN F told HDC that they both recall that compressions were being done at around 100–120 per minute, which is the correct rate.

105. Taking all the evidence into consideration, I am satisfied that on the balance of probabilities, it is likely that the correct compression rate of around 100–120 per minute was provided to Miss A, rather than the documented rate of 60 per minute. While the documentation of these events is otherwise relatively comprehensive, I take the opportunity to highlight to Dr B the importance of accurately notating steps during a resuscitation.

106. It is accepted that for the first 30 minutes of CPR the rate of compressions to breaths was incorrect, at 30:2 instead of 15:2. As per the New Zealand Resuscitation Council guidelines,¹⁰ infant and child CPR should be delivered with a ratio of 2 breaths to 15 compressions. In addition, initially thumbs were used to deliver the compressions to Miss A, when the correct way to deliver compressions for a child of Miss A's age was to use the heel of a hand. These mistakes were subsequently corrected, but it meant that fully effective CPR administered to Miss A was delayed until this correction occurred.

107. Secondly, there is the issue of the dose of adrenalin given to Miss A during the resuscitation attempts. Regarding this, Dr Humm advised:

“The dose of adrenalin in resuscitation is calculated in micrograms per kilogram. 10mcg per kilogram of the child's weight is the advised dose. [Miss A's] weight was 17kg (as previously documented by [Dr C]). Thus the correct dose would have been 170 micrograms. The clinical notes by [Dr B] state that 1mg of Adrenalin was given 1mg = 1000mcg. Thus a larger dose than recommended in the guidelines was given (on 5 occasions) ...

It is clear that the dose used was too high. It can be difficult to remember doses of drugs used very infrequently. For many an aide memoire is crucial.”

108. Dr Humm considered the prescription of the incorrect dose of adrenaline to Miss A by Dr B to be “a moderate departure from best practice”. Dr B told HDC that he does not remember why he chose that dose, but the likely explanation is that his training and experience had almost exclusively been in adult resuscitation.

109. I note that the calculation done for the adrenaline administered to Miss A was substantially incorrect, resulting in an overdose of almost six times the dose required. Further, this incorrect dose was administered on five separate occasions throughout the morning without Dr B realising his error. I acknowledge Dr Humm's statement that it can be difficult to remember doses of drugs used very infrequently, but I consider that ensuring that the correct dose of a medication is prescribed to a patient is a basic aspect of healthcare provision, and I am critical that this was not done on this occasion.

Conclusion

110. While acknowledging the mitigating factors in relation to the systems at the medical centre, and that this was no doubt a stressful situation, I nevertheless consider that Dr B's actions amount to a breach of the Code. The errors in the care he provided point to a lack of knowledge on paediatric asthma and resuscitation, and I agree with the Review's suggestion (page 26) that contacting an on-call paediatrician about Miss A's presentation prior to her collapse would have greatly assisted Dr B in his decision-making.

111. In summary, I consider that by failing to arrange for Miss A to be given oxygen prior to her collapse, giving Miss A an overdose of adrenaline that amounted to almost six times the

¹⁰ <https://www.nzrc.org.nz/assets/Guidelines/Paed-ALS/ANZCOR-Guideline-12.2-Paed-Diagnosis-and-Management-March16.pdf>.

dose she should have received, and by coordinating the CPR effort of Miss A with multiple inaccuracies, Dr B failed to provide Miss A services with reasonable care and skill. It follows that I find Dr B in breach of Right 4(1) of the Code.

112. It is important to acknowledge that Dr B has reflected on what happened in Miss A's care and has committed to learning from this event and doing everything he can to avoid such an outcome in the future.

Recommendations

113. I recommend that Te Whatu Ora and the medical centre:
- a) Provide HDC with an update on the implementation of the recommendations outlined in the Serious Event Review, within three months of the date of this report. Te Whatu Ora and the medical centre are then to provide continuous updates to HDC on the implementation and effectiveness of these recommendations on a three-monthly basis, until the recommendations have been completed and implemented for at least six months.
 - b) Consider having a supply of printed resources (such as asthma management plans) available at the facility, for provision to patients and guardians when necessary. In response to this recommendation in my provisional opinion, the medical centre stated that this has been completed, and the printer issues have been resolved. Evidence of these changes are to be sent to HDC within one month of the date of this report.
 - c) Provide evidence to HDC that a co-designed governance structure has been finalised, and that clear roles and responsibilities have been agreed upon, within three months of the date of this report.
 - d) Develop a training plan for each clinical staff member at the medical centre, which is to be reviewed and amended accordingly each year, to identify and rectify any gaps in each staff member's training and knowledge. Evidence that this planning is underway is to be sent to HDC within six months of the date of this report.
 - e) Provide HDC with evidence that the issues regarding the outside signage at the facility have been addressed, or details of a plan on how these issues will be addressed. In response to this recommendation in my provisional opinion, both the DHB and the medical centre stated that this has been completed.
 - f) Develop a clear co-designed communication pathway detailing the process to be followed by the facility staff to contact external support systems (such as the public hospital or Starship Hospital or the ambulance service). Evidence that this has been done, as well as evidence of staff orientation to this pathway, is to be sent to HDC within three months of the date of this report.

- g) Develop a set of standing orders with which all non-prescribing staff are familiar and are supported to use, or provide training to staff on any existing but unused standing orders. Evidence that this has been done is to be sent to HDC within three months of the date of this report.
- h) Undertake a review of the emergency information and equipment currently in place at the facility, to ensure that:
 - i. Appropriate signage and reference charts are readily available for reference in an emergency situation;
 - ii. The resuscitation room and trolley has all the appropriate emergency equipment and is organised appropriately; and
 - iii. All staff are very familiar with the equipment, including where to find each piece of equipment and how it is used.

In response to this recommendation in my provisional opinion, the medical centre stated that this has been completed. Evidence of these changes is to be sent to HDC within six months of the date of this report.

- i) Consider adding specific information to its daily staff roster, to include the specialties and skill sets of each clinical staff member, so that staff members are familiar with each other's abilities and skill sets in the event of an emergency presentation (to assist in the development of an emergency response plan). The outcome of this consideration, and any changes made as a result, are to be sent to HDC within one month of the date of this report.
- j) Provide the family with a written apology for the deficiencies in the care provided to Miss A. The apology is to be sent to HDC within three weeks of the date of this report, for forwarding.

114. I note that Dr B attended a course on Advanced Paediatric Life Support in early 2020. In addition, I recommend that Dr B:

- a) Report back to HDC on any further training sessions he has attended or changes he has made to his practice since the events of this case, within one month of the date of this report.
- b) Provide the family with a written apology for the deficiencies in the care he provided to Miss A. The apology is to be sent to HDC within three weeks of the date of this report, for forwarding.

115. I recommend that the Medical Council of New Zealand consider whether a competence review of Dr B is warranted.

Follow-up actions

116. A copy of this report with details identifying the parties removed, except the experts who advised on this case, will be sent to the Medical Council of New Zealand, and it will be advised of Dr B's name.
117. A copy of this report with details identifying the parties removed, except the experts who advised on this case, will be sent to the Health Quality & Safety Commission (HQSC), the Division of Rural Hospital Medicine of New Zealand (DRHMNZ), the Rural Health Alliance Aotearoa New Zealand (RHAANZ), and the Ministry of Health, and placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.
118. With reference to HDC's Naming Policy, I have decided not to name the medical centre service given the small size of the facility, and the potential for individual staff members to be identified through publication. In addition, noting that it is a rural facility, I consider that it is important not to undermine public confidence in the service. For these reasons, I have decided not to name the entities behind the medical centre service (that is, the medical centre and the DHB).

Appendix A: Independent clinical advice to Commissioner

The following expert advice was obtained from GP Dr Liz Humm:

"I have been asked to provide an opinion to the Commissioner for the HDC. Case reference: C19HDC00853.

I have read and agree to follow the Commissioner's Guidelines for Independent Advisors. I am not aware of any conflicts of interest.

I have been a rural GP in New Zealand for over 25 years (although at the time of writing this report I am on a year's leave and working as a doctor in a rural hospital in Papua New Guinea).

My post graduate qualifications include FRNZCGP (Fellowship of the New Zealand College of General Practitioners) and FDRHMNZ (Fellowship of the Division of Rural Hospital Medicine New Zealand). I am involved in teaching and supervision of medical students, junior doctors and GP registrars on behalf of the University of Auckland and the College of GPs. I am actively involved with patient care and on-call duties including management of medical emergencies and trauma, and have been throughout my 25 years of practice in New Zealand. I am PRIME (Primary Response In Medical Emergency) trained and continue to undertake MOPS (Maintenance of Professional Standards). Whilst every rural GP practice is unique in its set-up, there are many similarities between the practice where I work and [the medical centre]. I am well aware of the challenges and joys of living and working in a small town.

Before I begin my report I would like to extend my deepest condolences to the family of [Miss A]. I will refer to her as [Miss A] throughout my report and hope this is appropriate.

The Commissioner has asked me specific questions which I will state now:

'Please review the enclosed documentation and advise whether you consider the care provided to [Miss A] by [the medical centre] was reasonable in the circumstances and why.

In particular, please comment on:

- 1. Was [Miss A's] management by [Dr C] on the evening of 4 [Month2] consistent with accepted practice? (Please note I have subsequently confirmed that this should be 'the early hours' of 4 [Month2])**
- 2. Was management provided by [Dr B] on the morning of 5 [Month2] consistent with accepted practice, including if it was reasonable to administer nebulised adrenalin to [Miss A]?**
- 3. As far as can be determined, was [Miss A's] resuscitation process consistent with accepted practice?**
- 4. Any additional comments on processes or practices relevant to the complaint.**

For each question, please advise:

- a) **What is the standard of care/accepted practice?**
- b) **If there has been a departure from the standard of care or accepted practice, would you consider it to be a mild, moderate or severe departure?**
- c) **Would it be viewed by your peers as a mild, moderate or severe departure?**
- d) **Recommendations for improvement that may help to prevent a similar occurrence in the future.'**

The documentation sent to me by HDC were

1. Copy of Serious Event Review dated [2019]
2. Copy of complaint dated [2019]
3. Copy of [GP's] response dated [2019]
4. Copy of [manager's] response dated [2019]
5. Copy of [Dr B's] response dated [2019], including notes of 5 [Month2]
6. Copy of [Dr C's] response dated [2019]
7. Clinical records from 12 [Month1]

Brief summary of events in chronological order:

12 [Month1]

[Miss A] was seen at [the medical centre] and diagnosed with 'viral induced wheeze' and prescribed redipred and salbutamol. (Redipred is a liquid steroid prescribed to reduce inflammation in the airways that occurs with asthma. Salbutamol is a medication that relaxes the muscle in the airways thus reducing constriction and increasing the calibre of the airway. Both medications enable more air to get into the airways in the lungs.) During the following 3 weeks [Miss A] was described as mildly wheezy. She attended [the medical centre] for routine immunisations during this time.

3–5 [Month2]

Very late on the evening of 3 [Month2] [Miss A] became much more wheezy and was taken by her mother for treatment at [the medical centre] and was treated by [Dr C]. She returned home after treatment in the early hours of 4 [Month2]. After a day at home with her mother on 4 [Month2] she again became wheezy overnight leading into 5 [Month2]. [Miss A] was again taken by her mother to [the medical centre] at about 7am on [5 Month2]. She was initially treated by the nursing staff until [Dr B] arrived. She was treated for asthma and possible croup but suffered a respiratory arrest. Resuscitation was done by [Dr B] and nursing staff present. Later [a GP] and [Dr C] arrived at work and assisted with resuscitation. Later still the rescue team, with paramedics, arrived by helicopter from [the public hospital] Intensive Care. Advice was also sought from Starship Hospital and [ambulance service] clinical support. Attempts were also made to video conference with [the public hospital] Intensive Care. Sadly,

resuscitation was not successful and [Miss A] was pronounced dead at about 8.50am on [5 Month2].

Answers to specific questions asked by the Commissioner:

Question 1

Regarding [Dr C's] management of [Miss A] just after midnight on 4 [Month2]:

- a) The standard of care was appropriate as per bpac guidelines and [DHB] HealthPathways. There was no departure from the standard care/accepted practice.
- b) Not applicable
- c) Recommendations for improvement. Whilst I feel that allowing [Miss A] to go home with her mother was appropriate (in accordance with guidelines), an alternative management of admitting her to a GP bed at [the medical centre] would also have been another option. Likewise so would have transferring her to [the public hospital]. She had been unwell with reduced oxygen saturations and although she responded well to treatment she may have deteriorated again. However, [Miss A] was described as settled and full of energy on [4 Month2]. From [Mrs A's] statement '[4 Month2], [Miss A] had a quiet day at home with me, no coughing or wheezing and no inhaler needed in the day. A lot of energy, generally well and I had no concerns'. Had she been admitted, she may well have been discharged on [4 Month2] with no additional treatment. Decisions such as whether to admit patients in the rural setting are made, of course, on clinical grounds. However, other factors also need to be considered. Examples of other factors influencing whether admission is the best option could be the distance the patient lives from [the medical centre], availability of ambulance services and patient access to a vehicle with enough fuel, a warrant and a competent driver. These other factors are important in practical terms of managing patients rurally and sometimes not reflected in guidelines. Taking into consideration the severity of asthma attack, it may also have been appropriate to have a more robust follow up plan for review of [Miss A], including an 'asthma action plan'. However, had she been reviewed in the day time on 4 [Month2] she may not have displayed any symptoms heralding what was to happen on [5 Month2].

Question 2

Regarding the management of [Miss A] by [Dr B] on 5 [Month2], including the administration of nebulised adrenalin:

- a) The standard of care/accepted practice I have taken from Starship Guidelines¹, [DHB] HealthPathways² and bpac resources³. These are New Zealand resources. I have also looked at international guidelines. Whilst the international guidelines are not identical, they are similar to New Zealand guidelines.

¹ Starship Guidelines 'Life Threatening Asthma'

² HealthPathways 'Life Threatening Asthma'

³ Bpac Guidelines 'Management of Acute Asthma in Primary Care'

- b) The management by [Dr B] was consistent with accepted practice. Regarding nebulised adrenalin — this is accepted practice for the management of severe croup. [Dr B] heard stridor (which is noisy breathing because of constriction of the larynx) which is a classic symptom of croup. Administration of nebulised adrenalin was therefore an appropriate treatment to be given. In some guidelines (although not New Zealand guidelines) it is also accepted as management for severe asthma.
- c) Not applicable
- d) Guidelines for the management of croup particularly, but also asthma, state that it is very important to try to minimise the distress of the patient. The aim is to keep the patient as calm as possible. The adrenalin nebuliser appeared to distress [Miss A]. However it would have been reasonable to give it at this time and likewise reasonable to discontinue because of the distress it was causing.

Question 3

Was the resuscitation process consistent with accepted practice?

- a) The resuscitation as documented is generally consistent with accepted practice.
- b) However, there were two departures from accepted practice as written in the clinical notes. The first was the rate of chest compressions. [Dr B's] clinical notes document a rate of 60 compressions per minute. The accepted rate is 100 to 120 chest compressions per minute. The second departure was the dose of adrenalin given to [Miss A]. The dose of adrenalin in resuscitation is calculated in micrograms per kilogram. 10mcg per kilogram of the child's weight is the advised dose. [Miss A's] weight was 17kg (as previously documented by [Dr C]). Thus the correct dose would have been 170 micrograms. The clinical notes by [Dr B] state that 1mg of Adrenalin was given 1mg = 1000mcg. Thus a larger dose than recommended in the guidelines was given (on 5 occasions). I am uncertain if the larger dose of adrenalin would have caused an adverse effect. However I have been advised by my colleague that guidelines predating 2005 recommended a larger dose of Adrenalin. This was found to increase poor outcomes especially in arrests caused by asphyxia. Subsequently the dose was reduced to the newer recommended dose. I consider these to be a moderate departure from accepted practice.
- c) I have consulted a peer who has advised me that he feels this a moderate departure from accepted practice. His comments are, 'We are required to be proficient in resuscitation and update our skills at least every 3 years. Protocols in management should be readily available. However, it must have been an extremely stressful and challenging situation. It's easy to find fault from a distance.'⁸

Question 4

Some of the comments by [Mrs A] are that the response to the respiratory arrest seemed slow, panicked and fumbling. I feel unable to comment about whether the response was *too* slow or *too* disorganised. If the response was *too* slow it may have been a departure from accepted practice. However, there is no precise timeline so I feel unable to comment further. Regarding whether the resuscitation was *too* disorganised,

again I feel unable to comment. I know, however, that the arrival of paramedics at an emergency situation brings with it a slick, calm efficiency. The composure of the paramedic is sometimes not apparent in those of us who manage emergencies less frequently.

There are some ways in which the logistics of the arrest situation management could have been improved. These issues have been discussed and addressed by [the medical centre] as outlined in the letter by [the manager]. Some of the changes recommended have already been implemented. These include visual signs for the high flow oxygen meters, paediatric medication calculation charts in the resuscitation room and procedure room, and more frequent emergency scenario training.

Finally I would like to reiterate my heartfelt condolences to [Miss A's] family and the ... community affected by this tragedy.

Dr Liz Humm
MBChB DRCOG DCH MRCGP FRNZCGP FDRHMNZ

The following further expert advice was obtained from Dr Humm:

“Case reference No 19HDC00853

I have been asked to provide further advice regarding the care provided to [Miss A] following receipt of the providers' response.

In my previous report I advised that there were 2 moderate departures from accepted practice during the resuscitation of [Miss A] namely

- 1 the rate of chest compressions given during the resuscitation**
- 2 the dose of adrenaline given to [Miss A]**

I have read the responses given by [Dr B] and by [the medical centre]. I have been asked if on reflection I wish to alter my previous view on the level of departure. Furthermore whether I feel the departure is attributable to individual providers or the group provider.

The two departures relate to the management of resuscitation of [Miss A] following her cardiorespiratory arrest. There are subtle differences in the protocol for resuscitation that are adopted over the years as new evidence emerges for best practice. This is why keeping up to date is vital for all practitioners who may have to resuscitate their patients.

Regarding the rate of chest compressions

The rate of chest compressions for both adults and children has been 100 compressions per minute for several years. There are various devices such as a metronome or even well known songs that are used in training sessions to help providers achieve the correct

rate. The most recent NZ Resuscitation Council guidelines from 2016 discuss changes. I will quote the relevant changes to rate of chest compressions.

'The only change to the ANZCOR BLS guidelines in light of the release of the ILCOR Consensus on Science and Treatment Recommendations is related to rate of chest compressions and this has changed from 'approximately 100' to '100 to 120 compressions per minute'. ANZCOR acknowledges that compression rates will vary between and within providers and there is evidence that survival rates are optimised at compression rates of 100–120 compressions per minute. There is some evidence that compression rates less than 100 or greater than 140 compressions per minute are associated with lower rates of survival.'⁴

On reflection I feel that the rate of compressions was slower than has been widely accepted for many years and as such think this is a **severe departure** from accepted practice. I feel that it is the **individual provider** who is responsible for this. I note that in the correspondence when a nurse recommended increasing the rate of compressions that the recommendation was adopted immediately.

I note that the provider has taken many steps to upskill since this time.

Regarding the dose of Adrenaline

It is clear that the dose used was too high. It can be difficult to remember doses of drugs used very infrequently. For many an aide memoire is crucial. I think that the large dose remains a **moderate departure** from best practice. I think that this is attributable to the individual provider. However, I also think that there was room for improvement at the group provider level as well. Having easily identifiable and available charts for resuscitation purposes including doses of adrenaline is important for any practice even if a patient having a cardiorespiratory arrest is very infrequent. I think whilst of course it is important to have these resources available where resuscitations are frequently performed it is equally important for the sites where resuscitation is rare. I am making the assumption that other staff would have been involved in the preparation of the adrenalin and had the opportunity to input that the dose was too high. As such I think the departure by the group provider is a **mild departure**.

I would also like to comment that I think teamwork is absolutely crucial for good outcomes. All team members need to feel valued for their input and their particular skills. In any situation where a patient's wellbeing is at stake all team members must feel able to question if they feel the best course of action is not being undertaken. Teamwork is key.

I think that both the individual provider and the group provider have worked hard and striven to do better since this tragedy. There has been plenty of reflection and from this reflection tangible improvements have been made.

⁴ ANZCOR Guideline 6 Compressions Rate of Compressions Jan 2016

Finally I wish to extend my heartfelt condolences to [Miss A's] family.

Dr Liz Humm MBChB DRCOG DCH MRCGP FRNZCGP FDRHMNZ"

The following further expert advice was obtained from Dr Humm:

"Case number 19HDC00853

I have been requested to provide further advice on this case.

I have reviewed further responses from [Dr B] and the nursing staff on duty during [Miss A's] presentation with asthma and her subsequent resuscitation and death. I also have read the Serious Event Review (SER).

I list the questions asked of me below.

Q1 I note that your initial advice was critical of the documented rate of chest compressions undertaken during the resuscitation attempt. Please see the attached further response from [Dr B], and the statements from the nurses, who advise that they cannot recall the compressions being that slow. In addition, [Dr B] has advised that he did not undertake the compressions himself, and that he was just coordinating them. Noting that the resuscitation was only directed by [Dr B], are you please able to advise if this changes your initial advice in the following scenarios:

- a) If the documented rate of 60 beats per minutes is accepted: or
- b) If the recollection of the nurses that the rate was around 104 beats per minute is accepted.

Q2 The appropriateness of [Dr B's] decision to prioritise treatment to [Miss A] over seeking paediatric advice and/or requesting an air ambulance.

Q3 Whether [Dr B] should have requested oxygen to be administered to [Miss A] at any stage?

Q4 Whether, in your opinion, [Miss A] should have been moved to the resuscitation room following her collapse.

Q5 The adequacy of training provided to [Dr B] by [the medical centre].

Q6 Any further comments you wish to make on the care provided to [Miss A] by [Dr B].

Q7 Any comments you wish to make on the care provided by [the medical centre]. My responses are below.

Q1

I am happy to accept the recollection of the nurses that the rate was around 104 beats per minute.

Q2

I think the decision by [Dr B] to initially assess [Miss A] and the response she had made to the treatment already given by the nursing staff was appropriate. Following this I think that help and advice from more experienced colleagues should have been sought. This advice would have included treatment, the most appropriate place to treat [Miss A] and the best mode of transport to get her there.

I wonder though if there was a false sense of security with the improvement in oxygen saturations to 93–97%. I wonder if the fact that she had presented around midnight the previous night with similar symptoms and responded well to treatment and been allowed home influenced decision making. I wonder if her apparent improvement in general condition, such as being described as giving ‘cheeky’ looks contributed to the lack of realisation of the severity of her condition.

Q3

I think in retrospect it is clear that oxygen should have been asked for to treat [Miss A]. However as mentioned in Q2 there were a few factors which could have made [Dr B] think this was only moderate asthma.

In the community health pathways the treatment for moderate asthma states give oxygen when oxygen saturations are less than 92%. By the time [Miss A] was seen by [Dr B] her oxygen saturations were 93–97%.

However, putting together the history [Dr B] obtained, the low oxygen saturation on arrival added to the tachycardia, high respiration rate and general examination findings a picture of a very unwell child is painted. His notes describe what I assume is the description [Dr C] gave [Dr B] as ‘Couldn’t talk for SOB, chest sucking in with every breath and lips and face blue’. This is certainly a description of a child with severe or even life threatening asthma. [Dr B’s] notes state [Miss A] had ‘severe asthma refractory to inhaler or steroids’. Severe asthma should be treated with oxygen as per several NZ guidelines (although I note that Starship guidelines for severe asthma are somewhat looser stating oxygen ‘as required’. For life threatening asthma Starship guidelines state ‘give high flow oxygen via mask (eg 15L/min)’⁵).

Q4

I think this is a tricky question to answer.

When [Miss A] presented there was already an adult patient (whom [Dr B] would also be responsible for) in the resuscitation room. The patient had been brought in by ambulance with ‘chest pain and possible melaena’. This patient, with those scant details, could have become very unstable and required resuscitation. I note there are 2 beds in the resuscitation room — however having an unwell adult and unwell child in

⁵ Starship Clinical Guidelines — asthma and wheeze, management of acute — date last published 2.8.2019 and Asthma, Life threatening — date last published 15.2.2019

the same room would not have been ideal. If the adult patient had been sufficiently assessed as being stable it would have been appropriate to move the adult elsewhere. After which [Miss A] could have been taken there swiftly — particularly after the initial observations on [Miss A] were so worrisome. Obviously a resuscitation room is the ideal place for a resuscitation to take place. At the time of her collapse it would have been quick to pick her up and move her to the resuscitation room as the procedure room where she was at the time is only a few metres away. However, there seems to have been very little delay in the arrival of the resuscitation equipment. The procedure room was described as being messy and cluttered but I am not certain whether this would have adversely affected the resuscitation process.

Q5

I am not aware exactly of the training provided by [the medical centre] prior to this event. The information in the Serious Event Review documents an orientation including accessing and using community health pathways. These pathways give clear details about treating severe asthma and when to call for help. The SER also documents spending time with the local medical officer to discuss what to do on call. I would hope that during this orientation [Dr B] was strongly encouraged and expected to seek help and advice from local colleagues with more experience of rural medicine — particularly when a patient was very unwell. I would expect a local senior colleague to be available for advice whenever [Dr B] was on call — and certainly in the first few months of working as a rural GP.

I am aware that [Dr B] attended a PRIME training course (PRIME stands for Primary Response in Medical Emergency) in [Month1] which is just prior to this event. The course would have included management of acute severe asthma and cardiopulmonary resuscitation.

I am aware of [Dr B's] previous medical experience in that he is [an overseas] trained MD family physician who graduated in 2009. He attained his licence to practise as a family physician in 2012. His registration with the Medical Council of New Zealand was in February 2019. It is my assumption that his employment with [the facility] was his first employment as a doctor in New Zealand. [Dr B] has stated that he has attended multiple resuscitations and been in charge of some of them. He also states his experience is predominantly in adult patients rather than children. He states he has attended numerous resuscitation training courses since 2010. I am not certain where [overseas] [Dr B] practised family medicine and how different or similar his experience was from practising as a rural GP in New Zealand.

Q6

I do not doubt that [Dr B] tried to do his very best for [Miss A]. I think phoning the hospital to advise nursing staff of [Miss A's] imminent arrival and instructions on treatment prior to his arrival was good. I think he recognised that [Miss A] was very unwell with 'severe asthma'. However advice from more experienced staff should have been sought sooner and certainly before the nebulised adrenalin was given. I am

surprised that he was not aware of the correct rate of chest compressions during CPR — particularly as he had recently done a PRIME training course (although I have accepted that the chest compressions were in actual fact done at the correct rate). I hear from [Dr B] a strong desire to learn from this tragedy.

Q7 I do not have anything further to add regarding the care provided by [the facility]. I see clearly a desire for, and efforts made to learn and improve following this tragedy.

Further comments I wish to make:

Rural general practice is currently facing something of a crisis with shortage of staff and GP burnout. The lengthy nature of this investigation must in itself be distressing both for [Miss A's] family and staff involved.

I also think that recollections of events so much later than the actual event are prone to misremembering or bias.

Finally I wish to give my very deepest condolences to [Miss A's] family.

Dr Liz Humm
MBChB DRCOG DCH MRCGP FRNZCGP FDRHMNZ"

Appendix B: Independent clinical advice to Commissioner

The following expert advice was obtained from RN Sharon Hansen:

“I have read the Guidelines for Independent Advisors document (www.hdc.org.nz). And I agree to follow them.

My qualifications are as follows.

Sharon Hansen MN NP (rural) I am a Registered Nurse Practitioner (Rural), having qualified in this scope of practice in 2007.

I am currently working in a semi rural general practice during normal working hours, (sole practice) and undertake after hours on call work during allocated weekends in a rural area. Previous to achieving this qualification I worked as a Registered Nurse in General Practice between 1992 to 2007 in a rural sole practice. During these years I worked as 1st on call in a remote rural practice for several years as a registered nurse working under standing orders.

I have also worked as a nurse practitioner assessor for the Nursing Council, and was the chair of the Rural General Practice Network from 2014 until 2019.

I have been asked to provide expert advice to the Health and Disability Commissioner on the care provided to [Miss A] from [the DHB] and [the medical centre].

I do not believe that I am in a conflicted position in this case.

Nursing Care

1. The adequacy of the triage and initial assessment of [Miss A]

[Miss A], aged 3 years, was assessed at [the medical centre] by [RN D] and [Dr C], on the night shift of the 3–4 [Month2]. [RN D] initially assessed vital signs and her observations and noted [Miss A's] SpO₂ levels were at 92%.

At the time [Miss A] was further assessed by [Dr C] who prescribed the nebulised salbutamol nebuliser, it not clear whether an order was given at the time for the preferred nebulisation gas. Compressed air was used to deliver the medication. No oxygen was reported to be given at the time.

[Miss A] was discharged to home with verbal but not a written asthma plan.

She was reviewed at [the medical centre] again at 0650 on the 5 [Month2] after her mother contacted health line. [Dr B] was contacted by health line and he rang [RN D] at [the medical centre], asked him to administer salbutamol via nebuliser. [RN D] assessed [Miss A], vital sign recordings were taken by [RN D] who noted her respiratory distress and O₂ levels at 86% with RR 38–42 and heart rate 166.

[RN D] initiated the verbal order given by [Dr B], he was not asked to nebulise through oxygen and [RN D] has since said the use of oxygen was not discussed from [Dr B]. [RN D] states he did not recall her being cyanotic.

[RN D] also reported to set up continuous monitoring of heart rate and SpO₂ levels at the time and vital signs were recorded by [RN E] and communicated to [Dr B] on his arrival.

It is reported by [RN E] that on arrival at [the medical centre], [Miss A's] mother [Mrs A] and said [Miss A] had been struggling to breathe since midnight, was often cyanotic and Ventolin inhalers had little effect.

a) What is the standard of care/accepted practice.

The standard of acceptable practice is to undertake a PEWS score which is used and recommended in a hospital setting (Starship, 2021) for paediatric patients or in a primary health care setting accurately take and record vital signs including heart rate, respiratory rate, SpO₂ using oximetry, BP, temperature and observations of respiratory distress and observable cyanosis in mucous membranes.

It is stated in the joint report from [RN G] and RN manager [RN F] that they both understood PEWS score and believed the other staff have had PEWS training.

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

In terms of the inquiry into the adequacy of the triage and initial assessment of [Miss A], I believe that [Miss A's] vital signs were taken and communicated to the medical officers concerned and other nursing colleagues at the time. In terms of the taking of vital signs and triage I cannot see where they used a PEWS score, or similar scoring tool, however the information taken on [Miss A's] vital signs did not appear to be a departure from an accepted standard of care.

[Miss A's] condition was consistent with a severe acute asthma episode as detailed within the [regional] Pathways which in turn fulfils the criteria in the standing order pathway for the administration of supplementary oxygen ([regional] pathways, last updated [2018]). If a PEWS score was used it would have prompted escalation to use supplementary oxygen.

I do not see from the statements from [RN D] and [RN E] that they initially understood the seriousness and extent of [Miss A's] respiratory distress and the risk it posed to her. It is also difficult to determine if they could see the pattern of the liable nature of her asthma given her fluctuating SpO₂ levels.

c) If there are any particular individuals responsible for this departure, or any systems issues attributable to the departure.

In terms of the adequacy of the triage and initial assessment in [Miss A's] care it seems that it is [RN D] and [RN E] who provided the pre collapse nursing care. Both of these RNs stated that they had either no experience or scant experience in dealing with a paediatric emergency of this nature.

It is noted that due to [the facility] being an inpatient facility, they follow the Hospital Health Pathways (HHP) to guide practice which does not have a standing order for life-threatening asthma in Children. There is a link within the HHP to the DHB oxygen policy which states 'in the event of an acute presentation or acute deterioration oxygen should be administered to prevent harm from hyperaemia without prescription' (supplementary information from [RN F], Nurse Manager [the facility]).

d) How would this be viewed by your peers.

Peer review would agree that the care that [RN D] and [RN E] provided was adequate, with the exception of using a scoring tool which would have given them evidence of [Miss A's] precarious condition and reference to pathways which support the use of oxygen and using oxygen as a driver for the salbutamol for nebulisation.

In addition to a scoring tool such as PEWS reference to the acute paediatric asthma [regional] pathways would have enabled them to correctly assess the severity of [Miss A's] condition as both [RN E] and [RN D] had documented attention to [Miss A's] difficulty in breathing and her cyanosis, which may have driven them to question the earlier use of oxygen in the pre collapse situation.

There was significance in the timing of this event, a change of shift and competing priorities, such as the other patient admitted for assessment of chest pain, completing his shift responsibilities and handover to the day staff may have interrupted [RN D's] attention to the situation. It would have been a busy time. It would be considered [RN E's] inexperience to be a factor with this being her first shift as the nurse in the acute area and her stated lack of exposure to acute paediatric presentations.

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

Recommendations include:

- Education on the use of [regional] pathways for all staff, independent of the HHP pathways, in particular those staff dealing with acute presentation of unwell primary health care patients. Training in the use of a widely used scoring tool for paediatric assessment.

- Regular in-house education on scenario based situations. (I note that these have been reinstated.)

:- Algorithm/flow chart guidelines availability, for escalating conditions, a computer that is accessible for use and easy to use or written information in a flip chart folder (this would have ensured high flow O₂ was being administered at an earlier stage).

2. The adequacy of the treatment and interventions given to [Miss A] prior to her collapse, including whether any further interventions were warranted.

a) What is the standard of care/accepted practice?

Standard practice, in addition to continued monitoring of her vital signs and constant health practitioner presence, in a severe paediatric asthma situation is to give Salbutamol 100 mcg MDI via spacer 6 puffs every 20 mins or earlier if her condition deteriorates. In addition 80 mcg via MDI spacer repeat every 20 mins, up to 3 doses in the first hour. Oral prednisolone 1mg/kg up to 60 mg. Supplementary oxygen in an individual with SpO₂ less than 92% and oxygen should be used as the driver gas for 5 mg salbutamol nebulisation. In addition 0.25 mg ipratropium with a second nebuliser in the case of inadequate response to the first nebuliser. IV hydrocortisone 4 mg/kg. Management of the condition to maintain SpO₂ levels between 94–98%.

At the time of her first presentation on the 3/4 of [Month2] [Miss A] was noted to have a SpO₂ of 92% which would have activated the use of oxygen use according to standing orders for [regional] pathways, Resuscitation Council New Zealand CORE certification, Starship Hospital online guidelines and [ambulance service] manual.

On her second presentation on the 5 [Month2] her SpO₂ was noted to be as low as 86%. After a ipratropium/salbutamol nebuliser her SpO₂ level was documented at 91%. She was not given oxygen until her collapse.

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

The function of this report is to comment on the actions of the nursing staff involved in [Miss A's] care. The nursing staff are not in a position to order the medication used including the oxygen.

I consider that the departure of the decision or the lapse in not providing [Miss A] with oxygen to be a serious departure of standard practice, oxygen is administered under standing orders for RNs and if the training and supervision and structural support for RNs does not include standing orders it is then the responsibility of the prescribing clinician to order it. It is not clear to me that [RN E] had the experience or training to understand the implications of the clinical picture [Miss A] initially presented, and the risk to her by the treatment being offered at the time.

c) If there are any particular individuals responsible for this departure, or any systems issues attributable to the departure.

Given neither [RN D], or [RN E] or at the time [RN G], in looking in on the RNs and patients in the acute area, questioned the use of oxygen, I would wonder if it was not

standard or normal practice for children to have oxygen to drive their nebulisation in [the facility], at that time.

It is not clear to me that they were aware of the recommendation for O₂ to be used in children with SpO₂ < 92%. I acknowledge the infrequency of presentations in practice of severely ill children in the rural sector.

[Miss A] was being cared for by a registered nurse who was on the NetP programme who was on her first day in acute care and as stated by herself, [Miss A] was the first paediatric patient she had cared for. She states she was not aware of the existence of the Community Pathways. Standard practice is to have inexperienced RNs supported by senior colleagues at times of critical care.

[RN G] CNS reports checking on both RNs and their patients after arriving for the day shift and reported that [Miss A] was in critical condition but well managed, she then went to the long term area of [the facility]. It is not clear from her report why she made the decision to move to the LTC instead of supporting [RN E] in a critical situation.

d) How would it be viewed by your peers?

Peers would expect that RNs would be aware and recognise the need for oxygen, particularly if they were up to date with Resuscitation Council New Zealand CORE, PRIME, or independent vaccinators course (as it is a requirement of training to be familiar with paediatric collapse and arrest).

There are grey areas in the administration of some prescribed medication, for example telling a patient to take OTC medications (paracetamol) for a headache or a cold, or giving oxygen without an order but in a life threatening situation.

Nursing peers would recommend giving the oxygen, justify it with guidelines and the criteria of a severely ill child and concurrently seek prescriber support at the time.

There was significance in the timing of this event, a change of shift and competing priorities, such as the other patient admitted for assessment of chest pain, completing his shift responsibilities and handover to the day staff may have interrupted [RN D's] attention to the situation. It would have been a busy time. I would consider [RN E's] inexperience to be a factor with this being her first shift as the nurse in the acute area and her stated lack of exposure to acute paediatric presentations.

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

- Senior staff members caring for or directly supervising junior staff members caring for the most vulnerable patients, as a practice policy and priority.

- Practice education for staff which includes familiarity with resources which enable quick decision making in critical situation such as New Zealand Resuscitation Council Whakahauroa Aotearoa algorithms/flow charts.

:- Development of standing orders which all non prescribing staff are familiar with and use.

:- An emergency flow chart of how to contact external support systems Eg Paediatric support at [the public hospital] or Starship or [the ambulance service].

3. The timeliness of the treatment and interventions given to [Miss A]:

a) Prior to her collapse.

a) What is the standard of care/accepted practice?

Standard practice would be for [Mrs A] to have information to hand that would have identified that she needed to call for help earlier on the night of the 5th of [Month2], particularly that [Miss A] was not settled and the salbutamol via the spacer was having minimal effect.

An asthma plan identifies red flags, and what actions to take at the time. These are available via asthma foundation and in the event that they cannot be printed, a hand written note can be supplied.

On admission to [the facility] best practice would be that she would be immediately attended to, by an RN and as soon as available, by [Dr B].

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

There was a departure of care, in that [Mrs A] was not offered written information, from her visit on the 3/4th and previous to that, the visit on the 12 [Month1]. I understand there was a printer issue, on the 3/4th however failing that the practice facility did not have standard written information on asthma exacerbation to hand, a hand written instruction would have sufficed, or written URL address for website such as the asthma foundation.

Should [Mrs A] have been advised to call an ambulance at the time of her concerns about [Miss A's] deteriorating condition, [ambulance service] protocols would have enabled early use of oxygen.

This departure from standard care in not providing a take home care plan was mild however it added to the series of events.

It is difficult to see a departure of care in the timing of the care [Miss A] received on her pre collapse admission to [the medical centre], as she was immediately assessed by both [RN D] and [RN E] and briefly by [RN G]. [Dr B] attended to her on his arrival.

c) If there are any particular individuals responsible for this departure, or any systems issues attributable to the departure.

It is not unusual to have printer or computer difficulties at times in an office environment.

I believe that either of the staff who saw [Miss A] on the 12 [Month1] and then on the evening of the 3/4th of [Month2] were in a position to provide the information in a written form, either [Dr C] or [RN D], or staff on the 12 [Month1], even if it was reference to the asthma foundation website or a written list of what to do and when to do it.

d) How would it be viewed by your peers?

Nursing peers would consider it important to provide written information for the family with a child who has repeated visits for respiratory illness. It is known that verbal information is easily forgotten especially in a situation exacerbated by tiredness or worry. Written information may have informed the family to escalate earlier treatment.

Nursing peers would have considered that [Miss A] and her mother would have continuous RN or medical officer presence during her time at [the facility] on 5 [Month2].

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

: - Further education for health professionals working with Whānau/family on health literacy and resources.

b) After her collapse.

a) What is the standard of care/accepted practice?

Basic life support (as per CORE)

Dangers (not appropriate here)

Responsive

Send for help

Open Airway

Normal breathing?

Start CPR Attach fibrillator

Including Advanced Life Support for Infants and Child, (Resuscitation Council of New Zealand) 2:15 breaths to compressions for 2 mins

Attach monitor for AED

Assess rhythm

Non shockable Continue with CPR

During CPR attend to airway adjuncts

Oxygen

Waveform capnography (if available and required with ET tube)

IV or IO access — correct dehydration if present with 20 ml bolus of 0.9 % NaCl. IV hydrocortisone 4 mg/kg.

IM adrenaline 0.01 mg/kg repeated after 20 mins if required or after then every 2nd loop.

IV infusion salbutamol as per Starship Hospital guidelines and addition of magnesium.

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

The departure from standard care appeared to occur at several junctions.

It was the ambulance officer who happened to be present who activated the 111 system which in turn activated the air retrieval team. While these actions were appropriate, it was not clear how the staff of [the medical centre] activated the emergency line to [the public hospital].

The resuscitation was hampered by inadequate equipment access, inappropriate medication, inadequate adherence to resuscitation guidelines, eg compressions, both depth and initially amount/breaths, timing of IV access. Late involvement of experienced staff able to intubate.

Arrest situations are very stressful events, they can be trained for but you cannot train for the emotion that occurs at a time when a life is at stake, particularly a child.

I consider the departure from normal nursing practice to be moderate, in that the drug dosages were not checked against the published norm for this age group, not challenged and that the compression ratio was incorrect, and that there was a delay in having equipment in the room and available for use, eg the oxygen.

c) If there are any particular individuals responsible for this departure, or any systems issues attributable to the departure.

The system where a second room was not equipped for unexpected emergencies did not help this situation, it diverted staff thinking and time, and did not allow for easy access to resources which would have immediately corrected initial mistakes, eg checking a flow chart would have corrected the compression rate and drug doses.

The nurses may have found it difficult to challenge ordered drug doses, however it is within their scope of practice to be aware of a deviation as large as the adrenaline doses ordered, and certainly within their scope of practice to know the rate and ratio of chest compressions for a child.

d) How would it be viewed by your peers?

My peers would view this as a deviation from standard practice and would consider that the nurses should have challenged the adrenaline doses, as CNS [RN G] did with the compressions ratio on becoming involved in the resuscitation.

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

:- Scenario based training and further education on expectations for RNs working in this type of situation.

4. The appropriateness of treating [Miss A] in the procedure room rather than the resuscitation room in light of her triage code.

a) What is the standard of care/accepted practice?

In a pre hospital or rural setting it is appropriate to manage a situation where it occurs, the luxury of a dedicated resuscitation room which is available when needed does not always happen. A standard of accepted practice is the ability of providers to quickly access fit for purpose equipment, such as portable AEDs, O₂ cylinders, PRIME kits.

[Miss A] was in a serious and unstable condition at the time she was admitted into the procedure room at [the facility], at the time of her collapse she became critical and it was then inappropriate to move her. It is likely that there would have been an interruption to the CPR rate and rhythm, given that there was another patient to move from the resuscitation room.

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

I do not consider there was any departure from standard care in treating her in the procedure room at the time of her admission to [the facility] given there was a patient with chest pain in the resuscitation room.

I consider there was a moderate departure from practice not from being the use of the procedure room but instead that emergency equipment for this type of situation was not all easily transferable, or organised. There was difficulty in easily transferring the equipment they required, there was dependence on the wall oxygen which was not working and breathing tubes for a child [Miss A's] age was jumbled amongst equipment used for a variety of paediatric ages.

c) If there are any particular individuals responsible for this departure, or any systems issues attributable to the departure.

I consider that this is a systems failure, regular attention to the resuscitation set up and equipment, eg regular audit would have identified issues earlier.

In hindsight with the benefit of time it would have been preferable to treat [Miss A] in the resuscitation room however once she had collapsed and given there was a patient in the treatment room, the situation would have been difficult, messy and possibly further compromising.

d) How would it be viewed by your peers?

The situation would be viewed that hindsight allows the luxury of perfecting actions in a difficult and rapidly evolving situation. Staff at the time undertook the actions that they deemed correct, they were hampered with a system that did not support them, flow diagrams either not available or not utilised, equipment that was not working or mixed up and too much reliance on a TV communication system which was difficult to get going in the heat of the moment. Should the resuscitation room have been available,

the piped oxygen still was not on and the paediatric ET tubes would have still been muddled together. The use of flow diagrams however may have altered the drug dose usage.

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

Recommendations are stated at the end of this report.

5. Whether [Miss A] should have been moved to the resuscitation room after her collapse:

There was still a patient in the resuscitation room with chest pain.

I believe the action of trying to sort out two patients, with minimal staffing, one who was in a critical condition, would have wasted time and further complicated the situation, and created more stress. Should a collapse occur outside the resuscitation room in any part of [the facility] or indeed the car park, initial resuscitation would be initiated where it was. Once organised and safe to do so, transfer to a more suitable environment would normally then take place.

a) What is the standard of care/accepted practice?

Standard practice is to provide life sustaining care quickly with as much expertise as possible, with correct available equipment and use of medications, in a safe environment until stability can be achieved.

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

I do not consider that there was a departure from accepted practice given the circumstances staff were faced with at that time.

c) If there are any particular individuals responsible for this departure, or any systems issues attributable to the departure.

The individuals responsible for making the decision where [Miss A] was placed were the nursing staff admitting her into [the facility]. If they had been aware that [Miss A's] condition was going to deteriorate to the point of collapse and respiratory arrest, they may well have taken the time to move patients around, however they did not have the luxury of that hindsight at the time.

d) How would it be viewed by your peers?

It would be likely that nursing peers would view this in the context of how it occurred and would not necessarily have made a different decision.

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

Recommendations are stated below.

6. The appropriateness of the administration of compressed air to drive the nebuliser therapy:

a) What is the standard of care/accepted practice?

Not all guidelines are specific regarding the administration of salbutamol via oxygen, however guidelines in 2019 from the Resuscitation Council New Zealand and Starship Hospital recommend the administration of nebuliser salbutamol via O₂ in the case of severe acute asthma.

The administration of high flow oxygen is recommended to be administered to a child with an SpO₂ of less than 92%. Recommendations include stabilisation with SpO₂ between 94–98% which was not achieved in a sustained manner.

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

I consider this to be a significant or severe departure of care given that [Miss A] had dropped her SpO₂ levels below 92% on several documented occasions, she was noted to be visibly distressed and cyanotic, as stated by her mother and [RN E].

c) If there are any particular individuals responsible for this departure, or any systems issues attributable to the departure.

As mentioned earlier in this report, oxygen is a drug and must be ordered or its administration must be supported by standing orders. While the omission to order the oxygen lies with the medical staff, the omission to question the appropriateness or recommend its use lies with the nursing staff during the pre collapse phase both in the consultations of the 3–4th and the 5th. Information regarding the appropriateness of oxygen use is readily available through the PRIME, Resuscitation Council guidelines and [regional] pathways.

Despite the need for standing orders, oxygen was required and should have been administered at the nebulisation and pre collapse phase. RNs are in a position to advocate at the strongest level for the patient here.

d) How would it be viewed by your peers?

Nursing peers would view the action of questioning of the use of oxygen to be a fundamental for a child in severe respiratory distress with lower than 92% and unstable SpO₂.

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

:- Scenario based training

:- Referral to the Code of Conduct specifically

3.7 'Advocate and assist health consumers to access appropriate level of care'

7.3 'Act promptly if a health consumer's safety is compromised'

Also Principle 4 in its entirety.

7. The appropriateness of the preparation and administration of IM and IV (1Mg) adrenaline doses, as per [Dr B's] instructions, including:

a) Whether this dose was appropriate for [Miss A]; and

a) What is the standard of care/accepted practice?

The standard dose of nebuliser adrenaline in children is 0.5mls/kg (Starship children's hospital guidelines, 2021) therefore a 5 ml dose of nebuliser adrenaline for suspected croup is appropriate.

The recommended adrenaline dose is 0.01mg/kg (10mcg/kg) of adrenaline 1:1000. These guidelines are taught in the PRIME update courses, vaccinator course updates and are available online in the [regional] pathways, Starship Children's hospital guidelines and on line through Medsafe. [Dr B] ordered 1 mg of 1/1000 (1 ml) adrenaline to be given, documented as given five times (5 mg in total).

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

This is a severe departure from the standard of care, however I am not in a position to state if the action of giving such a high dose of adrenaline at this point was the critical point for [Miss A].

c) If there are any particular individuals responsible for this departure, or any systems issues attributable to the departure.

The individuals responsible for the action of checking the drug and the dosage was the nurses involved in that process, namely [RN E], [RN D] and [RN G] for the nebuliser amount and this was also confirmed with [Dr B].

[Dr B] ordered the IM adrenaline, I am not clear who drew up and checked and or administered the IM or IV adrenaline, through the notes provided.

d) How would it be viewed by your peers?

Familiarity with drug doses would not be expected at a new graduate level especially in an unfamiliar situation. More experienced nurses may have more exposure to what is 'normally given' or familiar with existing guidelines which would determine the expected doses. Nurses who have undertaken CORE CPR training and CPR for vaccinator courses or PRIME training would be exposed to these doses for children through their updates and would know what resources to check against. While they may also not be aware of the actual doses through their memory, they would be aware of the discrepancy of the doses.

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

See recommendations at the end of this report.

b) If not appropriate, what actions you would have expected nursing staff to have taken.

a) What is the standard of care/accepted practice?

Nursing staff should have questioned the dose with the prescribing clinician citing guidelines and sources.

They could then have escalated their concerns regarding the dose to the prescribing clinician, senior nursing staff or another medical officer. They are under no obligation to administer a drug at a dose they believe to be inappropriate.

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

I consider this to be a moderate departure from care, given the larger than recommended of the doses.

c) If there are any particular individuals responsible for this departure, or any systems issues attributable to the departure.

The ultimate individual responsible for the departure of standard care here was the prescribing clinician. Nurses in this situation are responsible for their own actions in drawing up the medication, checking it and administering it.

d) How would it be viewed by your peers?

The nursing staff responsible for overseeing [RN E's] work are in a position here to question the drug doses which would have informed [RN E], crucially the expected drug dose, how to access guidelines or further information to support that, and how to approach the situation. Given the time critical nature of the situation this would have to be done quickly with resources at hand to check against and a quick discussion with [Dr B] about the dose.

Nursing peers would view the actions of the RNs as not consistent with expected care for RNs.

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

:- Referral to the Code of Conduct on the nursing council and competencies for registered nurses web site, specifically code of conduct

6.7 'To support mentor and teach colleagues'

6.9 'Intervene to stop unsafe, incompetent, unethical or unlawful practice. Discuss issues with those involved ...'

8. The adequacy of the chest compressions undertaken by the nurses (noting that the resuscitation was directed by [Dr B]), in the following scenarios:

a) If the documented rate of 60 beats per minute is accepted; or

a) What is the standard of care/accepted practice?

Chest compressions at a rate of 100–120 per minute at a ratio of 15:2 is taught to health professionals (Resuscitation Council New Zealand Guidelines, 2016).

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

I do not accept that the documentation of 60 beats/min is likely to be the rate at which chest compressions were delivered. In hindsight in a busy scenario it is likely that these were not documented, however a variety of staff were involved in delivering compression including the air retrieval team, it would have been obvious if there was a significant difference in rate between providers.

c) If there are any particular individuals responsible for this departure, or any systems issues attributable to the departure.

I believe there was probably an error in assessing the rate of compressions following the event, and during the documentation of the event by [Dr B].

d) How would it be viewed by your peers?

Several staff from different disciplines were involved and I believe that nursing peers would have believed the actual rate delivered to be higher. It would be unusual for all disciplines to administer an inappropriate rate, specifically and especially the air retrieval team who are well experienced in difficult life threatening situations.

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

:- Attention to documentation at the time of the respiratory arrest, as difficult as this can be it is an important aspect of the situation, and may be done by a peripheral member of staff.

b) If the recollection of the nurses is accepted and the rate was around 104 beats per minute.

a) What is the standard of care/accepted practice?

As above the rate of accepted practice is between 100–120 beats/min.

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

It is more likely that the compressions were delivered at a higher rate, although unless specifically counted and documented it will be impossible to know for sure. The

departure here is in the lack of collaborating documentation in the rate of compressions and I consider that to be a very mild departure of care.

c) If there are any particular individuals responsible for this departure, or any systems issues attributable to the departure.

Several staff involved in the resuscitation for [Miss A] were documenting actions taken, the documentation was noted to be messy by [RN E].

d) How would it be viewed by your peers?

This would be considered a minor transgression in not documenting the rate of compressions.

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

:- Senior staff members caring for or directly supervising junior staff members caring for the most vulnerable patients, as a practice policy and priority.

:- Practice education which includes familiarity with resources which enable quick decision making in a critical situation such as New Zealand Resuscitation Council Whakahauroa Aotearoa algorithms/flow charts.

:- Protected time for scenario based training which includes the DHB and [the] health care staff. (I am aware there were mitigating reasons why this hadn't taken place.)

:- Attention to the ready availability of portable resuscitation equipment including portable oxygen.

:- Placement of such information readily available on the resuscitation trolley or on the wall of the procedure room as well as the resuscitation wall and on a flip chart on the resuscitation trolley.

:- Staff being very familiar with the equipment, where it was and how it was used, including computer virtual support with external support systems, such as [the public hospital].

:- An emergency flow chart of how to contact external support systems and who would be used. Eg Paediatric support at [the public hospital] or Starship or [ambulance service].

:- Priority external training or educational support for staff, eg triage training, PEWs and CORE for all staff with regular review.

:- Attention to the code of conduct and RN competencies.

9) Any other comments you wish to make on the nursing care provided to [Miss A] at [the medical centre].

In the first instance, I would like to express my sorrow at such a tragic outcome for [Miss A] and her family. It is an unfathomable loss for them.

I would also like to acknowledge that the situation would have escalated very quickly and unexpectedly. Rural practitioners are rarely exposed to these kind of situations, and may have not had much experience in actual resuscitation. Relying on memory of their training is not always reliable and the situation may well have been improved if there were prompts available to the staff at the time.

The staff involved in this tragic event will also be devastated for the family, they will have questioned themselves extensively and undergone much personal and professional review. In undergoing a formal review such as this allows the process to be exposed to enable learning and strengthening of systems for the future.

Attention to the Code of Conduct and published on the Nursing Council of New Zealand's website is recommended.

References

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Observation and Monitoring of an Infant, Child or Young Person, Starship.org.nz."

Appendix C: DHB's Serious Event Review

"Findings

Specifics of [Miss A's] care

- [Miss A's] 1st and 2nd presentations resulted in her receiving appropriate medical management and verbal discharge advice with two exceptions. It is likely that [Miss A's] nebulised medication was driven via an air compressor at her second presentation and she was not observed for one hour post the last dose of medication; [the DHB] policy as well as community health pathways stipulate oxygen is used to drive nebulisers for paediatric patients and patients should be observed for at least one hour after their last dose of medication.
- [Miss A's] mother obtained medical assistance at an appropriate time on the 5th [Month2] when [Miss A] was not responding to standard treatment at home. It was reasonable for her to transport [Miss A] to [the facility] as it was likely the already deployed ambulance may have been delayed in attending to her at home.
- If an ambulance had attended [Miss A] at home, she would have been commenced on oxygen as she would have met the [ambulance service's] CPG (Clinical Procedures and Guidelines) indications to initiate oxygen therapy with her SpO₂ likely to have been less than 94%.
- The initial assessment of [Miss A] on the 5th of [Month2] indicated she had hypoxaemia and was likely to be developing hypoxia at this time indicating she had severe/life threatening asthma. While the RNs conducting the assessment were generally aware of how unwell [Miss A] was they did not administer oxygen which was likely the result of multiple factors; from a knowledge gap and lack of exposure to treating children with acute asthma, to oxygen not being readily available within the room and the possible belief that through the administration of bronchodilator therapy alone [Miss A's] condition would improve.
- If a helicopter EMS team had been requested following [Miss A's] initial assessment on arrival the flight ICPs would have arrived approximately 15–20 minutes after [Miss A's] resuscitation started.
- The critical nature of [Miss A's] condition [triage category 2] at her initial assessment did not prompt staff to move her to a better equipped room where resuscitation equipment was readily available. There were no policies at the time that provided guidance to staff to where patients should be best treated.
- The use of compressed air to drive nebuliser therapy appears to be common practice amongst nursing staff at [the facility]. The use of the air compressor significantly contributed to [Miss A's] clinical condition deteriorating when she had a need for ongoing oxygen, at the time of arrival, during, and between bronchodilator treatment. [Miss A] did not receive oxygen until her cardiac arrest.
- MO3 was aware nebulised treatment was being delivered by compressed air and did not identify [Miss A] as being hypoxaemic. Instead, MO3 thought her SpO₂ had improved [from 86% to 93%] and further nebulised treatment was required, but not oxygen.

- Once [Miss A] had received two subsequent nebuliser treatments without significant improvement this was both an indication that her severe asthma was further deteriorating [life threatening] and a prompt to contact the paediatrician on-call for advice on further management; instead an alternative diagnosis [croup] was explored with an adrenaline nebuliser prescribed to treat [Miss A's] stridor.
- Nebulised adrenaline is an accepted treatment of stridor for croup and the dosage provided was consistent with Health Pathways and Starship Hospital guidance.
- While [Miss A's] collapse occurred soon after the commencement of the adrenaline nebuliser, its administration was only contributory to her respiratory and cardiac arrest through increasing her oxygen demand by increasing her already rapid heart rate. [Miss A] was already hypoxic due to her asthma restricting air intake and using the air compressor to deliver medications which increased her heart rate. This meant that her need for oxygen exceeded her supply.
- Community Health Pathways provides clear advice at what points throughout the treatment of asthma in children general practice medical officers should refer to a paediatrician for advice as well as when an Intensive Care Paramedic and helicopter EMS transfer should be called for life-threatening asthma. MO3 was prioritising treating and attempting to stabilise [Miss A's] condition over seeking paediatrician advice and/or requesting an air ambulance. The request for the Intensive Care Paramedic and helicopter EMS transfer was made when the Ambulance Officer joined [Miss A's] arrest.
- MO3 had commenced work at [the facility] less than 3 months prior to this event and had received orientation to [the facility] that included the use of community health pathways. It is unclear if they had established regular use and familiarity with the application prior to them treating [Miss A].
- While MO's complete PRIME training, clear communication processes on who MO's should call for clinical support during serious medical or trauma events beyond contacting the 0800 number (all GP practices call) to arrange transport to a tertiary centre, does not appear well defined nor known/communicated among [the facility] team. However, during [Miss A's] resuscitation advice was sought from appropriate experts and this was followed by the team, although seemingly not in a coordinated fashion.
- [Miss A] was not intubated for nearly an hour from her initial collapse. An MO with intubation experience was on staff at [the facility] however was not included within the staff contacted to assist with the arrest. While a system of calling for help amongst the clinical staff exists it is unclear in the event of different types of emergency if each team member is aware of each other's skill set and that this is factored into their emergency response plan.
- The staff were trained to manage cardiac arrest, however there was deviation away from established paediatric resuscitation standards; the compression technique started was for a baby rather than a child [two thumbs], the compression to breath ratio initially was for an adult not a child and the dosage of each dose of IM/IV adrenaline administered was five times the amount advised in the NZRC guideline. While these errors occurred,

they are unlikely to have contributed to [Miss A's] death with hypoxia being directly responsible for both her cardiac and respiratory arrest.

Training

- [Local events] disrupted an established schedule of simulation scenarios at [the facility] aimed at priming and further developing staff attending to various acute clinical events. Clinical governance around safeguarding that this educational activity was restarted and maintained at a regular frequency was not robust.
- Additionally, an educational needs assessment framework for nurses was not in place to identify ongoing educational/training needs of staff.
- Where possible, [the facility] attempts to recruit Medical Officers and Nursing staff with some acute experience within emergency departments or higher-level care environments knowing that skills gained in these settings can be valuable in remote areas.
- Those Medical Officers working at [the facility] at the time of [Miss A's] death had varied backgrounds, from generalists to one MO with training in obstetrics and gynaecology, another with women's and child health experience and others with emergency department experience and anaesthetics training. Only one MO present during [Miss A's] resuscitation was confident to intubate her — the MO with anaesthetics training.
- Educational plans for the continuing professional development of [the facility] nursing staff had a limited scope with the focus being on annual attendance for resuscitation updates which included CPR for paediatrics and the completion of the NZRC CORE course every 3 years. Bringing nursing educators to deliver a course in identifying and managing the acutely unwell child was being considered at the time of this event.
- The number of children presenting after hours with asthma and other acute childhood conditions in the region is low, therefore the exposure for [DHB] nursing staff does not enable continued growth in knowledge and skills in both identifying and managing the acutely unwell child.
- [Facility] Medical Officers and Practice Nurses complete a PRIME course every two years to enable them to provide immediate management of medical and trauma events. The course includes the management of acute asthma, however is not specific to children.
- [Facility] inpatient nursing staff are expected to assist with acute 'walk-in' patients after hours. The role that General Practice Nurses play in terms of after-hours support for serious medical/trauma events, having completed the PRIME course is clear — they do not provide afterhours support unless they are called in to provide help.
- Attempts were made by management to enrol [facility] nursing staff in the NZ College of Emergency Nurses Triage Training Course but as [the DHB] and [the medical centre] were still negotiating the contract governing the services provided, [the facility] was not recognised as providing first responder emergency services leading to enrolment applications being overlooked by the course convenor. This led to nursing staff having to triage patients presenting to [the facility] without the appropriate training.

Environment

- [The facility] is an isolated facility at least 1–3 hours travel time from the nearest tertiary hospital.
- A suspected leak within the reticulated oxygen system at [the facility] meant that the gas was not available via the wall outlet in the procedure room where [Miss A] was treated. While an oxygen cylinder was not available within the same room, they were within easy reach in the hospital corridor.
- There was a significant time delay in fixing the suspected leak within the reticulated oxygen system, namely due to a specialised testing kit having to come from Australia. Within the commissioning of [the facility] it appears ensuring minimum downtime of the medical gas system by having a testing kit readily available was not addressed.
- [The facility's] existing telephone system was problematic with connection issues apparent during the call with the [ambulance service] at a critical time where [the facility] team was seeking further advice around [Miss A's] management. Reportedly there have been ongoing issues with the mobile device used which had been officially logged but unresolved at the time of the event
- Ongoing, unresolved issues with computers operating on two platforms [the DHB] & ... within [the facility] meant that printer connectivity was unreliable and despite multiple reports to resolve the issue resulted in the standard written parent/care giver advice around asthma 'The Asthma Action Plan and 'Using your Spacer' was not provided to [Miss A's] mother.

Contributory Factors

- The governance around the implementation of the IT system at [the facility] did not have an adequate response plan to timely resolve printing and other IT problems experienced by staff. This led to MO2 being unable to provide an Asthma Action Plan to [Miss A's] mother at the time of discharge following her second presentation. As a result, [Miss A's] mother did not have access to the plan to refer to as [Miss A's] condition worsened the following night which may have prompted earlier contact with the [telehealth service] and [facility] staff. In addition, the provision of the plan may have also assisted in [Miss A's] mother asking about the use of oxygen on her arrival to [the facility]. In not providing the plan to [Miss A's] mother there was a missed opportunity to provide treatment earlier and contact with [the public hospital's] paediatric service for advice on further management, including transfer.
- There was an absence of a codesigned communication pathway for [facility] staff to follow to gain assistance locally and escalate care to obtain tertiary support of [the public hospital]. This along with a lack of knowledge around the use of the 777 number and its omission within the emergency response flip chart to gain specialist support and knowledge, led to [facility] clinicians contacting a number of different agencies to gain advice on managing the situation and a delay in requesting transport to [the main centre] for [Miss A] even prior to her collapse.

- Within the commissioning of [the facility], clear mitigation and resolution pathways to protect critical equipment and services, considering the isolated location of [the facility], did not occur. This led to there being no appropriate testing kit being available onsite or even within [the DHB] to further investigate a potential leak within [the facility's] reticulated oxygen system. As the resolution of the suspected leak took several months, wall oxygen was not immediately available to provide to [Miss A] as part of the management of her severe/life threatening asthma. This potentially affected the decision to commence nebulised medication using an air compressor rather than oxygen.
- Lack of paediatric nursing staff knowledge and an experience base built more around use of the nebuliser for adult COPD patients, led to the use of the compressed air to drive [Miss A's] nebuliser therapy. This contributed to [Miss A's] already acute condition deteriorating further.
- The lack of a timely co-designed governance structure between [the DHB] and [the medical centre], during and post commissioning of [the facility], led to pathways for managing an acutely unwell paediatric admission not being defined. Additionally, the lack of governance led to [the facility] not formally recognised as receiving medical and surgical emergency patients which led to nursing staff within [the facility] unable to access appropriate triage training to prioritise acute presentations 24 hours a day. These factors led to [Miss A's] inappropriate placement into general practice procedure room as opposed to resus bed, inadequate access to paediatric specific equipment, and lack of access to specialised help in the form of phone support by Paediatric Specialist on-call and EMS air ambulance transfer.
- Limited exposure to paediatric clinical emergencies and reduced simulations of the same at [the facility] likely resulted in several practices inconsistent with the Clinical Pathways and ANZCOR paediatric resuscitation guidelines. This included incorrect hand position and rate of chest compressions, and a drug error in the dose of IM/IV adrenaline.

Root causes

Lack of exposure to acute severe/life threatening exacerbations of asthma, in addition to a lack of continuing education and simulated paediatric emergencies led to a lack of knowledge of the hypoxic effects of this condition when presenting this unwell. This resulted in staff not recognising the need to administer oxygen to [Miss A] following identification that she had an SpO₂ of less than 92%. Additionally, this led to nebulised medication being delivered via an air compressor, not oxygen, further adding to [Miss A's] hypoxic state that resulted in her eventual collapse then death.

Unawareness and lack of endorsement of the use of community health pathways by all clinical staff through governance at [the facility], led to a missed opportunity to utilise standing orders for the administration of oxygen to [Miss A] following the identification that she had an SpO₂ of less than 92%. This led to [Miss A] not receiving supplemental oxygen but also her being administered nebulised medications via an air compressor. This resulted in worsening her hypoxic state, leading to her eventual collapse then death.

Recommendations

1. Following a review of workflow for ‘walk-in’ patients after hours, develop a pathway indicating the location in which patients should be assessed and receive treatment based upon their triage category.

Responsibility: [The facility and the medical centre]

Timeframe: By [2021]

Measure: A pathway is developed and signed off by [the facility’s] Clinical Advisory group and Governance group. Staff surveyed two months after implementation of the pathway to review ensure they are both aware and understanding the pathway and its application.

2. Confirm that the scope of services [the facility] provides includes provision of initial emergency medical and trauma care and that the Royal New Zealand College of Urgent Care Standard [2015] applies. Ensure this is communicated to the College of Emergency Nurses New Zealand to enable triage course training applications from [the facility] to be prioritised at the same level as other emergency departments within New Zealand.

Responsibility: [The facility and the medical centre]

Timeframe: Completed [2019]

Measure: Evidenced by staff records of attendance.

3. Ensure that all inpatient nursing staff complete an agreed Triage Course as part of their initial orientation within 6 months of the commencement of employment.

Responsibility: [The facility and the medical centre]

Timeframe: Completed [2019] for current staff with 30 hours of pre reading

Measure: All oriented nursing staff are using the triage tool in the urgent care package in Indici.

4. Endorse the use of Community/Hospital Health Pathways by all Clinical Staff to inform/facilitate immediate management of possible acute ‘walk-in’ presentations, consultations and referrals. Ensure this is included within the orientation programme.

Responsibility: [The facility and the medical centre]

Timeframe: Completed — approved by [facility]

Measure: Survey staff to ensure they know when to utilise Health pathways — Orientation includes how to access and when to use health pathways.

5. Revise the emergency flip chart to incorporate ringing 777 for emergency assistance from the applicable specialist team [e.g. Trauma team vs ICU].

Responsibility: [Facility] Services Manager

Timeframe: [2021]

Measure: Updated flip charts in place throughout [the facility]

6. Implement a standard operating procedure to regularly check the contents of the infant/toddler/child box aligned with the scheduled checking of the resuscitation trolley to facilitate familiarity with and ensure the integrity of its contents — include within paediatric simulation for clinical emergency events the opening of the infant/toddler/child box, again to facilitate familiarity with its contents.

Responsibility: Nurse Manager, [the medical centre]

Timeframe: Completed in [2019]

Measure: Documentation indicates the procedure is followed with the contents of the infant/toddler/child box is reviewed by staff expected to access and use its contents reviewed as prescribed.

7. Identify appropriate education and training opportunities to enable [facility] Clinical staff to identify and manage 'the unwell child' with a focus of performing the immediate basics of management well. Ensure regular scenarios and regular update opportunities are incorporated into the ongoing professional development sessions occurring throughout the year.

Responsibility: [The facility and the medical centre]

Timeframe: Completed and ongoing

Measure: There is evidence that appropriate courses — training sessions are identified and provided to staff and that planning for future courses — training sessions have a paediatric content relevant to likely presentations to [the facility].

[2019]: Paediatrician ran a session on dealing with the asthmatic child.

[2019]: Starship Paediatric trauma training via videolink.

[2019]: Paediatric resus scenario training

[2019]: Acute assessment of Paediatrics webinar.

[2020]: Neonatal resus scenario training.

[2020]: MO 3 attended Advanced Paediatric Life Support Course

8. As part of policy/procedure related to the process of commissioning the Clinical Engineering Team include:

- a. Purchasing any equipment to trouble shoot systems so that it is readily on hand.
- b. Develop and implement a process to prioritise attention to and resolution of new issues that arise in a facility after it is opened.
- c. Provision of product information about known practice issues with or equipment and how to prevent them to the staff for inclusion in the staff orientation programme.

Responsibility: Manager Clinical Engineering

Timeframe: Complete [2021]

Measure: Updated policy /procedure

9. Manager of [the facility] include any known practice issues related to new building components that [a]ffect equipment viability and safety in the ongoing orientation of all staff involved in cleaning, maintaining, using or teaching about the equipment.

Responsibility: Nurse Manager, [the medical centre]

Timeframe: Completed [2021]

Measure: Updated staff orientation programme

Other findings

- The design of the General Practice area of [the facility] saw the omission of an annunciator connected to the emergency call bell system when a clinical emergency in this part of [the facility] was always probable. An annunciator in this area seems essential to enable other practice nurses/MO's to immediately respond to a critical patient during normal practice hours. Additionally, in the event of acute care areas being overcapacity afterhours where patients may need to overflow into the general practice area, locating an annunciator there is necessary to validate to those pushing the clinical emergency button the call for assistance has been activated.
- At the time of the event [the DHB] and [the medical centre] were negotiating a new contract which included service specifications and governance activity. Before the new contract was signed in [2019], the parties were operating under a prior contract which contained less detail about general governance, clinical governance, roles, responsibilities, and medical services.
- The current available telephone systems within [the facility] do not enable programmable numbers nor a reliable method of communication within and external to [the facility]. This potential can hinder appropriate external support during an emergency situation.
- The white board in the procedure room was used to record and calculate emergency drug doses without transcribing all to the Clinical Emergency Record/Drug Treatment Sheet.
- Confusion around the use of the correct observation chart and subsequent early warning scoring system. At the [Month1] presentation, observations were recorded on a PEWS chart designed for a 3 month–1-year-old baby. At the 5th [Month2] presentation, observations were documented on an adult EWS chart. Both of these actions indicate lack of knowledge and training around the use of a tool that is designed to detect early deterioration in patients when correctly used.
- There are patients who present to [the facility] out of hours, who have not been triaged by the [telehealth service] triage nurse or the Medical Officer on call. There does not appear to be a way to make these data on these 'walk-in' patients evident to inform staffing requirements to support the RN, staffing contingency plans as well as informing education and training needs based upon the nature of presentations seen.

- The current HealthInfo Asthma Action Plan document does not take into account the limited resources available within remote rural settings to manage the severe and life-threatening forms of the condition. In remote communities, ensuring early transport either by private car or by ambulance to a medical centre when signs and symptoms are at the “Worsening Asthma” stage rather than a severe stage as currently directed by the document, would ensure more time for responding clinicians to provide appropriate management and seek assistance from a tertiary centre for escalation of care.
- The medical assessment and notes were recorded in the General Practice system. While not material to the management of this case, the Health Record Standard [2002] and [DHB] Clinical Records Policy requires notes to be written in the same record — integrated — so that all team members can see the sequence of care for decision-making and handover purposes. The new General Practice patient management system (PMS) is supporting better sharing of patient record and continuity of care and the team is working towards all notes being recorded electronically in new PMS.

Recommendations arising from other findings

10. Explore installation of further annunciator speakers in the general practice area and consider the development of a schedule to regularly check the emergency call bell system across [the facility].

Responsibility: [Facility] Services Manager

Timeframe: [2021]

Measure: Annunciator is installed in General practice area.

11. The use of the Clinical Emergency Record/Drug Treatment Sheet is mandated across [the facility] for documenting the sequence of care for any clinical emergency that occurs on-site. The use of the document is reinforced during orientation/education and practised during applicable simulation events where there is always a nominated individual to record events.

Responsibility: [The facility and the medical centre]

Timeframe: Completed and ongoing

Measure: Audit of Emergency record/Drug treatment sheet usage following each emergency event

12. In the development of the new [facility] integrated model of care ensure the creation of an appropriate governance structure which aligns with both [the DHB’s] clinical governance policy as well as the HQSC’s Clinical Governance — guidance for health and disability providers. The integrated model of care and governance structure must include:

- appropriate medical and nursing services plans signed off by the [facility’s] Clinical Advisory group and the [facility’s] Governance group.
- policies and procedures aligned to Tier One Community Health, Transitional and Support Services Service Specification and in line with [DHB] and primary care guidelines

- a document and records management process
- quality systems with KPIs on matters including risk and incident reporting, patient/staff satisfaction and communications, service delivery, workforce integration, IT and facility issues.

Responsibility: [Facility] Services Manager

Timeframe: Within 9 months

Measure: The KPIs are reflected in the quarterly report to the [facility's] Governance Group.

13. Training in the use and scoring of age appropriate Early Warning Score documents are mandated for all acute presentations to [the] facility to record, monitor and action any changes to the patient's condition.

Responsibility: Clinical Nurse Specialist

Timeframe: Completed and ongoing

Measure: Evidence of staff training records and completed Early Warning Scores
Have already created and implemented the use of Urgent Care folders for each age group including appropriate EWs forms. Initial refresher for staff was completed by end of March 2021 and then all staff trained as part of Induction/orientation. All staff have completed healthLearn EWs score packages for Adult and paediatrics

14. Review the Community HealthPathways Asthma Action Plan incorporating necessary changes required for the plan to meet the needs of patients living in remote communities.

Responsibility: [DHB] HealthPathways Portfolio Manager

Timeframe: Within 6 months

Measure: Local Asthma Action plan in use

15. Review how the integration of general practice notes with the 'walk-in' clinical record can occur and develop a process so that all notes are stored in one place.

Responsibility: [The facility]

Timeframe: Completed

Measure: Process in place to ensure all notes are stored in one place

16. Implement a process to ensure that all staff are aware of and can easily access and can print from HealthPathways and use the pathways to guide clinical management. Include training of HealthPathways in [the facility's] existing orientation programmes.

Responsibility: [The facility and the medical centre]

Timeframe: Completed

Measure: Information visible and clear in orientation package

17. Ensure that the use of the telemedicine unit is included in the up-dated orientation programme for all nurses and doctors employed in the inpatient unit and general practice. Include a practical component and include in scenario training.

Responsibility: Health Services Manager and Nurse Manager, [the medical centre]

Timeframe: Completed

Measure: Evidenced in the orientation programme and individually signed off when completed

Evidenced in the scenario training plan

18. Collect, monitor and review the information about all patients who present out of hours to assist in informing after hours staffing requirements, contingency plans, ongoing staff education and training needs, including planning for simulated events to ensure staff can respond appropriately.

Responsibility: Health Services Manager and Nurse Manager, [the facility]

Timeframe: [2021]

Measure: Data presented to [the facility's] Clinical Advisory Group and Governance group at their meeting in [2021] and to each meeting thereafter.

19. Review and implement an improved, reliable mechanism of communication that is better than the existing phone system within [the facility] that facilitates hands free communication both internally and to external specialist providers.

Responsibility: Nurse Manager/Health Services Manager, [the facility]

Timeframe: [2021]

Measure: New system installed and in use

Conclusion

Everyone involved with [Miss A's] care would like to express their sincere sorrow at her death. There has been much reflection at an individual, service and organisation level regarding her care. [The DHB] and [the medical centre] offer their sincere apologies to [the family] for the identified systems issues which contributed to [Miss A's] rapid deterioration leading to her death. [The DHB] and [the medical centre] also sincerely apologise for the time this complex review has taken to complete. We acknowledge [Miss A's] family's grief and need for answers around the death of their beloved daughter. The recommendations we have made in this Serious Event Review will improve the quality of systems that guide care provided to patients at the rural health facility so that [Miss A] and her family's experience is not repeated."