

Anaesthetist, Dr B
Registered Nurse, RN D
Registered Nurse, RN C
West Coast District Health Board

A Report by the
Health and Disability Commissioner

(Case 13HDC00482)



Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

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Executive summary

1. In 2012, Master A, aged 15 years, had an emergency appendectomy at Grey Base Hospital. Anaesthetist Dr B was working at the hospital that day as a locum anaesthetist.
2. Dr B extubated Master A in theatre. While he was being taken to the post-anaesthesia care unit (PACU) he stopped breathing. Dr B treated the episode as a laryngospasm¹ and gave Master A a jaw thrust and chin lift and applied positive end expiratory pressure (PEEP), to break the laryngospasm. Master A resumed breathing.
3. At around 9.30pm in PACU Master A had a coughing incident, during which he coughed up blood-stained sputum and/or pink froth into his oxygen mask. Dr B stated that Master A's chest was clear at that time and she attributed the event to his having been intubated.
4. There are five documented oxygen saturations recorded while Master A was in PACU (99%, 89%, 93%, 92% and 90%). The 90% is the last recorded oxygen saturation, but no time is documented for any of the saturations. There is no record of how much oxygen therapy was being administered to achieve these saturations, nor any record of Master A's respiration rate or his level of consciousness.
5. Dr B recorded that Master A was "for oxygen via HFM [Hudson face mask²]/NP [nasal prongs] to keep sats [saturations] $\geq 94\%$ " and charted "HFM or N/P 2–10L [litres]".
6. At around 9.40pm Master A was discharged to the children's ward, where there was already one other patient. At that time, Master A's oxygen saturations were 96% on 8 litres of oxygen. Dr B said she was satisfied that Master A would be closely monitored on the children's ward; however, she did not document this as a requirement in the postoperative instructions. She said she did not transfer Master A to the CCU (Critical Care Unit) or to the adult ward as she was satisfied that his laryngospasm had resolved and his chest was clear.
7. Registered nurse (RN) G transferred Master A to the children's ward. She said that, at 10.00pm, Master A's oxygen saturations were 94% on 8 litres, so she adjusted the oxygen to 10 litres "for comfort", and his saturations rose to 96%.
8. RN D was on night duty on the children's ward. At around 2am she changed the oxygen to adult-sized nasal prongs with 3 litres of oxygen. RN D said that the oximeter alarm³ sounded twice between 10.45pm and 5.00am, and that Master A's saturations remained stable at 95% overnight. At 5.00am she turned off the oximeter machine and removed the probe from Master A's finger. She did not assess him between 5.00am and 6.30am.

¹ A laryngospasm is an uncontrolled/involuntary muscular contraction (spasm) of the laryngeal cords, which interrupts breathing.

² Hudson is a trade name, but the name is often used to refer to a face mask from any manufacturer which is used to deliver uncontrolled medium concentrations of oxygen to patients who are breathing spontaneously.

³ Pulse oximetry is a non-invasive method for monitoring a patient's oxygen saturation, using a sensor placed on a thin part of the patient's body, usually a fingertip or earlobe.

9. At 6.30am when RN D entered the room she discovered that Master A had had a respiratory arrest. Resuscitation was attempted. Master A was transferred to a hospital in a main centre (Hospital 2) but, sadly, he died a few days later.

Findings

Dr B

10. Dr B should have further investigated the reason for Master A's high oxygen requirement prior to discharging him from PACU to the children's ward, and should have scheduled a review on the ward or ordered more intensive monitoring.
11. Furthermore, Dr B did not consult with senior nursing staff or the resident medical officer (RMO) on duty. Dr B should have considered and discussed whether a discharge to CCU was more appropriate than a discharge to the children's ward. Dr B failed to provide postoperative anaesthetic services to Master A with reasonable care and skill and, accordingly, breached Right 4(1)⁴ of the Code of Health and Disability Services Consumers' Rights (the Code).
12. Dr B had a professional obligation to keep clear and accurate patient records. However, she did not adequately record the induction medication, whether she suctioned Master A's airway prior to extubation, or any observations from any chest examinations she performed. She failed to record the coughing incident and her interpretation of it. By failing to make adequate records, Dr B did not comply with professional standards and also breached Right 4(2)⁵ of the Code.

RN C

13. RN C showed a lack of critical thinking. She should have raised concerns with Dr B about the discharge to the children's ward and the level of oxygen prescribed, and/or discussed the discharge with the duty nurse manager.
14. RN C failed to provide services to Master A with reasonable care and skill and breached Right 4(1) of the Code.
15. RN C had a professional obligation to keep clear and accurate patient records. She stated that she forgot to do so as she was distracted by Master A's coughing incident. RN C failed to comply with professional standards of documentation and breached Right 4(2) of the Code.

RN D

16. RN D's change from provision of oxygen by Hudson mask at 10 litres to nasal prongs at 3 litres, inadequate monitoring and assessments of Master A, failure to obtain RMO

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

⁵ Right 4(2) states: "Every consumer has the right to have services provided that comply with legal, professional, ethical, and other relevant standards."

review, cessation of the monitoring by oximeter, and failure to review Master A between 5.00am and 6.30am were serious departures from expected standards. RN D failed to provide services to Master A with reasonable care and skill and breached Right 4(1) of the Code.

17. It was RN D's legal, professional and ethical duty to make a full, prompt and truthful explanation to the DHB about what had occurred that night. Accordingly, by failing to disclose that she had removed the oximeter, RN D breached Rights 6(1)⁶ and 4(2) of the Code.
18. RN D will be referred to the Director of Proceedings in accordance with section 45(2)(f) of the Health and Disability Commissioner Act 1994 for the purpose of deciding whether any proceedings should be taken.

RN G

19. Adverse comment is made about RN G's failure to obtain an RMO review of Master A before she increased the oxygen to 10 litres, and her contradictory and incomplete record-keeping.

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20. Staff orientation and training at Grey Base Hospital was suboptimal. The policies in place were insufficient. A series of failures of equipment, training and communication resulted in unacceptable delay in treating Master A's respiratory collapse. Master A was not provided with services with reasonable care and skill and, accordingly, West Coast District Health Board (DHB) breached Right 4(1) of the Code.
21. The pattern of suboptimal clinical documentation by multiple staff members means West Coast DHB failed to ensure that its staff met expected standards of documentation and, accordingly, West Coast DHB breached Right 4(2) of the Code.

Complaint and investigation

22. The Commissioner received a complaint from Mrs A about the services provided at West Coast DHB to her son, Master A. The following issues were identified for investigation:
 - *The appropriateness of the care provided to Master A by West Coast District Health Board in 2012.*

⁶ Right 6(1) states: "Every consumer has the right to the information that a reasonable consumer, in that consumer's circumstances, would expect to receive ..."

- *The appropriateness of the care provided to Master A by Dr B in 2012.*
- *The appropriateness of the care provided to Master A by RN D in 2012.*
- *The appropriateness of the care provided to Master A by RN C in 2012.*

23. The parties directly involved in the investigation were:

Mrs A	Consumer's mother
Dr B	Anaesthetist
RN C	Registered nurse
RN D	Registered nurse
EN E	Enrolled nurse
RN F	Registered nurse
RN G	Registered nurse
RN H	Registered nurse
RN I	Registered nurse
RN J	Registered nurse
Dr K	Consultant physician
Mr L	Anaesthetic technician
Ms M	Telephonist
Dr N	Consultant surgeon
Dr O	Resident medical officer
Ms P	Orderly
West Coast DHB	District health board

24. Information was also reviewed from:

Dr Q	Specialist anaesthetist
RN R	Registered Nurse
New Zealand Police	
Coroner	
Dr S	Specialist anaesthetist
Dr T	Specialist anaesthetist

25. Independent expert advice was obtained from registered nurse Dawn Carey (**Appendix A**), and consultant anaesthetist Dr Joe Sherriff (**Appendix B**).

Information gathered during investigation

Background

26. Master A, aged 15 years, was fit, active and generally healthy. One day late in 2012, Master A began to feel unwell with diarrhoea and vomiting. The following day, Master A remained unwell. He was still experiencing pain despite having taken Panadol, but had no further diarrhoea or vomiting.
27. That day at about 5.30pm Master A's mother, Mrs A,⁷ took Master A to Grey Base Hospital Emergency Department (ED). Master A was seen by a surgeon, Dr N, who recorded a preoperative diagnosis of appendicitis. The ED notes record Master A as being in pain, and that he weighed 54.4 kilograms. His respiration rate was 20 breaths per minute (the normal rate for a child over 12 years is 15–20 breaths per minute) and his oxygen saturation was 100% on room air. His other observations were a heart rate of 81 beats per minute (bpm) (normal is 70–100bpm), blood pressure of 120/65mmHg (normal is up to 135/86mmHg), and temperature of 37.6°C (normal is around 37°C). Mrs A noted that Master A was in severe pain at that time but, despite that, his baseline observations were normal.
28. The Duty Nurse Manager (DNM) at that time, RN H, stated to the Police that she was contacted by ED and advised that Master A's family had requested that he be admitted to the children's ward following the surgery because of his history of dyspraxia⁸ and associated behavioural problems. RN H stated: "I was happy to agree with this arrangement." Mrs A advised that Master A did not have behavioural problems, but did sometimes take longer than others to understand information given to him.
29. Mrs A stated that Master A's brother had recently undergone a procedure in hospital. He had been bored in an adult ward, so Mrs A thought the children's ward would provide a more appropriate environment for Master A. However, she intended the suggestion to apply only if it was clinically appropriate for Master A to be placed in the children's ward, and that was discussed with Dr N. At around 7pm, Master A was admitted to the children's ward prior to going to surgery. The sole nurse on duty, RN G, stated that as Master A was 15 years old he would normally have gone to an adult ward. RN G stated that Mrs A told her that Master A had some communication difficulties related to his dyspraxia.

Surgery

30. Anaesthetist Dr B was working at Grey Base Hospital as a locum anaesthetist at the time Master A was admitted. She had previously worked at the hospital for a few days on two

⁷ Mrs A is a registered nurse.

⁸ A cognitive disorder marked by an impaired ability to comprehend or express language in its written or spoken form.

occasions in 2010. Theatre nurse RN C advised that she had worked with Dr B on those previous occasions.

31. Dr B met with Master A and Mrs A and advised of the plan to administer a general anaesthetic with rapid sequence induction.⁹
32. Dr B stated that Mrs A took her aside and advised that Master A had dyspraxia and could be quite terse and short-tempered on occasion, and to bear this in mind when he awakened following the operation. Dr B stated that Mrs A also informed her that Master A woke almost every morning from sleep with a blood nose. Mrs A said that she told Dr B that Master A would occasionally wake at night with a blood nose, but not every night, and sometimes would have a bleeding nose during the day, which would stop within five minutes with applied pressure.
33. Dr B administered a premedication of sodium citrate¹⁰ because Master A had eaten yoghurt at 4pm. After an unremarkable general anaesthetic with a rapid sequence induction and easy intubation, the surgery commenced at 7.46pm. Dr B did not document the induction drug used, but documented that she administered 150mcg fentanyl and 10mg morphine (both opiate medications) as part of Master A's anaesthesia.
34. Master A underwent an uneventful laparoscopic appendectomy through a right iliac fossa¹¹ skin crease incision. An inflamed, swollen retrocaecal appendix was removed in a simple and uncomplicated operation. Dr N stated that once he had established that Master A had made a good postoperative surgical recovery, he left the operating theatre and went home.

Post-anaesthesia care unit

35. Dr B stated that she extubated Master A in theatre and, while he was being taken to the post-anaesthesia care unit (PACU), he was spontaneously ventilating at 12 breaths per minute. West Coast DHB advised HDC that from its interviews with staff during the Root Cause Analysis (RCA) process it had determined that RN C and Dr B left the operating theatre with Master A at 8.40pm. However, RN C recalls that Master A entered PACU at 8.34pm.
36. RN C stated that she works as a theatre nurse but has previously attended a PACU course. As she does not normally work as a PACU nurse and takes that role only when called as part of the surgical after-hours team, her "practice is to have the anaesthetist remain with the patient while the patient is in PACU".

⁹ Rapid sequence induction (RSI) involves a prompt induction of general anaesthesia and subsequent intubation of the trachea.

¹⁰ Sodium citrate is a drug given to help neutralise acid in the stomach by increasing the pH level.

¹¹ The right iliac fossa refers to the right inferior part of the surface of the abdomen.

37. Dr B was at Master A's head, and RN C was at the foot of the bed. As they were moving the bed from theatre to PACU, RN C's shoe fell off, and they paused for around 10 seconds while she replaced it. Dr B said that when they arrived at the doors of PACU it was noted that Master A had stopped breathing. RN C stated that "as soon as they got to the Recovery Bay"¹² the saturations monitor was put on, and the saturations "suddenly took a dive and went from being in the 90s to 68 percent". RN C left to call an enrolled nurse (EN), E, and an anaesthetic technician, Mr L, to assist.
38. Dr B said that she did not notice any stridor¹³ or attempts to take a breath against a closed glottis. She said that there was "silence and [she] treated the episode as laryngospasm"¹⁴. Dr B stated that she treated Master A with a jaw thrust and chin lift and then asked for a Laerdal bag mask in order to apply some positive end expiratory pressure (PEEP), to break the laryngospasm. Dr B said that Master A had de-saturated rapidly to oxygen saturations in the 70s from having had saturations around 97% at the time of leaving the operating theatre.
39. Master A's laryngospasm did not resolve with PEEP and so at 8.43pm Dr B administered 50mg of suxamethonium¹⁵ and bag masked Master A until he was ventilating spontaneously again. Dr B advised that Master A's saturations picked up quickly with bag masking and he was ventilating spontaneously within 10 minutes of entering PACU.
40. Dr B stated that she "suctioned out secretions twice, and there was some clear fluid which looked like saliva. There was no aspiration seen, nor was there any evidence of pulmonary oedema." Dr B said that she completed two comprehensive examinations of Master A's chest at that time, which showed that his chest was clear with no wheeze or added sounds, which "you would hear if pulmonary oedema was present".
41. Dr B made no record of the examinations and recorded a brief note "awoke well", which she said implied "no further concerns". Dr B submitted that she "mentally reviewed a number of alternative bases for the episode", including pulmonary oedema. She stated that it "would not be normal to document that process", and noted that the episode was a common event in patients who are recovering postoperatively.

¹² In response to the provisional opinion, RN C clarified that when she referred to "Recovery" she was referring to PACU.

¹³ Stridor is a high-pitched wheezing sound resulting from turbulent air flow in the upper airway. Stridor is produced by a narrowed or obstructed airway path.

¹⁴ A laryngospasm is an uncontrolled/involuntary muscular contraction (spasm) of the laryngeal cords, which interrupts breathing.

¹⁵ Suxamethonium is used to induce muscle relaxation and short-term paralysis, usually to facilitate tracheal intubation.

42. Dr B's written instructions included that the IV fluid therapy continue at 200ml per hour and be discontinued before discharge from PACU. The anaesthesia record reports two litres of fluid being administered/in progress intraoperatively and upon transfer to PACU. RN C said that there was "some difficulty" in maintaining Master A's oxygen saturations above 94–95%, so Dr B charted instructions on the drug sheet to manage that. Dr B recorded in the clinical records: "[F]or oxygen via HFM [Hudson face mask¹⁶]/NP [nasal prongs] to keep sats [saturations] \geq 94%." She charted "HFM or N/P 2–10L [litres]". Dr B advised that Master A's observations at that time were satisfactory, with saturations in the mid-90s on oxygen via a Hudson face mask. Dr B stated:

"From a review of my notes, it is difficult to recall why I charted up to 10 litres of oxygen, as it is not my usual practice. Normally I would have charted 2–6 litres of oxygen via nasal prongs or Hudson Face Mask in order to keep sats more than 94%. I do recall, however, that [Master A] kept wanting to take his mask off as it was annoying him and one of the nurses prompted me to write up a higher flow for the ward. I likely charted 10 litres so for the periods of time [Master A] had the mask on he would be getting an adequate amount of oxygen."

43. RN C stated: "I did not tell [Dr B] what rate of oxygen should be charted for [Master A]; I did tell her that if she wanted him to have oxygen in the ward it would need to be charted otherwise it would not be given."
44. In response to the provisional opinion, Dr B accepted that she was responsible for the level of oxygen she prescribed, and did not make the prescribing decision because the nursing staff prompted her to do so. She submitted that the reason she charted that level of oxygen was because Master A kept pulling off the mask. She further stated: "To contextualise the charting of this level of oxygen greater than normal is simply a greater flow of oxygen, the inspired level is exactly the same as if 6 litres was charted."
45. After Master A awoke, his parents and sister came to see him. At that time Master A was irritable and not happy to see his sister. Mrs A said: "He was really agitated and angrier than I had seen him before." She said that Master A swore at his family, which was something he never did. Dr B advised HDC that such behaviour is not unusual in patients emerging from anaesthesia.
46. RN H stated to the Police that at approximately 9.30pm RN G told her that Master A had not yet arrived in the children's ward because he had been "slow to wake up from his anaesthetic".

¹⁶ Hudson is a trade name, but the name is often used to refer to a face mask from any manufacturer which is used to deliver uncontrolled medium concentrations of oxygen to patients who are breathing spontaneously.

47. RN C stated that Master A remained “grumpy” but his recovery was uneventful, so at approximately 9.30pm she discussed with Dr B whether Master A was fit to be transferred to the children’s ward.
48. Dr B told HDC that she was satisfied that Master A would be closely monitored on the children’s ward; however, she did not document in the postoperative instructions that Master A required close monitoring. She said that she did not consider transferring him to the Critical Care Unit (CCU) or to the adult ward as she was satisfied that his laryngospasm had resolved and he had a clear chest. Additionally, she thought he would have one-to-one nursing on the children’s ward.¹⁷ Dr B told HDC that from her knowledge of working at the hospital she was satisfied that Master A would receive high quality nursing care and that, although she required monitoring to occur, that was not due to any concern about Master A’s ongoing presentation.
49. RN J advised the Police that on the day of Master A’s operation she worked the night shift in CCU. That night there were two patients in CCU, and there was space for two more patients.

Coughing incident

50. RN C stated:

“Just prior to the Ward nurse coming into recovery [Master A] had a coughing fit. There was some blood stained saliva and mucous coughed up into the mask. It was a small amount and easily wiped off the mask. I calmly cleaned him up and brought it to [Dr B’s] attention. No further treatment was required.”
51. Mrs A said that she and her husband and daughter were present at that time, and RN C did not bring the coughing fit to Dr B’s attention. Mrs A stated that RN C “merely wiped the mask and ignored it”. Mrs A was concerned when Master A coughed up pink frothy blood¹⁸ and raised it with Dr B, who replied that it was probably just some trauma from the intubation during surgery. Dr B described it as “blood stained sputum”, which she attributed to Master A having been intubated. Dr B also advised HDC that the ward nurse, RN G, was present when the coughing fit occurred, and was therefore aware of it. However, RN C and Mrs A stated that RN G was not present at the time of the coughing fit, and RN G advised that she arrived at 9.40pm.
52. Mrs A said she questioned whether Master A was “OK”. She also recalls that Dr B briefly examined Master A’s lungs at that time by listening to his lower lobes, but did not

¹⁷ As stated below, there was already another patient in the children’s ward, and a further patient arrived at 5.00am. There was only one nurse on duty in the evening and overnight.

¹⁸ In her various responses to HDC, Mrs A referred to Master A coughing up pink or blood-stained froth, pink frothy sputum/phlegm, and frothy blood.

listen to Master A's upper or posterior lung lobes. Mrs A said: "[As Master A] was so distressed I was focusing on him and didn't think to look at the monitors as I trusted the staff to do their job." Mrs A said that Master A was discharged approximately five minutes after the coughing fit, and she did not look at his oxygen saturations and assumed that they were satisfactory as he was being discharged.

53. Mrs A recalls that Dr B was in a rush to leave that day. However, Dr B advised HDC that she was not in a rush to leave, and that she spent an hour with Master A in PACU, which "might be regarded by other anaesthetists as a lengthy stay with patients post-operatively".
54. Dr B told HDC that Master A's chest was clear at that stage, and she attributed the coughing incident to his having been intubated. Dr B did not record any reference to the coughing incident or having conducted a chest examination in response to it. Dr B submitted that the coughing incident and chest examination following it were very minor events, which "underlines the lack of rational basis for there to be any documentation of it".
55. RN C stated that "it was not an extended lengthy fit with saturations dropping", that Master A's oxygen saturations did not drop during the coughing fit, and that Master A had been on 6 litres of oxygen "for at least half an hour prior to discharge". However, the DHB in its response to HDC noted that Master A's oxygen was increased to 8 litres following the coughing fit, and RN G stated that on transfer to the ward at around 9.40pm–9.45pm, Master A was receiving 8 litres of oxygen.
56. RN C described Dr B's assessment of Master A at that time as "comprehensive", stating: "The anaesthetist checked his airways immediately which were clear."
57. RN C said that the coughing incident occurred just as she was about to complete her final documentation and, consequently, she forgot to complete the records. She stated that she was "about to complete the onscreen documentation" and had "the screen up and the discharge form ready to fill in" when she was distracted by Master A's coughing fit.
58. Dr B submitted that, in her opinion, at no time was there any indication that it was clinically inappropriate to discharge Master A to the children's ward.

Records in PACU

59. RN C told HDC that the evening of Master A's operation was the first time she had seen the particular post-anaesthesia nursing record (PACU chart) in use at the time of these events, and she had received no education about the sheet.

60. The PACU chart contains a scoring tool¹⁹ for use on arrival to, and discharge from, PACU. Master A's score on arrival in PACU was documented as 4; however, on discharge he was not scored against the assessment tool.
61. The PACU chart (see Appendix C) records that when Master A arrived in PACU his oxygen saturations dropped to 48%, and that Master A was bagged by Dr B and given 50mg of suxamethonium at 8.43pm, and that by 8.50pm his saturations had increased to 98% with bagging. RN C stated that she put the blood pressure cuff on Master A at approximately 8.45pm and started the recording cycles. Then, once everything had settled, she "looked on trends" and entered the blood pressure, pulse and saturations.
62. In relation to oxygen therapy, the West Coast DHB "PACU Standard Care Policy" provides that "4L/min is prescribed (not 6L/min as in wards) to encourage breathing stimulated by CO₂ drive. The patient's oxygen mask is removed when the patient is alert." It also states: "Document patient's recordings at 5 minute intervals. If the patient's condition is unstable the recordings will be increased accordingly and variations documented."
63. RN C stated that she assessed Master A's vital signs every five minutes, and Master A was also monitored by machine. As she had made no records of the final assessments, she asked technicians to recover the recordings from the machine's memory, but was advised that it was not possible.
64. Five-minute observations appear to be recorded on the PACU chart as required by the PACU policy. There are no times recorded for these five-minute observations. However, by taking five-minute intervals from when Master A's saturations were noted at the foot of the PACU chart to be 98% at 8.50pm, when, according to Dr B, Master A started to ventilate spontaneously, it is possible to give an approximate time for each recording as follows:

	O ₂ saturations	Pulse (approx.)	BP (approx.)
8.55pm	99%	80	110/55
9.00pm	89%	80	108/55
9.05pm	No reading	90	128/50

¹⁹ The PACU assessment tool provides for a score of 0, 1 or 2 for assessments of breathing, saturation, consciousness, circulation, activity, temperature and pain. The lower the score, the greater the concern about the patient's condition. The maximum score possible is 14.

9.10pm	93%	92	132/58
9.15pm	No reading	94	128/55
9.20pm	92%	94	135/60
9.25pm	No reading	100	125/55
9.30pm	90%	90	110/60
9.35pm approx. time of coughing incident	No reading		
9.40pm approx. time of transfer to ward	96% on 8 litres O ₂ ²⁰		

65. RN C was asked to confirm the accuracy of these timings. In response, she confirmed that Master A entered PACU at approximately 8.34pm, and she put the blood pressure cuff on him at approximately 8.45pm and started the recording cycles at that time. RN C repeated that “once everything had settled”, she “looked on trends” and entered blood pressure, pulse and saturations. She made no further comment about the approximate timings recorded above.
66. These are approximate times and, if it were the case that the recordings on the PACU chart relate to recordings commenced at 8.45pm (10 minutes earlier), then in that case the recording of saturations of 90% would have been made at approximately 9.20pm, approximately 10 minutes before the children’s ward was advised that Master A was ready to transfer, and no observations were recorded between 9.20pm and discharge.
67. There is no record of how much oxygen therapy was being administered to achieve these saturations, and Master A’s respiration rate and level of consciousness are not recorded. Dr B said that Master A’s saturations were 98% when he left the unit, but there is no record of this. She stated: “If the [PACU record] was complete then one would see his

²⁰ As per RN G and the ward nursing notes.

Modified Aldrete Score²¹ is 12/12 ... one is ready for the ward once a modified Aldrete score of 10/12 is reached. This confirms that he was stable and ready for discharge from the PACU.” RN C said that Master A had maintained “normal sats” on 6 litres of oxygen for at least half an hour before he was transferred to the ward. RN G stated that at handover Master A was on 8 litres of oxygen, and his saturations were 96%.

68. There is one observation of “wound satis” (wound satisfactory) on admission to PACU, but no record on discharge. The discharge information regarding the time, destination and handover details is incomplete. RN C stated that she accepts responsibility for the “less than adequate” documentation, but said that this does not mean the care was not professional and adequate.
69. The PACU chart does not have times documented against the recordings, and so it is unclear how long Master A was in PACU. West Coast DHB acknowledged that the time is not recorded, and said that Master A was in PACU for approximately 60–70 minutes. RN C stated that the children’s ward was contacted at 9.31pm and told that Master A was fit to return to the ward, and that Master A was in PACU for just over one hour.

Decision to transfer to the children’s ward

70. As stated, Dr B was a locum anaesthetist working at Grey Base Hospital during the time of these events. West Coast DHB stated that at that time new anaesthetists were not provided with information about communicating with senior nurses regarding discharge destinations, or communicating with resident medical officers (RMOs) for patient review after discharge.
71. RN C stated that the ward nurse, RN G, arrived at PACU. RN C explained to her what had happened previously, and told her that Master A was now “fine”. RN C asked RN G whether she was happy to take Master A to the ward. RN C initially stated that RN G told her that as Master A would be “the only patient in the ward she could special him²²”, but later accepted that RN G may have told her that there was already another patient in the children’s ward.
72. Mrs A said that she was present when RN G arrived, and does not recall anyone saying that Master A needed to be monitored closely. She recalls Dr B and RN C saying that Master A was fine to go and asking whether RN G was happy to accept Master A.
73. RN C stated that the decision to transfer was made by her, Dr B and RN G. RN C said that both Dr B and RN G were happy for Master A to be transferred, and that Master A met all discharge criteria of being pain free with normal vital signs 20–30 minutes prior to his discharge from PACU. RN C also stated that she was “mindful” that the PACU

²¹ A scoring system used to assess patient suitability for discharge from a PACU, which is based on certain criteria including respirations, activity, consciousness, circulation, and colour.

²² Provide one-on-one nursing care.

staff are the only on-call team for the hospital, and she was aware that a woman in labour that evening could need surgical assistance.

74. In response to the first provisional opinion, Mrs A said that there was a rush to get Master A out of PACU, and she does not believe he had normal vital signs 20–30 minutes prior to discharge, particularly as he had experienced the coughing fit during that time and at discharge was needing 8 litres of oxygen to maintain 96% oxygen saturations.
75. RN G was working an afternoon shift from 2.30pm until 10.30pm. She said that she was the only registered nurse on the children’s ward, and there was one patient on the ward prior to Master A’s admission.
76. RN G stated that, when she arrived at PACU, Master A’s family, Dr B, and the theatre/recovery nursing staff were present. RN C handed over Master A’s care to her. Dr B explained that Master A had had a laryngospasm, had been administered suxamethonium, and had needed to be bagged. RN G said that Dr B explained that this was not an uncommon occurrence, and that Master A was now stable on 8 litres of oxygen via a Hudson mask, and his oxygen saturations were 96%. RN C said that Dr B advised that Master A’s oxygen saturations tended to drop when he was sleepy, so she had charted oxygen on the ward. RN G does not recall any comment about the coughing fit.
77. Dr B told RN G that Master A’s chest was clear on auscultation. As stated, Dr B had charted “HFM or N/P 2–10L”. RN G stated that Dr B told her to request a medical review if Master A’s oxygen saturations did not stay above 94% on 2–10 litres of oxygen.
78. West Coast DHB noted that an oxygen requirement greater than 6 litres would usually trigger an RMO review. With regard to Dr B’s prescription of oxygen, the DHB stated: “We agree that this legitimises the administration of up to 10 litres of oxygen with a SpO₂ [oxygen saturation] of 94% without requiring a medical review.” The RCA noted that the requirement for RMO review was not formalised in the PACU discharge criteria. The review recommended the development of clear guidelines, including the indications for RMO review.
79. The West Coast DHB policy “Post Anaesthetic Care Nurse PACU” provides that the nurse must ensure that the DHB discharge criteria are met before discharging the patient from PACU. The criteria state:

“A patient must be:

- able to maintain their own airway and have effective ventilation
- maintain appropriate oxygen saturation
- physiologically stable

- comfortable
- normothermi[c]²³
- unlikely to develop immediate post operative complications.

The decision to discharge the patient is made using written discharge criteria. Any deviations from the discharge criteria must be discussed with the anaesthetist concerned ... Patients unable to fulfil the discharge criteria must remain in PACU or are transferred to a Critical Care Unit for further observation and clinical management.”

Transfer to the children’s ward

80. RN G said that she transferred Master A to a room on the children’s ward, and his family remained on the ward while he was settled into the room. She stated that Master A remained slightly agitated and told his family to leave, as he was tired. RN G said that Master A’s family decided to go home, but Mrs A advised her that Master A could be difficult to communicate with, and said that she would be happy to be telephoned to come in overnight if there were any issues.
81. Mrs A said that she went home because she trusted the staff to look after Master A and to contact her if there were any problems. Mrs A recalls that, before she left the ward, she told the nurse that she was concerned about Master A, and asked the nurse to monitor him closely. Mrs A also recalls that she asked the nurse to keep the monitor on Master A because of the laryngospasm he had had in the recovery ward. Mrs A said that she also questioned where the night nurse would be sitting, because she knew from experience that the nurses tended to sit in the office, which is a long way away from the patients.
82. RN G said that she explained to Master A that she would leave the pulse oximeter on his finger so that she could do his observations, and he asked what a pulse oximeter did. After she had explained he agreed to its use.
83. The policy in use, DHB X’s Policy and Procedure Manual vol Q — Child Health, provides: “[T]he infant/child’s SpO₂, respiratory rate, colour and work of breathing is monitored and recorded hourly. O₂ flow rate is recorded hourly.”
84. RN G said that she was situated in the nursing station directly opposite Master A’s room and, at all times, she could see the monitor screen from the pulse oximeter through his window. She said that, at 10.00pm, she took Master A’s vital signs. She stated: “His oxygen saturations were then 94% on 8L. I adjusted the oxygen to 10L for comfort and his saturations immediately rose to 96%. Other vital signs were within normal limits.” Although RN G said that she increased the oxygen at 10.00pm, there is no record of this

²³ Having a normal temperature.

in the clinical notes. The Child Observation Chart records that at 9.45pm, Master A was receiving 10 litres of oxygen and his saturations were 96%, and at 10.30pm Master A was receiving 10 litres of oxygen and his saturations were 95%.

85. RN G stated that she checked the pulse oximeter at least every 10 minutes between 10.00pm and 10.40pm, at which time the night shift nurse arrived. RN G said that Master A's oxygen saturations remained between 95% and 97%. She said that prior to handover at 10.30pm she took his vital signs, which were within normal limits, and she documented that Master A's saturations were 96% on 8 litres of oxygen and noted: "[M]onitor sats closely o/n [overnight]." At that time Master A's respiratory rate was 20 breaths per minute. RN G stated:

"I believe I paged the RMO just prior to the night shift nurse arriving to report on [Master A's] condition and reported I had adjusted [Master A's] oxygen from 8L–10L as charted in [Master A's] drug chart. When the night shift nurse arrived I had not spoken to or heard from the RMO but I asked the night shift nurse to please chase up."

86. The night shift RMO, Dr O, stated to the Police that he was unaware of Master A's presence in the children's ward until 1.00am. There is no record of RN G having paged the RMO or advising RN D, the night duty nurse, that she had done so. RN D stated that RN G did not request her to follow up a page to the RMO.

RN D

87. RN D was on night duty on the children's ward. RN D said that RN G told her that Master A was saturating at 95% on 10 litres of oxygen via a Hudson mask, and had responded to prompts to take deep breaths. RN G advised RN D of the incidents in PACU, and said that Master A's overnight stay in the paediatric unit rather than an adult surgical ward had been discussed and chosen as an age-appropriate diversional environment, as there was access to Xbox and DVDs in the ward. RN G told RN D that Mrs A had requested that she (RN D) keep a "good eye" on Master A overnight, and that Mrs A was willing to return to the children's ward overnight if Master A asked for her or if there were any concerns.
88. RN D stated that she "was under the impression" that RN G had reported the "full extent of intervention Master A required in PACU and the subsequent increase in oxygen to 10L ... to her afternoon shift DNM [duty nurse manager] [RN H], when providing the end of shift verbal handover". RN D said she "assumed" that Dr B was aware of the increase to 10 litres of oxygen. RN D stated that she was not advised that Master A had regular morning nose bleeds, which was "potentially very important" information given the level of oxygen Master A was receiving when discharged from PACU. As stated, Mrs A said that she told Dr B that Master A would occasionally wake at night with a blood nose, but

not every night, and sometimes would have a bleeding nose during the day, but did not say that he had regular morning nose bleeds.

89. RN D said that she read through Master A's file, including RN G's nursing notes, when she started her shift. RN D stated: "There was no nursing or anaesthetic note that [Master A] was to be monitored closely on the Ward." (As stated above, this is incorrect, as RN G recorded at 10.30pm that Master A's oxygen saturation was 96% on 8 litres of oxygen, and noted, "[M]onitor sats closely o/n [overnight].")
90. RN D stated that she was stationed at the nurse's station facing the north lounge, with Master A's room on her left and another patient's room on her right. She said she read through Master A's file and noted that RN G had not completed the "nursing paediatric history 5–15 years" form, which sets out social information about the patient. She stated that RN G had made no entries on Master A's care plan, so she "put [RN G's] name on the care plan and dated and made entries into [Master A's] care plan with reference to the afternoon shift care and put her name at the bottom because there was nothing in the record when it was handed to [RN D]".
91. RN D said that she noted that Master A's oxygen saturation was 96%, which she knew was not optimum in a young, healthy person on 10 litres of oxygen, as the recording should have been 100%. She stated that she double checked the percentage by applying another oximeter to the middle finger of his opposite hand, and confirmed the recording of 96%. RN D recorded in the clinical notes: "SpO₂ continual monitoring, observe for throat obstruction." In response to the provisional opinion, RN D submitted that there was no documentation of the reasons for RN G increasing the oxygen from 8 litres to 10 litres, nor was there any information on the PACU records regarding the amount of oxygen Master A had been administered during the postoperative period.
92. RN D stated that over the course of the shift she changed the probe from one finger to another to renew Master A's fingertip circulation and check the accuracy of the readings. She said that the probe was an adult sized finger probe, which could slip off with finger/hand movement. She advised that the alarm sounded twice between 10.45pm and 5am and that, each time, she responded to the alarm. She stated that on both occasions the alarm related to no oxygen saturation reading, as the probe had dislodged. She also said:

"During my shift whilst it was on continuous monitoring I responded two times to a probe dislodged alarm. I did not document either of these incidents in the nursing notes. Each time I touched [Master A's] hands, his fingers responded with a slight movement."
93. RN D stated that the oximeter reading was never below 95%.

Fluids

94. Although Dr B had charted on the anaesthesia and PACU record that the IV fluid therapy was to continue at 200ml per hour and be discontinued before Master A was discharged from PACU, the clinical notes indicate that the IV fluids continued after Master A was transferred to the children's ward. Dr B advised HDC that she ticked the relevant box,²⁴ and there was nothing untoward about the fluids continuing on the ward.
95. A fluid balance chart was not commenced. RN D stated that when she commenced her shift Master A had IV fluids in progress, which were completed at 2am. West Coast DHB stated that it is usual practice for a fluid balance chart to be completed when a patient is receiving IV fluids.

Blood pressure

96. Master A had only one blood pressure reading recorded while he was in the children's ward. West Coast DHB advised that blood pressure recordings are required as part of the PEWS (Paediatric Early Warning Score²⁵) scoring tool, and the recordings should have been done. Nonetheless, the PEWS result is recorded as 2 until 10.30pm, and then 1 until 5am.

Change to nasal prongs

97. RN D stated that Master A was sleeping and appeared comfortable. She said she observed that Master A was breathing through his nose with his mouth closed, and she was concerned that his airways would be getting dry with 10 litres of oxygen, so she decided to replace the Hudson mask with nasal prongs at 3 litres via a humidification system.²⁶ In response to the provisional opinion, she submitted that she was aware that Master A had been combative and had tried to remove his mask in PACU. She considered that nasal prongs would be more comfortable and would allow Master A to have sips of water. RN D said:

“Unfortunately, while setting the humidification unit in the treatment room, I could not get the fluid to heat, (the unit was sent to the technician the following day) so instead used adult sized nasal prongs with 3 litres of oxygen.”

²⁴ The box on the Anaesthesia and PACU record form is alongside the words “Continue current bag at 200mLs/hr and discontinue before discharge from PACU”.

²⁵ Early warning scores are generated by combining the scores from a selection of routine observations of patients, e.g. pulse, respiratory rate, respiratory distress, consciousness level. If a child's clinical condition is deteriorating, the “score” for the observations will increase, and so a higher or increasing score gives an early indication that intervention may be required.

²⁶ RN D advised that the children's ward staff were required to work under the “Child Health [DHB X] Volume Q” policy, which she considered applied to Master A. The policy states: “Humidification of inspired gases is required when more than a brief episode, O₂ therapy is anticipated or the infant/child has difficulty managing secretions.” The stated rationale is that oxygen can cause drying of the mucosa and secretions.

98. RN D stated that, at approximately 1am, while she was in the treatment room trying to set up the humidification system, she received her first visit of the night from the duty nurse manager (DNM), RN F, and they discussed Master A's recent observations and RN D's rationale for changing him to nasal prongs. There is no oxygen saturation level recorded at that time. RN D advised that by 1am Master A had been in the children's ward for 3 hours and 15 minutes on 10 litres of oxygen, his saturations were consistently 95%, and that both she and RN F considered his other observations to be stable.
99. RN F stated that she relies on a comprehensive handover from ward staff and the afternoon DNM to ensure she has a clinical overview of all patients. RN F advised that she was not informed of any problems or concerns with Master A when she received handover from RN H.

Dr O

100. RN F said that, at around 1am, RN D told her that the RMO (Dr O) had just checked Master A and was happy for his oxygen to be changed to nasal prongs at a lower rate, depending on his saturation levels.
101. RN D said that when Dr O entered the children's ward at approximately midnight to access the RMO computer room, she introduced herself and, when he returned at 2am, she mentioned that she had changed Master A's oxygen therapy to nasal prongs, and said that he was a nose breather, was tolerating nasal prongs, and had a saturation of 95%, but she did not ask Dr O to review Master A. Subsequently, RN D told HDC:

"I discussed the reduction of oxygen to 3L at 0100 hours with [RN F] and with RMO [Dr O] both of whom knew the amount of oxygen he had been on and the saturations. Although not a full assessment when I discussed my approach with locum RMO [Dr O], he raised no concerns other than to maintain his saturations. [Dr O] did not suggest he review ... I was working on the basis that RMO, [Dr O] had also received a full handover and was aware of [Master A's] background, from the surgical team."

102. Dr O stated that his duties were to review all patients presenting at the Emergency Department (ED), ward patients if nursing staff raised concerns, and critical patients handed over by the doctor on duty during the evening shift.
103. Dr O said that he was unaware of Master A and was not given any handover at the start of his shift. It was not until 1am he was told that "there [was] a post operative patient in [the children's ward] who needed 10L oxygen in the recovery".
104. Dr O stated that at around 1am he went to the children's ward and was told by RN D that Master A "was being weaned off O₂, that he was on 3L and his numbers were looking fine". Dr O said he advised RN D to monitor Master A closely and contact him (Dr O) if

there were any concerns. He stated that RN D was happy with Master A's progress and, at that stage, did not want him to review Master A.

105. There is no record in Master A's notes of any consultation with Dr O.

Assessments

106. The Child Observation Chart records that Master A was changed to nasal prongs at 2.00am, at which time his saturations were at 95%. The next record was made at 3.30am (95%), and the final record at 5.00am (95%). The recorded respiratory rates show 20 breaths per minute from 11.30pm to 5am, apart from one increase to 25 breaths per minute at 2am.
107. RN D stated that she did not auscultate Master A's chest and that, on reflection, she acknowledges that she should have done so. In response to the provisional opinion, she stated: "[T]here was no clinical indication from Master A's presentation noted by any staff member that there was any clinical need to [auscultate his chest]." At 2.00am RN D noted that the fluids had been completed, Master A had drunk 50ml of water, and he had refused the use of the urinal or to get up to the toilet. In her statement to the Coroner made on 17 June 2013, RN D said that at 2.00am she explained the change to nasal prongs to Master A, had another informal conversation with him prior to 3.30am, and recorded his observations at 3.30am.
108. In a statement to HDC in response to the nursing expert advice, RN D stated that she "anticipated" that the change from the Hudson mask to nasal prongs "was a vital time to be vigilant", and that she therefore "visualised [Master A's] insitu Massimo monitoring equipment 5–10, and at a maximum 20 minutes apart to ensure that [she] was watching for any desaturation". She said: "I did not chart every visualisation as there was no variance to the recordings charted."

Handover to RN F

109. Between 3.15am and 3.30am RN D handed over to RN F in order for RN D to have a meal break. RN D then left the children's ward for 30 minutes. RN F stated that she checked Master A once, and his monitor observations were stable and within normal limits, and he appeared to be sleeping soundly and snoring lightly. She said that when RN D returned they checked Master A together, and he remained asleep with stable observations. There is no record of those observations.
110. Mrs A advised that it was not normal for Master A to snore.

3.30am –5.00am

111. RN D advised that prior to 5.00am she carried out nursing housekeeping duties, during which she was away from the nursing station and not attending to patient cares.

5.00am

112. RN D advised that she was expecting a new admission at 5.00am. When the ED nurse and the new admission arrived, she came out of Master A's room, where she had been recording a set of observations. At that time, Master A was snoring audibly with his mouth closed. She stated that it was a soft palate deep snore, and that he had a respiration rate of 20 and an oxygen saturation of 95%. In response to the provisional opinion, she stated that the snoring did not give her reason to consider obstruction, and she thought it was indicative of his dyspraxia and tiredness. She stated that Master A was sleeping in a semi-upright position, with good neck position. The RCA notes that the ED nurse heard loud snoring, but not stridor, from Master A when she was handing over the new patient to RN D.
113. RN D stated:
- “Prior to leaving [Master A's] room I turned the Massimo oximeter machine off and removed the probe from [Master A's] finger. My rationale at the time was that if I was in [another room] with a new admission, (as I planned to be) I would not easily respond to the probe dislodging again. That [Master A] had maintained oxygen saturation of 95% for six hours. (PEWS protocol to seek medical review if SpO₂ less than 94%).”
114. RN D told HDC: “At no time during the shift did I perceive a level of concern about the amount of oxygen he was on from other staff or the fact that he had not gone back to his preoperative 98% or to 100% when he had been on 6, 8, or 10L. The focus was on him maintaining above 94%.”
115. In response to the provisional opinion, RN D specified the care required by the new patient, which she said would take at least an hour. She said: “My aim in turning the monitor off was to guard against the probe dislodging again in that time when I would not be able to respond to it quickly.” She stated that the monitor had not alarmed for a medical reason during her shift and Master A had not desaturated. She said she would not have turned off the monitor if she had thought it would alarm genuinely.
116. RN D did not record that she had turned off the monitor. West Coast DHB advised that throughout its investigation into Master A's death, RN D reported to the DHB that the monitor did not alarm during her shift and was not alarming when she entered Master A's room and discovered his respiratory arrest. As a result, the DHB removed the monitor from use and had it checked by a biomedical engineer and found that it was functioning appropriately. The DHB raised the default alarm volume, even though it could have been heard at the nursing station when set at the previous volume.

117. West Coast DHB stated that following the completion of its investigation, RN D acknowledged in her statement to the Coroner that the monitor did alarm several times during her shift and that it was turned off at the time of Master A's arrest.
118. In response to the provisional opinion, RN D stated that following Master A's death she worked as sole charge in the children's ward for a further four days. She outlined her involvement in the RCA,²⁷ and said she was not aware that there was a view that the machine may have malfunctioned, and she did not misrepresent the facts to the RCA. She further stated that she "deeply regrets" not providing that information sooner, and acknowledges that she should have done so.

Emergency call

119. RN D said that she provided nursing cares in two other rooms and completed the nursing documentation in the patient notes. She said she planned to do Master A's observations, so at 6.30am she entered his room, and then recognised that his status had changed.
120. RN D stated:

"He had pallor, his shoulders were raising with a deep breath taken. His mouth was open. His fingers were dusky. He did not respond to voice command or chest rub stimuli. I replaced nasal prongs with Hudson mask at 12litres as my first response but needed to raise alarm, as I was leaving [Master A's room] I bumped into CNM [RN F] in the doorway coming to take a final report on my 3 patients, came to [Master A's room] looking for me and found me, I ushered her in, we both simultaneously knew I was about to ring 777. I don't recall what words I spoke to CNM [RN F], I think I blurted respiratory arrest."
121. RN F stated that on entering the children's ward she looked for RN D and met her as she was coming out of Master A's room. RN D asked RN F to check Master A as he was unresponsive and dusky with laboured breathing. RN D handed RN F an Ambu bag and went to the telephone to dial 777, the ward emergency call.
122. RN F advised that on checking Master A she found him unresponsive with minimal chest movement. He had dusky fingertips and a very weak radial pulse, and had on a Hudson mask, which was delivering 10 litres of oxygen. RN F stated that she dropped the bed head and connected the Ambu bag to 100% oxygen, removed the Hudson mask, and commenced assisted ventilation. However, it was difficult to maintain ventilation owing to respiratory resistance. RN D returned and they commenced two-person ventilation.

²⁷ RN D submitted that she was not asked to provide a statement or to comment on the draft RCA.

123. RN D said that she was familiar with the children's ward resuscitation trolley. However, she stated: "At no time since I have been employed at Grey Hospital WCDHB [since] 2008, have I participated in a team emergency CPR practice scenario."

Resuscitation

124. The night orderly, Ms P, arrived and assisted with ventilation. Ms P advised the Police: "I don't have any medical training, I did a first aid course many years ago but that's it." She stated that she put two hands on the bag and squeezed it when she was told to do so. She said she had previously attended 777 calls, but had never been "hands on" before; however, in this case there were not enough staff present when she arrived at the children's ward.
125. Ms P said that she was replaced by anaesthetic technician Mr L when he arrived, and then she wrote down the medications given to Master A, and the times they were given. She said she wrote on the closest piece of paper she could find — which was not a medical form or chart and, when one of the nurses told her she could go, she left the notes in the drug room. West Coast DHB has not provided those records to HDC.
126. Dr O arrived, listened to Master A's heart and lungs, and commenced chest compressions.
127. Dr O stated that he could not find any pulse or heart sounds. He requested suctioning, as blood-stained secretions were coming from Master A's mouth. RN D stated that Ms P handed her the cylinder, which came away from the wall. RN D said she reattached the tubing, which took several seconds, and then it was patent.
128. An ED nurse arrived. The ED nurse stated: "I saw copious amounts of blood stained fluid, which looked like pulmonary oedema, when I was assisting with the suctioning." RN D recalls that in addition to the pulmonary oedema fluid, "there was a lot of frank blood on Master A's cheek and pillow case". Mrs A stated that when she arrived she did not see frank blood on Master A or his pillowcase. She stated that when she arrived she saw "copious amounts of oedematous fluid all over his cheeks and all over the pillow underneath".
129. The ED nurse said that 1mg of adrenalin was given to Master A, and Dr O called for a defibrillator. RN F stated that she thought that the adjacent ward's²⁸ defibrillator had been moved as that ward had been emptied as part of the hospital refit, and the last patients were to leave the following morning. RN F said that the defibrillator was accessed from CCU. She further stated:

²⁸ This ward is for care of the elderly at Grey Base Hospital, and is situated beside the children's ward.

“The difference in time was minimal and hospital policy states a defibrillator is accessible within three minutes of any area. The CCU defibrillator is well within these limits, approximately one minute from call to arrival.”

130. In contrast, West Coast DHB stated that there was some delay in getting the defibrillator to Master A, meaning it arrived outside the required three-minute time frame.
131. West Coast DHB also advised that the guidelines for location of defibrillators indicate that there should be one within three minutes of a clinical area. The DHB stated that there is a defibrillator located in the ward immediately next to the children’s ward but, on the day of this event, that ward was relocating because of a concern about seismic activity, and an assumption was made that the defibrillator would have been moved; however, it was actually still in the ward.
132. Dr O stated that the defibrillator arrived at around 6.50am and, as the signal from the machine was to shock the patient, that was done. In contrast, RN F stated that the defibrillator was used to assess Master A’s cardiac rhythm, and said: “No initial shock was advised. CPR and drug treatment continued.” West Coast DHB stated:

“When the defibrillator arrived, it had leads for cardiac monitoring. This created some initial confusion and further delay. In a cardiac arrest setting cardiac monitoring leads are not required and defibrillator pads are sufficient.”

133. West Coast DHB also stated that the emergency trolley in the children’s ward is different from other wards, as a different range of equipment size is needed in the paediatric environment, and the staff from different areas who attended to assist in resuscitating Master A may have been unfamiliar with the trolley.
134. Dr B said that she responded to the 777 call at 6.36am. She asked for the anaesthetic technician to be called in and went to the children’s ward. On her arrival, Master A was receiving CPR, and other resuscitation measures had already been carried out. Dr B assisted with the resuscitation and advised: “[W]e got [Master A’s] output back after a long period of CPR.” Dr N then arrived and Dr B worked with him and Dr K to stabilise Master A and diagnosticate.

Transfer to Critical Care Unit

135. At 7.05am Master A was transferred to the Critical Care Unit, where he was placed on a ventilator. Dr B continued to care for Master A on his transfer to CCU.
136. West Coast DHB contacted the air retrieval team and plans were made for Master A to be transferred to Hospital 2.

137. At 10.30am, the air retrieval team arrived, including Hospital 2's ICU personnel, but Master A remained too unstable to transfer. At 6pm Master A was transferred by air, accompanied by his parents, and cared for in Hospital 2's ICU.
138. Sadly, Master A died a few days later at Hospital 2.

Autopsy medical report

139. An anatomical pathologist performed an autopsy. She concluded that the cause of death was global ischaemic brain injury. The antecedent causes were negative pressure pulmonary oedema and post-anaesthetic laryngospasm.
140. The pathologist stated:

“Negative pressure pulmonary oedema is a rare but well-recognised complication of laryngospasm, disproportionately affecting fit, healthy young men who have the muscular strength required to generate high negative intrathoracic pressures.

Essentially, laryngospasm causes closure of the airway due to contraction of the laryngeal muscles but inspiratory efforts continue, generating high negative intrathoracic pressures which draw fluid into the lungs from the surrounding tissues. Laryngospasm and pulmonary oedema require different treatments. In this case, while the laryngospasm was successfully treated and resolved, the pulmonary oedema did not appear to be recognised.

In pulmonary oedema, fluid fills the air spaces of the lungs making gas exchange difficult, and the lungs wet and heavy. Frothy fluid can sometimes be seen coming from the mouth. Fluid build-up in the lungs eventually causes back-pressure on the heart, meaning the heart has to work harder to contract adequately. Blood being circulated around the body is poorly oxygenated and the brain is one of the first organs to be affected by this lack of oxygen.”

West Coast DHB

141. West Coast DHB completed a Root Cause Analysis Report in March 2013. The Report contains 11 recommendations arising from the investigation into Master A's death.
142. West Coast DHB advised that the following actions have been taken:
- PACU documentation. The anaesthetic/PACU record was updated in March 2013 to ensure that theatre staff are compliant with PACU process and documentation. Theatre staff are now rostered to PACU as frequently as possible to maintain both clinical and documentation skills. In addition, arrangements were made for New Zealand Nurses Organisation documentation study courses to be attended by all staff

in 2013, and for staff to attend a specialised PACU course to ensure they are aware of how to manage challenging situations in PACU.

- PACU discharge guidelines. The PACU discharge document has been reviewed and is now in line with that used at DHB X. In addition, a new document has been created for all patients having an anaesthetic outside of normal working hours, to be completed by the anaesthetist. It specifically addresses:
 - i. Indications for the involvement of the duty nurse manager in a discharge destination decision.
 - ii. Indications for RMO review with guidelines for ongoing patient care.
 - iii. Indications for further specialist review of the patient.
 - iv. Patient discharge destination.
- An orientation document is being drafted specifically for anaesthesia aimed to assist new anaesthetists and anaesthesia locums. The importance of communication with senior nurses around discharge destination is emphasised along with communication with the RMO for patient review. This information has not been proactively provided to new anaesthetists in the past.
- Emergency trolleys are being reviewed to ensure that appropriate paediatric equipment and medication are located on all trolleys. In an emergency the trolley is manned by the registered nurse most familiar with that clinical area and the associated trolley.
- Pulse oximeter alarms have all been set to a higher default volume.
- Further appropriate resuscitation equipment has been purchased and a stocktake of resuscitation training means has occurred. Refresher training for all CPR trainers is in place. Resuscitation training includes clinical deterioration scenarios — this remains part of the role of the resuscitation service leader.
- The Department of Nursing and Midwifery holds a budget for education and professional development and supports nurses to obtain courses relevant to their clinical specialty areas.
- West Coast DHB is implementing a “speak up” initiative across the organisation which encourages nurses to apply critical thinking and develop the skills to question accordingly. The senior nurses group has lifted the focus around quality, critical thinking and utilising reviews such as the Mid Staffordshire Inquiry. The team is in the process of preparing sessions to be delivered across the organisation with a specific focus on critical thinking and improved patient outcomes.

Further anaesthetic expert opinions

143. In addition to the expert anaesthetic advice provided to HDC by Dr Joe Sherriff (see Appendix B), HDC has also received copies of the specialist report obtained by the Police from anaesthetist Dr S, and the advice commissioned by the Coroner from specialist anaesthetist Dr T. In addition, Dr B has provided HDC with an opinion she obtained from specialist anaesthetist Dr Q. Each advisor has commented on the events that occurred as summarised below.

Dr S

144. Dr S stated that Master A received a moderate dose of opiate medication for a 40-minute operation, but the dose was not excessive. Dr S said that there is no record of the use of an induction drug, which is likely to have been a recording error, and there is also no mention of Dr B having suctioned the airway prior to extubation.
145. Dr S stated that a relatively small fall in oxygen saturations from 98% to 90% reflects quite a large decrease in the oxygen partial pressure. He stated: “This should help explain why relatively small decreases in haemoglobin saturation which might seem trivial at face value are actually potentially significant.”
146. With regard to the decision to send Master A to the ward despite his requiring a relatively high level of oxygen, Dr S noted: “From the various statements it appears as though his oxygen requirements (administration via a Hudson mask) escalated from 6L/min to 8L/min to maintain an oxygen saturation of 95% during his stay in PACU ... the oxygen requirements were abnormally high for a healthy 15 year old who had been oxygenating normally when breathing air prior to the operation.”
147. Dr S noted that at the time of Master A’s discharge from PACU there was no established explanation for his high oxygen requirement. He stated that opinion would be divided among anaesthetists whether transfer to the ward was appropriate, but that he would have investigated the matter further with a chest X-ray before Master A left PACU.
148. With regard to the maintenance of saturations at 95% after RN D changed Master A to nasal prongs, Dr S noted: “[I]t is surprising to me that the change from high flow oxygen via a Hudson mask to lower flows via nasal prongs did not result in deterioration in oxygenation.” He stated that if pulmonary oedema following the initial laryngospasm was the sole precipitating event he would have expected a progressive increase in respiratory distress, hypoxia and obtundation,²⁹ whereas the available data suggests Master A remained “stable” over some 8 hours, and that this was followed by a “precipitous deterioration” some time after oxygen monitoring was discontinued at 5am. Dr S said that in his view “this sequence of events is strange and it leaves open the possibility that

²⁹ Obtundation means mental blunting with mild to moderate reduction in alertness and a diminished sensation of pain.

[Master A] was unlucky enough to suffer a second acute event (perhaps a second episode of laryngospasm) that caused this sudden deterioration”.

149. Dr S considered that the two main aspects that might have been managed differently were Master A’s discharge from PACU when there was “compelling evidence that he had a persistent oxygenation problem”, and the discontinuation of pulse oximetry on the ward in the face of a significant ongoing oxygen requirement. However, he stated that in his view “the practitioners involved could support their decisions with contextually logical arguments and it is likely that a proportion of other practitioners in a same position would make similar decisions”. For those reasons, Dr S said he did not consider that these decisions were a major departure from the standard of care expected from reasonable persons in their positions.

Dr T

150. With regard to the anaesthetic process, Dr T also noted that there is no documentation of the actual induction drug used, and opined that the combination of 150mcg of fentanyl and 10mg of morphine was unusual and a high dose of opioid analgesia for a person of Master A’s weight (54.4kg). However, by the time of Master A’s collapse the following morning this would not have been a contributing factor.
151. Dr T stated: “[Master A] was hypoxic in the recovery room. He needed high flow oxygen to maintain acceptable saturations. He was confused, wanting to remove his oxygen mask, and was rude to his family. This was incorrectly interpreted as part of [Master A’s] dysphasia, or usual behaviour pattern.”
152. Dr T said that the coughing fit would fit with a degree of pulmonary oedema being present. Master A was nursed in a Fowler’s position (semi-sitting). Dr T stated: “Hypoxia that persists as it did in this case, in an otherwise healthy boy, in this position, should raise concern and prompt further investigation. Persistent hypoxia of this degree cannot be ascribed to laryngospasm alone.”
153. Dr T considers that Master A should have had a chest X-ray performed while he was in PACU, and the fact that he required such high flow oxygen at an early stage should have raised a red flag for him to be monitored closely. Dr T noted that there was no specific instruction for nursing staff to be aware of pulmonary oedema, and considers that there was inadequate understanding of the potential for deterioration on the part of the ward staff.
154. Dr T stated that Dr B’s failure to communicate the possibility of pulmonary oedema to the staff taking over Master A’s care was “a crucial lapse”. The postoperative orders were generalised, whereas “[i]deally [Master A] should have been scheduled for a review on the ward, to be on the lookout for deterioration”. The review could have been by Dr B, or she could have communicated with the RMO on duty.

155. Dr T stated that Master A's breathing pattern in the early postoperative period, and his oxygen saturation of 95% through the night while sitting half upright should have been cause for concern. Dr T stated that he is unable to explain why Master A suffered the late deterioration. He said: "If I accept [the] observations as they are documented as being accurate, then no preceding trend or warnings were present, and this event remains unexplained. However, I would suggest that pulmonary oedema was in fact present from the time of the laryngospasm event, and was missed through not being considered, or the severity was not appreciated."
156. Dr T stated that negative pressure pulmonary oedema usually improves fairly quickly with intervention such as supplemental oxygen and monitoring, non-invasive ventilation with a CPAP³⁰ mask or, in severe cases, intubation and ventilation. However, "[k]ey to this would be early suspicion of pulmonary oedema developing, diagnosis and institution of supportive measures".

Dr Q

157. Dr Q stated that pulmonary oedema can occur in fit young people at the time of severe laryngospasm, but resolves once the laryngospasm is corrected. Dr Q noted that post-laryngospasm pulmonary oedema will occur if there is concomitant aspiration of stomach contents, and the severity and speed of onset is a direct response to the degree of aspiration. Dr Q considered that Dr B performed a thorough examination in PACU, and her finding would lead most anaesthetists to believe that aspiration was minimal.
158. Dr Q stated: "The only concern was the moderately reduced SaO₂ in the presence of oxygen therapy, which would make one suspicious that some degree of aspiration was possible. A baseline reading on room air would have given a more complete overview." Dr Q considered that there was no clinical reason to keep Master A in PACU longer, as he was awake with clear lungs, and that the maintenance of oxygen saturations above 94% on the ward suggests an incident of aspiration and/or obstruction in the ward leading to fulminating pulmonary oedema.
159. In Dr Q's view, Dr B used all due caution, and acted "well within recommended guidelines" in that the episode of laryngospasm was managed competently, Master A was fully assessed in PACU to determine the required level of care, and written instructions were left.

Responses to first provisional opinion

160. West Coast DHB, Mrs A, Dr B, RN F, RN G, RN C and RN D provided responses to the first provisional opinion. These have been incorporated into the "information gathered" section of the report where appropriate. In addition, the following submissions were received.

³⁰ Continuous positive airway pressure.

West Coast DHB

161. West Coast DHB submitted:

- It is deeply saddened by Master A’s untimely death. It stated: “We acknowledge the significant loss and grief that [the family] have, and continue to, experience.”
- It accepts the finding that it breached Rights 4(1) and 4(2) of the Code.
- It has prepared a new Grey Base Hospital Senior Medical Officer/Locum Orientation Handbook.
- A DHB-wide audit is being conducted by the Resuscitation Service Leader, and training has been delivered.
- In April 2014 it ordered five new emergency trolleys. Following the arrival of the new trolleys, the emergency trolleys will be standardised and will include appropriate stocks of paediatric equipment and drugs.
- The PACU documentation has been reviewed and updated.
- It has prepared a flowchart for the after-hours discharge of patients from PACU, and an after-hours PACU discharge form. The new documentation has been audited every second month, and there has been a significant improvement in the quality of documentation.
- All staff within PACU are undergoing PACU training.
- Resuscitation training is being provided.

RN C

162. RN C submitted:

- She had not seen the PACU record sheet before the day of Master A’s operation, and had not received any education on the sheet. Had she completed the documentation in PACU it “would have included the printed record³¹ of 5-minute observations recorded by the monitor which had been recording throughout Master A’s stay in PACU, the discussions with Dr B and the PACU assessment discharge score”.
- At the time of discharge from PACU, Master A’s oxygen saturations were stable.
- At the time of Master A’s discharge there was only a boarding mother with a baby patient on the children’s ward.
- The decision to discharge to the children’s ward was made by herself, in consultation with Dr B and RN G.

³¹ RN C earlier referred to her having had the screen up and the discharge form ready to fill in, rather than the availability of a printed record.

- She and Dr B provided a comprehensive handover to RN G.

RN G

163. RN G acknowledged the inconsistency in her recording of the oxygen saturations and advised that she cannot explain why this occurred.
164. RN G advised that since this incident she has actively sought education about laryngospasm, including: nursing care of the condition, potential complications, relevant observations and lines of treatment. She has reflected on her involvement in Master A's care and is now vigilant with her documentation, and has identified how she uses critical thinking and the principles of "Speak Up" (which supports nurses to raise clinical concerns and questions with confidence).

RN F

165. RN F submitted that she is now more vigilant in obtaining an accurate overview of patients, and has increased her questioning of clinicians to gain a clear clinical picture to supplement her own clinical assessment of patients.

Dr B

166. Dr B submitted:
- Regarding Master A's oxygen saturations at the time of discharge from the PACU, "[b]ecause the documentation was not accurate, there was no '*pattern of [Master A's] oxygen saturations*'".
 - While she required monitoring to occur, that was not because of any concerns about Master A's ongoing presentation, which was unremarkable. Close monitoring was not directed because there was no requirement for it. Her expectations in relation to nursing care would not normally be documented.
 - As Master A's oxygen saturations did not drop when RN D changed him from the Hudson mask to the nasal prongs, there was no pulmonary oedema present at that time or before the monitoring device was removed.
 - She considers that all staff did think critically, "save perhaps [RN D]", and considers that there is no evidence of poor communication between staff.

RN D

167. RN D submitted an opinion from a registered nurse, RN R. RN R considers that there was a culture of complacency amongst the staff involved, which led them all to believe that their actions were correct and that nothing was going to go wrong.
168. With regard to Master A's discharge from PACU, RN R stated: "In my opinion it is concerning that four experienced health professionals would make a decision to transfer a 15 year old who had a general anaesthetic, then a severe breathing episode, within such a

short time frame. I would expect him to remain in recovery until he was breathing spontaneously, not requiring oxygen to maintain saturations above 94%, and awake and alert.” RN R said that Master A’s saturations and oxygen requirement were abnormal, indicating that something was wrong. RN R further opined that Master A’s coughing incident in PACU, “added to the previous lack of breathing event should have triggered the staff to be more concerned and vigilant regarding [Master A’s] recovery from anaesthetic”. RN R stated that although 10 litres of oxygen was within the oxygen prescription, it is unusually high and should have triggered RN G to consider what was causing Master A to require so much supplementary oxygen, and to consult with colleagues regarding his lack of improvement.

169. RN R noted that none of the staff involved were risk averse, and none expected that Master A might deteriorate. She stated: “It appears that none of them attempted to understand what might have happened with [Master A], nor asked critical questions which may have led to a more formal review of his condition and his treatment.”
170. With regard to RN D having removed the pulse oximeter, RN R stated that her view was that RN D’s actions were justifiable in the circumstances.³²
171. RN D submitted that there were failures by other staff to ensure there was accurate and full documentation from which subsequent nursing care could be provided.
172. RN D submitted that she should not be blamed for being the last nurse in a line of nurses who failed in their duty, as this was a collective and systemic failing.
173. RN D accepted that she had a legal, professional and ethical duty to disclose all relevant information. She stated that she was traumatised by finding Master A moribund, and had never previously been involved in a resuscitation. She stated that at the time of the RCA when she was asked whether the monitor had gone off, she responded “no” and never intended to imply that she could not hear the alarm or that the alarm was faulty. However, she accepted that she should have explained further.

Responses to second provisional opinion

174. Mr and Mrs A’s further submissions have been included in the “information gathered” section where appropriate.
175. West Coast DHB further responded that it had no further comments to make.

³² In her response to the second provisional opinion (see below), RN D provided a further opinion from RN R, in which RN R described the circumstances as including the following: RN D completed a set of observations on Master A at 5am, at which time Master A was settled, snoring with his mouth closed, and had a respiration rate of 20 respirations per minute; Master A had maintained saturations stable at 95% for the previous seven and a half hours (including the previous three hours on three litres of oxygen via nasal prongs); and RN D would be unable to respond to the alarm.

176. RN C advised that she did not wish to make any further response and provided a formal written apology to the family.
177. Dr B's further submissions have been included in the "information gathered" section where appropriate. She also submitted as follows:
- There were "no concerns raised by the hospital with [Master A's] status overnight and it was a complete shock for all parties and those left to diagnosticate, particularly as it was not known at the time that [RN D] had not informed anyone that [Master A] was unmonitored from at least 5am".
 - She did not fail to communicate because she communicated that Master A had a clear chest and "there was no indication for further review save if his saturations dropped below 94%". Master A was also to be monitored, and that monitoring was removed contrary to Dr B's instructions.
 - At the time Master A was discharged from PACU "there was nothing to report [to the DNM or RMO] apart from an unusual wake-up and [Master A] needing oxygen".
 - "[Master A's] PACU stay was complicated by apnoea and laryngospasm which was correctly managed and there were no ongoing concerns during his protracted stay there. There was no indication for a chest x-ray or transfer to CCU let alone reintubation." Dr B said she acted with "all due care and ensured that [Master A] was monitored overnight in case of any potential deterioration; this was carefully and comprehensively discussed with nursing staff". Dr B also stated that she was available to be contacted for any concerns but was not contacted.
 - The RMO or "medical" would have been contacted if Master A's saturations had dropped below 94% "as it is standard procedure to gain a medical review if there is any concerns about a patient and particularly if saturations drop below 94%".
 - With regard to the table of estimated times, it is "completely incongruent that trenchant findings can be drawn from an estimate", especially as the estimated information is contradicted by the statements of staff. The conclusion that the oxygen saturation of 90% was recorded at about 9.30pm is "baseless, and is inconsistent with the recollection of any of the staff present at the time".
 - Master A did not cough up blood during the coughing incident. He coughed up blood-stained sputum, which is not uncommon after intubation. If pulmonary oedema had been present at that time she "would have heard crepitations or wheeze on [auscultation]". She did not mention the coughing fit to RN G because RN G was present at the time it occurred.
 - She examined Master A comprehensively at least twice before Mrs A was present and also after the coughing incident.

- “[Dr T’s] opinion that ‘the coughing incident would fit with the degree of pulmonary oedema being present at that time’ does not consider the full review that [Dr B] gave [Master A] on three occasions.”
- The postoperative instructions were sufficient in that she directed the nursing staff that Master A was to have oxygen and monitoring.
- Master A was chatty and alert at the time of his transfer and there was no concern raised by any staff when he left the ward.
- Her view is that “close monitoring is analogous to cardiac care or ICU care”. Master A did require monitoring as a precaution but there was no indication for intensive care and her instructions were clear. Postoperative instructions are “often generalised and appropriate”. If Master A’s saturations had dropped below 94% that would have been detected on the monitor if it was working.
- “It is clear that [Master A] was fine for many hours in the monitored state that he was in, and that there was no concern from any of the staff” and that Master A “did not desaturate at 2am when he was changed to minimal oxygen with the removal of the Hudson mask to nasal prongs which, as she has said on numerous occasions, is an unarguable indication that he was not in florid pulmonary oedema at that stage”.
- “When [Master A] was snoring (which implies obstruction of his airways) on the ward at around 5am had he been checked by nursing staff, and/or the monitor been still in place, it is likely that [Dr B] would have been called, she would have been able to see his deterioration clearly occurring and possibly prevent this tragic outcome.”
- Dr B submitted that she made very considerable efforts during Master A’s resuscitation, which resulted in his pulse being re-established and his being stabilised so that he could be transferred to Hospital 2.

RN D

178. RN D’s submissions have been included in the “information gathered” section where appropriate. She submitted a further opinion from RN R, who reiterated the reasons she considers the nurses were lulled into a false sense of security as follows:

- Dr B and two nurses had agreed that Master A was well enough to be transferred to the children’s ward despite his severe desaturation in PACU, his subsequent difficulty in maintaining saturations above 94%, his coughing up blood-stained sputum, and PACU staff knowing that the children’s ward had only one nurse. That decision was in clear breach of the DHB policy “Post Anaesthetic Care Nurse PACU” which states that a patient leaving PACU must be able to “maintain appropriate oxygen saturation” and be “unlikely to develop immediate post-operative complications”.

- The lack of documentation/instruction by Dr B regarding the need for Master A to be closely monitored overnight and no communication of the possibility of pulmonary oedema.
 - Master A’s observations had been stable for 7.5 hours and he had maintained oxygen saturations at 95%, including since changing from mask to nasal prongs. RN F had reviewed Master A with RN D and raised no concerns about his condition or care.
179. RN R noted that continuous oximetry monitoring was not requested by Dr B nor was it “customary policy” for children on oxygen. However, she noted that the DHB’s policy required that a child’s SpO₂, respiratory rate, colour and effort be monitored and recorded hourly, and that RN D had documented the oxygen saturation and respiratory effort every 90 minutes.
180. RN R stated that the system failed Master A and his family, in particular having only one nurse in the children’s ward. Her opinion is that RN D’s failings “do not constitute a **serious** departure from expected standards of care **by her**” (emphasis in original). RN R stated that she agrees with HDC’s expert nursing advisor, Ms Dawn Carey, that “nursing care in relation to assessment, monitoring, communication and clinical documentation provided to [Master A] was generally suboptimal and departed from expected standards”.

Other relevant standards

181. The Medical Council of New Zealand publication *Good Medical Practice* (2011) sets the following standards:

“Good Clinical Care — A definition

2. Good clinical care includes:

- adequately assessing the patient’s condition, taking account of the patient’s history and his or her views and examining the patient as appropriate
- providing or arranging investigations or treatment when needed
- taking suitable and prompt action when needed
- referring the patient to another practitioner when this is in the patient’s best interests.

...

Keeping records

4. You must keep clear and accurate patient records that report:

- relevant clinical findings
- decisions made
- information given to patients
- any drugs or other treatment prescribed.

Make these records at the same time as the event you are recording or as soon as possible afterwards.”

182. The Medical Council of New Zealand publication *Good Prescribing Practice* (April 2010) provides:

“Medicines or treatment must not be prescribed for your own convenience or simply because patients demand them. To ensure that your prescribing is appropriate and responsible you should:

...

- be familiar with the indications, side effects, contraindications, major drug interactions, appropriate dosages, effectiveness and cost effectiveness of the medicines that you prescribe

...

- never prescribe indiscriminately, excessively or recklessly.”

183. The Nursing Council of New Zealand *Code of Conduct for Nurses* (June 2012) provides:

“Principal 4.

Maintain health consumer trust by providing safe and competent care.

Standards

4.1 Use appropriate care and skill when assessing the health needs of health consumers, planning, implementing and evaluating their care.

...

4.7 Deliver care based on best available evidence and best practice.

4.8 Keep clear and accurate records.”

184. The Nursing Council of New Zealand *Competencies for Registered Nurses* (December 2007) provides:

“Domain 2:

Management of nursing care

Competency 2.1

Provides nursing care to achieve identified outcomes.

Indicator: undertakes practice procedures and skills in a competent and safe way.

Competency 2.2

Undertakes a comprehensive and accurate nursing assessment of clients in a variety of settings.

Indicator: undertakes assessment in an organised and systemic way.

Competency 2.3

Ensures documentation is accurate and maintains confidentiality of information.

Indicator: maintains clear, concise, timely, accurate and current client records within a legal and ethical framework.

7.4 Act immediately if a health consumer has suffered harm for any reason. Minimise further harm and follow organisational policies related to incident management and documentation. A full and prompt explanation should be made by the appropriate person to the health consumer concerned and, where appropriate, their family about what has occurred and the likely outcome.”

185. The New Zealand Nurses Organisation *Code of Ethics* states:

“Promoting open, honest and truthful communication among colleagues and with employers, to foster a supportive, trustful environment. Organisational culture may influence the nurse’s ability to achieve veracity.

...

Practising from the perspective that public accountability, transparency and openness are essential elements of a democratic society to promote the well-being of the community.”

Opinion — Introduction

186. It is not my role to make findings of causation. Accordingly, the breach findings against Dr B, RN D, RN C and West Coast DHB should not be interpreted as having any implication as to the cause of Master A’s death.
187. Master A was a healthy, fit, 15-year-old boy. His family has been traumatised by his untimely death. His mother told my Office that she left Master A in the children’s ward and went home overnight because she trusted the staff at Grey Base Hospital to care for her child appropriately. In my view, it was reasonable for her to have this expectation.

188. I have considered the actions of individual clinicians and the systems in place at West Coast DHB. A hospital should have a culture that supports safe care, promptly identifies risks to patient safety, and responds appropriately to such risks. West Coast DHB had policies and guidelines in place, albeit incomplete. However, in my view, multiple staff failed to think critically about Master A's presentation. Additionally, there is a paucity of adequate records, and evidence of poor communication between staff.
189. The PACU chart records that when Master A arrived in PACU his saturations dropped to 48%, and that he was bagged by Dr B, given 50mg of suxamethonium at 8.43pm, and that by 8.50pm his oxygen saturations had increased to 98% with bagging.
190. Five-minute observations then appear to be recorded on the PACU chart as required by the PACU policy. There are no times recorded for these five-minute observations. However, by taking five-minute intervals from when Master A's saturations were noted to be 98% at 8.50pm when, according to Dr B, Master A started to ventilate spontaneously, it is possible to estimate an approximate time for each recording as follows:

	O ₂ saturations	Pulse (approx.)	BP (approx.)
8.55pm	99%	80	110/55
9.00pm	89%	80	108/55
9.05pm	No reading	90	128/50
9.10pm	93%	92	132/58
9.15pm	No reading	94	128/55
9.20pm	92%	94	135/60
9.25pm	No reading	100	125/55
9.30pm	90%	90	110/60
9.35pm approx. time of coughing incident	No reading		
9.40pm approx. time of transfer to ward	96% on 8L O ₂		

-
191. RN C was asked to confirm the accuracy of these timings. She responded that Master A entered PACU at approximately 8.34pm, and she put the blood pressure cuff on him at approximately 8.45pm, started the recording cycles, and then once everything had settled, she “looked on trends” and entered blood pressure, pulse and saturations. She made no further comment about the timings.
192. In response to the provisional opinion, Dr B submitted that it is “completely incongruent that trenchant findings can be drawn from an estimate”, especially as the estimated information is contradicted by the statements of staff. Dr B said the conclusion that the oxygen saturation of 90% was recorded at about 9.30pm is “baseless, and is inconsistent with the recollection of any of the staff present at the time”.
193. As previously noted, these are approximate times and it is accepted that the recordings on the PACU chart may relate to recordings commenced at 8.45pm (10 minutes earlier), in which case the recording of saturations of 90% would have been made at 9.20pm, approximately 10 minutes before the children’s ward was advised that Master A was ready to transfer, and no observations were recorded between 9.20pm and discharge.
194. In any event, I am of the view that it is more likely than not that at around 9.20pm to 9.30pm Master A’s oxygen saturations were recorded at 90%. The children’s ward was contacted at around 9.30pm and told that Master A was fit to return to the ward. Shortly thereafter, Master A experienced a coughing fit, during which he coughed up blood-stained sputum and/or “pink froth”.³³ I am unable to determine which of these is the more accurate description. However, Master A’s oxygen was increased from 6 litres to 8 litres following the coughing fit and, at the time of discharge from PACU at around 9.40pm, his saturations were 96%. Master A was received on the children’s ward at around 9.45pm.
-

Opinion: Dr B

Anaesthetic process — no breach

195. Dr B was working at Grey Base Hospital as a locum anaesthetist at the time of these events. She met with Master A and his mother immediately prior to Master A’s surgery, for the pre-anaesthetic assessment. Dr B planned a rapid sequence induction of anaesthesia with oral sodium citrate pre-medication to reduce the gastric acidity because of the possibility that Master A did not have an empty stomach. My expert advisor,

³³ RN C stated that blood-stained saliva and mucous was coughed up into the mask. Mrs A described it as pink or blood-stained froth, pink frothy sputum/phlegm, and frothy blood. Dr B described it as “blood stained sputum” which she attributed to Master A having been intubated.

consultant anaesthetist Dr Joe Sherriff, advised that this technique minimises the risk of inhalation of acid gastric contents, and is standard practice for urgent abdominal surgery.

196. Dr Sherriff advised that the anaesthetic process followed normal anaesthetic practice. I accept that, overall, the consent and anaesthesia processes were consistent with accepted practice. However, I note that Dr S and Dr T both noted that Dr B did not document the actual induction drug used. Dr S considered that although Master A received a moderate dose of opiate medication, the dose was not excessive. Dr T stated that, in his opinion, the combination of 150mcg of fentanyl and 10mg of morphine was an unusually high dose of opioid analgesia for a person of Master A's weight (54.4kg).

Postoperative care in PACU

Management of cessation of ventilation — no breach

197. There is no record of Dr B having suctioned Master A's airway prior to his extubation in theatre. Dr B stated that, at that stage, Master A was ventilating spontaneously at 12 breaths per minute. He was moved from the theatre to PACU with no monitoring in place. At around 8.40pm, Master A had an incident involving cessation of ventilation.
198. Dr B said that when she and RN C arrived at the doors of PACU, she noticed that Master A had stopped breathing. RN C stated that when they arrived at the recovery bay, the saturations monitor was put on Master A, by which stage the saturations had dropped from being in the 90s to 68%. That level is not recorded, but the PACU chart appears to record that when Master A arrived in PACU his saturations had dropped to 48%.
199. Dr B stated that she did not notice any stridor, or attempts to take a breath against a closed glottis. She said that there was "silence and [she] treated the episode as laryngospasm". Dr B treated Master A with a jaw thrust and chin lift, and applied positive end expiratory pressure to break the laryngospasm.
200. Dr Sherriff noted that a laryngospasm usually presents with stridor prior to complete airway obstruction, and is initially accompanied by vigorous respiratory effort, which is the underlying cause of negative pressure pulmonary oedema. Dr Sherriff noted that in this case there is no evidence of Master A having attempted to breathe against an obstructed airway, and that the cessation of ventilation could have had other causes, for example sedation from residual effects of sevoflurane or fentanyl, incomplete reversal of the muscle paralyzing drug atracurium, or aspiration of gastric contents. Nevertheless, irrespective of the cause, Dr Sherriff advised that Dr B's immediate management of Master A's cessation of breathing was consistent with accepted standards.
201. Dr B stated that she examined Master A's chest, and it was clear with no wheeze or added sounds. She also stated that she suctioned out Master A's secretions twice and saw some clear fluid, which looked like saliva, but saw no aspiration or evidence of pulmonary oedema. Dr B made no record of any chest examinations she undertook, or

what she observed during such examinations. The record is limited to a note “awoke well”. Dr B said that the record “awoke well” implies that there were no further concerns. I am concerned about Dr B’s documentation, as is discussed further below.

202. Dr Sherriff advised that, in a thin patient, pulmonary oedema is not usually a subtle sign on chest auscultation and that, even if Dr B had listened only to the lung bases, she would have heard the distinctive crepitations of pulmonary oedema, if it had been present at that time. I note the pathologist’s comment that negative pressure pulmonary oedema is a rare but well-recognised complication of laryngospasm, and that laryngospasm and pulmonary oedema require different treatments. The pathologist considered that while the laryngospasm was successfully treated and resolved, the pulmonary oedema does not appear to have been recognised. As noted by Dr Q, post-laryngospasm pulmonary oedema can manifest immediately, or some hours later. Dr B submitted that she did consider pulmonary oedema as one of the possible sequelae of laryngospasm, and that the monitoring she required was sufficient. Dr B also stated that if pulmonary oedema had been present she would have heard crepitations or wheeze when she reviewed Master A.
203. I accept Dr Sherriff’s advice that Dr B’s immediate response to Master A’s cessation of breathing was appropriate.

Discharge from PACU and postoperative instructions — breach

Coughing incident

204. Shortly after 9.30pm, Master A had an incident where he coughed up blood-stained sputum and/or “pink froth” into the mask. Mrs A was concerned about this and said she raised her concerns with Dr B, who replied that it was probably just trauma from the intubation during surgery.
205. I note Dr T’s opinion that the coughing incident would fit with a degree of pulmonary oedema being present at that time. However, Dr B advised HDC that, as Master A’s chest was clear, she attributed the event to his having been intubated. RN C recalls that Dr B checked Master A’s airway, and Mrs A recalls that Dr B briefly listened to Master A’s chest (lower lobes). Dr B did not record that she had listened to Master A’s chest. She told HDC that the coughing incident and chest examination following it were very minor events, which “underlines the lack of rational basis for there to be any documentation of it”.
206. It is unclear whether Master A’s oxygen saturations dropped significantly during the coughing incident. RN C stated that it was not an extended, lengthy fit with saturations dropping but from the information available I consider it is more likely than not that the oxygen was increased from 6 litres to 8 litres following the coughing incident. Dr Sherriff advised:

“A single episode of coughing of blood stained sputum would not be unusual after the airway interventions that [Master A] had undergone. If it persisted, along with an increased respiratory rate, respiratory distress and falling oxygen saturation it would be of great concern.”

207. Dr Sherriff noted that, other than a moderately increased respiratory rate of 20 on the ward at 10.30pm (at which point Dr B was no longer present) none of these signs were observed. Dr Sherriff further advised:

“[I]f [Dr B] was aware of the recorded oxygen saturation of 90% on an increased inspired oxygen and the coughing of pink sputum prior to discharge to the ward, she should have insisted on more intensive observation.”

208. As noted above, I am unable to determine what Master A coughed up into the oxygen mask. However, I am of the view that the oxygen saturation of 90% was recorded at around 9.20 to 9.30pm, at which time, according to RN C, Master A was receiving 6 litres of oxygen, and I find that Dr B should have been aware of that recording. In addition, Dr B was present during the coughing incident. In my view, Master A’s overall presentation was concerning, and the significance of the coughing fit should have been carefully considered in light of Master A’s laryngospasm and oxygen requirements, and adequate records should have been maintained. However, Master A was discharged from PACU approximately five minutes after the coughing incident.

Investigation of oxygen requirements and discharge instructions

209. There is conflicting evidence as to Master A’s oxygen saturation at the point of discharge. Dr B stated that when Master A was discharged from PACU his oxygen saturation was 98%. However, I accept RN G’s account that Dr B told her at handover that Master A was stable on 8 litres of oxygen via a Hudson mask, and his oxygen saturation was 96%. That is supported by Mrs A’s recollection of the handover, and by the clinical notes. Shortly after handover, RN G recorded that Master A’s oxygen saturation was 94% on 8 litres of oxygen.
210. Dr B stated that “[b]ecause the documentation was not accurate, there was no ‘*pattern of [Master A’s] oxygen saturations*’”. I accept that records of the monitoring in PACU are incomplete. However, in my view, the pattern of Master A’s oxygen saturations from such records as do exist, which should have been apparent to Dr B, was concerning.
211. In my view, it was suboptimal for Dr B to have failed to document detailed instructions for more intensive observation post discharge from PACU in light of the above factors.
212. I am also concerned about Dr B’s prescription of oxygen insofar as it relates to the postoperative instructions she provided. Master A was prescribed oxygen therapy at 2–10 litres to maintain oxygen saturation greater than or equal to 94%. Dr Sherriff advised that

Dr B's instruction to continue oxygen on the ward to maintain an oxygen saturation of 94% or greater was appropriate. However, the West Coast DHB "PACU Standard Care Policy" provides that "4L/min is prescribed (not 6L/min as in wards) to encourage breathing stimulated by CO₂ drive. The patient's oxygen mask is removed when the patient is alert." The DHB noted that an oxygen requirement greater than 6 litres would usually trigger an RMO review. With regard to Dr B's prescription of oxygen, the DHB stated: "We agree that this legitimises the administration of up to 10 litres of oxygen with a SpO₂ of 94% without requiring a medical review."

213. Dr B stated that she cannot recall why she charted up to 10 litres of oxygen, as that is not her usual practice. She said that she would normally have charted 2–6 litres of oxygen by nasal prongs or Hudson face mask in order to keep the oxygen saturations over 94%. Dr B said:
- "[Master A] kept wanting to take his mask off as it was annoying him and one of the nurses prompted me to write up a higher flow for the ward. I likely charted 10 litres so for the periods of time [Master A] had the mask on he would be getting an adequate amount of oxygen."
214. RN C said she told Dr B that if she wanted Master A to have oxygen in the ward she would need to chart it, otherwise it would not be given. However, she stated that she did not tell Dr B what rate of oxygen should be charted for Master A.
215. Dr B later stated that she accepts that she was responsible for the level of oxygen she prescribed, and did not make the prescribing decision because the nursing staff prompted her to do so. In response to my provisional opinion, Dr B said that she prescribed up to 10 litres because Master A kept pulling the mask off. Dr B also stated that this was simply a greater flow of oxygen, and that "the inspired level [with 10 litres] is exactly the same as if 6 litres was charted".
216. In my view, the evidence suggests that Master A's condition was not stable, and that further investigation into the reasons for Master A needing such a high level of oxygen was required before he was discharged from PACU to the ward. I note Dr S's opinion that Master A's oxygen requirements were abnormally high for a healthy 15-year-old who had been oxygenating normally when breathing air prior to the operation and that, at the time of Master A's discharge from PACU, there was no established explanation for his high oxygen requirement. Dr S stated that opinion would be divided among anaesthetists whether transfer to the ward was appropriate, but that he would have investigated the matter further with a chest X-ray before Master A left PACU. Dr T also considered that a chest X-ray should have been performed.
217. Dr Q opined that Master A's moderately reduced saturations in the presence of oxygen therapy would make one suspicious that some degree of aspiration was possible, and

suggested that a baseline reading on room air would have given a more complete overview.

218. In response to my provisional opinion, Dr B submitted that there was no indication of a need for a chest X-ray because there was “no sign of wheeze or any concern on examination”. Furthermore, Dr B submitted that she gave a comprehensive handover to RN G, but would not be expected to document the nursing care required on the children’s ward. Dr B also stated that close monitoring was not required in light of Master A’s presentation. The handover given to RN G consisted of Dr B explaining that Master A had had a laryngospasm, been administered suxamethonium, and had needed to be bagged. RN G said Dr B explained that this was not an uncommon occurrence, and that Master A was now stable on 8 litres of oxygen via a Hudson mask, and his oxygen saturation was 96%. RN G said Dr B told her that Master A’s oxygen saturations tended to drop when he was sleepy, so she had charted oxygen on the ward.
219. The only instructions Dr B noted in the clinical records are: “For oxygen via HFM/NP to keep sats \geq 94%.”
220. Dr T is of the view that the fact that Master A had required such a high flow of oxygen at an early stage should have raised a red flag for him to be monitored closely. Dr B told HDC that she was satisfied that Master A would be closely monitored on the children’s ward. However, she did not document in the postoperative instructions a requirement for close monitoring, and she later submitted that there was no requirement for close monitoring, because it was not warranted in light of Master A’s presentation. In response to the provisional opinion, Dr B said that, in her view, close monitoring is analogous to cardiac care or ICU care. She stated that Master A did require monitoring, but there was no indication for him to receive intensive care.
221. Dr T’s view was that Dr B’s failure to communicate the possibility of pulmonary oedema to the staff taking over Master A’s care was “a crucial lapse”, and that the postoperative orders were generalised, whereas “[i]deally [Master A] should have been scheduled for a review on the ward, to be on the lookout for deterioration”. Dr T said that the review could have been performed by Dr B herself, or she could have communicated with the RMO on duty. Dr B said that she considered pulmonary oedema as one of the possible sequelae of laryngospasm, and that the monitoring she required was sufficient. However, she gave no instruction for nursing staff to be aware of, and alert to, the possibility of pulmonary oedema. In response to the provisional opinion, Dr B said that postoperative instructions are often “generalised and appropriate”.
222. Dr B did not consult with senior nursing staff, such as the DNM, about the proposed discharge arrangements, and did not hand over Master A’s care to the RMO, despite the concerning issues discussed above. In response to the provisional opinion, Dr B further

submitted that there was nothing to report apart from an unusual wake-up³⁴ and Master A needing oxygen, and that consultation with senior nursing staff was also not necessary in light of Master A's presentation. I disagree, for the reasons set out above.

223. Dr B was a locum; I consider that, in these circumstances, she should have been more precautionary in ensuring that the instructions she gave for the nursing staff with regard to monitoring or observing Master A were adequately detailed. In particular, I consider that Dr B should have requested more intensive observation.

Conclusion

224. Overall, in my view, Dr B did not provide appropriate postoperative care to Master A. Dr B should have carefully considered Master A's coughing fit in PACU in light of Master A's laryngospasm and oxygen requirements. Furthermore, Dr B should have further investigated the reason for Master A's high oxygen requirement prior to discharging him from PACU to the children's ward, and should have scheduled a review on the ward or ordered more intensive monitoring. Dr B did not consult with senior nursing staff or the RMO on duty and, in my view, Dr B should have considered and discussed whether a discharge to the Critical Care Unit was more appropriate than a discharge to the children's ward.
225. In my view, Dr B failed to provide postoperative anaesthetic services to Master A with reasonable care and skill and, accordingly, breached Right 4(1) of the Code.

Record-keeping — breach

226. This Office has frequently emphasised the importance of record-keeping. It is through the medical record that healthcare providers have the power to produce definite proof of a particular matter. Furthermore, the failure to maintain adequate records is poor practice, affects continuity of care, and puts patients at real risk of harm.³⁵ In my view, Dr B's record-keeping was inadequate in a number of areas.
227. Dr B failed to record the induction drug she used, or any examinations she undertook, and wrote only a brief note, "awoke well", following the treatment provided when Master A stopped breathing. She stated that this implied that there were no further concerns. Furthermore, following the coughing incident Dr B failed to record the event, her interpretation of it, or any assessment she conducted. She stated that this was because it was a very minor event.
228. Dr B has acknowledged that her documentation was sub-optimal, but submitted that the documentation is in accordance with the usual practice of anaesthetists. She stated that "no finding can be made about the substantive care simply on the basis of there being a

³⁴ Dr B's contemporaneous records record that Master A "awoke well".

³⁵ See Opinion 08HDC10236, 28 November 2008 at page 11.

partial failure in documentation”. I disagree. In my view, the failure to maintain adequate records is poor practice and affects the continuity of care. Accordingly, Dr B breached Right 4(2) of the Code for failing to keep clear and accurate patient records, in accordance with her professional obligations.

Oxygen prescription — other comment

229. My expert nursing advisor, RN Dawn Carey, is not a peer of Dr B. However, I note Ms Carey’s comment that prescribing outside normal parameters circumvents safety protocols and lulls inexperienced practitioners into ignoring pertinent clinical cues. As further stated by Ms Carey:

“Prescribing such range without accompanying instructions as to when to seek anaesthetic review legitimised the administration of 10 litres of oxygen and [Master A] only having an SpO₂ value of 94%. Whilst I note that [Dr B] explains that this is not her usual approach to charting, I still find it concerning. In this case the normal process of high oxygen requirements triggering a patient review did not occur, which is the risk of prescribing outside normal safety parameters.”

230. In my view, Dr B’s oxygen prescription contributed to the lack of critical thinking displayed by the nurses.

Fluids — adverse comment

231. Dr B ticked the box on the anaesthesia and PACU record that the IV fluid therapy was to continue at 200ml per hour and be discontinued before Master A was discharged from PACU. Despite this, she discharged Master A with the fluids still running, and the fluids subsequently continued until 2.00am. I consider that Dr B provided mixed messages to the nursing staff regarding the continuation of the fluids, which was not helpful to them.

Opinion: RN C

232. RN C advised HDC that she works as a theatre nurse, although previously she has attended a PACU course. I am concerned about RN C’s clinical decision-making in this case, and her record-keeping.

Decision to transfer to the children’s ward — breach

233. I am not satisfied that RN C assessed Master A adequately while he was in PACU. RN C stated that she assessed Master A’s vital signs every five minutes. However, she made incomplete records of the assessments (discussed below).

234. RN C agreed with the decision to transfer Master A to the children’s ward. She stated that, although not documented, Master A met the criteria for discharge. She also stated that she was mindful that PACU staff were the only on-call team for the hospital, and was aware that a woman in labour at the hospital that evening might need surgical assistance.
235. Despite RN C saying that Master A had maintained “normal sats” on 6 litres of oxygen for at least half an hour before he was transferred, and that he met the criteria for discharge, I have found that the last documented oxygen saturation recording in PACU was at around 9.20 to 9.30pm, around the time that the decision was made to transfer Master A to the children’s ward, and showed that his oxygen saturation was 90%.
236. Ms Carey advised:
- “I do not consider 90% SpO₂ to demonstrate a stable patient who is safe to transfer to a non high dependency ward area. Based on the information submitted, I disagree with the decision to transfer [Master A] from PACU at the time he was transferred.”
237. I note Ms Carey’s comment: “I find it difficult to accept [RN C’s] assessment of ‘normal’ and disagree with her response that ... *‘despite my inadequate documentation he met all discharge criteria’*.” I agree with Ms Carey’s view that in light of the events that had taken place while he was in PACU, including the level of oxygen he required, his low oxygen saturations and the coughing incident, Master A was insufficiently stable to be transferred to a ward at around 9.30pm.
238. As stated, Dr B had prescribed oxygen therapy at 2–10 litres to maintain an oxygen saturation of greater than or equal to 94%. I consider that this prescribing meant that the normal process — that high oxygen requirements would trigger a patient review — did not occur. However, I note Ms Carey’s comments:
- “[Dr B’s charting] does not abdicate the nurses for their lack of critical thinking and assessment in this case. Registered Nurses are accountable for ensuring all health services that they provide are consistent with their education and assessed competence, meet legislative requirements and are supported by appropriate standards.³⁶ Based on the submitted RCA it is reported that a RMO review should be sought when a patient is requiring more than 6 litres of oxygen. I am critical that the RNs in question did not act in accordance with the established hospital protocol.”
239. RN C submitted that the protocol did not apply because Dr B remained with Master A while he was in PACU. However, I agree with Ms Carey that, as the DHB required that an RMO review be sought when a patient required more than 6 litres of oxygen, RN C should have, at the very least, raised concerns with Dr B about the discharge to the

³⁶ Nursing Council of New Zealand (NCNZ), *Competencies for registered nurses* (Wellington: NCNZ, 2007).

children's ward and the level of oxygen prescribed, and/or discussed the discharge with the duty nurse manager.

240. I agree with Ms Carey's criticism of RN C's assessment, monitoring and documentation while Master A was in PACU. In my view, RN C showed a lack of critical thinking. She should have raised concerns with Dr B about the discharge to the children's ward and the level of oxygen prescribed, and/or discussed the discharge with the duty nurse manager. In my view, RN C failed to provide services to Master A with reasonable care and skill and breached Right 4(1) of the Code.

Documentation — breach

241. RN C's record-keeping was poor, and has contributed to difficulties in assessing what actually happened in this case. RN C has accepted that her documentation was below the standard expected of a registered nurse.
242. RN C stated that she had not seen the PACU record sheet before the day of Master A's operation, and had not received any education on the sheet. Previously she stated that the cause was that she was distracted by Master A's coughing fit, and so forgot to complete the records. In my view, if the new sheet was a factor that impeded her ability to complete the records, she should have sought assistance from the duty nurse manager. I do not accept that this factor excuses the failure to make adequate records.
243. Master A's PACU score was documented as four when he arrived at PACU but, on discharge, he was not scored against the PACU assessment tool. As stated, while Master A was in PACU there are five documented oxygen saturations, with the lowest being 89% and the last recorded oxygen saturation being 90%. However, no time is documented for any of the saturations. As noted by Ms Carey, oxygen saturation recordings in isolation are of minimal value. Despite Master A's downward trend in the recorded oxygen saturations, there is no record of how much oxygen therapy was being administered to achieve those saturations, or of Master A's respiration rate and his level of consciousness.
244. RN C told HDC that Master A met the criteria for discharge, but did not record the basis for that conclusion. There is one observation that the wound was satisfactory on admission to PACU, but no record on discharge. The discharge information regarding the time, destination and handover details is incomplete.
245. RN C has accepted responsibility for the inadequacies in her documentation, but stated that this does not mean that the care was not professional and adequate. I disagree — adequate documentation is an integral aspect of professional care. As noted by Ms Carey: "An appropriate level of assessment, monitoring and documentation is critical to ensure the safe transfer of care of a patient from one health practitioner to another."

246. RN C had a professional obligation to keep clear and accurate patient records. She stated that she forgot to do so as she was distracted by Master A's coughing incident. In my view, the records should have been maintained for the entire time that Master A was in PACU. Accordingly, RN C failed to comply with professional standards of documentation and breached Right 4(2) of the Code.

Opinion: RN D

Care and treatment — breach

Requirement for close monitoring

247. RN D was the sole nurse on night duty in the children's ward. She stated that RN G told her at handover that Master A's oxygen saturation was 95% on 10 litres of oxygen via a Hudson mask, and that Master A had responded to prompts to take deep breaths. RN D said that she noted that Master A's oxygen saturation was not optimal in a young healthy person who was on 10 litres of oxygen. She said that she read through Master A's file, including RN G's nursing notes, when she started her shift. She stated: "There was no nursing or anaesthetic note that [Master A] was to be monitored closely on the Ward." In response to the provisional opinion, RN D noted that the documentation she received was incomplete, and that Dr B had not indicated that Master A required close monitoring or that there were any clinical concerns.
248. However, I note that RN G had recorded at 10.30pm to "monitor sats [saturation]s closely o/n [overnight]". Furthermore, at 1.00am Dr O advised RN D to monitor Master A closely and contact him (Dr O) if there were any concerns. I remain of the view that this meant that RN D should have been aware of the need to monitor Master A closely.

Blood pressure

249. Master A had only one blood pressure reading recorded while he was in the children's ward. West Coast DHB advised that it is a requirement of the PEWS that blood pressure recordings are completed as part of the scoring tool.

Change to nasal prongs

250. At around 1am, RN D decided to replace the Hudson mask with nasal prongs at 3 litres of oxygen by way of a humidification system. RN D said that when Dr O entered the children's ward at approximately midnight to access the RMO computer room, she introduced herself and, when he returned at 2am, she mentioned that she had changed Master A's oxygen therapy to nasal prongs, that Master A was a nose breather and was tolerating nasal prongs, and that he had an oxygen saturation of 95%. However, RN D did not ask Dr O to review Master A. RN D subsequently told HDC:

“I discussed the reduction of oxygen to 3L at 0100 hours with [RN F] and with RMO [Dr O] both of whom knew the amount of oxygen he had been on and the saturations. Although not a full assessment when I discussed my approach with locum RMO [Dr O], he raised no concerns other than to maintain his saturations. [Dr O] did not suggest he review ... I was working on the basis that RMO, [Dr O] had also received a full handover and was aware of [Master A’s] background, from the surgical team.”

251. However, RN F stated that RN D told her that the RMO had checked Master A and was happy for this change to be made. Dr O stated that at around 1am he went to the children’s ward and was told by RN D that Master A “was being weaned off O₂, that he was on 3L and his numbers were looking fine”. Dr O said that he advised RN D to monitor Master A closely and to contact him (Dr O) if there were any concerns. In response to the provisional opinion, RN D said that neither RN F nor Dr O suggested a medical review was necessary.
252. There is no record of any consultation with Dr O before 1am, and I accept Dr O’s account of events that he was only told at around 1am that “there [was] a post operative patient in [the children’s ward] who needed 10L oxygen in the recovery” and that Master A was being weaned off oxygen, was on 3 litres and his numbers were looking fine, and that Dr O was not asked to review Master A.
253. While I note that RN D made RN F aware of her rationale for changing Master A to nasal prongs, I accept Ms Carey’s advice that the decision to change to 3 litres by nasal prongs was made in the context of a sleeping, uncomplaining patient who was compliant with keeping on his oxygen mask. She stated: “I struggle to understand [RN D’s] clinical rationale for such a reduction in therapy.”

Monitoring after change to nasal prongs

254. In her statement to the Coroner, RN D said that at 2.00am she explained the change to nasal prongs to Master A, had another informal conversation with him prior to 3.30am, and recorded his observations at 3.30am.
255. The Child Observation Chart records that Master A was changed to nasal prongs at 2.00am, at which time his oxygen saturation was at 95%. The next record was made at 3.30am (95%) and the final record at 5.00am (95%). As stated by Ms Carey, when therapy is reduced or increased, heightened monitoring should occur for the next hour. Ms Carey stated: “[I]n my opinion [Master A] should have received this level of monitoring and I am critical that he did not.”
256. In response to Ms Carey’s advice, RN D stated that she “anticipated” that the change from the Hudson mask to nasal prongs “was a vital time to be vigilant”, and that she therefore “visualised [Master A’s] insitu Massimo monitoring equipment 5–10, and at a maximum 20 minutes apart to ensure that [she] was watching for any desaturation”. She

said: “I did not chart every visualisation as there was no variance to the recordings charted.” Health professionals whose evidence is based solely on their subsequent recollections (in the absence of written records offering definitive proof) may find their evidence discounted. In light of the lack of records, I do not accept RN D’s account that she monitored Master A at least every 20 minutes from the time she changed Master A to nasal prongs.

257. I note that RN D also stated that prior to 5am she carried out housekeeping duties, which meant she was away from the nursing station and not attending to patient cares. RN D stated that she was not able to attend to Master A between 5.00am and 6.30am as she was the sole nurse on duty when a new admission arrived who required her full attention.

Assessment and monitoring throughout shift

258. In my view, RN D showed a lack of critical thinking, which should have prompted further assessment of Master A’s condition. Based on the RCA and the West Coast DHB’s protocol, an RMO review should have been sought because Master A was requiring more than 6 litres of oxygen. I consider that RN D should have sought appropriate review, regardless of Dr B’s prescription.
259. The observation chart reports that Master A’s oxygen therapy had been 10 litres from 9.45pm; however, this did not prompt any escalation in assessment or monitoring. I agree with Ms Carey’s comments:

“[P]ost operative nursing care involves the full assessment and regular monitoring of the patient’s respiratory, neurological, cardiovascular and pain status plus the intake and losses. A true assessment of the patient can only be gained from having knowledge of all these components. This was not done in this case. In my opinion, [Master A] did not receive the appropriate or expected level of post operative assessment and monitoring on the children’s ward.”

Cessation of oxygen monitoring

260. RN D stated that the pulse oximeter alarmed several times between 10.45pm and 5.00am and that, each time, she responded to the alarm and concluded that it was the result of the probe being dislodged. RN D did not document any of those incidents.
261. At around 1am RN D told Dr O that Master A “was being weaned off O₂, that he was on 3L and his numbers were looking fine”. Dr O advised RN D to monitor Master A closely and contact him (Dr O) if there were any concerns.
262. RN D advised that she was expecting a new admission into the ward at 5.00am and, at that time, Master A was snoring with his mouth closed. RN D stated that it was a soft palate deep snore, and that Master A had a respiration rate of 20 and an oxygen saturation of 95%.

263. RN D said that prior to leaving Master A's room at 5am she turned off the oximeter machine and removed the probe from his finger. She stated that her reason for doing this was that if she was in another room with the new admission, as planned, she could not easily respond if the probe dislodged again. She stated that at that time Master A had maintained an oxygen saturation of 95% for six hours.

264. However, as advised by Ms Carey:

“[W]hilst this is true he had required 10L oxygen until 02.00 to achieve this, which belies any assessment of stability. When she turned off sats monitoring, [Master A] had three hours of sats 95% with 3L oxygen. I would be more accepting of ‘stable’ assessment if she had trialled him without oxygen to see what his baseline was, how sensitive he was to needing oxygen.”

265. Ms Carey advised that RN D's actions were a moderate to severe departure from expected standards. RN D provided an opinion by RN R stating that her actions were justifiable in the circumstances. In addition, in response to the provisional opinion, RN D stated that she did not review Master A because another patient required her attention, she was the only RN on duty on the children's ward and, in her view, Master A had been stable throughout her shift.

266. Despite RN D's submissions, I remain of the view that RN D should not have stopped monitoring Master A without first obtaining an RMO review. I do not consider her explanation that Master A was stable to be feasible. Furthermore, although she was required to undertake hourly monitoring and recording of Master A's oxygen saturation, oxygen flow rate, colour, respiratory rate, and work of breathing,³⁷ RN D did not review Master A between 5.00am and 6.30am, at which time she found him to be non-responsive.

Conclusion

267. In my view, RN D's change from provision of oxygen via Hudson mask at 10 litres to nasal prongs at 3 litres, inadequate monitoring and assessment of Master A, failure to obtain RMO review of Master A, cessation of monitoring by oximeter, and failure to review Master A after 5.00am cumulatively amount to a serious departure from expected standards. Accordingly, I find that RN D failed to provide services to Master A with reasonable care and skill and breached Right 4(1) of the Code.

Disclosure — breach

268. RN D did not disclose to West Coast DHB or Master A's parents that she had ceased monitoring of Master A's oxygen saturation at 5.00am. The DHB advised that during its RCA process RN D reported that the monitor did not alarm during her shift, and was not

³⁷ District Health Board Policy and Procedure Manual, Vol Q — Child Health, page 270.

alarming at 6.30am when she entered the room and discovered Master A's condition. It was not until RN D subsequently made a statement to the Coroner on 17 June 2013 that she disclosed that the monitor had alarmed during her shift and that she had turned it off at 5.00am.

269. RN D's lack of candour is concerning. Master A's parents were his representatives. They had a right to know what happened postoperatively following routine surgery in light of their fit, healthy son's subsequent death. RN D had a legal duty to disclose accurate, truthful information, in accordance with her individual duty of care.³⁸
270. Right 6(1) of the Code states that every consumer has the right to the information that a reasonable consumer, in that consumer's circumstances, would expect to receive. Furthermore, under Right 6(1)(e) of the Code, providers of health and disability services have a duty of open disclosure according to legal, professional, ethical, and other relevant standards. For the purposes of Right 6 of the Code, "consumer" includes "a person entitled to give consent on behalf of that consumer" which, in this case, includes Master A's parents. In my view, by RN D failing to provide information, Master A's parents were deprived of information that reasonable people in their circumstances would expect to receive. In these circumstances, RN D breached Right 6(1) of the Code.
271. It was also RN D's legal, professional and ethical duty to openly and promptly disclose to her employer, the DHB, the events that occurred that night. RN D advised HDC that she accepted that she had a legal, professional and ethical duty to disclose all relevant information. She stated that she was traumatised by finding Master A moribund, and had never previously been involved in resuscitation. She stated that at the time of the RCA she was asked whether the monitor had gone off, and she responded "no". She said she never intended to imply that she could not hear the alarm or that the alarm was faulty. However, she accepted that she should have explained further.
272. I remain of the view that by failing to openly and promptly disclose to West Coast DHB the events that occurred that night, RN D failed to comply with legal, ethical and professional standards, and also breached Right 4(2) of the Code.

³⁸ See Ministry of Health, New Zealand Standard Health and Disability Services Standards 2008.

Opinion: RN G

RMO review and record-keeping — adverse comment

273. RN G was the sole nurse on duty at the children's ward at the time of Master A's transfer from PACU. She was working the afternoon shift from 2.30pm until 10.30pm. In my view, RN G's account of events has been inconsistent and unreliable.
274. RN G stated that Dr B handed over to her that Master A had had a laryngospasm, had been administered suxamethonium, and had needed to be bagged. RN G said that Dr B explained that Master A was stable on 8 litres of oxygen via a Hudson mask, and that his oxygen saturation was 96%, but it tended to drop when he was sleepy. Dr B told RN G to request a medical review if Master A's oxygen saturations did not stay at or above 94% on 2–10 litres of oxygen.
275. Although RN G documented at 9.45pm that Master A's oxygen saturation was 96% on 10 litres of oxygen, she advised HDC that she actually "adjusted the oxygen to 10L for comfort and his saturations immediately rose to 96%" at 10pm after Master A's oxygen saturation had fallen to 94% on 8 litres of oxygen.
276. However, at 10.30pm RN G recorded in the clinical notes that Master A's oxygen saturation was 96% on 8 litres of oxygen, and noted to "monitor sats closely o/n". However, she also recorded in the Child Observation Chart that, at 10.30pm, Master A's oxygen saturation was 95% on 10 litres of oxygen. RN G has acknowledged the inconsistency in her recording of the oxygen saturations and stated that she cannot explain why this occurred.
277. RN G stated that she paged the RMO to report having changed Master A's oxygen from 8 litres to 10 litres and received no response, so she asked the night nurse to chase him up. However, she made no record of having paged the RMO, and the night nurse, RN D, denies being asked to chase up the RMO.
278. RN G took Master A's blood pressure once at 9.45pm, but did not repeat the measurement. She also failed to commence a fluid balance chart. As stated by Ms Carey:

“[P]ost operative nursing care involves the full assessment and regular monitoring of the patient's respiratory, neurological, cardiovascular and pain status plus the intake and losses. A true assessment of the patient can only be gained from having knowledge of all these components.”

279. This was not done in this case. In my view, RN G should have obtained an RMO review of Master A before she increased the oxygen to 10 litres. Furthermore, RN G's record-keeping was contradictory and incomplete. Additionally, RN G did not complete the

“nursing paediatric history 5–15 years” form, which may have provided useful information for RN D.

280. Although RN G’s actions may have been influenced by Dr B’s prescription of 2–10 litres of oxygen, that factor does not excuse RN G’s inadequate record-keeping and failure to seek appropriate RMO review. In my view, RN G provided sub-optimal nursing care to Master A. RN G stated that she accepts the adverse comment about her performance. Since this incident she has “actively sought education about laryngospasm and reflected on [Master A’s] care”. She said that she is now vigilant with documentation and uses critical thinking and the principles of “Speak Up”.

Opinion: West Coast DHB

Introduction

281. A hospital should have effective systems in place, and ensure that its staff are aware of the systems and adequately trained and supported to comply with them. In this case, there was a lack of effective service planning and effective coordination and collaboration to maintain services that were safe for patients and clinicians. The staff and the systems existing in West Coast DHB let Master A down, as is discussed below.
282. I consider that Dr B’s failures to request more intensive observation of Master A on the Ward and to investigate the reasons for his high oxygen requirement were individual clinical failures. Similarly, both RN C and RN D individually failed to comply with their duty of care. However, I consider that West Coast DHB also failed to provide Master A with services with reasonable care, and is directly responsible for those failures.

Grey Base Hospital systems — breach

Staff

283. I consider that the staff orientation and training at West Coast DHB were suboptimal and contributed to the inadequate care Master A received, as is discussed below.

Dr B

284. Dr B was a locum anaesthetist working at Grey Base Hospital during the time of these events. She had previously worked for several days on two occasions at the hospital in 2010. Dr B did not consult with the duty nurse manager regarding the ward to which Master A was to be transferred from PACU. She also did not hand over Master A’s care to the RMO. West Coast DHB stated that new anaesthetists were not provided with information about communicating with senior nurses regarding discharge destinations, or communicating with RMOs for patient review after discharge, and that these matters were not addressed in the discharge guidelines.

285. This is not the first time that I have drawn the attention of West Coast DHB to the inadequacies in its orientation system. As I have previously stated:³⁹

“It is important to ensure that new locum doctors are informed of practice processes they are likely to be unfamiliar with, specific to that rural area. This should occur before they are expected to work in an emergency or after-hours setting. All West Coast DHB policies should be readily accessible and comprehensive.”

RN C

286. RN C was employed and trained as a theatre nurse, although she had attended a PACU course previously. West Coast DHB has acknowledged that, in order to ensure that theatre staff are compliant with PACU processes and documentation, it is necessary that they are rostered to PACU as frequently as possible, and that they attend specialised PACU courses to ensure they are aware of how to manage challenging situations in PACU. In my view, RN C should have been trained appropriately to ensure that she had the necessary current skills to work in PACU.

RN D

287. RN D said that she was familiar with the children’s ward resuscitation trolley, but stated: “At no time since I have been employed at Grey Hospital WCDHB [since] 2008, have I participated in a team emergency CPR practice scenario.” In my opinion, regular training and upskilling is vital to ensure that the team is equipped to work together effectively.

Policies and protocols

288. I consider that West Coast DHB’s policies and procedures were inadequate. The DHB has accepted that DHB X’s policy for postoperative care in PACU required review in light of the specific resources and needs of West Coast DHB. The PACU discharge guidelines did not specify the circumstances in which review by the RMO or specialist was required. Furthermore, the DHB has accepted that the orientation documentation was insufficient.
289. The discharge guidelines did not address the necessity for the involvement of the duty nurse manager when deciding the discharge destination, or include guidelines for the patient discharge destination.
290. Although West Coast DHB has acknowledged that the prescription of more than 6 litres of oxygen was outside the normal safety parameters and should have triggered an RMO review, this requirement was not formalised in the PACU discharge criteria.

³⁹ Opinion 10HDC01344 (20 June 2013), available at www.hdc.org.nz.

Resuscitation

291. RN D made a 777 emergency call at around 6.30am when she discovered that Master A was unresponsive and dusky, with laboured breathing. In response to that call, the night orderly, Ms P, assisted with ventilation, despite having no medical training. Once she was relieved of this duty she wrote down on a piece of paper the medications administered and the times they were given to Master A. She subsequently left the paper in the drug room.
292. When Dr O requested suctioning of the blood-stained secretions coming from Master A's mouth, Ms P handed the cylinder to RN D, and the equipment came away from the wall, as a result of a problem with the equipment. There was a delay of several seconds while RN D reattached the tubing.
293. When Dr O called for a defibrillator, there was confusion. RN F believed the adjacent ward's defibrillator had been moved because of the hospital refit, and accessed a defibrillator from the Critical Care Unit. West Coast DHB stated that there was a delay in getting the defibrillator to Master A, meaning it arrived outside the required three-minute time frame. When the defibrillator arrived, it had leads for cardiac monitoring, which caused confusion and further delay. Furthermore, not all staff who attended were familiar with the equipment on the paediatric trolley.
294. In my view, the confusion and the delays in Master A's resuscitation were unacceptable and demonstrate systemic failings within Grey Base Hospital.

Conclusions

295. In my view, staff orientation and training at Grey Base Hospital were suboptimal. The policies in place were insufficient. In addition, the series of failures of equipment, training and communication resulted in unacceptable delay in treating Master A's respiratory collapse. I find that Master A was not provided with services with reasonable care and skill and, accordingly, West Coast DHB breached Right 4(1) of the Code.

Documentation of clinical record — breach

296. I am also critical of the standard of Master A's Grey Base Hospital records. As I have stated previously, it is essential to a patient's seamless continuity of care that all clinical reviews and decisions are documented fully. The omission to do so creates potential risk, particularly in the hospital setting where multiple staff are involved in a patient's care.⁴⁰
297. Standards New Zealand Health and Disability Services (Core) Standards⁴¹ require organisations to ensure that the management of health information meets the requirements of appropriate legislation and relevant professional and sector standards,

⁴⁰ Ibid at page 12.

⁴¹ NZS 8134.1:2008, Standard 2.9.

that service providers use up-to-date and relevant consumer records, and that all records pertaining to individual consumer service delivery are integrated. There are numerous instances of poor documentation of Master A's hospital record. Dr B failed to record Master A's oxygen saturations after he had stopped breathing, and wrote only a brief note, "awoke well", which provided little assistance to staff subsequently caring for Master A. Dr B failed to record the induction drug she used or any examinations she undertook. Dr B also made no record of the coughing incident, her interpretation of it or her assessment of Master A.

298. RN C documented only five oxygen saturations while Master A was in PACU, and did not record the times, how much oxygen therapy was being administered to achieve the saturations, Master A's respiration rate, or his level of consciousness. RN C made no record of the PACU score on discharge, and failed to complete the discharge information.
299. RN G did not complete the "nursing paediatric history 5–15 years" form and made contradictory records regarding Master A's oxygen saturations and the quantity of oxygen he was receiving. RN G stated that she paged the RMO but made no record of doing so.
300. RN D failed to record Master A's blood pressure, her interactions with the RMO, or that she had stopped the monitoring of Master A's oxygen saturations.

Conclusion

301. Overall, I find that the pattern of suboptimal clinical documentation by multiple staff members means that West Coast DHB failed to ensure that its staff met expected standards of documentation, and thereby West Coast DHB breached Right 4(2) of the Code.
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Recommendations

302. I recommend that Dr B provide a written apology to the family within three weeks of the date of this opinion. The apology is to be sent to HDC for forwarding.
303. RN C has provided a written apology to the family for forwarding.
304. I recommend that RN D provide a written apology to the family within three weeks of the date of this opinion. The apology is to be sent to HDC for forwarding.
305. I recommend that RN G provide a written apology to the family within three weeks of the date of this opinion. The apology is to be sent to HDC for forwarding.

306. I recommend that West Coast DHB provide a written apology to the family within three weeks of the date of this. The apology is to be sent to HDC for forwarding.
307. I recommend that within three months of the date of this opinion West Coast DHB:
- (a) Review the standardised care plans in use to ensure that there are no contradictory requirements.
 - (b) Conduct an audit of documentation across Grey Base Hospital and, within three months of the date of this opinion, report back to HDC on the outcome of its review.
 - (c) Review the implementation and use of the Grey Base Hospital Senior Medical Officer/Locum Orientation Handbook.
 - (d) Review the training and experience of nurses working in PACU.
 - (e) Ensure that all staff who may be required to assist with resuscitation are adequately trained.
 - (f) Report back to HDC on the steps taken to comply with these recommendations, and the recommendations set out in the Root Cause Analysis.
308. I recommend that within six months of the date of this opinion West Coast DHB audit the effectiveness and the changes in behaviour that have resulted, and report to HDC on the outcome of the audit.

Follow-up actions

309. • RN D will be referred to the Director of Proceedings in accordance with section 45(2)(f) of the Health and Disability Commissioner Act 1994 for the purpose of deciding whether any proceedings should be taken.
- A copy of this report will be sent to the Coroner.
 - A copy of this report with details identifying the parties removed, except West Coast DHB, Grey Base Hospital, and the experts who advised HDC on this case, will be sent to the Medical Council of New Zealand, and the Council will be advised of Dr B's name.
 - A copy of this report with details identifying the parties removed, except West Coast DHB, Grey Base Hospital, and the experts who advised HDC on this case, will be sent to the New Zealand Nursing Organisation, the New Zealand Society of Anaesthetists, and the Australian and New Zealand College of Anaesthetists.

- A copy of this report with details identifying the parties removed, except West Coast DHB, Grey Base Hospital, and the experts who advised HDC on this case, will be sent to the Nursing Council of New Zealand, and it will be advised of the names of RN D and RN C.
 - A copy of this report with details identifying the parties removed, except West Coast DHB, Grey Base Hospital, and the experts who advised HDC on this case, will be placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.
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Addendum

310. The Director of Proceedings decided not to take proceedings in this case.

Appendix A — Independent nursing expert advice to the Commissioner

The following expert advice was obtained from nursing advisor Dawn Carey:

- “1. Thank you for the request that I provide clinical advice in relation to the complaint from [Mr and Mrs A] about the post operative care provided to their late son [Master A], whilst he was an in-patient at Grey Base Hospital, West Coast District Health Board. In preparing the advice on this case to the best of my knowledge I have no personal or professional conflict of interest. I have read and agree to follow the Commissioner’s Guidelines for Independent Advisors.
2. I have reviewed the documentation on file: complaint from [Mr and Mrs A]; response from West Coast DHB (WCDHB), including clinical notes from Grey Base Hospital (GBH), serious incident review and findings, response from [Dr B]; clinical notes from [Hospital 2].
3. [Master A] was normally fit and well, other than having a diagnosis of dyspraxia with some learning disability. He attended a main stream school and was active, participating in [various] sports regularly. Following an uneventful emergent appendectomy [in] 2012, he was found unresponsive on [the children’s ward] at 6.30am [the following day]. Resuscitation was initiated and he was initially managed in CCU before being transferred to [Hospital 2] for supportive cares. Sadly [Master A] never regained consciousness and a magnetic resonance imaging (MRI) of his brain showed findings consistent with global hypoxic ischaemia and likely brain death. Due to respiratory and general instability brain death testing could not be completed. [A few days later], invasive therapies were withdrawn and [Master A] died in ICU.

I have been asked to provide advice on the post operative nursing care provided to [Master A] at GBH and to consider the specific issues:

- (i) The care provided in PACU following the laryngospasm
 - (ii) The decision to transfer [Master A] from PACU to [the children’s ward]
 - (iii) The amount of oxygen therapy administered to [Master A]
 - (iv) The nursing observations conducted in [the children’s ward]
 - (v) The volume of the Massimo monitor
 - (vi) The clinical documentation, including in relation to oxygen and fluid intake.
- 4. Provider response(s):**
WCDHB conducted a root cause analysis (RCA) investigation into [Master A’s] death. The investigation determined that:

- 4.1 [Master A's] operation was routine and uncomplicated.
- 4.2 He experienced laryngospasm in PACU, which was treated appropriately.
- 4.3 There is a lack of clarity concerning how much oxygen therapy [Master A] was receiving in PACU before his transfer to [the children's ward].
- 4.4 PACU documentation did not indicate how much oxygen therapy was required to maintain his oxygen saturations and his discharge criteria were not completed.
- 4.5 [Master A] also had a coughing fit in PACU and produced a small amount of pink/red sputum.
- 4.6 Whilst oxygen therapy greater than 6 litres would usually trigger a RMO review, this was not done in this case. [Master A's] post operative prescriptions included oxygen therapy 2–10 litres.
- 4.7 There is not a formal or comprehensive pathway for upskilling PACU nurses at GBH.
- 4.8 The prospective identification of post operative placement on [the children's ward] was appropriate.
- 4.9 There is only one RN on [the children's ward] overnight, which limits the ability to discuss treatment and options routinely.
- 4.10 Due to locum SMOs there can be a lack of local knowledge about environment, staff capabilities and available resources.
- 4.11 Whilst the Duty Nurse Manager (DNM) is available to provide oversight and senior nurse clinical expertise, it is dependent on the communication of the ward RN.
- 4.12 The DNM was not informed that [Master A's] PACU stay had not been straightforward.
- 4.13 There is a lack of guidelines at GBH regarding post operative ward placement, RMO reviews, and DNM involvement in post operative care decision making.
- 4.14 [Master A] was monitored via a Massimo monitor, which did not alarm. Upon testing this monitor was found to be functioning properly, although its audible alarm was such that it may not have been heard throughout [the children's ward] environment.
- 4.15 The overnight duty RN worked between the patient rooms, the nurses' station, treatment room, and office, which was usual practice.
- 4.16 [Master A] was observed and monitored appropriately.
- 4.17 Upon discovering [Master A] unresponsive at 06.30am, emergency resuscitation procedures were instituted as appropriate.
- 4.18 WCDHB complies with the local guideline that defibrillators need to be located within three minutes of a clinical area.
- 4.19 Due to confusion about the location of the nearest defibrillator to [the children's ward], there was a delay in sourcing one for [Master A]. This

meant that the defibrillator took longer than three minutes to be brought to [the children's ward].

- 4.20 When the defibrillator arrived it had leads for cardiac monitoring attached. This caused initial confusion and further delay.
- 4.21 The emergency trolley on [the children's ward] was manned by a paediatric RN, who was familiar with the location of equipment and medications.
- 4.22 Upon transfer to CCU [Master A] remained unstable and continued to deteriorate, which delayed his transfer to [Hospital 2].
- 4.23 The cause of [Master A's] collapse was not known at the time the RCA was conducted.

RCA recommendations included: reviewing the PACU discharge criteria and documentation; developing a programme to upskill RNs to work in PACU; to ensure that there is clear knowledge about where the closest defibrillator is located at all times; to increase default monitor alarms to a louder setting; that clinical deterioration scenarios are practised to establish greater familiarity with equipment.

5. The Anaesthetist, [Dr B] provided the Coroner and the Commissioner with a report. Points from her response, which are relevant to my advice about the post operative nursing care are:
 - Following the incidence of laryngospasm, [Master A] was suctioned twice and there was clear fluid, which looked like saliva. There was no aspiration seen, nor was there any evidence of pulmonary oedema. His chest was clear with no wheeze or added sounds.
 - I listened to his chest again — in PACU — which was clear and wrote a note in the clinical notes as well as charting 10L oxygen for overnight, in order to keep his oxygen saturations over 94%. At this stage there was no evidence of aspiration or pulmonary oedema.
 - There were no ongoing secretions and two complete examinations of his chest were clear. Two comprehensive examinations of his chest were undertaken prior to me going out to speak with his parents.
 - It is difficult to recall why I charted up to 10L of oxygen as this is not my normal practice. I do recall, however, that [Master A] wanted to take his mask off as it was annoying him and one of the nurses prompted me to write a higher flow rate for the ward. I likely charted 10L so that for the periods of time [Master A] had the mask on he would be getting an adequate amount of oxygen. Again I was satisfied with him leaving the PACU and no pulmonary oedema was detected at that stage.

- When the ward RN came I found that she only had a boarding mother as a patient and she was happy to take him. In the ward [Master A] would be closely monitored and checked on regularly as they had a low patient load.
- I did not consider transferring [Master A] to the CCU or to the adult ward as I was satisfied that his laryngospasm had resolved. He had a clear chest at this stage and also he had one to one nursing on [the children's ward].
- I did not realise that he would be in a side room well away from the nurses' station. I had also assumed that the monitors would be appropriately loud and alarm audible if there was any adverse event.
- As Anaesthetists we are on call for our patients and I would have come back at any stage to reassess him if concerns were raised.
- Things certainly looked bleak when I first saw him — following activation of 777 call — [Master A] looked like he had been 'down' for a long time. I noted a lot of blood on [Master A's] right cheek and pillow case, as well as pulmonary oedema.
- The arterial blood gas (ABG) results indicated that he may have been hyperventilating and may have been unresponsive much earlier than thought. I now know he was snoring loudly from 5am when the nurses from ED admitted another patient — this noise to an Anaesthetist is one of airway obstruction.

6. Responses from the RNs have not been submitted.

7. Review of GBH clinical records and comments

(i) The care provided in PACU following laryngospasm

Pre operative notes report [Master A] as being 54.4kgs with a respiration rate of 16 and SpO₂ 98% on room air. These observations are within the normal range for an adolescent. Pre operative status, trend of vital signs plus operative details help the PACU RN evaluate when the patient is stable for transfer to the ward environment. Many hospitals use a scoring system to help guide this process. Within the WCDHB Anaesthesia and PACU Record (A&PR) there is a scoring tool to be used upon arrival to and discharge from the PACU area. Submitted documentation only reports [Master A's] score upon arrival to PACU.

The PACU nursing record for [Master A] [that day], has no times documented so I am unable to definitively determine how long he was there for. Based on other documentation it is reported that [Master A] was transferred to PACU at approximately 8.40pm and was on [the children's ward] at 9.45pm. This gives him at maximum a standard PACU length of

stay. I would have expected an extended PACU stay due to him experiencing laryngospasm when he was extubated. Post laryngospasm pulmonary oedema is not uncommon in otherwise healthy young people and can manifest immediately or some hours later.^{1,2} I do acknowledge that [Dr B] reports performing comprehensive chest examinations and that there was no evidence of pulmonary oedema when she last reviewed him.

In the PACU, there are a total of five documented oxygen saturations (SpO₂) recorded. These range from 99–90%. There is no recording of how much oxygen therapy was being administered to achieve these SpO₂, or of [Master A's] respiration rate or level of consciousness. In my opinion, SpO₂ recordings in isolation are of minimal value. [Master A's] overall SpO₂ trend — after a recording of 89%, which I presume is due to the 'coughing episode' reported in the RCA investigation and [Dr B's] report — is downwards. I can find no documentation that relates to the PACU RN auscultating his chest or evaluating the quality of his respiratory effort. In my opinion, both should have been done.

RNs who work in post anaesthesia areas are usually very aware of the need for a comprehensive assessment of the patient's vital signs, input, losses and pain. This was not done in this case. An appropriate level of assessment, monitoring and documentation is critical to ensure the safe transfer of care of a patient from one health practitioner to another. As a RN peer, I consider that the nursing care in PACU was suboptimal and a moderate departure from the expected standards of nursing care.

(ii) The decision to transfer [Master A] from PACU to [the children's ward]

Due to the lack of nursing assessment and documentation I cannot definitively determine whether a further Anaesthetic review should have been sought prior to [Master A] transferring to [the children's ward]. However, in the context of this case, I do not consider 90% SpO₂ to demonstrate a stable patient who is safe to transfer to a non high dependency ward area. Based on the information submitted I disagree with the decision to transfer [Master A] from PACU at the time he was transferred.

¹ Murray-Calderon, P. & Connolly, M.A. (1997) Laryngospasm and noncardiogenic pulmonary oedema, *Journal of PeriAnaesthesia Nursing*, 12(2), 89–94.

² Fetzer-Fowler, S.J. & Mullen, C.A. (1990). Laryngospasm-induced pulmonary oedema: case report. *Journal of Post Anaesthesia Nursing*, 5(4), 222–227.

(iii) The amount of oxygen administered to [Master A]

As reported, [Master A] was prescribed oxygen therapy at 2–10 litres to maintain a SpO₂ greater or equal to 94%. Prescribing such range without accompanying instructions as to when to seek an anaesthetic review legitimises the administration of 10 litres of oxygen and [Master A] only having a SpO₂ value of 94%. Whilst I note that [Dr B] explains that this was not her usual approach to charting, I still find it concerning. In this case the normal process of high oxygen requirements triggering a patient review did not occur, which is the risk with prescribing outside normal safety parameters. However, [Dr B's] charting does not abdicate the nurses for their lack of critical thinking and assessment in this case. Registered Nurses are accountable for ensuring all health services that they provide are consistent with their education and assessed competence, meet legislative requirements and are supported by appropriate standards³. Based on the submitted RCA it is reported that a RMO review should be sought when a patient is requiring more than 6 litres of oxygen. I am critical that the RNs in question did not act in accordance with the established hospital protocol.

(iv) The nursing observations conducted in [the children's ward]

The relevant WCDHB post operative monitoring policy has not been submitted for review so I cannot comment on whether the RNs complied with the DHB standard or not. Routine post operative vital signs are generally assessed every 30 minutes for the first two hours and then hourly for the next two to four hours or until the patient is fully awake, orientated and tolerating fluids/diet. In my opinion, this is a general ward nursing standard as advocated by most general RN education. It is also generally accepted and recommended that if continuous monitoring is required then hourly observations should be recorded and when therapy is reduced or increased heightened monitoring should also occur for the next hour. In my opinion [Master A] should have received this level of monitoring and I am critical that he did not.

The WCDHB Paediatric Early Warning Score (PEWS) has also not been submitted so again I am unable to comment on compliance. The initial recorded PEWS for [Master A] is 2, which usually would be accompanied with guidance such as continuing the level of monitoring or increasing it, and informing [the] RN in charge. Whilst EWS systems should never replace clinical assessment, they do provide sound guidance as to when escalation in monitoring or review should occur. As acknowledged, I do

³ Nursing Council of New Zealand (NCNZ), *Competencies for registered nurses* (Wellington: NCNZ, 2007).

not know WCDHB's guidelines for their PEWS so am unable to determine whether the RN should have acted differently or not.

I agree that [Master A] required continuous oxygen saturation observations as he had a period of respiratory instability immediately post extubation and he had an ongoing high oxygen requirement. Whilst I note [Dr B's] response that [Master A] would be closely monitored on the ward, this was not documented in the post op instructions to [the children's ward]. In my opinion, the expected level of monitoring should have been specified and documented in the clinical notes. I acknowledge that both the RN entries in the clinical notes reflect the need for continuous oxygen saturation monitoring so they seem generally aware of [Dr B's] expectation.

Whilst post operative in [the children's ward], [Master A] only had one blood pressure recorded on his Observation Chart (OC). Despite receiving intravenous (IV) fluid therapy a fluid balance chart was not commenced. The OC reports his oxygen therapy as being 10 litres from 9.45pm and his recorded respiration rate being 20–25. This is higher than his age, history and pre operative assessments but did not trigger any escalation in assessment or monitoring. In my opinion, post operative nursing care involves the full assessment and regular monitoring of the patient's respiratory, neurological, cardiovascular and pain status plus their intake and losses. A true assessment of the patient can only be gained from having knowledge of all these components. This was not done in this case. In my opinion, [Master A] did not receive the appropriate or expected level of post operative assessment and monitoring on [the children's ward].

The WCDHB reports that the night duty RN discussed [Master A] with the duty RMO at approximately 2am but no further detail is available. Also it is reported that the RN was relieved by the hospital's Duty Nurse Manager (DNM) at 3.30am for approximately 30 minutes. Again it has not been reported what information was relayed to the DNM as part of transfer of care. RCA findings rightly report that the DNM's expertise is dependent upon the communication that is conveyed. I would recommend that further clarification is sought from WCDHB or from the RN.

(v) The volume on the Massimo monitor

The RCA findings report that the Massimo monitor was working correctly but did not alarm. I am of the opinion that this would only occur if the alarm was not turned on or not set appropriately. I would advise further clarification is sought from the Provider concerning this.

(vi) **The clinical documentation, including in relation to oxygen and fluid intake**

[Dr B's] instructions included that the IV fluid therapy continue at 200 millilitres (mls) per hour and discontinue before discharge from PACU. The anaesthesia record reports two litres of fluids being administered/in progress intraoperatively and upon transfer to PACU. [Master A's] IV fluids continued on [the children's ward] and I am unclear as to whether [Dr B] verbally instructed this — contrary to the documented instruction — or whether IV fluids were administered in error by the nurses.

As previously discussed I consider the general quality of nursing clinical documentation to be suboptimal especially in relation to PACU nursing care but also the recording of clinical observations on [the children's ward].

8. **Additional comments**

Unfortunately there are some discrepancies between my understanding of the timings and sequence of events as reported in the RCA. I appreciate that the RCA investigation included communications between all the clinical staff involved, which may have yielded different information than what I received. I have come to a different understanding and question the RCA concerning the report that [Master A's] initial [children's ward] post operative recordings were within normal limits, that his oxygen was increased to 10 litres at 11pm, and that from 10.45pm to 1am hourly observations were maintained on him. I also note that the PEWS observation records a respiratory rate of 25 for 2am, which also differs to the submitted RCA.

Whilst I agree with the WCDHB RCA recommendations, I would encourage that the general quality of post operative nursing care and respiratory knowledge is further explored and a plan of clinical education put in place to manage any deficits.

9. **Clinical advice**

I would recommend that information is sought from the registered nurses who provided care to [Master A] post operatively. Based on the submitted documentation I consider that the nursing care in relation to assessment, monitoring, communication and clinical documentation provided to [Master A] was generally suboptimal and departed from the expected standards.

Dawn Carey (RN PG Dip)

...

Further expert advice

[RN C] — OR/PACU RN. I am critical of her documentation, assessment and monitoring of [Master A] in PACU, moderate departures.

[RN G] — [The children's ward] RN responsible for [Master A] post op until 22.40. I am critical of the failure to assess/critically think. WCDHB policy requires a RMO review if >6L oxygen is required to maintain sats >94%, she got sidelined by the Anaesthetist's prescribing but still probably mild–moderate departure.

[RN D] — [The children's ward] RN responsible for [Master A] post op 22.40 until found unresponsive at 06.30. Turned off sats monitor at 05.00. Reported rationale was that he had sats 95% for 6 hours. Whilst this is true he had required 10L oxygen until 02.00 to achieve this, which belies any assessment of stability. When she turned off sats monitoring [Master A] had 3 hours of sats 95% with 3L oxygen. I would be more accepting of 'stable' assessment if she had trialled him without oxygen to see what his baseline was, how sensitive he was to needing oxygen. Moderate–severe departure.

I am unsure whether Duty Nurse Manager [RN F] should also be notified. She did the meal relief for [RN D]. In my opinion she was dependent on [the children's ward] RNs following the WCDHB protocols and adequately assessing that [Master A] was not in a stable condition.

...

Further expert advice 4 February 2014

1. Thank you for the request that I provide additional clinical advice in relation to the complaint from [Mr and Mrs A] about the post operative care provided to their late son, [Master A], whilst he was an in-patient at Grey Base Hospital, West Coast District Health Board (WCDHB). This advice is to be read in conjunction with my preliminary clinical advice. In preparing the advice on this case to the best of my knowledge I have no personal or professional conflict of interest. I have read and agree to follow the Commissioner's Guidelines for Independent Advisors.

I have been asked to provide the Commissioner with clinical advice about the standard of post operative nursing care provided to [Master A] in the post anaesthetic care unit (PACU) and on [the children's ward].

2. I have reviewed the additional documentation submitted in response to my preliminary advice: additional responses from WCDHB, copies of WCDHB

staff members' statements as supplied to the Coroner, response from [RN C], response from [RN D].

3. I note the WCDHB response to my preliminary advice and the work that they have already undertaken following the serious incident review into [Master A's] death.

I would like to recommend that WCDHB also consider reviewing the standardised care plans in use to ensure that there are no contradicting requirements e.g. paediatric generic appendectomy care plan specifies 4 hourly T.P.R but PEWS requires a full assessment (including BP) on admission and requires that the monitoring requirements specified in the DHB Vol Q Child Health (VQCH) Policy are followed, which specifies SpO₂, respiratory rate, colour and effort, oxygen flow and percentage is monitored and recorded hourly when a patient is receiving oxygen therapy.

4. PACU RN: [RN C]

I have reviewed my preliminary advice in relation to the additional response from [RN C]. I note that [RN C] reports taking responsibility for her less than adequate clinical documentation and acknowledges that accurate documentation is essential to good patient care. I also note that [RN C] reports that ... *it is not correct that he was at 90% SpO₂ at the time the decision was made. On the contrary he had maintained normal sats on 6L for at least half an hour before he was transferred* ... Unfortunately, there are no vital signs or any commentary recorded that demonstrate this period of normality in the PACU. Registered nurses are responsible and accountable for ensuring that their practice meets the expected legislative and professional standards. The maintenance of accurate and contemporaneous clinical documentation is necessary for continuity of patient care and is a competency requirement set by NCNZ⁴. In my opinion, safe transfer of care means that subsequent RNs should be able to determine the treatments and interventions that are provided and the patient's response to them. It is impossible to do this for the nursing care provided in the PACU environment and I remain critical of this. Variations also continue to persist between [RN C's] and other colleagues' recollections, with reportage that [Master A's] oxygen needed to be increased to 8 litres post the coughing fit, which occurred in PACU. This oxygen requirement is also reported by the Serious Incident Review panel and fits with the contemporaneously documented vital signs recorded on the 'Child Observation Chart' (COC). Essentially, I find it difficult to accept [RN C's] assessment of 'normal' and disagree with her

⁴ Nursing Council of New Zealand (NCNZ), *Competencies for registered nurses* (Wellington: NCNZ, 2007).

response that ... *despite my inadequate documentation he met all discharge criteria ...*

As an experienced staff member, [RN C] had an operational knowledge of GBH's staff resources, systems and policies. In my opinion, this knowledge plus a realisation that [Master A] was requiring oxygen therapy that on a ward would necessitate a RMO review, should have ensured that [RN C] updated the DNM, and confirmed placement on [the children's ward] prior to handing over the care of [Master A] to [RN G]. I am critical that this communication did not occur.

As a RN peer, I consider that the nursing care provided to [Master A] whilst he was in the PACU was suboptimal and demonstrates a moderate departure from the expected standards of nursing care.

5. [The children's ward], PM shift: [RN G]

I have reviewed my preliminary advice in relation to the additional responses from WCDHB. No additional response from [RN G] has been received for consideration.

[RN G] reports [Dr B's] instructions as ... *2–10L of oxygen for SpO₂ to stay above 94%, if not I was to request a medical review.* In my preliminary advice I considered that there was a lack of critical thinking employed by the RN in relation to the amount of oxygen that [Master A] was requiring and I was critical that the RN did not act in accordance with the established GBH protocol — RMO review when a ward patient is requiring more than 6 litres of oxygen. Whilst I remain of this opinion, I am also mindful that [RN G] acted in complete accordance with her perception of [Dr B's] instructions. The contemporaneous Anaesthetic post operative note and Medication Chart also supports [RN G's] actions. In my opinion prescribing outside usual normal parameters circumvents safety protocols and lulls inexperienced practitioners into ignoring pertinent clinical cues. At the time [RN G] had been employed at GBH for approximately 4 months, which may have affected her complete understanding of GBH established systems and policies and be a contributing factor as to why she did not act in accordance with her knowledge, skills and competencies.

Within the contemporaneous nursing documentation and in the statement to the Coroner, there is no evidence of [RN G] completing a respiratory assessment. In my opinion, this should have been completed when [RN G] increased the oxygen therapy to 10 litres. [RN G] reports that she believes that she paged the RMO to review [Master A]. I am of the opinion that such a request was clinically appropriate. However, there is a lack of contemporaneous documentation reporting the 'page' or the need for it to be followed up by [RN D]. [RN D] and [Dr O] — RMO — also deny any such communications

occurring. Clinical documentation serves a number of purposes; it reports the event, the contemporaneous assessment, treatment given, and the actions that need to be completed by the next shift. I consider this last aspect to be a crucial part of safe transfer of care.

Whilst I accept that [Dr B's] prescription legitimised nursing staff administering 10 litres of oxygen to [Master A] and accepting SpO₂ 94%, I remain critical of the quality of assessment skills, critical thinking and clinical documentation employed by [RN G]. In my opinion, the provided nursing care demonstrates a mild–moderate departure from the expected standards.

6. [The children's ward], night shift: [RN D]

I have reviewed my preliminary advice in relation to the additional response from [RN D]. I note that [RN D] endorses the recommendations of the Serious Incident Review panel and does not disagree with my preliminary advice that there was a lack of critical thinking and assessment by the nurses involved in this case. [RN D] details a series of assumptions that she had presumed when she took responsibility for [Master A's] care on [the day following his operation]. Whilst I accept that [RN D] cannot be responsible for the quality of care and communication that occurred prior to her commencing her shift, I find it hard to accept that these assumptions prevented or curtailed her from seeking a review of [Master A] had she deemed it necessary. Due to the differing accounts provided I am unable to determine with any surety, the quality or content of the conversations that [RN D] reports as having with DNM [RN F] and [Dr O] about [Master A]. I note that WCDHB support the ISBAR format for clinical communication and are also implementing a 'Speak Up' initiative. In my opinion, these are appropriate.

[RN D] reports her experience of nursing youth following an appendectomy and considers that there were certain variances — the administration of oxygen in the absence of a patient controlled analgesia (PCA) being in progress, the range of prescribed oxygen, the achieved SpO₂ — between [Master A] and other similar post operative patients. I find such an appreciation at odds with the action of reducing [Master A's] oxygen from 10 litres unhumidified — achieving SpO₂ 95% — straight to 3 litres unhumidified. As this action is presented in the context of a sleeping, uncomplaining patient who was compliant with keeping his oxygen mask on, I struggle to understand [RN D's] clinical rationale for such a reduction in therapy. I note that [RN D] agrees that heightened monitoring should always occur when therapy is reduced or increased for a patient, reporting that while this did occur she did not document it as the trend was unchanged. Whilst an awareness of the DHB VQCH policy that covers oxygen therapy is also explained, the documented observations are not in accordance with the specified requirements ... SpO₂, respiratory rate,

colour and effort, oxygen flow and percentage is monitored and recorded hourly ... In my opinion, [Master A] should have received such a level of monitoring and recording.

[RN D] reports removing the oxygen saturation — Massimo — monitor from [Master A] at 5am as she would be busy admitting a new patient and would be delayed in attending should it alarm. I disagree with this action and am of the opinion that it is contrary to the contemporaneous documentation of [RN G] ... *monitor sats closely O/N* and the instruction that [RN D] reports receiving from [Dr O] ... *maintain his saturations*. As a RN, I am critical of the change from continuous SpO₂ monitoring to none. In my opinion, the fact that [RN D] would not be able to easily visualise [Master A] made the need for an appropriately set audible alarm greater. Based on the DHB VQCH policy, [Master A] should have had his respiratory observations next recorded 6am, which did not occur. I am also critical of this.

In my clinical opinion, the nursing care provided by [RN D] was suboptimal and demonstrates a moderate–severe departure from the expected standards of nursing care. In my opinion, there was a lack of critical thinking, and a suboptimal approach to assessment, monitoring and documentation.

7. Clinical advice

In my opinion, the post operative nursing care provided to [Master A] at GBH was suboptimal and departed from the expected standards of nursing care. In my opinion, there was a general lack of critical thinking, and a poor approach to assessment, monitoring, and documentation, which undermined the safe transfer of patient care.

[RN C] — provided nursing care that moderately departed from the expected standards of nursing care.

[RN G] — provided nursing care that demonstrates a mild–moderate departure from the expected standards of nursing care.

[RN D] — provided nursing care that demonstrates a moderate–severe departure from the expected standards of nursing care.

Dawn Carey (RN PG Dip)”

Appendix B — Independent anaesthetic expert advice to the Commissioner

“1.1 Report to the Health and Disability Commissioner (HDC) on the complaint by [Mrs A] regarding the management of her son [Master A], at Grey Hospital [in] 2012. As requested by the HDC I will limit my comments to the care provided by [Dr B] locum Consultant Anaesthetist.

1.2 I am a Consultant Anaesthetist, graduated MB, ChB Manchester University 1975, a Fellow of the Royal College of Anaesthetists and Australia New Zealand College of Anaesthetists. For the last 22 years I have been in Invercargill working both in Southland Hospital and in Private Practice. Prior to that, I was a Consultant in UK for 8 years. With the exception of the last 2 years I have been on call for emergency cases for all surgical specialties and Intensive Care throughout this time.

I was Head of Department or College of Anaesthetists Supervisor of Training for most of the past 30 years. I served for 7 years on the NZ National Committee of the Australia New Zealand College of Anaesthetists and had 10 years as an instructor on the Early Management of Severe Trauma Course.

1.3 I have read all the papers on the case provided to me. These are very well summarised in the letter dated 6 August to me by [HDC’s legal investigator].

1.4 The record made by [Dr B] of her pre consultation and anaesthetic note is reasonably comprehensive. However, both the medical and nursing record of the episode of apnoea and the following hours is rather brief. More detail is supplied in the complaint by [Mrs A], the report by [Dr B] and the Serious Incident Review from West Coast DHB. All of these were written with the benefit of hindsight.

1.5 I have met [Dr B] while she was working as a short term locum anaesthetist at [another] Hospital but had no personal or immediate professional relationship with her.

2.1 [Master A] was admitted to Grey Hospital on the afternoon of [date] with abdominal pain. He was diagnosed as having probable appendicitis and scheduled for surgery that evening. During recovery from an uneventful anaesthetic he had an episode of apnoea which was treated promptly with no obvious sequelae. He was then observed on the Paediatric Ward overnight but was found in extremis early on the following morning. After intensive resuscitation he was transferred to [Hospital 2] Intensive Care Unit, where he died [a few days later].

2.2 It is understood that the cause of death was pulmonary oedema which developed at some stage between the immediate post anaesthetic hypoxic episode and when he was found in extremis on the ward the following morning.

2.3 I have attached a review article on Negative Pressure Pulmonary Oedema (NPPO) and a paper by the Association of Anaesthetists of Great Britain and Ireland (AAGBI)

on their guidelines for tracheal intubation. The latter has appendices on the management of laryngospasm and post obstructive pulmonary oedema. NPPO has only recently been recognised as a serious post-anaesthetic complication. In the past 22 years, I am only aware of 2 cases in my hospital, neither of which was in my own patients. In both cases the signs of pulmonary oedema developed immediately and diagnosis was very straightforward.

2.4 NPPO usually presents unambiguously, immediately after relief of the respiratory obstruction though delayed presentation up to 3 hours has been reported. Death is rare and usually due to hypoxic brain injury at the time of the airway obstruction. [Master A] had recovered consciousness to the extent that such damage can be ruled out.

3.1 [Dr B] saw [Master A], with his mother immediately prior to surgery for pre anaesthetic assessment. She noted his dyspraxia and found no other issues. In view of the likelihood that [Master A] did not have an empty stomach she planned a rapid sequence induction of anaesthesia with oral sodium citrate premedication to reduce gastric acidity. This technique minimises the risk of inhalation of acid gastric contents and is standard practice for urgent abdominal surgery.

3.2 This assessment and consent process were consistent with standard anaesthetic practice.

3.3 The anaesthetic itself was well documented and followed normal anaesthetic practice. A rapid sequence induction with pre oxygenation, intravenous Propofol and Suxamethonium was followed by maintenance of anaesthesia with Sevoflurane, Atracurium and Fentanyl.

3.4 Propofol is a short acting drug giving loss of consciousness; Suxamethonium is a short acting muscle paralysing drug which facilitates intubation of the trachea. Sevoflurane is an inhalational anaesthetic used for maintenance of anaesthesia, Fentanyl is a powerful analgesic related to Morphine and Atracurium is a longer acting muscle paralysing drug which facilitates abdominal surgery and lessens the requirement of other anaesthetic agents. With the exception of Sevoflurane all of these are administered intravenously.

3.5 The surgery appears to have [been] completed by [Dr N] in less than 30 minutes. [Dr B] checked that the effect of the Atracurium had reduced to a level where its effect could be completely reversed, turned off the Sevoflurane and gave the reversal agent for Atracurium.

3.6 [Dr B] removed the endotracheal tube after [Master A] had recovered consciousness sufficient to open his eyes, checked that respiration was adequate and transferred him to the Post Anaesthesia Care Unit (PACU). This was consistent with the AAGBI guidelines.

3.7 Patients are at risk of a number of airway complications in the immediate post anaesthetic period. This is why the anaesthetist accompanies the patient to PACU and remains with them until it is safe to transfer care to the PACU nurse.

3.8 During this transfer [Dr B] noticed that [Master A] had stopped breathing.

3.9 Inadequate respiration during recovery from anaesthesia is a condition that requires immediate treatment. There are 2 components to be considered: apnoea, where the patient is not attempting to breathe, and respiratory obstruction where the airway is blocked and there may or may not be respiratory effort. Apnoea is treated by manual ventilation whereas respiratory obstruction is relieved by airway manoeuvres such as a jaw thrust and if needed, the insertion of an artificial airway. In either situation treatment needs to be instituted immediately and usually prior to the cause being known.

3.10 [Dr B] acted promptly using the above measures, ensured adequate ventilation and observed a rapid improvement in oxygenation.

3.11 She appears confident in her diagnosis of laryngospasm. From the history provided, the cessation of ventilation could have been due to sedation from residual effects of Sevoflurane or Fentanyl, incomplete reversal of the muscle paralysing drug, Atracurium or aspiration of gastric contents amongst other causes.

3.12 Laryngospasm usually presents with stridor prior to complete airway obstruction and is initially accompanied by vigorous respiratory effort. This is the underlying cause of negative pressure pulmonary oedema. There is no record of [Master A] attempting to breathe against an obstructed airway.

3.13 Irrespective of the cause, [Dr B's] management ensured that [Master A] had adequate oxygenation and return of consciousness. She diagnosed the underlying cause to be laryngospasm. Despite the other possible causes, there is no reason to refute this. Her management was consistent with Appendix 1 of the AAGBI guidelines.

3.14 She examined his chest to look for evidence of pulmonary consolidation or oedema. [Mrs A] states that this examination was inadequate but [Dr B] reports that she had already examined the chest thoroughly twice before she did a final quick check while [Mrs A] was present. Pulmonary oedema is not usually a subtle sign on chest auscultation in a thin patient. Even if [Dr B] did only listen to the lung bases she would have heard the distinctive crepitations of pulmonary oedema, had that been present at that time. It is unfortunate that she did not make a note of these chest examinations at the time.

3.15 Shortly after that [Master A] woke up, agitated and swearing. Post-operative agitation is very common in younger children after Sevoflurane anaesthesia and not particularly unusual in young adults.

3.16 Oxygen was given, presumably by the Hudson mask usually used on wards and recovery units. This will deliver a mixture of oxygen and room air to give an oxygen concentration of around 35%. This is relatively independent of oxygen flow, so 10 litres per minute will certainly not deliver 5 times the oxygen concentration of 2 litres per minute. To get higher inspired oxygen concentrations a different type of mask with a reservoir bag must be used.

3.17 It is normal for oxygen saturation to be lowered after an anaesthetic, which is why supplementary oxygen is given as a routine in recovery units and often continued on the surgical ward. A saturation of 96% on oxygen, while lower than expected, would not give undue cause for concern. [Dr B's] advice to continue oxygen on the ward to maintain an oxygen saturation of over 94% was appropriate.

3.18 It is difficult to interpret the Post Anaesthesia Nursing Record. Records of pulse, blood pressure and oxygen saturation have been made with no indication as to their times. The discharge from PACU assessment has not been completed. It is worrying that the last recorded oxygen saturation was 90%. If [Dr B] was aware of this she should have insisted on more intensive monitoring with a view to possible re-intubation of the trachea. If she was not aware of the low saturation it should have been brought to her attention.

3.19 The coughing fit, prior to discharge from the recovery unit, as noted in the Serious Incident review could be of significance. The sputum is variously described as pink or red. Neither the nursing nor [Dr B's] contemporaneous notes mention this episode which is clearly remembered by [Mrs A].

3.20 A single episode of coughing of blood stained sputum would not be unusual after the airway interventions that [Master A] had undergone. If it persisted, along with an increased respiratory rate, respiratory distress and falling oxygen saturation it would be of great concern.

3.21 Other than a moderately increased respiratory rate noted on the ward at 22.30, none of these signs were observed.

3.23 I am confident that [Dr B] would have returned to reassess [Master A] during the night, had she been called. There was no call until he was found to be almost apnoeic with no cardiac output at 06:30.

3.24 Whilst I have not been asked to comment on the nursing management of [Master A] there is concern that despite the apparently acceptable observations during the night, his respiratory status was deteriorating and medical assistance could have been sought earlier.

3.25 When the cardiac arrest call came, [Dr B] attended and played an appropriate part in a very difficult resuscitation which was initially successful. A delay in defibrillation is noted in the Serious Incident Review. It would appear that this was due to equipment issues beyond [Dr B's] control.

4.1 In summary, the pre-operative consultation, plan and conduct of the anaesthetic including the management of an unexpected episode of apnoea met all the expected professional standards.

4.2 [Dr B's] instructions for post-operative management, as noted contemporaneously, were entirely appropriate. If she was aware of the recorded oxygen saturation of 90% on increased inspired oxygen and the coughing of pink sputum prior to discharge to the ward she should have insisted on more intensive observation. If not, it should have been brought to her attention. This would indicate a moderate departure from expected standards. I assess it as moderate, as the instructions given by [Dr B] should have picked up further deterioration as it occurred, enabling her to be called back and appropriate treatment instituted.

4.3 I have great sympathy for [Mrs A] and her family and can understand their frustration and anger about the turn of events. It would also have been an extremely traumatic experience for [Dr B] and the nursing staff involved. This was an unusual presentation of a rare complication of anaesthesia. From the information provided it appears to me that [Dr B] acted appropriately and professionally at every step with the possible exception noted in paragraph 4.2 above.

Dr J J H Sherriff MB, ChB, FANZCA Consultant Anaesthetist.”

Appendix C — Post anaesthesia nursing record

POST ANAESTHESIA NURSING RECORD			
Procedure:		Date:	
Handover by: (print)		Received by: (print)	
<input checked="" type="checkbox"/> Airway on arrival (circle)		Nausea Y/N <input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> Jaw support / OPA / NPA / LMA / ETT		Vomiting Y / N <input type="checkbox"/>	

Time	SpO ₂	Respirations	Consciousness	O ₂	Temp	Diastolic	Pulse	Dermatone Level	Pain Score 1-10	IV Fluids	Urine Output	Wound Ooze	Medicines/Drains	PR Loss	Distention	Check	Side	Warmth	Return	Colour	Sensation	Movement	Pulse	Swelling
	99	24																						
	93																							
	92																							
	90																							
					36																			
210																								
200																								
190																								
180																								
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130																								
120																								
110																								
100																								
90																								
80																								
70																								
60																								
50																								
40																								
30																								

PACU ASSESSMENT		O/A	DX
Breathing			
Breathe freely and/or cough	2		
Partial obstruction/shallow	1		
Needs assistance	0		
Saturation			
>95%	2		
90-95%	1		
<90%	0		
Consciousness			
Awake/normal sleep	2		
Awakes to mild stimuli	1		
Awakes to pain/unconscious	0		
Circulation			
Adult			
Stable BP & pulse	2		
Systolic BP +/- 30mmHg normal	1		
High or low BP, Tachy/bradycardia	0		
<5 years			
Warm hands and feet	2		
Cold hands and feet	1		
Cold elbows and knees	0		
Activity			
Adult			
Controlled limb movement & head lift	2		
Partial limb movement & head lift	1		
Unable to move to command	0		
<5 years			
Normal muscle tone/strength	2		
Jerky and/or stridor	1		
Temperature			
>36.0	2		
35.5-36.0	1		
<35.5	0		
Pain score			
Mild: 0-3	2		
Moderate 4-7	1		
Severe: 8-10	0		
Total score			4

Time Left PACU:

Discharge To:

Handover by

Print: _____

Signature: _____

Ward Nurse: ISBAR Handover received

Print: _____

Signature: _____

Comments/ Information

Admitted in PACU & assessed. Jaw & gutt. in situ & clipped. 48

- Ripped by anaesthetist. Spontaneous return of SpO₂ at 20:3

vs. Breathing continued ↑ SpO₂ at 98% O₂SD.

metabolic & respiratory gases O₂SD.

Wound stable.

Paracetamol 1000 given 21:00

To have O₂ on overnight