

Nelson Marlborough District Health Board

A Report by the Health and Disability Commissioner

(Case 17HDC00679)



Health and Disability Commissioner
Te Tuhou Hauora, Hauātanga

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Executive summary

1. On Day 1¹ in 2014, Mrs B, aged 65 years at the time of these events, was admitted to a public hospital for ultra low anterior resection² and loop ileostomy³ surgery that day.
2. On Day 2 it was reported that she was recovering well, but by that afternoon she started to show signs of postoperative ileus⁴ and had a high white cell count⁵ (WCC), which persisted throughout her admission. There is no clinical record that infection was considered as a cause of the elevated WCC.
3. On Day 3, Mrs B experienced vomiting, nausea, and abdominal distension. Staff attempted to insert a nasogastric tube⁶ (NGT) on two occasions that evening but were unsuccessful. Subsequently Mrs B had a large vomit and became distressed at the prospect of further attempts to insert an NGT.
4. The next day at 9pm it was noted that Mrs B's abdomen remained distended and that she refused to have an NGT inserted. However, there is no record that the significance of NGT insertion was discussed with her at this time.
5. On Day 5 at 9.30am, a surgical registrar reviewed Mrs B following deterioration in her condition that morning. The registrar made a working diagnosis of respiratory distress secondary to pneumonia, and planned for immediate transfer to the intensive care unit (ICU).
6. The registrar discussed Mrs B with ICU staff, and at 9.55am she was transferred to ICU. There is no documentation in relation to the handover to ICU at this time.
7. Following assessment in ICU, Mrs B was treated with high flow nasal prongs,⁷ and the plan was to escalate to bilevel positive airway pressure⁸ (BiPAP) if that proved insufficient. There is no record that NGT insertion was considered at this time.
8. At 11.20am, Mrs B's SpO₂⁹ reduced to 90%,¹⁰ and at 11.45am a decision was made to commence BiPAP treatment. Her condition did not improve on BiPAP, and it is recorded that she had vomited and was hypotensive.¹¹

¹ Relevant dates are referred to as Days 1–5 to protect privacy.

² An operation to remove part of the rectum.

³ A loop of the small intestine is brought out through a stoma (surgical opening), but the colon and rectum are not removed.

⁴ Obstruction of the bowel.

⁵ One possible reason for a high level of white blood cells is that the body is fighting an infection.

⁶ A tube that is inserted through the nose into the stomach.

⁷ A non-invasive respiratory support for patients with high oxygen requirements or increased work of breathing.

⁸ A form of non-invasive ventilation via a sealed face mask.

⁹ Peripheral haemoglobin oxygen saturation.

¹⁰ Normal SpO₂ levels are between 95–100%.

¹¹ Having low blood pressure.

9. At 2.20pm, the registrar and the on-call anaesthetist were called. The registrar inserted an NGT, after which more than three litres of dark green gastric fluid was suctioned out, and it was also noted that Mrs B may have had an aspiration¹² during intubation. BiPAP treatment was stopped, and at 2.30pm mechanical ventilation was commenced.
10. Subsequently, Mrs B required CPR for non-recordable cardiac output. Attempts to resuscitate her failed, and she died at 4.33pm. A post mortem noted the cause of death as pneumonia¹³ due to aspiration.

Findings

11. Nelson Marlborough District Health Board (NMDHB) was found to have breached Right 4(1)¹⁴ of the Code of Health and Disability Services Consumers' Rights (the Code) for the following reasons:
 - There was a lack of timely investigation of whether infection was the cause of Mrs B's persistently elevated WCC.
 - There is no record that staff discussed the importance of NGT insertion with Mrs B on Day 4 prior to her refusal of intubation that night.
 - It appears that NGT insertion was not considered on the morning of Day 5 despite persistent ileus and acute respiratory deterioration.
 - There was inadequate documentation regarding handover from the ward to ICU staff.
 - In ICU, an NGT was not inserted prior to treatment with BiPAP, the on-call anaesthetist should have been called sooner, and invasive ventilation was implemented too late.

Recommendations

12. It was recommended that NMDHB provide a written apology to Mrs B's family and provide evidence to HDC that its "Non-invasive ventilation policy" has been implemented.

¹² Accidental inhalation of foreign matter into the lungs.

¹³ Inflammation of the lungs.

¹⁴ Right 4(1) states: "Every consumer has the right to have services provided with reasonable care and skill."

Complaint and investigation

13. The Health and Disability Commissioner (HDC) received a complaint from Ms A about the services provided to her late mother-in-law, Mrs B, by Nelson Marlborough District Health Board. The following issue was identified for investigation:

- *Whether Nelson Marlborough District Health Board provided Mrs B with an appropriate standard of care between Day 1 and Day 5.*

14. The parties directly involved in the investigation were:

Ms A	Complainant
NMDHB	Group provider

Also mentioned in this report:

Dr C	General surgeon
RN D	Registered nurse
Dr E	Surgical registrar
Dr F	Anaesthetist

15. Further information was received from the Office of the Coroner.
16. Independent expert advice was obtained from consultant general surgeon Dr Christoffel Gerhardus Snyman (Appendix A), and from intensive care specialist Dr Alexander Khrapov (Appendix B).

Information gathered during investigation

Introduction

17. Mrs B, aged 65 years at the time of these events, was admitted to a public hospital on Day 1 for ultra low anterior resection and loop ileostomy surgery, following radiation treatment for a low rectal cancer. Although the procedure appeared to have gone well, Mrs B's condition deteriorated postoperatively. On Day 5, following a diagnosis of acute respiratory distress, she was transferred to the intensive care unit (ICU), where she died that day. A post mortem found the cause of death to be bilateral pneumonia due to aspiration.
18. Mrs B had no medical or surgical history of note other than having had a hysterectomy, and she was an ex-smoker with no evidence of underlying lung disease.

Surgical and postoperative care

19. Mrs B's elective ultra low anterior resection and loop ileostomy was performed by general surgeon Dr C. Postoperatively, Mrs B was managed in accordance with the "Enhanced

Recovery After Surgery” (ERAS) protocol, and on Day 2 it was reported that she was recovering well. However, by that afternoon Mrs B was beginning to exhibit signs of postoperative ileus. She also had a high white cell count (WCC), which was considered to be a normal postoperative response at that time. In subsequent days her WCC remained elevated, and there is no clinical record that infection was considered as a cause for the elevation. An infective screen¹⁵ was not carried out postoperatively.

20. On Day 3 at 6am, it was recorded that during the night Mrs B had experienced vomiting and abdominal distension. At 8.10am, the clinical plan was to attempt to insert a nasogastric tube (NGT) “if distension and vomiting [did] not improve by lunch”. At 3pm, the nursing notes record, “[R]emains nauseated but [nil] vomits since 0800,” and note the plan to insert an NGT if Mrs B vomited again. Later it was documented that Mrs B continued to experience nausea and vomiting in small amounts throughout the day, and at 6pm two registered nurses attempted to insert an NGT, but neither were successful.
21. Following these attempts to insert an NGT, Mrs B had a large vomit of 1300ml, and is reported to have felt better and less nauseous as a result. RN D stated that Mrs B became distressed at the prospect of any further attempts to insert an NGT, and clinical notes show that following discussion with the surgical registrar it was decided to avoid further attempts at NGT insertion “if possible”.
22. On Day 4, Dr C was on leave, and Mrs B was attended by his surgical team, including an advanced surgical trainee. Consultant support was available for the trainee if required. The clinical impression that day was “?ileus ?ileostomy swelling causing obstruction”. At 9pm it was noted that Mrs B’s abdomen remained distended, she had had “no vomiting/no nausea”, and she was refusing to have an NGT inserted. There is no documentation of what information was discussed with Mrs B around the time of her refusal. At 10.30pm, she had two small vomits.

Deterioration on morning of Day 5

23. Mrs B’s condition and early warning score¹⁶ (EWS) deteriorated significantly in the early hours of Day 5, as she developed increasing respiratory distress. At 6am her EWS was 4, and had increased from a score of 2 at 1am. Observations recorded a heart rate of 117 beats per minute and a respiratory rate of 24 breaths per minute, and it was noted that Mrs B appeared confused. The on-call house surgeon was notified, and at 6.50am she recorded that Mrs B was confused, coughing green sputum, and having increased difficulty breathing. An arterial blood gas test¹⁷ taken at 6.38am confirmed hypoxaemia¹⁸ and, following an examination that included findings that Mrs B’s respiratory rate and WCC remained elevated, the house surgeon recorded her impression of “acute respiratory

¹⁵ Clinical investigations to check for the presence of infection.

¹⁶ Calculated from routine vital sign measurements. EWS increases as vital signs become increasingly abnormal, and triggers an escalating clinical response so that clinicians with the appropriate skills can intervene to manage the patient’s deterioration. A score greater than 6 is considered an indication for urgent medical review.

¹⁷ A test that measures oxygen and carbon dioxide levels in the blood.

¹⁸ An abnormally low concentration of oxygen in the blood.

distress ?pneumonia". Following discussion with surgical registrar Dr E, Mrs B was commenced on high flow oxygen by rebreather.¹⁹

24. At 7.50am, Mrs B's EWS had risen to 7, and Dr E was asked to see her. However, Dr E was attending to another acutely unwell patient in ICU, and could not do so immediately. Dr E reviewed Mrs B at 9.30am, and noted that she appeared cyanotic,²⁰ with a respiratory rate of 33 breaths per minute. Dr E made a working diagnosis of respiratory distress secondary to pneumonia. She discussed Mrs B with ICU staff, and planned for immediate transfer to ICU for a trial of treatment with bilevel positive airway pressure (BiPAP). The clinical records do not document that placement of an NGT was considered at that time.

25. Dr E described to HDC the usual handover process between the ward and ICU staff:

"Any patient moved to ICU in [the public hospital] would have been discussed with the on call anaesthetist. Normal practice at the time was to check if there was capacity for ICU to take a new patient as decided by the ICU [charge] nurse either before or after speaking with the anaesthetist on call about the patient. If the patient's conditions included respiratory or cardiovascular concerns, the anaesthetist would review the patient and alter management regarding ventilator or blood pressure support."

26. Dr E discussed Mrs B with the nurse who was assisting the charge nurse manager. Dr E told HDC that she would then have either telephoned the on-call anaesthetist, Dr F, or spoken to him in theatre, and informed him of her working diagnosis of aspiration pneumonia.

27. NMDHB told HDC that a nurse accompanied Mrs B to ICU, and that the expectation would have been for the nurse to complete a verbal handover on arrival to ICU. There is no documentation in relation to the ward to ICU handover at this time, and a review of nursing care conducted by NMDHB identified that there was insufficient documentation regarding the handover.

Care in ICU

28. Mrs B was transferred from the ward to ICU at approximately 9.55am. Physiologic recordings continued to be documented on the "Adult EWS Observation Chart" from the ward, and included respiratory rate, SpO₂ levels, inspired oxygen percentage, oxygen and ventilatory support mode, heart rate, blood pressure, and temperature. Most results were documented every 30–60 minutes from about 10am until 1pm. From 1pm until 2.30pm, no measurements were recorded, after which recordings were noted in the "Intensive Care 24 Hour Chart".

29. Following her arrival in ICU, Mrs B was assessed by Dr F, Dr E, and an on-call general surgeon as "not tired, not distressed and talking in short sentences", and a diagnosis of "hospital acquired pneumonia" was noted. A plan was made to trial high flow nasal prongs, and to escalate to BiPAP if that proved insufficient. There is no record that NGT

¹⁹ An apparatus with face mask and gas supply forming a closed system from which one can breathe as long as the concentrations of oxygen and carbon dioxide remain within tolerable limits.

²⁰ Marked by a bluish or purplish discoloration owing to deficient oxygenation of the blood.

insertion was considered at this time. At 11.20am, Mrs B's SpO₂ reduced to 90%, and at 11.45am a decision was made to commence BiPAP treatment.

30. A chest X-ray taken between 12.30pm and 1.30pm showed evidence of pneumonia in Mrs B's left lung.
31. Mrs B's condition did not improve on BiPAP, and it is recorded that she had vomited and was hypotensive. Dr F and Dr E were called at 2.20pm, and Dr E successfully inserted an NGT, after which more than three litres of dark green gastric fluid was suctioned out. It was noted that Mrs B had had a "possible aspiration [during] intubation". BiPAP treatment was ceased, and mechanical ventilation commenced at 2.30pm.
32. A noradrenaline²¹ infusion was given, but subsequently Mrs B required CPR for non-recordable cardiac output. Attempts to resuscitate Mrs B were unsuccessful and, sadly, she died at 4.33pm. A post mortem confirmed the cause of death as pneumonia due to aspiration.
33. Dr C stated that although the point at which aspiration occurred is uncertain, Mrs B would have been at risk of aspiration during the initial attempt at NGT insertion on Day 3.

Further information

34. NMDHB told HDC that it has made a number of changes in response to the events of this report. It stated that since this incident, it has changed the on-duty roster for general surgery so that a Senior Medical Officer (SMO)/consultant is on call for acute call-out a week at a time from Friday 8am to Friday 8am the following week, during which time the SMO has no planned elective work. NMDHB said that if an SMO is rostered for the acute call-out week and is also scheduled to be in private practice, the SMO is covered by another SMO being present in the hospital, to ensure that acute surgical needs are met.
35. NMDHB stated that the above changes to SMO rostering have "reduced the need for ad hoc handovers", and that it has developed a new policy²² to ensure that robust and formal patient-centred handovers take place, which enable greater continuity of care. In addition, NMDHB stated that on Friday mornings, a combined ward round (the "Grand Round") is now undertaken by all SMOs, registrars, and clinical nurse managers, "where handover of care to the incoming acute call person takes place". NMDHB said that these changes mean that a newly presenting patient can be offered acute care, while postoperative ward patients can experience continuity of care even if the consultant who operated on them is not available. NMDHB told HDC that because of the above changes, careful tailoring around patient care has improved, and the Grand Round has reduced the risk of being heavily reliant on protocol without looking at patients' specific needs.
36. NMDHB further stated that at the time of these events, there were no policies in place regarding the use of BiPAP ventilation, and there was no mandatory escalation attached to

²¹ Used to treat life-threatening low blood pressure (hypotension). It works by constricting the blood vessels and increasing blood pressure and blood sugar levels.

²² "Handover Guidelines Intensive Care, Role and Responsibilities After Hours".

charts that specified the action required for any given EWS. NMDHB told HDC that currently it is in the process of developing an ICU-specific policy on the use of non-invasive ventilation and BiPAP, and that the new policy was expected to be operational by May 2019.

37. In response to my provisional decision and in relation to the development of an ICU-specific policy on the above matters, NMDHB stated that a “Non-invasive ventilation policy” has been drafted to provide an evidenced-based process for managing critically ill patients. In addition, NMDHB delivered a “Non-invasive positive pressure ventilation” education programme around the care of critically ill patients at NMDHB.
38. NMDHB stated that it has also developed a “High Flow Nasal Oxygen Therapy Guideline” policy, which lists potential contraindications that are also applicable to non-invasive ventilation and BiPAP. In relation to EWS response, it has now established the policy “NMDHB Procedure: Adult Vital Sign and Early Warning Score Measurement, Recording and Escalation procedure”, which outlines acceptable response times and includes instruction for situations where the designated clinical responder is unavailable owing to other urgent demands. In addition, NMDHB has established a Critical Care Outreach Service to provide clinical expertise in managing acutely unwell patients outside of ICU, and nursing staff in this service have been trained in proactive identification of patients of concern, and reactive management of deteriorating patients as shown by elevated EWS.

Responses to provisional opinion

39. Ms A was given an opportunity to comment on sections of my provisional opinion. She stated that several nurses told her that she should complain, and she found this distressing, as it indicated to her that NMDHB seemed to rely on “the people most vulnerable” to report problems, and did not have an adequate system for self-investigation to regulate itself without a logged complaint.
40. NMDHB was given an opportunity to comment on my provisional opinion, and made no further comment on the proposed findings. NMDHB provided an update on the changes made since these events. This information has been incorporated into the report.

Opinion: Nelson Marlborough District Health Board — breach

41. Mrs B underwent surgery for an ultra low anterior resection and loop ileostomy on Day 1. Her WCC was elevated from Day 1 after her surgery, and remained so in subsequent days. She developed postoperative ileus, and on Day 5, owing to an acute deterioration in her condition, she was transferred to ICU and treated with BiPAP. Subsequently she vomited while on BiPAP, and although staff implemented an NGT and invasive ventilation treatment, Mrs B died.

Postoperative recovery

42. My expert advisor, consultant general surgeon Dr Christoffel Gerhardus Snyman, advised that overall he considers the pre-ICU treatment of Mrs B to have been adequate and within acceptable parameters of standards of care. However, he did note some areas of concern.
43. Dr Snyman advised that there appears to have been an acceptance of persistent unexplained elevated WCC without screening for a possible infective source. He said that a failure to carry out a standard infective screen in these circumstances would be a moderate deviation from the expected standard of care. I note that an infective screen was not conducted, and there is no evidence that infection was considered as a cause for Mrs B's continued elevated WCC.
44. In relation to Mrs B's documented refusal to have an NGT inserted on the evening of Day 4, Dr Snyman stated:

"If the placement of a nasogastric tube was discussed with [Mrs B] on [Day 4] and she refused it following the discussion, this would have been an important point to document. This lack of documentation would be considered a minor deviation from the accepted standard of documentation, especially as a nasogastric tube is considered to be part of the standard algorithm of care for continued ileus."
45. As noted above, Mrs B's condition deteriorated significantly on the morning of Day 5, and she was transferred to ICU. There is no evidence that at this time consideration was given to the placement of an NGT. Dr Snyman advised that by that stage of Mrs B's treatment, an NGT should have been placed if at all possible, owing to the known presence of persistent ileus and her acute respiratory deterioration. Dr Snyman advised that it would be a moderate deviation if NGT insertion was not considered or discussed at this time.
46. Notwithstanding Dr Snyman's comments that the overall standard of surgical care was appropriate, it is clear that in some instances, care was suboptimal. Accordingly, in the first instance I am critical that there was a lack of timely investigation to explore whether infection was the cause of Mrs B's persistently elevated WCC.
47. In the absence of documentation, I am unable to make a finding as to what, if anything, was discussed with Mrs B prior to her NGT refusal on Day 4. However, I agree with Dr Snyman, and I am critical that there is no evidence in the notes that such an important discussion took place.
48. I also share my expert's concern that the potential for Mrs B to have an NGT inserted does not appear to have been discussed or considered in the morning of Day 5. Given Mrs B's known problems, as stated above, it appears that NGT insertion should have been considered at this time to treat the issues stemming from her ileus and respiratory distress, and I am concerned that this did not occur.

Handover from ward to ICU

49. The handover from the ward to ICU took place between the surgical registrar, Dr E, and the ICU nurse by telephone before Mrs B's transfer, followed by a combined surgical and intensive care specialist review once she arrived in ICU. Dr E told HDC that as per normal practice, after confirming with ICU that it had capacity for further patients, she would have then discussed the case and her working diagnosis of aspiration pneumonia with the on-call anaesthetist, Dr F, by telephone or in theatre. However, this conversation was not documented. NMDHB acknowledged that there was insufficient documentation regarding nursing or doctor handover.
50. Dr Snyman advised:
- "I find the explanation of the process whereby a patient is transferred to ICU to be sufficient and in line with good clinical practice. There is documentation that [Mrs B] was reviewed by the anaesthetist, [Dr F], and the surgical team at 10:15h. I would consider the combined review of [Mrs B] by ICU and surgical services to be an excellent handover."
51. However, my other expert advisor, intensive care specialist Dr Alexander Khrapov, noted that there were early indications for ICU transfer and invasive ventilation, and that this was not well documented in the handover from the ward to ICU.
52. While I accept that Dr Snyman considered the verbal handover process described above to be reasonable, I consider that there was inadequate handover documentation from the ward to ICU, and I note that NMDHB has acknowledged this.

ICU treatment Day 5

53. Mrs B was transferred from the ward to ICU at approximately 9.55am on Day 5 because of her acute respiratory distress. Physiologic recordings were documented every 30–60 minutes from about 10am–1pm, but no observations were documented from 1pm–2.30pm. After initially being treated on high flow nasal prongs, BiPAP was instigated following deterioration in Mrs B's oxygenation. After she vomited while on BiPAP, Dr E and Dr F were called, and at 2.30pm they inserted an NGT and commenced invasive ventilation. However, Mrs B suffered a cardiac arrest, and died as a result of pneumonia caused by aspiration.
54. Dr Khrapov advised that after abdominal surgery, one of the main risk factors for aspiration is an increase in the volume of gastric content and postoperative ileus. He considers it most likely that Mrs B had a silent pulmonary²³ aspiration either during the preceding night or in the early morning of Day 5.

²³ Relating to, affecting, or occurring in the lungs.

55. Dr Khrapov advised:

“Recent gastro-intestinal surgery requires closer monitoring for ileus, gastric distension and vomiting. NGT placement is usually recommended either with free drainage or low suction before BiPAP commencement in such patients. Severe [acute respiratory distress syndrome (ARDS)] required early intubation and separation of the compromised airways and gastro-intestinal tract.”

56. He stated:

“I have some concerns about the delay in SMO involvement. Call for Consultant Anaesthetist was too late to intervene ... when the patient became moribund.²⁴ The general clinical assessment of respiratory and cardio-vascular systems, the [arterial blood gas] tests frequency and interpretation were sporadic and lacked to prompt the decisive action between ICU admission and the start of invasive ventilation ... I am of the opinion that following rapidly progressing respiratory failure earlier invasive ventilation was indicated. ... Early invasive ventilation attempt should have been performed at the earliest opportunity to expedite the NGT [placement], airway and gastro-intestinal tract separation and advanced respiratory support for ARDS due to severe aspiration pneumonia. Realistically, this would have been attempted ... at least by 12:00, when the severe respiratory failure was obvious and before patient becomes unresponsive and had another massive aspiration.”

57. Dr Khrapov advised that NMDHB staff failed to provide an acceptable standard of care during the rapid deterioration of Mrs B’s respiratory functions and progressing ARDS with severe ileus. He said that this constituted a moderate departure from acceptable standards, and attributed this to a system failure.

58. I am concerned that an NGT was not inserted prior to the commencement of BiPAP treatment, and that there was a failure to seek SMO intervention sooner during the course of Mrs B’s deterioration. I am also critical of the inadequate clinical monitoring in ICU, and that invasive ventilation was not implemented sooner when it was clear that Mrs B was experiencing severe respiratory failure.

Conclusion

59. Mrs B’s postoperative and ICU care were suboptimal in several instances. It is concerning that her care fell below the standard expected both during her admission and across two departments. In summary:

- There was a lack of timely investigation of whether infection was the cause of Mrs B’s persistently elevated WCC.
- There is no record that staff discussed the importance of NGT insertion with Mrs B on Day 4 prior to her refusal of intubation that night.

²⁴ Dying or approaching death.

- It appears that NGT insertion was not considered on the morning of Day 5 despite persistent ileus and acute respiratory deterioration.
 - There was inadequate documentation regarding handover from the ward to ICU staff.
 - In ICU, an NGT was not inserted prior to treatment with BiPAP, the consultant anaesthetist should have been called sooner, and invasive ventilation was implemented too late.
60. NMDHB is responsible for the services it provides, and I am critical that opportunities to implement appropriate treatment and escalate Mrs B's care when needed were missed. Accordingly, I find that NMDHB failed to provide Mrs B with an appropriate standard of care, and therefore breached Right 4(1) of the Code.
61. It is pleasing that NMDHB has implemented several policy and procedural changes that demonstrate that it has taken appropriate learnings from these events.²⁵

Recommendations

62. I recommend that NMDHB:
- a) Provide a written apology to Mrs B's family. The apology is to be sent to HDC within four weeks of the date of this report.
 - b) Provide evidence that the "Non-invasive ventilation policy" has been implemented, and report back to HDC on this within two months of the date of this report.

Follow-up actions

63. A copy of this report with details identifying the parties removed, except the experts who advised on this case and NMDHB, will be sent to the Health Quality & Safety Commission and the Coroner, and placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

²⁵ See paragraphs 34–38 of this report.

Appendix A: Independent advice to the Commissioner

The following expert advice was obtained from consultant general surgeon Dr Christoffel Gerhardus Snyman:

“I have been asked by the HDC to provide an opinion to the Commissioner on case number [C17HDC00679].

I have read and agree to follow the Commissioner’s Guidelines for Independent Advisors.

My name is Christoffel Gerhardus Snyman. I hold a fellowship in general surgery (FRACS) since 2003. I have extensively trained and worked as a specialist general surgeon in New Zealand. I am a full time consultant general surgeon in a medium sized public hospital. I am competent at performing colorectal surgery.

I do not have a personal or professional conflict in this case.

Expert advice requested

Please review the enclosed documentation and advise whether you consider the care provided to [Mrs B] at [the public hospital] was reasonable in the circumstances, and why.

In particular, please comment on:

1. The overall management of [Mrs B’s] declining health following surgery, including, but not limited to:
 - Placement of the nasogastric tube
 - The timeliness of the response following [Mrs B’s] Early Warning Score of 7.
2. The overall management of [Mrs B] in the Intensive Care Unit. In particular, please comment on:
 - The use of BiPAP in ICU in the context of ileus symptoms without gastric decompression
 - Whether the subsequent findings after use of BiPAP should have prompted a different approach.
3. The adequacy of handover:
 - From weekday to weekend staff; and
 - From ward to ICU.
4. Any other matters in this case that you consider warrant comment.

I reviewed the documents provided to me from the Commissioner's office. These included:

- Police statement of [Ms A], daughter-in-law to [Mrs B].
- Nelson Marlborough DHB's response dated 12 July 2017
- Clinical records from Nelson Marlborough DHB dating from [Day 1]
- Further correspondence received from Nelson Marlborough DHB, 15 August 2017.

I note reference made in some of the documentation of reports submitted to the coroner by [two experts]. Neither of these reports nor the coroner's report was available for my review.

Additional literature:

- Damian Bragg et al. Postoperative ileus: Recent developments in pathophysiology and management. *Clinical Nutrition* 34 (2015) 367–376
- Ryash Vather et al. Postoperative ileus: mechanisms and future directions for research. *CEPP* (2014) 41, 358–370
- Jeffrey Barletta et al. Reducing the burden of postoperative ileus: Evaluating and implementing an evidence-based strategy. *World J Surg* (2014) 38:1966–1977
- Farhad Zeinali et al. Pharmacological management of postoperative ileus. *Can J Surg* (2009) 52:2, 153–157
- Burt Cagir et al. Postoperative ileus. Medscape article 2242141. Overview updated 2016
- Jorg C Kalf et al. UpToDate 2017
- BMJ Best Practice — Ileus
- A.M.Wolthuis et al. Incidence of prolonged postoperative ileus after colorectal surgery: a systematic review and meta-analysis. *Colorectal Disease* (2015) 18, 01–09

Summary

[Mrs B] was diagnosed with a low rectal cancer at colonoscopy. She appears to have had a routine preoperative course with appropriate discussion through a colorectal multi-disciplinary meeting recommending neo-adjuvant chemo and radiotherapy. This was completed [two months prior to the surgery].

There were no concerns raised in the preoperative setting.

[Mrs B] had preoperative bowel preparation.

[Mrs B] presented to [the public hospital] on [Day 1] for an elective Ultra Low Anterior Resection, colonic pouch, and defunctioning loop Ileostomy. Surgery was complicated by a minor splenic bleed.

[Day 2] Largely unremarkable with recovery as expected.

[Day 3]: Evidence of abdominal distension and vomiting the night before. This did not settle and two attempts at placing a nasogastric tube were made that evening. The attempts were unsuccessful.

[Day 4]: Diagnosis of ileus with ongoing symptoms and signs supporting this diagnosis. Note is made at 21:00h that [Mrs B] refused the placement of a nasogastric tube.

[Day 5]: [Mrs B] developed acute respiratory distress. She was transferred to intensive care. Despite further treatment, she passed away at 17:50h.

Discussion

My comments on the appropriateness of the treatment of [Mrs B] relates to the 'at the time' perspective. It can be all too easy to criticise in retrospect what was not predictable at that moment in time.

The overall management of [Mrs B's] declining health following surgery, including, but not limited to:

- Placement of the nasogastric tube
 - o Reasonable to omit up to the morning of [Day 5]. No deviation from standard of care.
 - o Moderate deviation from standard of care on [Day 4], in the absence of explanations as to why it was omitted.
- The timeliness of the response following [Mrs B's] Early Warning Score of 7.
 - o Adequate and in line with standard of care

Ileus is a self limiting condition that requires both physiological support of the patient and symptomatic relief for the patient until it resolves. It is a reasonably common occurrence after surgery. Although the literature quotes a wider range, the incidence of ileus is probably around 10–15%.

The diagnosis of postoperative ileus is defined as:

- Inability to maintain adequate oral intake
- Evidence of lack of intestinal motility (Flatus or faeces)
- Abdominal distension
- Nausea and vomiting
- Radiological confirmation

The recommended management of ileus is:

- Restriction of oral intake
- Intravenous fluids to maintain hydration
- Monitor and correct electrolyte disturbances
- Sensible management of various medications that may contribute towards ileus
- Nasogastric decompression tube
- Nutritional support if ileus does not resolve in a timely fashion

There is no proven medical management to assist with the resolution of ileus.

The insertion of a nasogastric tube is to potentially help relieve gastric distension and to aid in reducing both the amount and frequency of vomiting. It may provide a means to monitor the progress or resolution of ileus. It is important to note that the nasogastric tube itself does not speed up the resolution of ileus. Nasogastric tubes themselves are not without their side effects and complications. The decision for placing a nasogastric tube has to balance both the positive and the negative.

The management of [Mrs B's] postoperative ileus management is acceptable. There is evidence in the notes that the ileus was recognised in a timely fashion and managed appropriately with restriction in oral intake and supplementation with intravenous fluids. There is documented evidence of daily electrolyte monitoring. On the morning of [Day 3], a plan was made to insert a nasogastric tube if there was no improvement. This was attempted at 18:30h but two attempts were unsuccessful.

At the same time [Mrs B] was recorded to have vomited 1300ml of bile. It is documented that she felt better afterwards. Further management was discussed with the surgical registrar on call and there was no further attempt at nasogastric tube insertion.

I consider this management plan to be appropriate and acceptable at that stage. I do not consider the decision to forego further attempts at nasogastric tube placement at that stage to be deviating from standard of care or from accepted practice.

On [Day 4], there is documented evidence that continued ileus was recognised and managed. There is no documentation on this day as to what discussions, if any, were had with [Mrs B] regarding further attempts at placing a nasogastric tube.

If the placement of a nasogastric tube was discussed with [Mrs B] on this day and she refused it following the discussion, this would have been an important point to document. This lack of documentation would be considered a minor deviation from the accepted standard of documentation, especially as a nasogastric tube is considered to be part of the standard algorithm of care for continued ileus.

The notes of the day mentions small vomits with intermittent nausea but that these symptoms responded to medication. There is no mention of other concerns. The nursing notes state that [Mrs B] refused a nasogastric tube at 21:00h.

There is no additional documentation as to why a nasogastric tube was considered at this time of the night or whether the placement was requested by the surgical team in response to further vomiting. This lack of clarity is disappointing.

When evaluating her care at this time, and specifically, the lack of a nasogastric tube, it is difficult to be critical of it. [Mrs B] had intermittent nausea and minimal vomiting throughout the day. A nasogastric tube may have helped in the symptomatic relief of her nausea. However it is documented that she did get relief from medication given. There is documentation of some fluid in the ileostomy bag. In the absence of large vomits and the presence of some stoma output it was reasonable at the time not to push for a nasogastric tube placement. I consider the omission of a nasogastric tube at this time to be acceptable, particularly as [Mrs B] was refusing it.

No concerns were raised overnight. The intentional rounding sheet documents a round every hour.

On [Day 5] the observations, Early Warning Score (EWS) and nursing assessment shows a sudden and severe deterioration in her respiratory function. A score of 6 and then 7 was noted on her EWS chart. The documentation time around this event would indicate that she was assessed by the house surgeon within a reasonable time of being notified. My interpretation of the times would indicate that there was at the very least a review within 30 minutes and in all probability, much less. The nursing notes written at 06:00h indicate that the house surgeon was present at the time. I consider this response time to be appropriate, timely, and near enough to the EWS protocols to be acceptable and not a deviation from standard of care.

Following the thorough review by the house surgeon, a differential diagnosis and management plan was documented and discussed with the surgical registrar on call. The surgical registrar reviewed [Mrs B] at 09:30h. The delay in reviewing [Mrs B] is explained by [Dr E] in her report to the Commissioner. She states that both herself and the surgical consultant on call, were in theatre with another emergency. She left as soon as it was safe to do so to review [Mrs B]. Following her review, the decision was made to transfer [Mrs B] to ICU. This transfer occurred at 09:55h. I consider the decision and transfer times to be acceptable with no deviation from standard of care. I note a review by the surgical and ICU consultant team at 10:15 decided to implement a treatment plan, starting with a trial of high flow nasal prongs and escalation to BiPAP if not sufficient.

There is no documentation of discussion or consideration given to the placement of a nasogastric tube at that stage. If it was discussed but not documented then this would be a minor deviation from standard of documentation. If a nasogastric tube was neither considered nor discussed at that stage, then I would consider it a moderate

deviation from standard of care. I think most of my surgical colleagues would agree that at this stage of a patient's treatment a nasogastric tube should be placed if at all possible, provided the patient consents to it. At that stage, the diagnosis of persistent ileus was well established, and in the presence of acute respiratory deterioration, gastric distension and diaphragmatic splinting must be considered as contributing to the distress.

The overall management of [Mrs B] in the Intensive Care Unit. In particular, please comment on:

- The use of BiPAP in ICU in the context of ileus symptoms without gastric decompression
- Whether the subsequent findings after use of BiPAP should have prompted a different approach.
 - o Potentially moderate deviation from standard of care.

[Mrs B's] respiratory distress was initially treated with high flow nasal prongs (Airvo). Although helpful, the treatment was insufficient and treatment was escalated onto BiPAP. The reason for the decision to escalate from Airvo to BiPAP is not clear. It is my opinion that the next step should have been to consider full intubation. I note there was an unsuccessful attempt by the ICU staff to place a nasogastric tube. I would consider the decision to use BiPAP without a nasogastric tube in the presence of known ileus with symptoms of vomiting to be a moderate deviation from standard of care. The use of BiPAP without gastric decompression under these circumstances poses a high risk of aggravating gastric distension, leading to vomiting and increasing the risk of aspiration in someone who is already in respiratory distress. If the BiPAP was an interim step to intubation because the intensivist was occupied with a different emergency, then this may have been the best decision under unfortunate circumstances. This is however neither reflected nor noted in the documentation.

This reflects my opinion as a surgeon. I recommend an opinion from a rural intensivist or anaesthetist be sought to comment on this particular escalation plan.

The adequacy of handover:

- From weekday to weekend staff; and
- From ward to ICU.
 - o No deviation from standard of care

The explanation of how weekend handover takes place in [the public hospital] is sufficient. I do not consider the lack of written documents around the handover process to be an indication of lack of adequate handover. I find the handover process for weekend care to be robust, acceptable, and in line with good clinical practice.

The handover from ward to ICU took place between the surgical registrar and the ICU nurse by phone prior to transfer. There is no documentation that [Mrs B] was

discussed with the ICU consultant at this stage. The surgical registrar, [Dr E], clarifies this in her report to the Commissioner. She states that she would have discussed the case with the ICU consultant on call by phone. Although there is no documentation of this conversation, it does not mean it did not happen. I find the explanation of the process whereby a patient is transferred to ICU to be sufficient and in line with good clinical practice. There is documentation that [Mrs B] was reviewed by the anaesthetist, [Dr F], and the surgical team at 10:15h. I would consider the combined review of [Mrs B] by ICU and surgical services to be an excellent handover.

Any other matters in this case that you consider warrant comment.

- o Potential moderate deviation from standard of care.

From [the day] following surgery, [Mrs B] had a high white cell count (WCC). This was, not unreasonably, considered to be a post-operative response on day 1. On subsequent days, the WCC remains significantly elevated with no documented evidence that infection was considered as a cause for the elevation. One of the contributory causes of postoperative ileus is infection. If a standard infective screen was not carried out in the presence of a persistent unexplained elevated WCC, I would consider it to be a moderate deviation from standard of care. If a screen was carried out but not documented then this would be a minor to moderate deviation from documentation standards.

Summary

I find the general post-operative management of [Mrs B's] ileus and the care provided to be adequate with no specific deviation from standard of care.

The response from the house surgeon to [Mrs B's] sudden deterioration was appropriate and timely. I find no deviation from standard of care and the response to the EWS protocol.

I find the documentation around key decisions to be lacking in clarity making evaluation of care at these points difficult to assess.

The management plan and decisions once [Mrs B] was admitted to ICU need to be clarified. In the absence of clear documentation as to why BIPAP was chosen without gastric decompression, I find this to potentially be a moderate deviation from standard of care. I would recommend a review of this decision by an anaesthetist or intensivist working in similar environment. This may have already been done, but not available to me for review.

I find the apparent acceptance of a persistent unexplained WCC without screening for a possible infective source to be a moderate deviation from standard of care."

Dr Snyman provided the following further expert advice on 17 March 2019:

“I have been asked by the HDC to provide further expert advice to the Commissioner on case number C17HDC00679. I have previously provided advice on this case. The following reply needs to be read in conjunction with my original reply.

I have read and agree to follow the Commissioner’s Guidelines for Independent Advisors.

My name is Christoffel Gerhardus Snyman. I hold a fellowship in general surgery (FRACS) since 2003. I have trained and worked as a specialist general surgeon in New Zealand. I am a full time consultant general surgeon in a medium sized public hospital. I am competent at performing colorectal surgery.

I do not have a personal or professional conflict in this case.

Further expert advice requested

As you are aware, this office has received additional information from the NMDHB in response to your expert report. Please review the enclosed documentation, and advise whether any of the information provided causes you to change or update your advice.

Please note, follow-up advice is designed to be brief and answer outstanding issues. There is no need to repeat the information provided in your original report.

Please be also aware that the Commissioner has obtained expert advice from an intensivist care specialist regarding the standard of care provided in ICU on [Day 5]. As such I would request that you limit your advice to the care provided prior to [Mrs B’s] transfer to ICU.

In particular, please comment on:

1. Whether the additional clinical records and information provided has changed your opinion of the appropriateness of care provided.
2. The adequacy of NMDHB policies and procedures in place at the time of the events, and changes in policies and procedures since these events.
3. Any other matters in this case that you consider warrant comment.

Documents provided

1. NMDHB’s response dated 26 February 2019.
2. Additional clinical records from NMDHB including:
 - a. Laboratory results covering the period [Days 2 to 6], inclusive.
 - b. Radiology report from chest X-ray of [Day 5]

3. A statement from [RN D] (dated 22 February 2019) in relation to the two attempts to insert a nasogastric tube on [Day 3].
4. NMDHB's chronology of events [during Mrs B's admission].
5. Additional policies and guidelines developed by NMDHB since the time of the events.

Summary

[Mrs B], 65, was admitted to [the public hospital] on [Day 1] for an ultra-low anterior resection and loop ileostomy following chemotherapy/radiation treatment for a low-rectal cancer. It was reported the procedure went well. Her condition deteriorated post-operatively, with vomiting, a distended abdomen, and difficulty breathing. She deteriorated further and a diagnosis was made of acute respiratory distress. She was transferred to ICU on [Day 5] where she died later that day. The cause of death following post-mortem was recorded as bilateral pneumonia due to aspiration in the post-operative setting.

Reply and update to original questions

1. The overall management of [Mrs B's] declining health following surgery, including, but not limited to:
 - Placement of the nasogastric tube
 - The timeliness of the response following [Mrs B's] Early Warning Score of 7.

The reply from the Registered Nurse relating to the attempts to insert a nasogastric tube on [Day 3] is noted. My original opinion stands: Pre-ICU decisions surrounding the nasogastric tube were appropriate with no deviation from care.

I note the comprehensive updated policy (attachment 4) on the use of the EWS tool. My original opinion remains unchanged. The response to the EWS of 7 was timely and appropriate. The new policy will support and enhance the care of the deteriorating patient.

2. The overall management of [Mrs B] in the Intensive Care Unit. In particular, please comment on:
 - The use of BiPAP in ICU in the context of ileus symptoms without gastric decompression
 - Whether the subsequent findings after use of BiPAP should have prompted a different approach.

Not applicable as opinion obtained from ICU expert.

3. The adequacy of handover:
 - From weekday to weekend staff; and

- From ward to ICU.

No change to my original opinion that handover was adequate. I do note significant changes in work practice with the establishment of an acute surgeon, expanded and enhanced handover process and new policies on handover in general between services. I am confident that these extensive changes will minimise uncertainty and clarify and firm up appropriate handover of care to ensure continued patient safety and care.

4. Any other matters in this case that you consider warrant comment.

Not applicable.

New opinions in follow-up document

5. Whether the additional clinical records and information provided has changed your opinion of the appropriateness of care provided.

My opinion remains unchanged. The pre-ICU treatment of [Mrs B] was adequate and within acceptable parameters of standards of care.

6. The adequacy of NMDHB policies and procedures in place at the time of the events, and changes in policies and procedures since these events.

There were no relevant policies in place at the time of the event. Since the event, NMDHB have initiated changes and reformed their service. There are now well described and documented processes and policies in place to ensure appropriate care for their patients given a similar set of circumstances. I am comfortable that the lessons learned from the event, has directly led to significant changes within NMDHB to minimise the chances of a similar event occurring again.

7. Any other matters in this case that you consider warrant comment.

No further comment.”

Dr Snyman provided the following further expert advice by email on 8 April 2019:

“My apologies for not commenting on the lack of a septic screen.

... [T]hey have not clarified whether a septic screen was carried out or not. My original opinion stands:

‘Moderate deviation from standard of care if a standard infective screen was not carried out in the presen[ce] of elevated white cell count, or mild to moderate if the screen was conducted but not documented.’”

Appendix B: Independent advice to the Commissioner

The following expert advice was obtained from intensive care specialist Dr Alexander Khrapov:

“I have been asked to provide an expert advice to the Commissioner on case number C17HDC00679. I have read and agree to follow the Commissioner’s Guidelines for Independent Advisors.

I am a Specialist Anaesthetist, vocationally registered in New Zealand since 2002. I have worked as a Senior Medical Officer in Anaesthetics and Intensive Care at Timaru Hospital since 2002 having worked in the speciality for more than 30 years in different hospitals.

I have been asked to provide advice to the Commissioner regarding the care provided to the late [Mrs B] by [the public hospital] (Nelson Marlborough DHB). I have no personal or professional conflict in this case.

More specifically I have been asked to comment on the following:

1. The overall management of [Mrs B’s] declining health following surgery, including, but not limited to the timeliness of the response following [Mrs B’s] Early Warning Score of 7. Were there indications that she ought to have been moved to ICU sooner?
2. The overall management of [Mrs B] in Intensive Care Unit. In particular:
 - use of BiPAP in ICU in the context of the ileus symptoms without gastric decompression;
 - Whether the subsequent findings after use of BiPAP should have prompted a different approach.
3. The adequacy of handover from ward to ICU.
4. Any other matters in this case warranting comment about the care provided.

This report is based upon information provided by the HDC, including copies of clinical records, different tests performed and responses from the various persons involved in the case and subsequent investigations. I have also reviewed the updated policies and protocols presented by NMDHB.

Background/Key points:

[Mrs B], 65, was admitted to [the public hospital] and had uneventful surgery for mid to low rectal cancer (ultra-low anterior resection, formation of J pouch and loop ileostomy) on [Day 1] after 8 weeks course of chemo-radio therapy. She had another 8 weeks break after this therapy to allow the tumour to shrink. She was expected to have a good chance of recovery. Before, during and after surgery the hospital staff were following the ERAS (early recovery after surgery) protocol to speed up recovery,

to prevent various complications [such] as ileus, DVT etc. and to resume early function of the gut motility and peristalsis.

Postoperative period was complicated by early ileus, nausea and vomiting, intermittent functioning of ileostomy and pain on [Days 2–4] after surgery. She had patient controlled analgesia with Fentanyl and multiple anti-nausea medications to relieve it. There were few unsuccessful attempts by nursing staff to treat ileus by trying to insert nasogastric tube (NGT) for decompression. [Mrs B's] conditions and early warning score (EWS) significantly deteriorated overnight on [Day 5] and her EWS reached 7 by 6:50 a.m. from being 1–2 the night before. She was transferred to Intensive Care Unit (ICU) at 9:55 for acute respiratory distress syndrome (ARDS) treatment with BiPAP. Further attempt to insert NGT failed.

[Mrs B] has been checked and reviewed by [the surgical registrar] and [the house surgeon] at 09:30. Chest X ray revealed significant left lower lobe consolidation and 'white out'. Her condition did not improve on BiPAP and she had massive vomit. She was intubated and NGT inserted by [an anaesthetist] at 15:00 with about 3 litres of gastric content aspirated by suction. Massive aspiration has been seen during intubation attempt with rapid sequence induction.

Conditions continued deteriorating and all resuscitation attempts were unsuccessful. [Mrs B] died at 16:33 from severe ARDS and followed cardiac arrest.

[Mrs B's] daughter-in-law, has expressed concerns about several aspects of the care provided at the time, including a delay in response to deteriorating EWS from 2 to 7 and transfer to ICU, use of BiPAP and gastric decompression, the adequacy of handover from ward to ICU, the time taken for the registrar to arrive and assess the conditions, nursing workload management issues at the time of increasing EWS.

Opinion/Comment:

This is a very sad case. [Ms A] and [Mrs B's] family have my deepest sympathies.

Peri-operative pulmonary aspiration of gastric contents is one of the major causes of brain damage and surgery/anaesthesia related death (Anaesthesia, V 72, No 11, November 2017, pp 1344–1357). One of main risk factors for aspiration is an increase in the volume of gastric content and postoperative ileus after abdominal surgery.

I have discussed the case confidentially and privately with my anaesthetic colleagues, without any names or hospital mentioned, as a general case scenario during our mortality and morbidity meeting on 13.12.2017. We were in an agreement with my conclusion and recommendations as below.

With regard to the commissioner's specific questions:

1. Management of [Mrs B's] declining health following surgery was reasonably adequate for the first three days after operation and followed ERAS protocol

which is an accepted practice. Post-operative ileus is common after similar type of colorectal surgery and it usually takes 2–5 days to resolve. Early insertion of the nasogastric tube by RMO or SMO would have been very helpful with gastric decompression, but was attempted by nursing staff and failed. Try to place NGT at 18:00 on [Day 3] was unsuccessful and produced 1300 ml of vomit. Further attempts were strongly rejected by [Mrs B]. Insertion of NGT is highly unpleasant, may be very difficult, sometimes unsuccessful even when performed by experienced staff and it is not without risk.

It might be considered as moderate departure from the standard of care not to use most experienced staff to resolve deteriorating ileus and to improve an intermittent ileostomy function. Whilst deterioration has been rapid between 6:00 and 9:00 on [Day 5], transfer to ICU was delayed due to staffing issues and late assessment by RMO and senior medical staff engaged in acute surgery in operating theatre. There were indications to move [Mrs B] sooner to Intensive Care at the early hours on [Day 5] with her deteriorating EWS of 7 and impending respiratory failure. [Mrs B] most likely had silent pulmonary aspiration either at night or early morning on [Day 5]. Our peer review recommended prompt involvement of senior medical staff: Surgeon, Anaesthetist or Intensive Care Specialist with outreach services, operating theatre or ICU.

Early diagnostic procedures as abdominal and chest X-ray, abdominal ultrasound to determine the residual gastric volume would be helpful as well as more frequent clinical review of post-surgical patients with complications and deteriorating EWS. Back up senior medical staff will be very helpful to have on call in case primary SMO are busy with other emergency.

2. Yes, I think it was reasonable and acceptable to continue trying to improve compromised lung function with escalating respiratory support from non-rebreathing face mask with high oxygen flow to high flow humidified oxygen and BiPAP at the early stages of treatment of ARDS. Her conditions deteriorated rapidly over the night on day four with likely pulmonary aspiration on early morning by 6:00 a.m. on [Day 5]. Use of BiPAP in ICU is common in awake patients with respiratory failure without upper airway compromise with good cough and preserved reflexes. Gastric decompression would be advisable when patient's ileus did not improve and mental state deteriorated. Recent gastro-intestinal surgery requires closer monitoring for ileus, gastric distension and vomiting. NGT placement is usually recommended either with free drainage or low suction before BiPAP commencement in such patients. Severe ARDS required early intubation and separation of the compromised airways and gastro-intestinal tract. This is more so for patients who are unable to protect their airways due to low level of consciousness, poor cough and secretion clearance.
3. There were early indications for ICU transfer and invasive ventilation. This would allow effective NGT placement by experienced SMO. That was not very well documented in handover from the ward to ICU. Some clinical notes were written

in retrospect. In this situation the failure to insert arterial line and to conduct arterial blood gas tests and direct blood pressure monitoring had impact on the outcome as it would prompt the early intervention, intubation and gastric decompression at the time of rapid deterioration.

4. I do have other concerns about the medical care provided to [Mrs B]:

Firstly, the standard of documentation of handover on [Days 4–5] over to weekend staff was inadequate. The details are too limited, done mostly by nursing staff and for example does not include surgical handover by RMO/SMO. Indications for early ICU transfer and BiPAP or for intubation were not very well documented. There are some remarks ‘? Ileus? Obstruction at the level of stoma’. There were no adequate plans for the gastric decompression or respiratory support in case of rapid deterioration. More detailed retrospective notes were added later on in the day which is not a best practice.

Secondly, I have some concerns about delay in SMO involvement. Call for Consultant Anaesthetist was too late to intervene (at 16.25 on [Day 5]) when the patient become moribund. The general clinical assessment of respiratory and cardio-vascular systems, the ABG tests frequency and interpretation were sporadic and lacked to prompt the decisive action between ICU admission and the start of invasive ventilation with massive pulmonary aspiration of gastric content to follow. There were changes beyond this point in time with definite severe respiratory compromise, hypotension and bradycardia (slowing of heart rate) from 16:25 onwards. Severe hypoxia developed with ABG further deteriorated to the point of no return. All vital signs ceased and patient was pronounced dead at 16:33. I am of the opinion that following rapidly progressing respiratory failure earlier invasive ventilation was indicated. There was no reason to pursue a BiPAP as a definitive respiratory support after massive vomit while on BiPAP. Use of BiPAP with or without nasogastric decompression with spontaneous breathing is controversial in ileus. NGT itself can be a channel for an air entry into the stomach with BiPAP or CPAP and cause further gastric distension especially with poorly functioning stoma. NGT insertion can provoke vomiting and regurgitation. It is highly unpleasant. Early invasive ventilation attempt should have been performed at the earliest opportunity to expedite the NGT placement, airway and gastro-intestinal tract separation and advanced respiratory support for ARDS due to severe aspiration pneumonia. Realistically, this would have been attempted after at least by 12:00, when the severe respiratory failure was obvious and before patient becomes unresponsive and had another massive aspiration.

I am pleased that NMDHB and staff involved in the case apologized for any mishaps and errors in the management of [Mrs B]. There are new sets of guidelines implemented by NMDHB to address care for patients who require abdominal decompression and drainage (Lippincott Guidelines, 2015). There is Protocol for ICCU BiPAP Vision and Manual for patients on BiPAP. NMDHB is one of the pilot sites for the Health Quality and Safety Commission (HQSC) to reduce harm from failures to

recognize and to respond to acute patient deterioration via Early Warning Score (EWS).

There is Policy and Procedure Draft by NMDHB for Adult Vital Sign and Early Warning Score Measurement, Recording and Escalation.

Summary:

Overall, I am of the opinion that, during the rapid deterioration of respiratory functions, progressing ARDS with severe ileus and non-decompressed stomach nursing staff, RMO and SMO of NMDHB who cared for [Mrs B] failed to provide an acceptable standard of care. I would rate the level of departure from an acceptable standard as moderate and as a system failure. They appear to have failed to recognise the rapid progression of ARDS and to review and remediate non-decompressed stomach to treat the severe postoperative ileus. They delay to take an appropriate action (in this case early NGT placement and invasive ventilator support when required). In my opinion the accepted standard of care would be to place NGT on [Day 3 or 4], expedite ileus treatment, ICU transfer sooner and intubate the patient when the airways were compromised. I think the decision to do this should have been made following the ICU transfer at 9:33.

I am satisfied that since this tragic event NMDHB implemented multiple measures to rectify and correct communication with family on early stages of patient deterioration, to improve and document handover and expedite patients care and follow up evidence based EWS, BiPAP and ERAS protocols.

I hope you find this report helpful and please contact me if you need any further comment.”

Dr Khrapov provided the following further expert advice on 19 March 2019:

“I have received all the necessary documents from you and NMDHB regarding the sad case of events during the treatment of [Mrs B] at [the public hospital] [Days 1–5] for which I have been expert adviser with HDC.

I can comment on additional questions raised in the investigation after obtaining response from NMDHB and their policy changes.

- 1 Additional clinical records and information provided by NMDHB has not changed my opinion of the appropriateness of the care provided in [the] surgical ward and ICU for [Mrs B]. I have been reading and reviewing the following documents forwarded to me:
 - NMDHB’s response dated 26/02/2019;
 - Additional clinical records from NMDHB including:
 - a. Laboratory results [Days 2–5] inclusive.
 - b. Radiology CXR report in ICU. Multiple ABG results.

- Statement from [RN D] regarding her two attempts of NGT insertion on [Day 3]
 - Chronology of events [during Mrs B's admission]
 - Additional policies and guidelines developed and implemented by NMDHB since the events.
2. The adequacy of NMDHB policies and procedures in place at the time of the events was not fully adequate or implemented as I have underlined in my previous report. NMDHB has implemented few changes in policies and procedures since the event which is more in line with the national and international guidelines for grading emergency medical response and managing patients on respiratory support with CPAP/BiPAP machines and full stomach.
 3. I have no other matters on the case which warranted any further comments.

I haven't seen or read the response from [Dr F] regarding his involvement in [Mrs B's] care in ICU. I will be happy to see it when available.

I am happy [that] my advice on the matter may be requested and disclosed under Privacy Act 1993 and the Official Information Act 1982. I am able to provide oral evidence in case of formal disciplinary or Tribunal hearing required but I am not sure if it is needed or warranted at present with policies and guidelines changed and implemented by NMDHB since the event.

I have no intention to enter into any discussions about my advice and expert review with any of insurance, lawyers, health providers or media involved with the case.

I have no personal or professional involvement and have no conflict in this case.

Please do not hesitate to contact me should you have any additional questions or advice on the matter."