

# **Northland District Health Board**

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

**(Case 10HDC00419)**



Health and Disability Commissioner  
*Te Toihau Hauora, Hauātanga*



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## Executive summary

1. In 2009, Mr A (aged 75 years) sought total knee joint replacement (TKJR) surgery at Whangarei Hospital. Mr A was advised by the consultant orthopaedic surgeon and the orthopaedic registrar that TKJR surgery would benefit him, but that there was a significant risk he could die during surgery, or postoperatively, because of his serious co-morbidities.
2. The TKJR surgery was performed in early 2010. A urinary catheter was inserted at the commencement of the surgery. The surgery proceeded without incident, and Mr A was stable in the immediate postoperative period. Mr A's postoperative urine output was recorded on the Fluid Balance chart, and his blood pressure was recorded on the Early Warning Score (EWS) chart.
3. Members of the Orthopaedic Team responsible for Mr A's postoperative care were the consultant orthopaedic surgeon, Dr B, the orthopaedic registrar, Dr H, and house officers Dr C and Dr D.
4. On Day 3, Dr C and the orthopaedic consultant conducted a ward round. The TKJR Clinical Pathway notes record that Mr A was "doing well" and that his catheter was to be removed the next day. However, by the afternoon and evening of Day 3, Mr A's urine output and blood pressure began to decrease. This was noted in the TKJR Clinical Pathway but there is no record of Mr A's condition being communicated to Dr C or another house officer.
5. On Day 4, registered nurse (RN) F noted that between 4am and 6am Mr A passed only 55ml of urine, which was below the normal urine output of 30mls per hour. RN F recorded in the TKJR Clinical Pathway that she did not remove Mr A's catheter because of her concerns about his low urine output. RN F advised that she communicated that information at handover to the morning shift nurses. Dr C and the orthopaedic registrar reported that no concerns were raised by the nursing staff during the morning ward round. The catheter was removed at 8am. Also, at that time, a nurse incorrectly recorded that Mr A had passed a total of 935mls of urine since 1am, instead of 435mls.
6. At 10.30am, Dr C handed over Mr A's care to Dr D. Dr D recalls only one discussion with a nurse at approximately 2pm, in which the nurse incorrectly told her that Mr A had not passed urine since 10am (rather than 8am), but his blood pressure was stable. At 2.30pm a bladder scan was taken, which showed 179mls of urine.
7. By 8pm, Mr A had still not passed urine since the removal of his catheter at 8am. RN I advised that she informed the house officer of Mr A's low urine output and took a bladder scan at 11pm in consultation with the house officer. Dr D does not recall being alerted to such concerns.
8. On the morning of Day 5, Mr A was reviewed by Dr C and, during the course of the examination, Mr A vomited blood. Mr A's condition deteriorated further throughout the day.

9. On Day 6, Mr A suffered a cardiac and respiratory arrest and, sadly, died.

**Decision summary**

10. On Day 4, when Mr A's urine output decreased and his blood pressure dropped, he should have been referred for specialist medical review. A combination of poor documentation and poor communication led to the failure by both the Orthopaedic Team and the Nursing Team to fully recognise Mr A's deteriorating condition. Furthermore, critical information about Mr A that was available to both teams was not adequately accessed and used; in particular:
- the Orthopaedic Team did not alert the Nursing Team to Mr A's co-morbidities and the complexity of managing the balance between Mr A's cardiac issues and his renal impairment;
  - the Nursing Team was not expected to seek out such information unless advised to do so;
  - the Nursing Team failed to alert the Orthopaedic Team to concerns about Mr A's urine output;
  - members of both the Nursing Team and the Orthopaedic Team failed to read Mr A's notes, which highlighted concerns about his urine output and blood pressure;
  - on one occasion, the Urine Output and Fluid Balance charts were not available to the Orthopaedic Team for review and, during other occasions, the clinical notes were incomplete and poor;
  - the Nursing Team made a number of calculation and recording errors on the Fluid Balance chart; and
  - the removal of Mr A's catheter on Day 4 made recognition of his deterioration more difficult.
11. In essence, there was a pattern of suboptimal behaviour in the care of Mr A.
12. The failures of the Orthopaedic and Nursing Teams were service failures and are directly attributable to Northland DHB. Accordingly, Northland DHB breached Right 4(1) of the Code for failing to provide Mr A with services with reasonable care and skill, and breached Right 4(5) for poor communication, inadequate documentation, and widespread failure by the Nursing Team to consistently comply with the relevant procedures required under the EWS chart. All these factors compromised Mr A's right to continuity of care.
13. The Orthopaedic Team's failure to communicate to the Nursing Team that particular attention needed to be given to Mr A in the postoperative period given his co-morbidities, resulted in a lost opportunity to ensure that Mr A was monitored closely, and increased the risk of harm to Mr A. Accordingly, Northland DHB also breached Right 4(4) of the Code.
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## Complaint and investigation

14. The Commissioner received a complaint from Ms G about the services provided to her father by Northland DHB. The following issue was identified for investigation:

*The appropriateness of the care provided by Northland District Health Board to Mr A from July 2009 to the time of his death.*

15. The investigation was extended to include the care provided to Mr A over a period of three days in early 2010 by the following people:

Dr B	Consultant orthopaedic surgeon
Dr C	House officer
Dr D	House officer
RN E	Registered nurse
RN F	Registered nurse

16. Investigation of the care provided by individual providers was discontinued, and no further action was taken in relation to those individuals.

17. Information was received from the above listed parties, and also:

Ms G	Complainant
Dr H	Orthopaedic registrar
RN I	Registered nurse
RN J	Registered nurse
RN K	Registered nurse
RN L	Registered nurse
Northland District Health Board	

Also mentioned in this report:

Dr M	House officer
RN N	Registered nurse
Ms O	Director of Nursing and Midwifery

18. Independent expert advice was obtained from an orthopaedic surgeon, Dr Denis Atkinson (**Appendix A**); a renal physician, Dr Grant Pidgeon (**Appendix B**); and a registered nurse, Ms Amanda Burton (**Appendix C**).

## Information gathered during investigation

### Mr A

19. Mr A, aged 75 years, had been suffering ongoing problems with his right knee. He also had other medical problems including hyperthyroidism,<sup>1</sup> aortic stenosis,<sup>2</sup> type II diabetes, ischaemic heart disease (IHD),<sup>3</sup> congestive heart failure (CHF),<sup>4</sup> moderate renal impairment, and paroxysmal atrial fibrillation.<sup>5</sup>
20. In 2006, Mr A sought TKJR surgery to be performed by the Orthopaedic Department at Whangarei Hospital. Mr A was not considered a suitable candidate for the surgery because of the anaesthetist's concerns about Mr A's severe aortic stenosis.
21. In December 2008, Mr A's general practitioner (GP) wrote to the orthopaedic surgeons at Whangarei Hospital pointing out that, in 2007, Mr A had tolerated a prostate operation under general anaesthetic and had recovered well from that procedure. Mr A's GP urged the orthopaedic surgeons to consider whether Mr A was a suitable candidate for a TKJR carried out under a spinal epidural, as the pain in his right knee was worsening and restricting his daily activities.
22. On 6 July 2009, consultant orthopaedic surgeon Dr B and an orthopaedic registrar reviewed Mr A and advised that although the TKJR surgery would benefit him, there was a significant risk that he could die during surgery, or postoperatively, as a result of his serious co-morbidities.
23. On 31 July 2009, Mr A was reviewed in the anaesthetic pre-assessment clinic. This included a measurement of Mr A's blood pressure, which was within normal range at 103/69mmHg.<sup>6</sup> The anaesthetic assessment confirmed that Mr A could proceed with the TKJR surgery, but emphasised that he was a high risk candidate. The Preoperative Patient Self Assessment booklet recorded that Mr A would have a high risk of venous thromboembolism<sup>7</sup> and would need postoperative care in the high dependency unit (HDU). Mr A's medical history, including his co-morbidities, was recorded on page four of the Preoperative Elective Care Pathway booklet.
24. Ten days before surgery, the Orthopaedic Elective Co-ordinator documented in the Preoperative Elective Care Pathway booklet a telephone consultation with Mr A, as part of the final pre-admission check. Mr A confirmed that he still wished to proceed with the surgery, and that he understood the risks and benefits of the surgery. It is also

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<sup>1</sup> A condition in which the thyroid gland produces too much thyroid hormone. It is often referred to as an "overactive thyroid".

<sup>2</sup> A disease of the heart valves in which the opening of the valve is narrowed.

<sup>3</sup> A disease characterised by reduced blood supply to the heart, usually due to thickening of the coronary artery walls.

<sup>4</sup> The inability of the heart to supply sufficient blood to the rest of the body, causing fluid to build up in the lungs, liver, gastrointestinal tract, and the arms and legs. In June 2008, Mr A was hospitalised for 12 days because of his CHF and renal impairment.

<sup>5</sup> Atrial fibrillation (AF) is the most common cardiac arrhythmia (irregular heartbeat). AF may occur in episodes lasting from minutes to days ("paroxysmal"), or be permanent in nature.

<sup>6</sup> Blood pressure between 90–130mmHg/60–80mmHg is considered normal.

<sup>7</sup> Venous thromboembolism is commonly known as a blood clot that forms within a vein.



recorded that, since the preoperative assessment, Mr A had had no admissions to hospital, no illnesses requiring hospital out-patient/GP consultation, and no new treatment, and there had been no changes to his medication or social situation. On the day of surgery, Mr A consented to the surgery in writing.

25. A bed in the HDU was booked and arrangements were made for Mr A's vital signs to be monitored remotely by the intensive care unit (ICU) via telemetry.<sup>8</sup>
26. House officer Dr C advised HDC that prior to Mr A's operation, orthopaedic registrar Dr H informed her that Mr A had multiple co-morbidities, including CHF, IHD, and diabetes, and that "[Mr A] would need a close eye kept on him over the next couple of days".

### **Day of TKJR surgery**

27. The surgery was performed. A urinary catheter was inserted at the commencement of the surgery. Mr A tolerated the surgery well and was stable in the immediate postoperative period. Accordingly, the HDU bed was cancelled and Mr A was transferred to the orthopaedic ward. The ICU continued to monitor Mr A's vital signs via telemetry.
28. Mr A's vital signs were recorded on an EWS chart and his fluid was recorded on a Fluid Balance chart.

### *Early Warning Score chart*

29. The EWS chart establishes a minimum standard for the monitoring of vital signs to help nursing staff identify deterioration in a patient, so that appropriate medical input is sought as early as possible.
30. The EWS chart records the patient's vital signs, including temperature, systolic blood pressure, heart rate, respiratory rate, CNS score<sup>9</sup> and urine output (for catheterised patients only). Vital signs that fall within the "normal" range are scored zero. Where a vital sign is outside the normal range, it is scored 1, 2 or 3 — 1 being least severe and 3 being most severe. The scores for each of the vital signs are then totalled to determine what action, if any, needs to be taken.
31. If the total score is zero, no action is required. A total score of 1 requires nursing staff to inform the ward nurse co-ordinator, assess the patient, modify the frequency of observations as appropriate, notify medical staff as appropriate, and document accordingly. A total score of 2 requires staff to inform the ward nurse co-ordinator, repeat the observation within 30 minutes, increase the frequency of observations, seek surgical/medical review within 30 minutes, and document the discussion and action plan. A total score of 3 or more requires staff to inform the ward nurse co-ordinator, carry out observations at least every 15 minutes until the patient has been reviewed by

<sup>8</sup> This is a form of technology where leads are attached to the patient using electrodes. The leads transmit signals to a monitoring station where they can be watched by nurses for any abnormalities in the patient's vital signs.

<sup>9</sup> This refers to the Canadian Neurological Scale, which is a tool used to monitor and assess the neurological status of stroke patients.

a doctor, seek review by a registrar or a rapid response nurse within 15 minutes, document discussions with the consultant, make an action plan, and consider a number of factors such as contact with family and referral to ICU.

*Fluid Balance chart*

32. The Fluid Balance chart records that Mr A was given 4800mls of IV fluid between 1.30pm and 9pm. At 9pm, an unidentified nurse incorrectly totalled Mr A's IV fluid intake as 3800mls on the Fluid Balance chart.

*Orthopaedic Team*

33. Members of the Orthopaedic Team responsible for Mr A's postoperative care were Dr B,<sup>10</sup> orthopaedic registrar Dr H, and house officers<sup>11</sup> Drs C and D.
34. Dr C graduated from medical school in 2009 and was employed by Whangarei Hospital as a house officer that year. She was the house officer on duty on the orthopaedic ward between 7.30am and 4pm on Days 1, 2, 3 and 5.
35. Dr D also began her employment as a first-year house officer at Whangarei Hospital in 2009. Dr D was the house officer on duty on the orthopaedic ward between 10.30am and 11pm on Day 4.

*Postoperative review process*

36. Dr C explained to HDC that the consultant would usually conduct a ward round with the registrar and house officer in the morning, and the consultant would issue instructions as to how each patient was to be managed. If the consultant was not available, the registrar would dictate the patients' management plan.
37. Northland DHB advised HDC that nurses base their postoperative priorities on the handover from the post-anaesthesia care unit nurse, who identifies any relevant past medical history and/or any current concerns he or she has been alerted to by the anaesthetist, surgeon, or registrar, in the immediate postoperative period. Northland DHB also advised that during ward rounds the surgeon or registrar would hand over to the senior nurse, or the nurse managing the orthopaedic ward, any critical information about the patient's postoperative care.
38. Northland DHB stated that the "[n]ursing staff do not recall any specific conversation or handover of information in this regard". There is also no record of the Orthopaedic Team handing over to the Nursing Team information about the complexity of managing the balance between Mr A's cardiac issues and his renal impairment.
39. Although the Pre-operative Elective Care Pathway booklet contained information about Mr A's medical history and co-morbidities, Northland DHB advised HDC that

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<sup>10</sup> Dr B worked at Whangarei Hospital part time but was available by telephone at other times.

<sup>11</sup> House officers are junior doctors who have provisional registration with the Medical Council of New Zealand. In their first year, they are expected to meet certain requirements in order to achieve registration under a general scope. House officers are expected to contribute to the running of the hospital wards, and are a primary point of contact for nursing staff during shifts. If the house officer is unsure or has concerns about a patient, he or she is responsible for raising the issue with more senior colleagues.

the layout of the booklet made it hard to find patients' previous medical history or current active problems, as staff had to flick through the booklet to find the information. It further advised that patients' preoperative booklets are kept in the main patient file, and that only "the most recent and relevant notes are transferred to a current local ward/unit file". Northland DHB advised that it is standard practice to transfer patients' preoperative notes to the local ward file, but it does not expect nurses providing postoperative care to actively seek out the information contained in the booklet, unless they have been alerted to the need to do so.

40. The Orthopaedic Clinical Nurse Manager who was working at Northland DHB at the time of these events has since moved overseas, and Northland DHB has been unable to contact her for further comment.

## Day 2

41. On Day 2, Mr A was reviewed by Dr C and Dr H on the morning ward round. Dr C told HDC that Dr H assessed Mr A while she wrote the notes on the TKJR Clinical Pathway.<sup>12</sup> Dr C recorded that Mr A was feeling well and his observations were stable.
42. Dr C said that the format of the TKJR Clinical Pathway, and the speed at which orthopaedic ward rounds were typically conducted, meant that written accounts of the ward round were "very limited". Dr C also stated that if the house officer took a full medical review of a patient, it would be written on a separate Treatment and Progress note because of the limited space in the TKJR Clinical Pathway.
43. Dr C advised that at mid-morning she reviewed Mr A's blood test results, which indicated that a blood transfusion was not needed.
44. The Fluid Balance chart records that between 3am and 10pm, Mr A passed 3250mls of urine. This was incorrectly totalled by an unidentified nurse as 3280mls. (See **Appendix D** for a summary of Mr A's blood pressure and fluid output observations between Day 2 and Day 5.)

## Day 3

45. Mr A was reviewed by Drs B and C during the morning ward round on Day 3. Dr C recorded in the TKJR Clinical Pathway that Mr A was "doing well" and that Dr B's instructions were to remove the drain and catheter, and to restart Mr A's warfarin.<sup>13</sup> Dr C advised HDC that the nursing staff did not raise any concerns about Mr A at that time.

<sup>12</sup> The TKJR Clinical Pathway is the document used by medical and nursing staff to record patients' postoperative progress following TKJR surgery. The TKJR Clinical Pathway consists of one double-sided page for each postoperative day. The first two-thirds of the first page is a checklist for nursing care. Below the checklist, there are five lines for the house officer to record notes from the ward round, and another five lines for nurses and clinicians to record Treatment and Progress notes. The first third of the second page is for the physiotherapist's notes, with the remainder of the page for Treatment and Progress notes.

<sup>13</sup> A medicine used to prevent blood clotting.

*Blood pressure*

46. The records indicate that Mr A's blood pressure was low at 9am and 2pm. It was recorded on the EWS chart at 9am (100/50mmHg), 11am (109/54mmHg) and 2pm (90/52mmHg).<sup>14</sup> RN L told HDC that she informed the house officer about Mr A's low blood pressure before 2.15pm and took another blood pressure reading at that time, which showed that Mr A's blood pressure remained low.<sup>15</sup> In contrast, Dr C advised that despite being available to be contacted all day, the nursing staff did not raise any concerns to her about Mr A.
47. The clinical records show that Mr A's blood pressure remained low, but within normal parameters for the rest of the afternoon and evening.<sup>16</sup> The ward handover sheet given to the afternoon shift RN, RN E, noted Mr A's low blood pressure.
48. RN E advised HDC that he noted the comment about Mr A's low blood pressure at handover, but did not consider it required action because, although Mr A's blood pressure was low, "the Systolic was above 90mmHg at [2pm] and was above 100mmHg during the PM shift, giving him an EWS of zero for most of the PM shift".

*Urine output*

49. Between 1am and 6am on Day 3, the Fluid Balance chart records that Mr A passed 750mls of urine. The night shift RN recorded at 6am in the TKJR Clinical Pathway that Mr A's catheter was "draining good amounts ∅ [nil] concerns voiced".
50. Mr A's Fluid Balance chart records a total urine output of 1225mls between 1am and 4pm (81.7mls/hr), but only a further 75mls between 4pm and 10pm (12.5mls/hr). These measurements were accurately totalled.
51. In relation to Mr A's urine output on Day 3, RN E advised:

"With the Urine output averaging greater than 75mls/hr (sic) from 0000 to 1600, with urine output from 1400 to 1600 averaging 105mls/hr and the patient having drunk over 1000ml from 1500 to 1900, there was little reason to expect a day two patient to have a urine output suddenly drop. Therefore after [4pm], with being busy maintaining all of my patients' requirements and being understaffed for that shift, I would have had to rely upon feedback from others within my team as to [Mr A's] urine output."

52. At 9.45pm, RN E noted the following in the TKJR Clinical Pathway:

"B/P 100/55 @ 2145. [Urine output] low. Please encourage [oral] fluids. Telemetry stopped as per ICU's instructions. [...] IDC to be removed @ 0600 ..."

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<sup>14</sup> On the EWS chart, systolic (the top number in the reading) blood pressure of 80 or less is given a score of 3, 81–89 is given a score of 2, 90–100 is given a score of 1, 101–189 is given a score of 0, and 190 or more is given a score of 2.

<sup>15</sup> During an interview with HDC, RN L advised that the 2.15pm blood pressure was taken on Day 4; however, the notes record that the blood pressure was taken on Day 3. The ward handover sheet records "B.P 95/50 @ 1415".

<sup>16</sup> 100/55mmHg at 4.45pm and 100/58mmHg at 9.45pm.

53. RN E advised HDC that he “would have” discussed Mr A’s low urine output with the house officer, but he could not recall doing so, and there is no reference to the discussion in the notes.
54. RN E further advised HDC that he told the night shift RN, RN F, about Mr A’s low urine output and blood pressure, that the plan was to encourage him to drink more fluids, and that if Mr A’s observations did not improve, to follow up with the house officer. RN E said he told RN F that the Orthopaedic Team had instructed that Mr A’s catheter was to be removed at 6am the following day.

#### *EWS*

55. Mr A’s EWS throughout most of Day 3 was zero, except at 2.00pm, 2.15pm and 4.45pm, when his EWS was 1 in relation to his low blood pressure. However, it was recorded as such only at 4.45pm.

#### **Day 4**

##### *Fluid balance*

56. RN F said that during her shift from 10.45pm on Day 3, to 7am on Day 4 she encouraged Mr A to increase his fluid intake. The fluid balance chart records that Mr A drank a total of 700mls between 1am and 6am, and passed a total of 385mls of urine during the same period (77mls/hr). Mr A’s blood pressure remained low overnight,<sup>17</sup> giving him an EWS of 1 throughout the shift.
57. RN F advised HDC that given Mr A’s EWS of 1, she “would have” informed the other senior RN on duty and the house officer. However, RN F could not recall, and did not document, having done so. The senior RN also does not recall having a conversation with RN F about Mr A.
58. RN F advised HDC that she was concerned about Mr A’s low urine output because he had passed only 55mls between 4am and 6am, and therefore she did not remove the catheter at 6am.

##### *Nursing handover*

59. At 7am, RN F handed over Mr A’s care to the morning shift nurses. RN F advised that she informed the nurses that she had not removed Mr A’s catheter because of her concerns about his low urine output, and that Mr A was to be reviewed by the doctor that morning before the catheter was removed. She said that she also informed the nurses about Mr A’s low, but stable, blood pressure. RN F wrote the following in the TKJR Clinical Pathway:

“IDC [indwelling urinary catheter] still in situ — ↓ [urine output] <30ml/hour,<sup>18</sup>  
↓BP but stable [...]”

60. Mr A’s low blood pressure and low urine output were recorded in the ward handover sheet for the night shift of Day 3.

<sup>17</sup> 92/60mmHg at 1am, 96/57mmHg at 2.30am, 94/60mmHg at 4am, and 94/58mmHg at 5.30am.

<sup>18</sup> The next recording on the EWS was at 9.30am, but no recording was made in relation to urine output at that time. There is no recording in the Fluid Balance chart of what Mr A’s urine output was at 7am.

61. RN L advised HDC that “anything of note will be passed on verbally” at handover, but usually the nurses just read the patients’ notes. She does not recall receiving a handover about Mr A’s care on the morning of Day 4. In response to the provisional opinion, she stated that she believes she was “probably called out to work on the floor and was not able to participate in some or all of the handover that morning”. RN L said that she was working with an enrolled nurse that day and would have expected the enrolled nurses to pass on to her any significant patient information.
62. During the course of the investigation, RN L advised HDC that although she cannot specifically recall reading Mr A’s notes, she believes she would have done so in order to see what the plan was for him that day. She said that she was unaware that RN F had not removed Mr A’s catheter because of concerns about his low urine output.
63. In response to the provisional opinion, RN L stated:

“I was not aware that [RN F] had not removed [Mr A’s] catheter. This suggests that I did not read the nursing notes, although my usual practice was to do so. Sometimes the notes are difficult to access if a night nurse still has them to record in, or a doctor has them. I would have taken [Ms F’s] concern seriously had I been aware of it.”
64. By 8am, Mr A had passed a further 50mls of urine. However, a nurse incorrectly recorded the total amount of urine passed since 1am as 935mls, instead of 435mls.<sup>19</sup>

*Review by the Orthopaedic Team*

65. Dr H reviewed Mr A with Dr C during the ward round that morning. Dr C recalled that the ward round was “even more rushed than usual” as Dr H was required in theatre. Dr C stated that Mr A was one of the last patients seen on the ward round, “therefore increasing the time pressure on [Dr H]”.
66. Dr C advised that Mr A’s telemetry leads had been removed the previous evening, which she thought indicated that Mr A was recovering well. She stated:

“The nursing staff did not raise any concerns about [Mr A] while we were on the ward round and we were not informed of the low BP and low urine output from the previous evening. Telemetry had been removed on the evening shift the night before on the instructions of ICU and I cannot speak for the registrar but I took this to mean there had been no concerns about the patient the previous evening and that [Mr A] was now at less risk of complications than in the first 2 days as ICU did not feel the need to monitor him further.”
67. Dr C told HDC that she was not aware that RN F did not remove Mr A’s catheter because of her concerns about his low urine output. Dr C told HDC that she does not think she read Mr A’s notes prior to the ward round, explaining that the speed in which the ward round is conducted “barely allows time to find the relevant page to write on, let alone read the relevant notes”.

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<sup>19</sup> It has not been possible to verify the identity of this nurse. RN L stated in her response to the provisional opinion that she did not make the incorrect recording.

68. Dr H recalls that Mr A's "general condition was satisfactory" and that no concerns were raised by the nursing staff or Dr C regarding Mr A's condition. Dr H advised HDC that it is standard practice to remove a catheter within 48 hours after TKJR surgery to decrease bacterial colonisation and the risk of infection. As Mr A had had an ongoing epidural and analgesia on Day 3, the catheter was retained for an additional day.
69. Dr C recorded the following in the TKJR Clinical Pathway:
- "Making good progress. Epidural is out. No [bowel movement]. Plan 1) [luer] out 2) catheter out 3) mobilise with physio."
70. Dr C explained that she did not record any comments about Mr A's vital signs or urine output in the ward round notes because the Fluid Balance and Drug charts were not available to her at the time. She believes that the charts may have been with the nurses.
71. The Fluid Balance chart records that the catheter was removed at 8am.
- Further review*
72. Dr C stated in her initial written response to HDC that, at 9.30am, she was informed by a nurse that Mr A had low blood pressure. The EWS chart records Mr A's blood pressure as 90/54mmHg at 9.30am. Dr C told HDC that she reviewed Mr A and recorded her assessment in the Treatment and Progress notes, which were separate from the TKJR Clinical Pathway. Northland DHB has been unable to locate these notes.
73. Dr C recalls that other than the low blood pressure, all other examinations were normal. She stated that she did not consider Mr A's blood pressure to be "alarmingly low", as she took into account Mr A's preoperative blood pressure (103/69mmHg) and that he had had an epidural.<sup>20</sup>
74. In light of her assessment, Dr C charted Mr A a 250ml IV fluid bolus of normal saline at 10.10am to treat his low blood pressure. She asked for nursing staff to repeat his observations following administration of the fluid bolus, with the expectation that she or the other house officer would be informed if there were any further problems.
75. At an interview with HDC, Dr C recalled that during the 9.30am conversation with the nurse about Mr A's blood pressure, the nurse also advised her that Mr A had not passed urine since his catheter had been removed at 8am. Dr C further recalled that she reviewed the Fluid Balance chart and noted that Mr A had had a good intake of oral fluids overnight and that morning.<sup>21</sup> She also stated that she was satisfied with Mr A's total urine output overnight, which was recorded (incorrectly) as 935mls at 8am, and that she would not have expected Mr A to have passed urine since the removal of the catheter.<sup>22</sup>

<sup>20</sup> Low blood pressure (hypotension) is a common side effect of having an epidural.

<sup>21</sup> Between 1am and 9am Mr A had drunk 1000mls of fluids.

<sup>22</sup> When a patient is catheterised, his or her urine drains directly into a bag, allowing the volume of urine output to be measured as the urine is produced. However, in the absence of a catheter, it can take several hours to determine the volume of a patient's urine output. This is because normal voiding of

*Handover to Dr D*

76. Dr C was required in theatre at 10.30am and arranged for Dr D to take over the care of her patients. Dr C said she recalls telling Dr D about Mr A at handover because Mr A was the only patient Dr C had concerns about. Dr C told HDC that she gave Dr D a brief summary of Mr A's medical history and his current postoperative stage, and advised that he had low blood pressure and had been given a fluid bolus, and that Dr D would "need to keep an eye on things".

*Blood pressure and urine*

77. At 11.30am Mr A's blood pressure was 94/58mmHg, warranting an EWS score of 1.
78. RN L advised HDC that throughout her shift she kept mentioning Mr A's low urine output and blood pressure to Dr C, and Dr C's response was to give Mr A IV saline and increase his oral fluids.
79. In her response to the provisional opinion, RN L clarified that at 9.30am she spoke to Dr C about Mr A's low blood pressure and that Mr A had not passed urine since his catheter had been removed. RN L also stated that she spoke to Dr C two or three times during her shift — the first time by telephone and subsequent times in person.
80. However, Dr C told HDC in her response to the provisional opinion that she was contacted only once by RN L. Dr C said that she was not available from 10.30am as she was in theatre. Dr D was on duty from 10.30am until 11pm. When this was put to RN L, she advised that she recalled speaking only to Dr C.
81. RN L advised HDC that she was worried about Mr A's blood pressure and believed that she probably checked it "a lot more than what is recorded". She stated that she may not have recorded all Mr A's blood pressure readings as she was busy with other patients. By 2pm, Mr A had still not passed urine since the removal of his catheter.
82. Dr D recalls that she had only one discussion with a nurse about Mr A, which was at approximately 2pm at the nurses' station. Dr D stated that the nurse told her that Mr A had not passed urine since his catheter had been removed at 10am,<sup>23</sup> but that he was eating and drinking well, and his blood pressure was stable. Dr D advised that she decided not to reinsert the catheter at that time because of the potential infection risk and advised the nurse to do a bladder scan if Mr A did not pass urine in the next hour.<sup>24</sup> Dr D also stated that she did not review the observation chart as the nurse had advised her that Mr A's observations were stable, which Dr D says she took to mean that his observations were normal.
83. RN L told HDC that she scanned Mr A's bladder at 2.30pm and then called the doctor to advise her of the results. RN L stated that the doctor said she would come to review Mr A, and that the doctor did so. The Fluid Balance chart records at 3pm: "[Has not passed urine] bladder scan 179mls."

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urine is dependent on urine volume building up in the patient's bladder — a process that can take several hours.

<sup>23</sup> As stated above, the catheter was removed at 8am that day.

<sup>24</sup> A bladder scan is a non-invasive way of determining the volume of urine in the bladder.



84. Dr D does not recall being informed of the bladder scan results or being updated about Mr A's situation. There is nothing in the contemporaneous record to indicate that Dr D was informed about the results or that she reviewed Mr A.
85. RN L recalls documenting the care she provided to Mr A, and said that she recorded it below Dr C's entry on the Treatment and Progress notes (which are now missing). RN L said she wrote on the Treatment and Progress notes because the full description of the issues did not fit onto the TKJR Clinical Pathway.
86. A number of months after the events,<sup>25</sup> RN L wrote the following retrospective note in relation to the care she provided Mr A on Day 4:

“Patient eating small amounts. Oral fluids encouraged throughout shift ... [Catheter] removed, 50mls recorded on [Fluid Balance chart], patient showered [bowel not opened], [has not passed urine] on toilet? ... [T]ransferred back to bed as [patient] feeling light headed. Routine observation showed ↓low B.P, end of bed elevated, O<sub>2</sub> stats ↓, oxygen therapy applied. [House officer] notified of ↓B.P, oral fluids encouraged as per plan. Hypotension consistently low, manual B.P recorded, [patient has not passed urine] since IDC removed. [Normal]/saline 250ml charted and given, scant wound ooze on [dressing], oral fluids recorded.

Patient [has not passed urine] @ [3pm]. Bladder scan done the results 179mls as per [Fluid Balance chart]. Handed over care to PM shift staff verbally updated patient current situation with [house officer] and staff caring for patient.”

87. Although RN L's retrospective account records that she advised the house officer of the results of the bladder scan, and that Mr A had not passed urine, as noted above, this is not Dr D's recollection.

*Handover to afternoon staff*

88. At 2.45pm, RN L handed over Mr A's care to RN I and RN K. RN L had not recorded Mr A's blood pressure since 11.30am. RN L advised HDC that she told RN I and RN K that Mr A had not passed urine since the catheter had been removed, that he had low blood pressure, and what she and the doctor had done for him that day. The Ward Handover sheet for the evening shift notes Mr A's low blood pressure, but not his urine output.
89. Mr A did not pass any urine between 2.45pm and 11pm. At 3pm, Mr A's Fluid Balance chart records that the bladder scan taken at 2.30pm showed 179mls, and that Mr A was given 500mls of water. At 4pm, the Fluid Balance chart records that Mr A was given a further 1000ml of water.

*Saline order*

90. By 8pm, Mr A had still not passed any urine, and his blood pressure was low (87/53mmHg).

<sup>25</sup> This was the same date on which Northland DHB wrote to Mr A's daughter, Ms G, summarising the findings from its review of the care provided to Mr A, and the steps it had taken to improve its service.

91. RN I recalls having a conversation with another nurse and Dr D about Mr A's low urine output at that time, and whether they needed to reinsert the catheter. RN I cannot remember Dr D's response.
92. Dr D does not recall being informed about Mr A's low blood pressure or urine output at that time. However, Dr D accepts that she must have been informed about Mr A's low blood pressure, as the notes indicate that at 8pm she requested, over the telephone, that Mr A be given a 500ml bolus of normal saline. Dr D believes that she would have been on another ward or in ED at this time. RN I cannot recall this telephone conversation with Dr D.
93. Dr D advised HDC that, had she been aware that Mr A had still not passed urine, she would have prioritised Mr A for review. Dr D further stated that she regrets not having signed off the phone order for normal saline, as this would have enabled her to identify Mr A's low urine output and then progress to a fuller review.
94. At 8pm RN I gave Mr A a 500ml bolus of normal saline. The running total of IV fluids given to Mr A that day was now 750mls,<sup>26</sup> but this was recorded (incorrectly) as 500mls. By 9.15pm, Mr A's blood pressure had increased to 112/63mmHg.

#### *Bladder scan*

95. At 11pm, RN I took a bladder scan, which showed 159mls<sup>27</sup> of urine. RN I believes that the bladder scan would have been done in consultation with Dr D, prior to handing over to the night shift staff. RN I believes she would have passed on her concerns about Mr A's low blood pressure and lack of urine output to the night shift RNs. She documented the following in Mr A's TKJR Clinical Pathway:

“[E]pi cath removed, warfarin restarted, HNPUEd [has not passed urine] H/O notified bladder scanned 159 mls pt doesn't feel like he needs to go [no] further order. BP ↓ given 500mls stat now ↑112/63 patient asleep@ time of notes.”

96. Dr D does not recall being alerted to concerns about Mr A's urine output or being advised of the results of the bladder scan at 11pm. She said that had she been advised, she would have handed over the information to the night house officer. There are no records of a handover to the night house officer. The notes on the Ward Handover sheet for the night shift mention Mr A's low blood pressure, but not his urine output.

#### *Night shift*

97. The night shift RN, RN J, noted in the TKJR Clinical Pathway that Mr A slept well. However, he advised HDC during the course of the investigation that he cannot recall Mr A or speaking to any nurses or doctors about him.
98. In response to the provisional opinion, RN J stated that he does not recall anything of concern being said about Mr A at handover, including that Mr A had not passed urine for a long period of time. RN J advised that had he known this, he would have

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<sup>26</sup> This was in addition to the water given to Mr A at 2.30pm and 4pm.

<sup>27</sup> The Fluid Balance chart records this as being 156mls.

encouraged fluids, put in a catheter, conducted a bladder scan, informed the house surgeon and asked for fluids to be charted.

99. The night shift house officer, Dr M, also has no recollection of Mr A. There is no evidence that Mr A was reviewed by Dr M, and RN J does not recall seeing the house officer during his shift.
100. One litre of normal saline was charted for Mr A to be administered at 1.30am on Day 5. This was recorded in the Daily IV Prescription form for Day 4. The bolus of normal saline was not given to Mr A.
101. RN J stated in response to the provisional opinion:

“Looking back now on the [Day 4] chart, it seems that a doctor came at 1.30am and recorded a normal saline prescription (the other alternative is that the saline order is actually made at 1.30am on [Day 4] (when I was not on duty)). However, that is recorded on the [Day 4] chart, which I stopped using, as it was now [Day 5].

As I was not looking out for new doctor’s orders, not being aware that a doctor or prescription was expected, I did not look back to the chart of what was now the day before. I was on the [Day 5] chart.

The 1am to 3am period is when patient rolls are done on the ward. If I was assisting other staff with rolls, then the doctor could have come and charted something without me being aware of him being on the ward.

I would certainly have administered the saline if I had been aware that it was charted.”

102. RN J did not record anything about Mr A’s urine output during his shift, and no oral fluids were recorded on the Fluid Balance chart for the duration of his shift. RN J recorded Mr A’s blood pressure on the EWS chart at 2am (108/65mmHg) and at 6.45am (95/52mmHg).
103. In his response to the provisional opinion, RN J stated: “I believe that [Mr A] did not pass any urine during the night, and that is why I have not recorded any output amounts for him on the Fluid Balance Chart.”
104. RN J also stated that he does not accept that his provision of care to Mr A was suboptimal, and believes that during his shift, the ward was short staffed, and that this may have been a factor in the level of care he was able to provide to Mr A.

## Day 5

105. RN N could not remember the handover she received about Mr A at 7am on Day 5. The Ward Handover sheet mentions Mr A’s low blood pressure but not his urine output. At 7am, the Fluid Balance Chart records that Mr A had not passed urine. It was now 23 hours since the removal of his catheter.

106. When Dr C arrived on the orthopaedic ward at 7.30am, she was told by nursing staff that Mr A had not passed urine overnight and had ongoing low blood pressure. Dr C reviewed the EWS and Fluid Balance charts, and realised that there was no record of Mr A having passed urine since the catheter had been removed.

107. Dr C then examined Mr A and, in the course of the examination, Mr A vomited blood. Dr C inserted an IV luer, took bloods, and requested a third bladder scan. Dr C recorded in the Treatment and Progress notes at 10.12am:

“ATSP re: No urine output since catheter removed yesterday morning. Had had 935ml urine output up till catheter out yesterday. Given 500ml bolus last night — no response charted 1L overnight which wasn’t given. Bladder scan this am 240ml. BP has been low = 90/50 overnight. Had coffee ground vomit this am when reviewing him 350ml blood on dipstick...”

108. Dr C said that when Dr B and Dr H arrived on the ward, she informed them of Mr A’s situation. Dr C said that she then returned to Mr A while Dr B and Dr H did a ward round of the other patients. Dr C charted IV fluids for Mr A, and these were given to him at 8.45am.

109. Dr H and Dr B reviewed Mr A at 9am as part of the ward round.

110. Dr B recorded in the clinical record:

“Was progressing well. Wound dry. Just able to [straight leg raise]. Flexion to 90 yesterday. Haematemesis<sup>28</sup> this morning.

Plan

1. Bloods
2. Stop warfarin
3. Losec
4. Medical input”

111. At 10.12am, Dr C recorded that the bladder scan she had requested that morning showed 240mls of urine in the bladder. Dr C charted further IV fluids for Mr A and inserted a urinary catheter. The results of the blood test indicated renal failure, and Dr C contacted a medical registrar to request a review. The registrar saw Mr A at 11.30am and discussed a management plan with Dr C.

112. Dr C followed the management plan, started Mr A on omeprazole, and continued IV fluids. As there appeared to be no improvement by the afternoon, Dr C asked the renal team to review Mr A. The renal team considered his renal failure to be pre-renal<sup>29</sup> in nature. The documented management plan included cautious IV therapy, daily blood tests for urea and electrolytes, and a strict Fluid Balance chart.

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<sup>28</sup> The vomiting of blood.

<sup>29</sup> A response to acute kidney failure.

113. At 8.30pm the nursing notes record that Mr A's urine output remained at less than 5mls per hour. Mr A was "vague" in his responses to conversations, and was falling asleep during dinner. The nurse on duty was awaiting review by Dr C.
114. Dr C explained that she was "on call" for the surgical wards that evening, and was not able to see Mr A as often as she would have liked. After being contacted by the nurse, Dr C saw Mr A briefly before she was called away to another ward. Dr C told HDC that she recognised that she did not have the experience "to know what else should be done [for Mr A] and with the demands from the other wards I was not able to give [Mr A] the time he needed for thorough review". Dr C contacted the on-call orthopaedic registrar, who reviewed Mr A and charted one unit of red blood cells.
115. At 11pm, Dr C handed over Mr A's care to the night shift house officer, with instructions to review Mr A after the blood transfusion.

### **Day 6**

116. In the early hours of Day 6, Mr A's condition deteriorated further. At 4.45am the nursing notes record that Mr A's EWS was 4 and 5, and that the house officer was "contacted at least two times during the shift". The nursing notes also state that a house officer reviewed Mr A at 3.30am and a chest X-ray was ordered, but before it could be taken, Mr A went into cardiac arrest. Mr A was not able to be resuscitated and, sadly, he died.
117. Mr A's daughter, Ms G, advised HDC that no contact was made with Mr A's family or next of kin when his condition deteriorated. After Mr A died, staff first tried to telephone his friend, who, the DHB advised, was listed as his contact person on a previous hospital admission record. That friend had since died and staff initially spoke to the friend's widow. Contact was then made with Mr A's sister. Ms G is concerned that this added to the delay in contacting Mr A's next of kin following his death.

### **Dr B's comments**

118. Dr B advised HDC that Mr A's blood pressure could not be considered "alarmingly low" on Day 3 in light of his preoperative blood pressure being 103/69mmHg. Dr B stated that this would indicate that Mr A's usual blood pressure was relatively low, and that his blood pressure had "dropped slightly" at 2pm. Dr B also advised that on Day 3, Mr A's urine output remained satisfactory, and therefore "would not in itself be a sign for urgent referral to a medical physician as Mr A, at that time, was still stable".
119. Dr B stated that the calculation and recording errors were made by the Nursing Team on Day 3 and 4, and that the Orthopaedic Team does not usually calculate the addition of urine output on the Fluid Balance chart. Dr B further stated that after the removal of the catheter:

"[i]t can take several hours before determining what the urine output is, as this is dependent on the urine volume building up in the bladder to allow normal voiding. Therefore calculation of urine output in the absence of a catheter can be delayed as was the case with [Mr A]."

120. Dr B stated that it would be unfair to blame solely the house officers for failing to recognise Mr A's deteriorating condition. He stated:

“[The blood pressure] changes were subtle, not alarming and with inaccurate urine output recordings made it very difficult to predict the eventual deterioration in [Mr A's] condition ...”

121. Dr B further advised HDC that if a patient is identified as deteriorating, the usual sequence of events would be for the house officer to contact the orthopaedic registrar on call for advice. The registrar may institute treatment, or request input from another speciality such as the medical team, or from the orthopaedic consultant (either on call or the consultant in charge of the particular patient). However, Dr B said that he was not contacted regarding any deterioration in Mr A's condition prior to Day 5.

### **Dr H's comments**

122. Dr H advised that where a patient has low urine output, the general process is for a house officer review in the first instance, rather than review by a registrar.

### **Northland DHB**

#### *Meeting with family*

123. In May 2010, Northland DHB met with Ms G and her family. During the meeting, Northland DHB apologised for not calling Ms G or other members of Mr A's family when his condition deteriorated. Northland DHB advised: “It is a difficult decision to know at what point to call in family in such circumstances.”

#### *Response to the complaint*

124. Northland DHB advised HDC that Mr A's preoperative and postoperative care were the subject of Morbidity and Mortality reviews by the Anaesthetic Team and the Multidisciplinary Team.<sup>30</sup> Reports from those reviews were presented to the Medical Executive Leadership Team. Following the reviews, Northland DHB acknowledged that the care Mr A received was not as good as it could have been, and that an escalation of care could have occurred earlier.
125. Northland DHB noted that it is “advanced in the implementation of systems for detecting deterioration and responding to the patient needs”, pointing to the EWS, the Acute Life Threatening Events and Recognition and Treatments (ALERT) course; and remote monitoring from ICU as examples.<sup>31</sup> It considers that the failure to escalate Mr A's care was partly due to “staff culture”, and partly about improving the teams that respond.

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<sup>30</sup> The Multidisciplinary Team included the Clinical Director of Surgical Services, the clinical heads of Department of Medicine, Renal, and ICU, two house officers, an intensivist, a renal physician, the Acute Services Manager, the Outpatient Services Manager, and the Director of Nursing.

<sup>31</sup> The ALERT Course information document states that it is “a multi-professional course to train staff in recognising patient deterioration and act appropriately in treating the acutely unwell”. The expected results from attending the ALERT course include earlier and more appropriate referrals to the ICU, fewer avoidable in-hospital deaths, improved multi-professional teamwork, improved communication, and fewer complaints from patients and their relatives.

126. Northland DHB’s Chief Medical Officer clarified that “staff culture” referred to the following:

“I believe the culture issue referred to is the very widespread reluctance for junior staff to involve their seniors when issues arise out of hours. There are many underlying reasons for this reluctance which has been an issue in the many different hospitals I have worked in across New Zealand and the UK. Sometimes juniors are concerned that calling their consultants will cause annoyance, sometimes they feel the need to prove their capability to a consultant. Changing this culture is difficult and takes a great deal of time. Changes are also very difficult to measure.”

127. The Chief Medical Officer further stated:

“Since I became Chief Medical Officer here,<sup>32</sup> I have taken many opportunities to impress upon junior staff the importance of escalating concerns in a timely fashion, with a reassurance that if they ever received a discouraging response from a consultant, I will personally intervene.”

128. Northland DHB also said that the discrepancy in the documentation was “unacceptable” and it acknowledged that the monitoring and management of Mr A’s fluid balance was “inadequate”. Northland DHB’s Clinical Director of Acute Services stated that as there were different nurses caring for Mr A each day, “[t]his limits the potential for highlighting competence issues with any one nurse”. Northland DHB further advised that at the relevant time, five different Fluid Balance charts were being used across the organisation, “contributing to issues of monitoring, accuracy and compliance”.

129. In relation to the TKJR clinical pathway, Northland DHB advised that the forms were “restrictive” and that this “may have [led] staff to be narrowly focussed in their evaluation of post-operative conditions rather than encouraging overall review of a patient’s progress”.

*Staffing levels — nursing*

130. RN E provided HDC with the Trend Care Ward Work Allocation Report for the afternoon shift on Day 3, which shows that while 47 hours and 35 minutes of nursing care was required for that shift, only 43 hours and 15 minutes of nursing time was available.<sup>33</sup>

*Staffing levels — medical*

131. Dr D and Dr C provided cover for each other when they were required elsewhere, such as assisting in theatre. Dr D provided cover for Dr C’s patients on Day 4 between

<sup>32</sup> The Chief Medical Officer was appointed in January 2012.

<sup>33</sup> Trend Care is the software used by Northland DHB to record patient acuity and care needs and staffing requirements. The Trend Care “Ward Work Allocation Report details the anticipated hours of nursing care that each patient will require for that shift to give a total “required hours” of nursing care. This is then compared to the “available hours” of nursing care and any variance between the two is recorded. Clinical information about Mr A was also recorded on Trend Care’s electronic Ward Handover Sheet at the end of each shift.

10.30am and 11pm. Between 4pm and 11pm on Day 4, Dr D was responsible for at least 74 patients, as she was the only house officer responsible for patients on the orthopaedic ward and the general surgical ward, and she was also responsible for ED admissions for all the surgical teams.

132. On reviewing the Duty Manager reports and Trend Care records, Dr D told HDC that the nights between Day 3 and Day 5 were “particularly busy”, and noted that on the evening of Day 4, six patients were awaiting acute theatre, and there was a status two<sup>34</sup> transfer to the Emergency Department (ED) following a fatal motor vehicle accident. Dr D advised: “It is likely that [the] ICU, Orthopaedic and General Surgical Registrar would have been occupied assessing and treating patients from [the motor vehicle accident], and not available to assist with ward reviews or advice.”
133. During the course of this investigation, HDC asked Dr D if she “was comfortable with her workload” on Day 4. Dr D replied that although she could not specifically recall the evening of Day 4, she felt that for the first three months of her employment she did not know whether she was struggling because she was “new and not good” or whether it was a high workload. She told HDC that she was learning about when it was “OK to call for help for routine jobs”.
134. Dr C advised HDC that it was often difficult to speak to registrars in the evenings as they would often be in theatre and their availability to review patients on the ward was dependent on how busy they were in ED or in acute theatre.
135. Northland DHB advised HDC that when junior staff are required to take on a high case load of patients, the following support is available to them:
  - (i) Registrars and consultants from the relevant clinical teams. In this case that would have comprised primarily the orthopaedic registrar and consultant, but in addition, the house officer is able to seek support when required from registrars and consultants from other teams.
  - (ii) Other house officers on duty — most relevant in this case would have been other orthopaedic house officers but, particularly after hours, house officers from different specialties will sometimes help out one another.
  - (iii) Nursing staff — senior nursing staff are able to assist with some house officer duties such as phlebotomy<sup>35</sup> and insertion of IV lines when house officers are busy.
  - (iv) The duty manager monitors the overall demands on services and workloads of clinical staff, especially after hours, and is available to provide support to the house officer and to call in more senior staff to assist if required.

#### *Changes made following the complaint*

136. Northland DHB advised HDC that it has taken the following steps to improve patient care:

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<sup>34</sup> Status two means the patient’s condition is serious, with a potential threat to life.

<sup>35</sup> Taking blood.



### Preoperative care

1. Guidelines have been developed by the Renal Service for the Pre-Assessment Clinic and Surgical Inpatient Teams, on assessment and management of surgical patients with chronic kidney disease (CKD).<sup>36</sup>
2. Pre-assessment clinics are commenced 30 minutes earlier, in order to allow time specifically for review of abnormal investigation results and planning of appropriate responses to these, including referral. Anaesthetists now take responsibility for all blood test results ordered at pre-assessment clinics.
3. Pre-assessment nurses specifically highlight patients with impaired renal function, alert anaesthetists, and place a note on assessment booklets that the renal team should be notified when the patient comes in for surgery. Anaesthetists now also call renal physicians if they have a patient on the list with significant renal impairment.

### Postoperative care

1. Anaesthetists now routinely provide more comprehensive input into postoperative care in the first 24 hours, including prescription of fluids, standing orders for oxygen, and telemetry for high risk patients.
2. A general physician/gerontologist now carries out ward rounds twice weekly on the orthopaedic ward to review patients with significant medical co-morbidities, and provide additional advice and teaching to the orthopaedic RMOs and nurses. This service commenced in June 2010.
3. A Rapid Response Team (RRT) nurse now provides an outreach service to all wards for patients who become physiologically unstable. In addition, ICU registrars are now available as part of the RRT, 24 hours per day. The RRT service commenced in September 2010. This service provides much more regular and consistent review and follow-up of all seriously unwell patients throughout the hospital, and cases are discussed with ICU consultants at the morning ICU handover and at a late afternoon/early evening meeting of the RRT nurse, ICU registrar and ICU consultant.
4. The orthopaedic team has been undertaking a review of the Clinical Pathway form used for TKJR.
5. Ward nursing care has been improved in a number of ways:
  - redesigning the Fluid Balance chart to encourage nurses to monitor total fluid balances at three-hourly intervals and again at the end of their shift;
  - amending the layout of the EWS chart by moving urine output from the bottom to the top;

<sup>36</sup> These provide specific guidelines for management of patients having surgery who have been diagnosed with CKD and do not meet the criteria for referral to the renal clinic.

- including the EWS and fluid balance total for each shift in the Ward Handover sheet;
  - all staff on the orthopaedic ward, including house officers, have attended ALERT;
  - improvements have been made regarding verbal handovers between nursing and medical staff with the utilisation of the Situation, Background, Assessment, Recommendations model (SBAR). This ensures accurate relevant information is communicated in a clear and concise manner;
  - the Team Nursing model in the orthopaedic ward has been reviewed so that teams are now smaller and a resource nurse is notified of any acute changes with each patient; and
  - a new position has been created for a Quality Nurse, who is responsible for auditing nursing practice. Audits are reviewed at monthly ward meetings, and ongoing education continues weekly with nurse participation included in their professional development portfolio.
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## **Response to the Provisional Opinion**

137. Dr B, Dr H, Dr D, RN F and RN E had no comments to make on the provisional opinion. The comments of Northland DHB, Dr C, RN L and RN J are incorporated into the Facts Gathered section where relevant.
138. In addition to RN L's comments above, she also advised HDC of a number of changes to the orthopaedic ward since the time of Mr A's death, as follows:
- there is now more thorough and detailed handovers of the ward;
  - there is better identification of complex patients when they are coming into the ward, and patients' pre-assessment books are readily available in their clinical documentation;
  - there appears to be better communication between doctors and nurses, and a greater sense of teamwork among the two professions; and
  - doctors' rounds are "not so rushed" and the RRT has made a "big difference". RN L stated that "[i]t is very helpful to have them available if junior doctors are not".
139. Northland DHB's Director of Nursing and Midwifery, Ms O, provided substantive comments in relation to my proposed recommendations. She advised HDC that in August 2012, a new Clinical Nurse Educator (CNE) was appointed to the orthopaedic ward, and the orthopaedic CNE and renal CNE work together to provide in-service education on cardio-renal syndrome for the orthopaedic ward.

140. Ms O advised that the TKJR Clinical Pathway form has been reviewed and amended to improve communication between staff and encourage documentation of concerns. She also informed HDC that clerical staff have in place a process to ensure patient records are properly integrated. She advised that various ongoing education sessions on accuracy of recording and calculations have been occurring since 2010, including the initial review of Mr A's case by the then Clinical Nurse Manager and Resuscitation Coordinator. In-service education on Fluid Balance charts and clinical handover have occurred, with these topics being regular agenda items on the monthly ward meetings.
141. Ms O advised HDC that there is now a "bedside handover" process where the nursing team hand over care at the patient's bedside at the beginning and end of each shift.
142. Ms O advised that Northland DHB will also be implementing the "handover module" this year, which will focus on reviewing handover at each step of the surgical patient's hospital journey. She stated that the module encourages the use of the SBAR communication framework to ensure that the patient's medical background, history and current issues relating to co-morbidity are consistently covered in the handover process, and to ensure that information is escalated in a crisis. Ms O also advised that "huddles" are now occurring, which are regular "touch points" for nurses throughout their shift.
143. Finally, Ms O advised HDC that house officers' contracts have been amended to include a 15-minute "protected handover time" where patients who need to be followed up by the night house officer are flagged. Ms O stated that previously, this process did not always occur and, if it did, it was ad hoc. The formal house officer handover is led by the Rapid Response nurses.

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## Opinion: Breach — Northland District Health Board

### Introduction

144. The complexities of modern medicine require that clinicians work in highly organised, multidisciplinary teams, with each team member responsible for directing their specialist capabilities towards achieving common goals for patients. It is essential that teams consistently communicate well with one another to ensure that a safe and seamless service is provided to the patient. It is also essential that clear communication is accompanied by accurate documentation. Clear communication and accurate documentation form two of the layers of protection that operate to deliver seamless care.<sup>37</sup> When any one or more of those layers do not operate optimally, there is potential for the patient to be harmed.<sup>38</sup>

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<sup>37</sup> Health and Disability Commissioner Anthony Hill, "Consumer-centered Care — Seamless Service Needed" (*NZ Doctor*, 24 August 2011) (available from [www.hdc.org.nz](http://www.hdc.org.nz)).

<sup>38</sup> See also Opinions 09HDC01883 and 10HDC00805.

145. If a patient is at high risk of developing complications, either during surgery or postoperatively, a holistic approach to the needs of that patient ought to be taken to achieve the best possible outcome in the circumstances.<sup>39</sup>
146. Mr A was a high-risk candidate for TKJR surgery because of his co-morbidities. Once the Orthopaedic Team decided to proceed with surgery, a heightened awareness of the complexities of Mr A's condition was required. Northland DHB and the teams involved had a responsibility to take all reasonable steps to ensure that the services were provided with reasonable care and skill,<sup>40</sup> that there was co-operation among the providers,<sup>41</sup> and that potential harm to Mr A was minimised.<sup>42</sup> Ultimately, poor communication, coupled with inaccurate and inadequate completion of documentation contributed to Mr A not receiving an appropriate standard of care.

### **Communicating Mr A's co-morbidities**

147. Mr A required close attention in the postoperative period because of his co-morbidities. This information needed to be communicated to the clinicians and nursing staff to ensure that Mr A received appropriate and seamless care.
148. Northland DHB advised that it was the surgeon's or registrar's responsibility to hand over any critical information to the nurse managing the orthopaedic ward. Mr A's co-morbidities were known to the Orthopaedic Team and were recorded in the Pre-operative Elective Care Pathway booklet, which was available to all clinicians for review. However, Northland DHB advised that nurses were not expected to actively seek out information contained in the booklet unless they had been alerted to do so. The Nursing Team does not recall any specific conversation or handover of information about Mr A's co-morbidities and the complexity of managing the balance between his cardiac issues and his renal impairment in the postoperative period. It appears that critical information about Mr A's co-morbidities and the need for close monitoring were not effectively communicated to the Nursing Team.

### **Recognising a deteriorating patient**

#### *Early signs of deterioration*

149. On Day 3, Mr A's blood pressure dropped and his urine output declined. RN L advised HDC that she informed the house officer about Mr A's low blood pressure before 2.15pm, but this is not Dr C's recollection. RN E believes that he would have alerted the house officer to Mr A's decreased urine output during his shift on the afternoon of Day 3, but there is nothing in the clinical notes to indicate that such communication took place.
150. My Renal Physician expert, Dr Grant Pidgeon, advised that the blood pressure and urine output recordings at that time should have alerted the Orthopaedic Team to review Mr A more closely, repeat blood tests, and seek assistance from appropriate colleagues, such as an intensive care or a renal physician. Dr Pidgeon also stated that

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<sup>39</sup> Code of Health and Disability Services Consumers' Rights, Right 4(4) and Clause 4.

<sup>40</sup> Code of Health and Disability Services Consumers' Rights, Right 4(1).

<sup>41</sup> Code of Health and Disability Services Consumers' Rights, Right 4(5).

<sup>42</sup> Code of Health and Disability Services Consumers' Rights, Right 4(4).

the afternoon shift nurses should have also made a request for medical review, as Mr A produced only 75mls of urine between 4pm and 10pm that day.

151. However, my Orthopaedic Surgeon expert, Dr Denis Atkinson, opined that Mr A's care on the second postoperative day was of an appropriate standard. This is also the view of my Nursing expert, Amanda Burton. Ms Burton advised that Mr A's blood pressure was similar to recordings taken the previous day, and was therefore considered to be stable for him. Ms Burton further advised that RN E's plan to encourage fluids overnight was adequate as it was reasonable to assume that this would remedy Mr A's low urinary output. Ms Burton does not consider that it was necessary at this stage to contact medical staff, as Mr A was considered to be stable. I further note Dr B's comment that the decrease in Mr A's blood pressure was a "relatively small drop" in light of his normal blood pressure prior to surgery and, therefore, his blood pressure on the second postoperative day would not, in itself, be cause for alarm.
152. Although Mr A was showing early subtle signs of deterioration on Day 3, he remained in a stable condition. I consider that the Nursing Team responded appropriately by encouraging fluids and continuing to monitor Mr A's blood pressure.

*Removal of catheter and ward round review*

153. At 7am on Day 4, RN F documented her decision not to remove Mr A's catheter because of her concerns about his low urine output overnight. She told HDC that she relayed this information to the nurses at morning handover. RN L does not recall receiving a handover about Mr A but believes that she would have seen the notes; however, she also stated that she was not aware of RN F's decision not to remove Mr A's catheter because of his low urine output, which RN L acknowledged suggested that she did not read the notes despite it being her usual practice.
154. Dr C stated that during the ward round that morning, the Nursing Team did not mention any concerns about low blood pressure or urine output, and the Fluid Balance chart was not available to her for review. Dr C also stated that she does not think that she read the nursing notes for Mr A on the morning of Day 4 because of the speed at which the ward round took place, and she was not aware of the reason for RN F's decision not to remove Mr A's catheter. Following the ward round, the Orthopaedic Team instructed the removal of the catheter, and it was removed at 8am.
155. If RN L did read the notes, she would have known that Mr A's urine output and blood pressure were low. Ms Burton advised that RN L should have discussed concerns about Mr A's condition with the Orthopaedic Team. RN L recalled that she spoke to Dr C on several occasions during her shift; however, Dr C recalled being contacted by a nurse on only one occasion that morning, at 9.30am. Dr C stated that she was in theatre after 10.30am and therefore was not available. Ms Burton advised that if the Orthopaedic Team instructed the removal of the catheter, RN L should have delayed its removal until she confirmed with the Team that it was aware of Mr A's condition. Ms Burton considered that RN L's failure to carry out the above was a moderate departure from accepted standards.

156. Dr Pidgeon advised that it would not be appropriate to blame nursing staff for not raising concerns. He further stated that the ward round review by the Orthopaedic Team on Day 4 appears to have been inadequate because Mr A's condition should have prompted a thorough medical review, which would include a review of the observations chart, Fluid Balance and Nursing notes.
157. I agree that a thorough medical review ought to have been done that morning. Although I accept that it was ultimately the responsibility of the Orthopaedic Team to do so that morning, I am cognisant of the fact that while the Nursing Team may have had some appreciation that Mr A's declining urine output was an indication of early deterioration, any concerns they may have had at the time were not communicated to the Orthopaedic Team. The Orthopaedic Team did not have the full picture of Mr A's condition, and I accept Dr Atkinson's view that, in all the circumstances, Dr C's review did not deviate from accepted standards.
158. In essence, the lack of communication within the Nursing Team and between the Nursing Team and the Orthopaedic Team, coupled with the Orthopaedic Team's and the Nursing Team's apparent failure to read the notes, led the Orthopaedic Team to believe that Mr A was recovering better than he actually was. Therefore the decision was made to remove the catheter, which in turn contributed to the subsequent delay in recognising that Mr A was not passing urine. These failings meant that Mr A's right to seamless service was, once again, compromised.

*Recognition of deterioration by house officer*

159. It appears that the first time a doctor was alerted to concerns about Mr A's low urine output was at 2pm on Day 4, when Dr D was told that Mr A had not passed urine since the removal of his catheter. However, Dr D said that she was told that Mr A's catheter had been removed at 10am, rather than 8am, and that Mr A's blood pressure was stable. Dr D stated that she therefore did not consider that it was necessary to review Mr A.
160. RN L advised that she conducted a bladder scan at 2.30pm and communicated the scan results to the doctor. However, Dr D does not recall receiving any update about Mr A at that time, and there is no record of Dr D being informed about the scan results.
161. At 2.45pm, RN L handed over Mr A's care to RN I. RN L stated that she advised RN I that Mr A had not passed urine since the catheter had been removed. RN I recalls discussing her concerns about Mr A's urine output with Dr D, but she cannot recall Dr D's response. In contrast, Dr D does not recall being alerted to any concerns about Mr A's urine output after the conversation at 2pm. Dr D recalls only that in the evening she received a telephone call from a nurse about Mr A's low blood pressure, and that she signed off an order for normal saline at 8pm.
162. RN I stated that at 11pm, following a discussion with Dr D about Mr A's low urine output, she scanned Mr A's bladder. This is supported by the contemporaneous notes: "HNPU [has not passed urine] H/O notified bladder scanned 159 mls." However, Dr

D does not recall having a discussion with RN I about Mr A's urine output or being told the results of the bladder scan at 11pm.

163. Dr D stated that if she had been aware of the bladder scan results, she would have handed over the information to the night shift house officer. Neither the night shift house officer nor the night shift nurse can recall the handover they received about Mr A. The Ward Handover sheet does not mention any concerns about Mr A's urine output.
164. In light of RN I's contemporaneous documentation, I consider that RN I did advise Dr D of Mr A's low urine output at around 11pm when the bladder scan was conducted, and the result of that scan was communicated to Dr D.
165. Dr Atkinson advised that he would have expected the house officer, on being alerted to the nurse's concerns about Mr A's urine output on the evening of Day 4, to have examined Mr A, including a review of his fluid balance and blood pressure. Dr Atkinson stated that he would also have expected the house officer to have requested a blood test and, on recognising Mr A's oliguric state,<sup>43</sup> the house officer ought to have contacted a more senior colleague to assist in the diagnosis and management of Mr A's condition.
166. Dr D submitted the following in relation to Dr Atkinson's comment:

“I agree that best practice would have been as [Dr Atkinson] states and I regret that the moderate departure from a standard of care is likely due to being otherwise occupied with reviews on other wards, admissions and essential tasks (IV lines etc) throughout the evening and not triaging his situation above these tasks. At that time I was a junior house officer in my 11<sup>th</sup> week since graduating. Now that I have more experience I am better able to recognise when I need to seek help if unable to deal with all patients in a timely manner due to workload.”

167. At the time of these events, Dr D, in her eleventh week as a house officer, was responsible for 74 patients between 4pm and 11pm on Day 4, including being the only house officer responsible for patients on the orthopaedic and general surgical wards, and ED admissions for all the surgical teams.
168. In light of Dr D's response, Dr Atkinson considered that Dr D provided an appropriate standard of care given Dr D's experience and work environment. Dr Pidgeon's view was that it would not be fair to blame solely the house officers, as they were not skilled in dealing with complex medical complications, and that “support from medical specialities and ICU should be available and preferably in a proactive rather than reactive manner”.
169. As this Office has previously commented, “[j]unior doctors will inevitably find themselves out of their depth at times”.<sup>44</sup> District health boards have a responsibility to ensure that junior doctors are adequately and appropriately supported in the event

<sup>43</sup> A diminished capacity to form and pass urine.

<sup>44</sup> Opinion 08HDC04311.

that they face a situation in which they are out of their depth.<sup>45</sup> This includes a safety net of vigilant senior nurses and readily available consultants, and a culture where it is acceptable and commonplace for questions to be asked, to and from any point in the hierarchy, at any time.<sup>46</sup>

170. I agree with both Dr Pidgeon's and Dr D's comments above. Proactive support is particularly important for junior doctors, who cannot always be expected to know when it is necessary or appropriate to ask for help. Therefore, it is incumbent on senior doctors to provide supervision and oversight at the level commensurate with the experience and competence of the junior doctor. In my view, a more proactive approach to senior support for house officers should have been taken in light of Dr D's limited level of experience at the time.

*Night shift*

171. RN J advised HDC that he did not make any recordings about Mr A's urine output because Mr A did not pass any urine and because he was not told at handover of any concerns about Mr A. RN J also does not recall seeing a house officer on duty during his shift, and he advised HDC that, had he known about Mr A's low urine output, he would have discussed it with the house officer. RN J also stated that he was not aware that saline had been charted for Mr A at 1.30am on Day 5 because it was recorded in the Daily IV Prescription form for Day 4.
172. The Daily IV Prescription form, dated Day 4, recorded: "0130 N/Saline 1L 150 [MI/hour]". The Treatment and Progress notes at 10.12am on Day 5 record: "...charted 1L overnight which wasn't given". It appears that one litre of saline was intended to be administered to Mr A at 1.30am on Day 5 but was charted on the Daily IV Prescription form for Day 4 and, therefore, RN J was not aware that he had to administer the saline to Mr A on Day 5.
173. Ms Burton advised that RN J's failure to make the relevant recordings was a severe departure from accepted standards. If RN J knew about Mr A's low urine output, he should have discussed this with the night shift house officer, encouraged oral fluids, conducted another bladder scan, commenced IV fluids, and initiated urea and electrolyte blood tests. She advised that RN J's failure to do so also amounted to a severe departure.
174. Although I am critical of RN J's failure to make the relevant recordings, I consider that it was the dual responsibility of the Nursing Team and the Orthopaedic Team to ensure that Mr A's postoperative care was provided with reasonable care and skill. RN J's failures are another example of how the Nursing Team failed to adequately respond to Mr A's deteriorating condition.
175. I acknowledge that when Mr A's deterioration was identified on the morning of Day 5, the standard of care he received in response was appropriate.

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<sup>45</sup> Opinion 09HDC02089.

<sup>46</sup> Opinion 09HDC01146.



*Early Warning Score*

176. The EWS system is designed to assist nurses in the early detection of a deteriorating patient. Where a vital sign is outside the normal range, it is scored 1, 2 or 3, and each score corresponds to a particular procedure. Mr A's observations warranted a score of 1 on 13 occasions between Days 1 and 4, and a score of 2 on six occasions between Day 4 and 4.20pm on Day 5 (see **Appendix E**).
177. A score of 1 required the Nursing Team to inform the ward nurse co-ordinator, assess Mr A, modify the frequency of his observations as appropriate, notify the Orthopaedic Team, and document accordingly. A score of 2 required nursing staff to inform the nurse ward co-ordinator, repeat observations within 30 minutes, increase the frequency of observations, seek surgical or medical review within 30 minutes, and document accordingly.
178. There is clear evidence that the above procedures were not consistently followed. Mr A's EWS was 1 at 2pm and 2.15pm on Day 3. RN L asserts that she informed the house officer of Mr A's low blood pressure, but Dr C states that no such concerns were raised.
179. RN F advised that during her shift from 10.45pm on Day 3 to 7am on Day 4, she "would have" informed the other senior RN on duty and the house officer about Mr A's EWS of 1, but RN F did not document this and could not recall doing so.
180. Dr C was advised by a nurse about Mr A's low blood pressure at 9.30am on Day 4 and assessed him accordingly. However, when Mr A's EWS was 1 at 11.30am, it appears that Dr D was not advised until 2pm, and incorrect information was given to her. Although Mr A had an EWS of 2 at 8pm, Dr D signed off a phone order for normal saline but did not review Mr A.
181. When Mr A's EWS was 1 at 6.45am on Day 5, there is no record of RN J notifying this to the house officer.
182. I consider that there was widespread failure among the Nursing Team to follow the required procedures, and that necessary steps to minimise harm and ensure continuity of care were not taken. As stated in previous Opinions, it is a district health board's responsibility to ensure that its staff use the EWS chart correctly, and consistently comply with the relevant procedures.<sup>47</sup>

**Calculation errors on Mr A's Fluid Balance chart**

183. There were several errors on Mr A's Fluid Balance chart, the most significant being at 8am on the third postoperative day, when a nurse recorded that Mr A's total urine output over the preceding eight hours was 935mls, when it was in fact only 435mls. This created a false assurance that Mr A was recovering better than he actually was. The errors were unacceptable.

<sup>47</sup> See Opinions 09HDC02146 and 09HDC01422.

184. My expert nursing advisor, Ms Burton, advised that research suggests that discrepancies in the completion of Fluid Balance charts may be due to time constraints, lack of knowledge as to the importance of fluid balance, and lack of numeracy skills. The Clinical Director of Acute Services stated that as there were different nurses on duty each day, it “limits the potential for highlighting competence issues with any one nurse”. Northland DHB also acknowledged that at the relevant time, there were five different Fluid Balance charts in use throughout the hospital, which made it more difficult for it to monitor the charts for accuracy and compliance.

### **Format of TKJR Clinical Pathway**

185. I am mindful of Dr Pidgeon’s observation that the medical notes before Day 5 are “very brief, with scant attention to medical assessment and review of important observations such as urine output”. He considered that it was possible that the format of the TKJR Clinical Pathway contributed to the poor documentation because its format encouraged concise note-keeping and allowed little room for extensive review. This view is shared by Ms Burton, who commented that the TKJR Clinical Pathway did not have sufficient space to document care in chronological order, and therefore some documentation would need to be written on a separate sheet, creating the potential for vital information to be missed or lost. Ms Burton also commented that the TKJR Clinical Pathway did not have space for individualising the care of the patient and for recording specific concerns that needed to be watched out for.
186. Northland DHB acknowledged that the TKJR Clinical Pathway may have led staff to be “narrowly focussed in their evaluation of postoperative conditions rather than encouraging overall review of a patient’s progress”. Northland DHB advised that the Orthopaedic Team has subsequently reviewed the Clinical Pathway form.
187. While accurate completion of documentation is crucial, so are the systems designed to minimise errors. The TKJR Clinical Pathway form had limited space for recording full medical reviews, and Northland DHB did not have a system to ensure that any notes following on from those recorded in the Clinical Pathway were properly integrated. In my opinion, this increased the potential for vital information to be overlooked and a complete picture of the patient’s condition not being captured. Mr A’s right to be provided with safe and seamless service was therefore compromised.<sup>48</sup>

### **Summary**

188. On Day 4, when Mr A’s urine output decreased and his blood pressure dropped, he should have been referred for specialist medical review. A combination of poor documentation and poor communication led to the failure by both the Orthopaedic Team and the Nursing Team to fully recognise Mr A’s deteriorating condition. Furthermore, critical information about Mr A that was available to both Teams was not adequately accessed and used; in particular:
- the Orthopaedic Team did not alert the Nursing Team to Mr A’s co-morbidities and the complexity of managing the balance between Mr A’s cardiac issues and his renal impairment;

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<sup>48</sup> See Opinion 10HDC00610 (page 10).

- the Nursing Team was not expected to seek out such information unless advised to do so;
- the Nursing Team failed to alert the Orthopaedic Team to concerns about Mr A's urine output;
- members of both the Nursing Team and the Orthopaedic Team failed to read Mr A's notes, which highlighted concerns about his urine output and blood pressure;
- on one occasion, the Urine Output and Fluid Balance charts were not available to the Orthopaedic Team for review, and during other occasions, the clinical notes were incomplete and poor;
- the Nursing Team made a number of calculation and recording errors on the Fluid Balance chart; and
- the removal of Mr A's catheter on Day 4 made recognition of his deterioration more difficult.

189. In essence, there was a pattern of suboptimal behaviour in the care of Mr A.

190. Although I acknowledge that failures by the Nursing Team contributed to the delay in recognising Mr A's deteriorating condition, I consider that the Orthopaedic Team had a responsibility to ensure that a thorough and careful review of Mr A was undertaken each day. As commented by Dr Pidgeon:

“It is not appropriate to blame nursing staff for not raising concerns. With such a high-risk patient, daily thorough review and documentation of this review is necessary. A review of the observations chart, fluid balance and nursing notes would have been sufficient to raise concerns and this is the responsibility of the [Orthopaedic Team].”

191. District health boards are responsible for the operation of clinical services within hospitals and can be held responsible for any service-level failures.<sup>49</sup> The failures of the Orthopaedic and Nursing Teams were service failures and are directly attributable to Northland DHB. Accordingly, I find Northland DHB breached Right 4(1) of the Code for failing to provide Mr A with services of reasonable care and skill, and Right 4(5) for poor communication between and within teams, inadequate documentation, and widespread failure by the Nursing Team to consistently comply with the relevant procedures required under the EWS chart. All these factors compromised Mr A's right to continuity of care.

192. The Orthopaedic Team's failure to communicate to the Nursing Team the complexity of managing the balance between Mr A's cardiac issues and his renal impairment in the postoperative period meant that a heightened awareness was not given to the steps required to minimise the risk of potential harm to Mr A. Accordingly, I find that Northland DHB also breached Right 4(4) of the Code.

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<sup>49</sup> Opinion 10HDC00703.

## Recommendations

193. I acknowledge that since these events Northland DHB has taken a number of steps to improve its systems. In my view, this investigation has identified some further areas for improvement. Accordingly, when my provisional report was issued I recommended that Northland DHB:
1. apologise to Ms G for its breaches of the Code. The apology is to be sent to HDC within two weeks of the final decision being issued, to be forwarded to Ms G;
  2. arrange regular presentations on cardio-renal syndrome for orthopaedic ward staff;
  3. develop a standard for, and regular audits of, nursing handover to ensure the current practice is appropriate and effective;
  4. assess the prevailing attitudes and practices in relation to ward rounds to ensure there is sufficient time for doctors to assess patients thoroughly and to read the relevant notes and charts;
  5. hold regular education sessions for nursing staff on the importance of accuracy in recording and calculations;
  6. review the workloads of house officers and the level of support and oversight available to them;
  7. include an area on the TKJR Clinical Pathway form to document specific concerns;
  8. ensure proper integration of patient records;
  9. review the EWS process; and
  10. report to HDC on the progress of the changes that have already been made following Ms G's complaint.
194. Northland DHB advised HDC that recommendations (2), (3), (4), (5), (6), (7), (8) and (10) have been implemented. Northland DHB also provided HDC with details of in-service education sessions held on documentation and communication/handover as outlined in the Response to the Provisional Opinion section.
195. I recommend that Northland DHB provide HDC with:
- a report on the progress of recommendation (9) by **10 August 2013**;
  - a progress report on the “handover module” following its implementation by **10 August 2013**; and
  - details of documentation audits on the orthopaedic ward.

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## Follow-up actions

- A copy of this report with details identifying the parties removed, except the experts who advised on this case and Northland District Health Board (Whangarei Hospital), will be sent to the Medical Council of New Zealand, the Nursing Council of New Zealand, the New Zealand Orthopaedic Association, the Royal

Australasian College of Surgeons, the Royal Australasian College of Physicians, the New Zealand Orthopaedic Nurses Association, and the College of Nurses Aotearoa (NZ) Inc, and placed on the Health and Disability Commissioner website, [www.hdc.org.nz](http://www.hdc.org.nz), for educational purposes.

## **Appendix A — Independent renal physician advice to the Commissioner**

The following expert advice was obtained from Grant Pidgeon, Renal Physician:

“Complaint: Northland DHB

Reference: 10/00419

I was asked to provide expert advice on this complaint, specifically regarding the timeliness of renal referral and the care provided to the deceased following his surgery. I base my comments on the medical records provided to me and need to state that I am still not convinced that I have all the necessary records particularly relating to the medical assessments performed from the morning of [Day 5]. Some of the medical entries seem unduly abrupt without conclusions and plans of actions, and this doesn't quite tally with some of the details quoted by the complainant in the formal complaint.

[Full records were later provided to Dr Pidgeon. His advice remained unchanged.]

[At this point Dr Pidgeon outlined the background facts. This information has been removed for brevity.]

### **Standard of Care**

There is no doubt that [Mr A] was a high risk patient for any surgical intervention. The preoperative surgical and anaesthetic advice was accurate and the planning around his surgery seems quite appropriate, as reflected by his initial post-operative progress.

Unfortunately on the second post-operative day he deteriorated markedly as evidenced by his lower blood pressure and declining urine output. These parameters should have alerted medical staff to review him more closely, repeat blood tests and seek assistance from appropriate colleagues such as intensivists or renal physicians. There is however no evidence from the notes that medical staff were made aware of the change in his status. The afternoon nurse should have been concerned that over a 6 hour period between 4pm and 10pm only 75mLs of urine were produced and this should have prompted a request for formal medical review. Instead all that is documented is a notation to push oral fluids.

The medical review the following morning appears inadequate given the persistent low blood pressure and oliguria. No mention is made of any review of the events of the previous afternoon and no comment made about vital signs or urine output, despite this man being very high risk for cardiac and renal complications. To be fair to the medical staff the urine output that morning was documented as 935mLs whereas it was in fact only 435mLs since 10pm the night before. No blood tests were performed that day and undoubtedly this contributed to the delay in recognizing his acute on chronic renal failure. The removal of the indwelling

catheter at this time contributed to the lack of recognition of the reduced urine output.

The most likely cause of the renal deterioration was that it was pre-renal related to the negative fluid balance of the day before, as there was no evidence of decompensated heart failure at that stage. Prompt fluid resuscitation at this time, possibly requiring ICU and more intensive haemodynamic monitoring, may have prevented his further decline. At the same time cessation of the various anti-hypertensive agents and diuretics would have been appropriate. When he was reviewed on [Day 4] his renal failure was unresponsive to fluid management and the outcome was probably irreversible. However, even if addressed earlier, in such a high risk patient this deterioration may not have been recoverable. At no stage was there a definite indication for acute dialysis and although the final blood tests showed hyperkalaemia and severe acidosis, these were performed during an arrest situation and probably were not an accurate representation of the situation prior to the arrest. His severe cardiac disease and hypotension would have made any attempt at acute dialysis very problematic.

There were deficiencies with regard to nursing staff documentation. Fluid balance was inaccurate on several occasions and this likely created false assurance for medical staff. Although the low urine output was noted on several occasions there is little to suggest that nursing staff recognized the severity of his condition and were prepared to escalate his monitoring and treatment. The hospital response to the complaint focuses considerably on the issues of inadequate documentation, handover and training of the nursing staff. Although these criticisms are valid and warranted there is a seeming lack of comment regarding any such deficiencies from the medical staff involved in [Mr A's] care.

The deterioration in his condition should have prompted a thorough medical review. It is not appropriate to blame nursing staff for not raising concerns. With such a high-risk patient, daily thorough medical review and documentation of this review is necessary. A review of the observations chart, fluid balance and nursing notes would have been sufficient to raise concerns and this is the responsibility of the medical team. It would not be fair however, to lay blame solely on the house surgeon, as surgical house surgeons are often engaged in tasks related to surgical admissions and discharges and are not skilled in dealing with complex medical complications. In such cases support from medical specialties and ICU should be available and preferably in a pro-active rather than reactive manner.

This case also highlights problems with documentation. The medical notes leading up to the deterioration on [Day 5] are very brief, with scant attention to medical assessment and review of important observations such as urine output. There are examples of treatments such as fluid boluses being given without any accompanying notes to suggest what had prompted this and whether the patient was even assessed. The lack of adequate documentation was possibly contributed to by the clinical pathway forms used for such post-operative situations which encourage concise note-keeping and allow little room for more extensive review.

In conclusion this case illustrates the difficulties in undertaking significant surgery in high-risk patients. Although it is appropriate to attempt to dissuade patients from such surgery, once an undertaking is made to proceed, there is a responsibility to ensure that all steps are taken to ensure an optimal outcome is achieved. In [Mr A's] case more could have been done to improve his outcome. Ultimately earlier recognition of his decline leading to appropriate fluid resuscitation, cessation of medications and consideration of ICU involvement, may not have altered the outcome, but it would have improved his chances.

Yours sincerely

Grant Pidgeon  
Renal Physician  
Wellington Hospital"



## Appendix B — Independent nursing advice to the Commissioner

The following expert advice was obtained from Amanda Burton, Registered Nurse:

“The following report is in response to a request by the Health and Disability Commissioner to provide an opinion on case 10/00419. I have read the Commissioner’s Guidelines for Independent Advisors and agree to follow these guidelines in full.

I am a Registered Comprehensive Nurse, completing my training in 1981. I have worked for approximately 30 years in the area of Orthopaedic Nursing and have held several positions in this time i.e. Clinical Nurse Leader, Clinical Nurse Educator, Administrator and am currently employed as a Clinical Nurse Specialist Orthopaedics (Elective Care). I have completed a Postgraduate Diploma in Health Studies through Auckland University and have a Postgraduate Certificate in Orthopaedic Nursing from the Royal National Orthopaedic Hospital in Stanmore, England.

During my time in orthopaedics I have helped to develop education material for patients undergoing joint replacement surgery, have been involved in the education and evaluation of nursing staff; and have also developed integrated clinical pathways for the care of joint replacement patients. I have nursed patients with complex orthopaedics problems both elective and trauma, and across all age groups.

[At this point Ms Burton lists the questions she was asked and the information she has reviewed. This information has been removed for the purpose of brevity.]

I have reviewed all the supporting information provided by the Commissioner:

### Letter of complaint

- Northland DHB’s response to complaint
- [Mr A’s] photocopied clinical records
- Notification letters to NDHB, [RN F], [RN E], [Dr C], [Dr D] and [Dr B]

### Further information from NDHB

- Information from [RN L]
- Information from [RN K]
- Information from [RN E]
- Information from [RN F]
- Information from [RN I]
- Information from [RN J]
- Information from [RN N]
- Information from [Dr C]
- Information from [Dr D]
- Information from [Dr H]
- Information from [Dr B]

- Information from [surgical house officer]
- Information from [Dr M]

### **Additional information**

Bennett. C (2008). 'At a Glance' Fluid Balance Bar Chart. NHS Institute for Innovation and Improvement. <http://www.institute.nhs.uk> Accessed from Internet 10 December 2011

Popovich, D (2011). Cultivating Safety in Handoff Communication. <http://www.medscape.com> Accessed from Internet 15/12/2011

Shepherd A (2010) Measuring and managing fluid balance, 15 July 2010. <http://www.nursingtimes.net>. Accessed from Internet 10 December 2011

Tang, V & Lee, E. (2010). Fluid balance chart: do we understand it? *Clinical Risk* 2010; 16: 10–13. <http://cr.rsmjournals.com> Accessed from Internet: 10/12/2011

Warburton P. (2012). Numeracy and patient safety: the need for regular staff assessment.

Nursing Standard (Royal College Of Nursing (Great Britain): 1987) [Nurs Stand] 2010 Mar 10–16; Vol. 24 (27), pp. 42–4

[At this point Ms Burton outlines the background facts. This information has been removed for brevity.]

### **Standards which apply in this case**

I could not find any specific standards that relate to nursing communication between the MDT, nursing observations/assessment or documentation. That being said the following apply:

#### **The Health and Disability Code of Rights — Right 4 Right to Services of an Appropriate Standard**

- 1) Every consumer has the right to have services provided with reasonable care and skill.
- 2) Every consumer has the right to have services provided that comply with legal, professional, ethical, and other relevant standards.
- 3) Every consumer has the right to have services provided in a manner consistent with his or her needs.
- 4) Every consumer has the right to have services provided in a manner that minimises the potential harm to, and optimises the quality of life of, that consumer.
- 5) Every consumer has the right to co-operation among providers to ensure quality and continuity of services.

#### **The Code of Conduct for Nurses**

2.9 accurately maintains required records related to nursing practice

4.6 takes care that a professional act or any omission does not have an adverse effect on the safety or well-being of patients/clients

**Was there a departure from any of those standards by Northland DHB or the individual nurses who provided care to [Mr A]? If so, please provide details**

From reading through the documentation provided there are errors in fluid balance recordings, inadequacies in documentation, lack of information with regard to communication between medical and nursing staff and a failure to recognise [Mr A's] deteriorating physical health and to act on the observations in a prompt manner. There was a departure from the expected standard of care for a patient undergoing a total knee joint replacement with the presenting medical co-morbidities.

**The standard of monitoring and nursing assessments**

There were inadequacies in monitoring and assessments:

- Fluid balance charts were added incorrectly leading to medical staff basing their decision making on a wrong urinary output
- IV fluids charted on [Day 4] do not appear to have been administered
- Observations were completed as required but initially fell just outside the parameters of the Early Warning System (unless fully taken into account with the low urine output) and were not discussed with medical staff. The EWS at the time only took account of urine output if the patient had an IDC in situ.

**Fluid balance charts**

[Day 1]

Input IV fluids — if 1000mls written at 1830hrs given then the total amount should be 4,800mls (not 3,800mls), this is not clear however.

Output should be 1680mls (not 1590mls).

[Day 2]

Output 3250mls (not 3280mls), although amount at 1300hrs not clear.

[Day 4]

Input IV fluids — 750mls (not 500mls).

Output 435mls (not 935mls).

[Day 5]

Input IV fluids 3895mls (not 2395mls).

With regard to fluid balance charts there is research to suggest that there are major discrepancies in the completion of fluid balance charts (Tang & Lee 2010,

Warburton 2010) and that this may be due to time constraints, lack of knowledge as to the importance of fluid balance and lack of numeracy skills. Warburton (2010) states that evidence from the UK and abroad suggests that problems with numeracy among healthcare staff occur across professions, and also that nurses and other professionals lack the necessary confidence and skills in numeracy. There is not a lot of research available on the completion of fluid balance charts, however, accuracy and compliance issues have been identified and in my personal experience this is an area where improvements could be made in patient safety and where nurses require more understanding of the importance of fluid balance monitoring. Shepherd (2010) reports that there are discrepancies in fluid balance completion and Bennett (2008) provides a bar chart design which enables staff to clearly view the accumulative fluid balance over several days and provides a visual trigger as part of the patient's assessment.

[Ward staff] have been involved in designing a new fluid balance chart with improvements in aligning to the EWS with urine output. This will give staff a vested interest in the completion of this chart. Fluid balance chart audits have also been completed and since these must be to a stated standard then there must be a guideline available to staff with regard to fluid balance charts although this was not included in the documentation provided. Although fluid balance charts are mentioned in the nursing orientation manual it would be appropriate to include more information and the standard to be achieved with regular education sessions on the importance of fluid balance in the orthopaedic patient and regular assessment of numeracy skills. Most hospitals would have a regular competency programme for IV certification but that normally occurs every 2–3 years. A more regular simple numeracy assessment may be beneficial particularly with nurses coming from all over the world to practice in New Zealand.

The IV fluids that were charted on [Day 4] may not have been handed over verbally to the nurse as [RN F] makes no mention of the patient being reviewed by medical staff and there is no documentation by medical staff. This could account for why they were not given.

[Dr B] notes that the 'BP was low, but stable which could indicate that this was the patient's normal BP and did not meet the criteria for EWS'. With the re-design of the fluid balance chart and this as a trigger for the EWS this would raise warning bells for staff to discuss with medical staff.

### **The standard of communication with other staff**

[At that time] [the ward] has just commenced team nursing and as part of this format there are regular catch-up sessions where nurses regroup to discuss where patients and their cares are at. Because there is an expected routine, as outlined in the nurse's orientation manual, then it would not have been documented in the clinical notes.

With regard to [Mr A's] low blood pressure and reduced urine output on the afternoon of [Day 3] it may be that [RN E] did not recognise this as a deterioration because [Mr A] 'fluid intake and output had been exemplary until 4 pm' and that

‘they were not expecting a drop off in his output, especially as he was well hydrated’. [Dr B] stated that [Mr A] had a low BP preoperatively and that this change in his blood pressure may have been a return to his usual blood pressure.

[RN E] did not document whether he had spoken to medical staff about [Mr A’s] low urine output and medical staff did not document that they had been spoken to. [RN E] states that the afternoon of [Day 3] was a busy shift and that there was ‘a Trend Care of negative 420’, with the night nurse being asked to come in early to help cover the shift. [RN E] also states that there was a verbal handover between the pm and night shift with instructions to encourage [Mr A] to drink more fluids.

The introduction of [Situation Background Assessment Recommendation] (SBAR) gives a simple but effective tool for ensuring that information is discussed in a clear and concise manner. Ultimately however, without concerns being triggered for nursing staff the required conversations with medical staff will not be initiated. Having a handover sheet that provides a visual trigger for nursing staff is useful i.e. the handover sheet has areas already highlighted that could be relevant e.g. vital signs, elimination, skin care.

### **The standard of documentation**

The clinical pathway being used at the time of [Mr A’s] admission was very comprehensive however it did not have sufficient room to document care in a chronological order requiring that some documentation needed to be written on a treatment and progress note sheet. This had the potential for vital information to be missed. It also may have caused some staff to abridge their written documentation rather than give a fuller report.

The clinical pathway does not appear to have space for individualising the care of the patient and for recording specific concerns that need to be watched for. This would be beneficial and although concerns may be highlighted on the front of the assessment booklet this does not necessarily get moved along as the document progresses. An area to record individual care on a daily basis might be considered as part of the pathway re-design.

The clinical pathway is being re-designed; however some significant changes have already been made. Namely that there is more room to allow for documentation in an orderly flow and the statement ‘is there further documentation on another page for this shift — yes/no.’ This should help staff keep a closer eye on the patient’s overall progress.

[Mr A] was assessed at pre admission clinic in July 2009. The documentation from this appointment recorded that the patient would be a high VTE risk, would need an HDU bed booked and that the case needed to be discussed with the anaesthetist of the day. There is no record of the complexity of managing the balance between [Mr A’s] cardiac issues and his renal impairment being handed over to nursing staff on the ward. [Dr C] states that ‘my registrar had informed me that [Dr B] was operating on a patient with multiple medical co-morbidities, including CHF, IHD and diabetes and that he would need a close eye kept on him over the next couple

of days'. If this information had also been handed over to nursing staff this might have highlighted concerns with [Mr A's] care and caused the staff to be more diligent.

This has been addressed in the improvements the NDHB have made that pre-admission nurses will highlight patients with impaired renal function on the patient's assessment booklet.

### **The adequacy of the changes made since this complaint**

Several changes to practice and documentation have been implemented by the Northland DHB and staff and these have comprehensively looked at the concerns raised since the initial complaint.

### **Monitoring and nursing assessments**

- There have been improvements in the fluid balance chart layout with more frequent review and closer alignment with the EWS.
- Staff have attended Acute Life Threatening Events and Recognition and Treatments (ALERT) course and this has highlighted the importance of monitoring and continual re-assessment.
- Redesign of the EWS with increased prominence of urinary output and alignment to EWS score.
- There has been the appointment of a quality nurse responsible for completion of audits which will keep staff aware of discrepancies in practice issues.
- As well as these changes [the ward] might consider regular education on fluid balance, assessment of numeracy skills and presentations on Cardiorenal Syndrome (patients presenting for elective surgery with cardiac issues and renal impairment as routinely admitted to orthopaedics). Also the inclusion in nursing orientation manual on standards for fluid balance charts and the importance of accurate fluid balance monitoring.

### **Communication**

- The introduction of the SBAR model will improve the flow of communication between staff.
- The team nursing model has been in place for over 18 months and staff will have become more familiar with meeting regularly to discuss patients and their care.
- [RN E] and [RN F] stated that they were more aware of the need to ensure that everything is communicated to medical staff on a regular basis and I am sure that as a response to this complaint that all staff on the ward have become more diligent as to their own role ensuring that information is clearly and concisely handed over to medical staff in a timely manner.

Staff are usually given a computer printed handover sheet at the beginning of the shift and everything that happens throughout the shift is written on this document

and [the Ward] might consider visual trigger on handover sheets for nursing staff, as this may remind staff to discuss aspects of concern with medical staff.

### **Documentation**

- Patients with renal impairment to be highlighted on clinical pathway assessment booklet.
- Changes to clinical pathway to allow more information with a chronological flow, inclusion of visual trigger about further documentation.
- Development of algorithm for managing oliguria following orthopaedic surgery

The change to the clinical pathway will have a major impact on how information is documented. Allowing more room will enable staff to give a fuller picture of what has happened with the patient without them needing to consider what is the most vital information to cram into a small space. Along with this, if not already developed then a standard for, and regular audits, of nursing handover. And the inclusion in the clinical pathway of an area to individualise care would also help staff to be reminded of what their responsibilities are with regard to documentation and communication.

If the orthopaedic unit does not have a pathway/algorithm for managing urinary retention/oliguria following surgery then this could be looked at. This would give nurses and medical staff a clear pathway to follow in the event of such a situation occurring again.

### **Addition**

#### **[RN E]**

[Mr A] had progressed well, as evidenced by the telemetry being removed. The care plan has observations as QID and these were completed at 1645 and 2145 hrs. The BP was similar to BPs taken on [Day 2] and were considered stable for this patient. [Mr A] was monitored QID as was required and it is reasonable for the nursing team caring for [Mr A] to monitor him as they did. [RN E] would not necessarily have needed to contact medical staff at this stage as [Mr A] had been considered stable. [RN E's] plan at handover to encourage fluids overnight was adequate. [RN E] does not document having discussed [Mr A] with medical staff, this was a mild departure from appropriate standards as [Mr A's] EWS vacillated over the shift and because [Mr A] had been stable it was reasonable to assume that encouraging fluids would correct the low urinary output.

#### **[RN F]**

If [RN F] informed her co-senior RN & H/O of [Mr A's] decreased output and low BP then this was an appropriate action. If [RN F] did not advise the H/O of [Mr A's] condition then this would have been a mild departure from appropriate standards of care. In light of the low urine output overnight [RN F] made an appropriate decision not to remove the catheter at 0600 hrs. The treatment and

progress note was adequate other than not noting that she had discussed [Mr A] with the night H/O.

**[RN L]**

[RN L] should have discussed concerns about [Mr A's] low urine output and low BP overnight with medical staff. This was a moderate departure from appropriate standards. [RN L] says that she was not aware of [Mr A's] condition overnight as there was no morning handover, however she does state that she read the report and [RN F] had documented the low BP and urine output in the notes. [RN L] states that she did notify the H/O of the low BP and that the patient had not passed urine since the IDC was removed at 0800 hrs. A bolus of 250mls N/Saline was given at 1030hrs in response to the low BP. Once [RN L] learnt of the doctor's instructions to remove the catheter she should have delayed this until she had confirmed that the doctor was aware of [Mr A's] condition. This was a moderate departure from appropriate standards. If [RN L] did not update the H/O on [Mr A's] condition and the results of the bladder scan this was a moderate departure from appropriate standards. However, in [RN L's] statement she says that she kept going back to the doctor who advised her to increase [Mr A's] oral fluid intake. Completing a bladder scan 4–6 hrs after the removal of a urinary catheter would be an appropriate action.

**[RN I]**

[RN I's] nursing notes from the pm shift on [Day 4] state that she notified the H/O that [Mr A] had not passed urine. However, if she had not advised the H/O that [Mr A] had not passed urine then this would be a severe departure from an appropriate standard. If [RN I] did not inform the H/O of the results of the bladder scan at 2300hrs then this would be a severe departure from an appropriate standard as [Mr A] had not passed urine for 15 hrs at that stage. There is no record of urea & electrolyte blood tests being taken which would be reasonable when the patient has not passed urine for a prolonged period. This could have been initiated by [RN I] on the pm shift. In [RN I's] statement she says 'that if a patient has not passed urine 8 hrs after removal of catheter they would usually do a bladder scan to see if the patient is producing urine', this was not done. Instead a bladder scan was completed 15 hrs after the catheter was removed. There was a bolus of 500mls N/Saline charted and given at 2000hrs, this would indicate that the H/O was aware of [Mr A's] condition and charted fluids.

**[RN J]**

There does not appear to be any documentation by [RN J] on the night shift [Day 4-5] other than completion of the pathway. In light of [Mr A's] low BP and that he had not passed urine since 0800hrs that day it is a severe departure from an appropriate standard. On the daily IV prescription it would appear that the night H/O charted a litre N/Saline. This was either done in response to the afternoon H/O asking the night H/O to review [Mr A] or in response to the night nurse discussing [Mr A's] condition with the night H/O. The IV fluids were not given, this is a severe departure from an appropriate standard given [Mr A's] condition. [RN J] should have discussed [Mr A's] lack of urine output with the night H/O,



encouraged oral fluids (there are no oral fluids recorded on the fluid balance chart), completed another bladder scan, commenced the IV fluids and initiated urea & electrolyte blood tests. This is a severe departure from an appropriate standard of care.

### Conclusion

One of the issues with this case is that the care given may have been adequate for a patient presenting for a routine total knee replacement, who presented with minimal co-morbidities and who progressed along an expected clinical pathway to discharge. However, this was not [the situation in Mr A's case]. If [Mr A's] preoperative physical condition had been communicated to nursing staff, with the potential complications that might be encountered with a patient having cardiorenal syndrome and staff had been alerted to be on the look-out for these changes then [Mr A's] deteriorating condition might have been picked up more promptly.

[Dr B] stated that [Mr A] recovered well following the surgery and progressed well. [RN E] states that [Mr A] had been drinking well and had a reduction in urine output from the evening of [Day 2]. The standard process would have been to encourage [Mr A] to have more oral fluids and this was handed over by [RN E] to the night nurse. [RN F] gave oral fluids and these are documented on the fluid balance chart. The correlation between the lower BP and reduction in urine output was not fully appreciated and was not documented as having been discussed with medical staff. If they had been discussed with medical staff then the recommendation would probably have been to push oral fluids in the first instance. [RN F] documented the low urine output and did not remove the IDC due to her concerns, this is also quite reasonable.

Nursing staff may have become a little 'complacent' when caring for patients following a TKJR and feel that nursing colleagues would view this with moderate disapproval. The fact that [Mr A] did not appear to pass urine for 27 hours following the removal of the urinary catheter is a concern. This situation was documented as having been discussed with medical staff but the error in the fluid balance chart may have led to a misunderstanding in how well [Mr A] was progressing.

The Northland DHB and nursing staff, both individually and as a ward have made significant changes in their practice, processes and documentation. With increased education, regular audits, additional safety processes i.e. telemetry monitoring, increased involvement by the anaesthetist, a renal physician available pre and post-operatively for advice and a heightened awareness of patients who fall outside 'the norm' there should be an improvement in patient safety and less likelihood of an unfortunate case such as [Mr A's] occurring again.

Yours sincerely

Amanda Burton"

## **Appendix C — Independent orthopaedic surgeon advice to the Commissioner**

The following expert advice was provided by orthopaedic surgeon Dr Denis Atkinson:

“1.0 I have been asked to provide an opinion to the Commissioner on the Case 10HDC00419. I have read and agreed to follow the Commissioner’s guidelines for independent advisors.

2.0 I Denis Atkinson am a vocationally registered Orthopaedic Surgeon. I practice in both private and public sectors within the Hawke’s Bay district. I am a graduate of the University of Otago. I have obtained a Fellowship in Orthopaedic Surgery from the Royal Australasian College of Surgeons in 1984. I have a specialist interest in knee and hip reconstructive surgery.

I am the past Chairman of the Professional Development and Standards Committee of the New Zealand Orthopaedic Association. I am a past President of the New Zealand Orthopaedic Association. I am a past President of the New Zealand Knee Society. I remain in active practice.

[At this point Dr Atkinson outlines the questions asked of him and the background facts. This information has been removed for brevity.]

### **6.0 Opinion**

6.1 I consider the pre operative assessments provided to [Mr A] and their timing was adequate. [Mr A] was adequately pre assessed and investigated prior to his surgery. I feel his medical condition was optimised prior to surgery. I consider he was informed regarding the nature and risks of his surgery. He was aware that the elective surgery to his knee could be complicated by death.

6.2 In light of [Mr A’s] complex medical background, a High Dependency Unit bed was booked for him in the post operative period. His surgery was uncomplicated in the immediate peri operative period, he was making good progress within the first forty-eight hours. I consider the plan for his post operative care was adequate. The care of [Mr A] in the first two post operative days was of an adequate standard.

6.3 His nursing and medical care on the third post operative day of [Day 4] is poorly documented. [Mr A’s] systolic blood pressure dropped on the evening of [Day 3] and remained low until his death. Accompanying the drop in his systolic blood pressure, his urine output was compromised. There was an incorrect totalling of his urine output on the morning of [Day 4]. I think it probable that this incorrect total led to the decision to remove the indwelling catheter. The absence of his indwelling catheter made assessment of hourly urine output impossible. This led to an inability to accurately record the Early Warning Score. There was a paucity of medical and nursing notes relating to [Mr A’s] care on [Day 4]. It would appear that the nursing staff recognised his hypotensive state and his low urine output. It is recorded that this was communicated to the House Surgeon. An

intravenous saline bolus was given to [Mr A]. [Mr A's] care would have benefited from the input of a Medical Physician and or an Intensivist on the [Day 4].

6.4 His low cardiac output and poor renal function was recognised on [Day 5]. The medical input provided at that time by the Medical Registrars and Renal Physicians was appropriate.

6.5 Morbidity and Mortality meetings related to [Mr A's] care are well documented.

6.6 As a result of these meetings there is an acknowledgement that there were shortcomings in [Mr A's] care. The Northland District Health board have made significant changes in the pre operative care of patients with significant co-morbidities. These changes are outlined in correspondence to the Health Commissioner of 8 March, 2011.

6.7 Of particular value is the establishment of a Rapid Response Team Nurse who provides an outreach service to the Wards for patients who are physiologically unstable. This nurse is in close communication with the Intensive Care Service. Northland District Health Board has also established increased input from a General Physician to the Orthopaedic Service on a twice weekly basis. There has been improvement in nursing care to provide further accuracy of nursing documentation.

6.8 I consider the Northland District Health Board has responded well to the Complainant's concerns regarding the care of [Mr A]. I feel the response of the District Health Board has been honest, compassionate and has been directed towards improving their standards of care.

**In Summary:**

[Mr A] suffered from a severe and debilitating arthritic condition of his knee. The condition of his knee had not responded to conservative treatments and was causing significant limitation in his quality of life. [Mr A] suffered from significant cardiac and renal co-morbidities. [Mr A] elected to proceed with knee replacement surgery in a hope this would improve his quality of life. In the post operative period his cardiac function deteriorated, on his third post operative day his deteriorating condition went unrecognised because of poor documentation and communication between his medical attendants. Once recognised his deteriorating medical condition was appropriately treated. In view of his severe cardiac co-morbidities, it is speculative as to whether an earlier diagnosis would have materially changed the outcome. The shortcomings leading to a delay in diagnosis in [Mr A's] case have been adequately and appropriately addressed by the Northland District Health Board.

Denis Atkinson  
MB ChB FRACS  
Orthopaedic Surgeon 28.3.11  
NZMC 971"

On 14 April 2011 Dr Atkinson provided the following further advice:

“I reply to your correspondence 8th April, 2011 with further enquiries relating to [Mr A’s] care. On the evening of the [Day 3] at 21.45 hours, nursing notes record [Mr A’s] blood pressure 100/55. In response to this, the nursing note records the patient was encouraged to take oral fluids. The epidural catheter strength was halved and the rate of infusion was decreased. His urine output from 2200 hours [Day 3] to 0800 hours [Day 4] was 435 mls. This was incorrectly tallied and recorded at 935 mls at 0800 hours on the morning of [Day 4]. In view of this total the House Surgeon recommended the urinary catheter to be removed.<sup>50</sup> The epidural catheter was removed. The House Surgeon recommended [Mr A] be mobilised with physiotherapy.<sup>51</sup>”

On the evening of the [Day 3], [Mr A’s] systolic blood pressure did not drop below 90. His early warning score (EWS) did not trigger the action plan. I can see no record that a medical staff member was contacted. The morning review by the House Surgeon on the [Day 4] did not deviate from an appropriate standard. I assume the House Surgeon relied on the erroneous urine output recording to make the judgement to remove the urinary catheter.

The retrospective nursing note [made a number of months after the events] reports that 1350 hours [Mr A’s] blood pressure remained low with lowered oxygen saturations. The patient had not passed urine, a bladder scan confirmed 170 mls of urine in the bladder. The retrospective report of the evening shift of the [Day 4] records that the patient had not passed urine. A bladder scan at that time confirmed 150 mls of urine in the bladder. A bolus of 500 mls of saline was administered to improve the blood pressure to 112/63 mmHg. Again the nursing [note] records the House Surgeon was notified.

Further to Paragraph 6.3 of my main report. There is no evidence in the hospital records of the House Surgeon’s response to the nurse’s concern.

On being alerted of the nurse’s concern, I would have expected the House Surgeon to examine [Mr A] and record his findings. His examination would have included review of the Fluid Balance Chart, his blood pressure and urine output. A repeat blood test including a full blood count, electrolytes, creatinine would have been appropriate. On recognition of [Mr A’s] oliguric state, I would have expected the House Surgeon to have contacted a more senior colleague to further aid diagnosis and management of the condition. I would expect this process to have been documented in the Hospital records. There is no record of medical staff input into [Mr A’s] management on the afternoon and evening of [Day 4]. This I would see as a moderate departure from an appropriate standard of care.

In Paragraph 6.3 of my Report, I commented that [Mr A] would have benefited from the input of a Medical Physician and/or an Intensivist on the [Day 4]. It is difficult to determine from Hospital records which medical staff were involved in

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<sup>50</sup> This recommendation was made by Dr H and recorded by Dr C.

<sup>51</sup> This recommendation was made by Dr H and recorded by Dr C.

[Mr A's] care on the afternoon and evening of [Day 4]. The failure to obtain more senior medical advice regarding [Mr A's] hypotensive and oliguric state is again a moderate departure from an appropriate standard of care.

As outlined in the body of my Report, [Mr A] was at high risk for cardiac and renal complications. This was recognised pre operatively and I feel satisfactorily investigated. His condition was communicated to the High Dependency Unit pre operatively. [Mr A's] condition was satisfactory in the first forty-eight hours post surgery and did not warrant intensive care input. In [Mr A's] case, the absence of daily medical specialty and/or ICU review is not a deviation from an appropriate standard of care.

These comments should be read in conjunction with the body of my Report.

Yours sincerely  
Denis Atkinson”

On 12 December 2011 Dr Atkinson provided the following further advice:

[Dr Atkinson's qualifications, training and experience have been removed for the purpose of brevity.]

### “3.0 Expert Advice Required

1. Please comment on the standard of medical care provided to [Mr A] by Northland District Health Board, and its individual doctors, between [Day 1] and [Day 6]. Please explain what standards apply and whether they were complied with.
2. If, in answering any of the above questions, you believe that Northland DHB or any individual doctor did not provide an appropriate standard of care, please indicate the severity of the departure from that standard. To assist you on this last point, I note that some experts approach the question by considering whether the providers' peers would view the conduct with mild, moderate, or severe disapproval.
3. Are there any aspects of the care provided that you consider warrant additional comment?

### 4.0 Sources of Information:

Information reviewed was provided by the Commissioner's Office on 15 February, 2011 and 11 March, 2011.

New Information Read and Reviewed:

- Notification letters to NDHB, [RN F], [RN E], [Dr C], [Dr D], and [Dr B] (pages 143–159) Information from NDHB (pages 160–334) Information from [Dr C] (pages 335–353) 3.0
- Information from [Dr D] (pages 354–361)
- Information from [Dr H] (pages 362–365)
- Information from [Dr B] (pages 36–378)

- Information from [surgical house officer] (pages 379–382)
- Information from [Dr M] (page 383)
- Information from [RN L] (pages 384–388)
- Information from [RN K] (pages 389–390)
- Information from [RN E] (pages 391–424)
- Information from [RN F] (pages 425–436)
- Information from [RN I] (pages 437–435)
- Information from [RN J] (pages 439–440)
- Information from [RN N] (pages 441–442)

[At this point Dr Atkinson outlines the background information. This has been removed for brevity.]

### **6.0 Opinion:**

6.1 I note the majority of the new information provided to me is based on Reports prepared and interviews conducted some eighteen months following events related to [Mr A's] care.

6.2 It would appear that there is a segment of the treatment and progress notes relating to [Mr A's] care which is genuinely missing. This would address concerns raised in my Report 14th April, 2011.

6.3 At the time of [Mr A's admission] there was clearly a heavy workload in the Surgical and ICU Departments at the Whangarei Hospital.

6.4 Reports confirm that the Junior Medical staff had an excessive workload and commitments. There was a complex system of data recording, progress notes appear to be recorded in multiple sites.

Policies and protocols regards the rapid deterioration of a patient's condition were ill defined. There appeared to be no mandate to record verbal orders and report response to these orders or management plans.

6.5 These shortcomings I feel represent a moderate departure from an appropriate standard of care on behalf of the Northland District Health Board.

It appears that the Northland District Health Board has extensively reviewed these protocols and procedures. My understanding is that a Rapid Response Team has been established to enable intervention by Intensive Care Services for the physiologically unstable patient.

6.6 I have reviewed the responses prepared by House Surgeons — [Dr C] and [Dr D], along with Orthopaedic Surgeon [Dr B]. In the context of their experience and the difficult work environment, I consider [Dr C] and [Dr D] provided an appropriate and adequate standard of care. [Dr B] provided adequate and appropriate care to [Mr A].

Denis Atkinson  
MB ChB FRACS  
Orthopaedic Surgeon, NZMC 9717"

## Appendix D — Summary of blood pressure and urine output observations

	Blood pressure (mmHg)	Total urine output since 1am (recorded) (mls)	Total urine output since 1am (actual) (mls)	Cumulative daily fluid intake since 1am (recorded) (mls)
<b>Day 2 — reviewed by registrar and house officer</b>				
<b>10pm</b>	-	3280	3250	2200 (incl. 500 IV)
<b>Day 3 — reviewed by consultant and house officer</b>				
<b>6am</b>	-	750	750	
<b>9am</b>	100/50	-	-	
<b>11am</b>	109/54	935	935	
<b>2pm</b>	90/52	1015	1015	
<b>2.15pm</b>	95/50	-	-	
<b>3pm</b>	-	1115	1115	500
<b>4pm</b>	-	1225	1225	700
<b>5pm</b>	-	-	-	900
<b>6pm</b>	-	-	-	1100
<b>7pm</b>	-	-	-	1300
<b>4.45pm</b>	100/55	-	-	
<b>9.45pm</b>	100/55	-	-	
<b>10pm</b>	-	1300	1300	
<b>Day 4 — reviewed by registrar and house officer</b>				
<b>1am</b>	92/60	190	190	200
<b>2am</b>	-	225	225	
<b>2.30am</b>	96/57	-	-	
<b>3am</b>	-	285	285	300
<b>4am</b>	94/60	330	330	500
<b>5am</b>	-	-	-	
<b>5.30am</b>	94/58	-	-	
<b>6am</b>	-	385	385	700
<b>7am</b>	-	-	-	
<b>8am</b>	-	935	435	
<b>9.30am</b>	90/54	-	-	1000
<b>10.30am</b>	-	-	-	1450 (incl. 250 IV)
<b>11.30am</b>	94/58	-	-	
<b>3pm</b>	-	hnpued bladder scan 179mls	hnpued bladder scan 179mls	2150
<b>8pm</b>	87/53	-	-	2650 (incl 750 IV)
<b>8.20pm</b>	90/65	-	-	
<b>9pm</b>	100/65	-	-	
<b>9.15pm</b>	112/63	-	-	

<b>11pm</b>		HNPUED bladder scan 156mls	HNPUED bladder scan 156mls	
<b>Day 5 — reviewed by consultant and registrar</b>				
<b>2am</b>	108/65	-	-	
<b>6.45am</b>	95/52	-	-	
<b>7am</b>	-	HNPUED	HNPUED	
<b>8.45am</b>				250 (IV)
<b>9.15am</b>				500 (IV)
<b>9.50am</b>				750 (IV)
<b>10am</b>		IDC inserted	IDC inserted	



## Appendix E — Summary of Mr A's Early Warning Scores

Observation	EWS
<b>Hourly urine output</b>	
10pm Day 3	1
8am Day 4	1
9am Day 4–10am Day 5	No catheter
12pm Day 5	1
2pm Day 5	3
<b>Systolic blood pressure</b>	
7.30pm Day 1	1
8pm Day 1	1
2pm Day 3	1
2.15pm Day 3	1
1am Day 4	1
2.30am Day 4	1
4am Day 4	1
5.30am Day 4	1
9.30am Day 4	1
11.30am Day 4	1
8pm Day 4	2
8.20pm Day 4	1
6.45am Day 5	1
9.15am Day 5	2
9.30am Day 5	2
10.10am Day 5	2

11.30am Day 5	2
12.50pm Day 5	1
4.20pm Day 5	2
<b>Oxygen saturation</b>	
2.20pm Day 1	1
11.30am Day 5	1
12.50pm Day 5	1
4.20pm Day 5	2