Auckland District Health Board

A Report by the
Health and Disability Commissioner

(Case 17HDC01589)

Health and Disability Commissioner
Te Toihau Hauora, Hauātanga

Contents

Executive summary

1. This report concerns the care provided to a young woman at a public hospital during her admission for postoperative treatment and tests. The Commissioner found Auckland District Health Board (ADHB) in breach of Right 4(1) of the Code for providing suboptimal care.

2. A PIVC (a device used to draw blood and give treatments) was inserted into the woman's arm on the day she was admitted to hospital. Throughout the woman's stay, staff repeatedly failed to document observations of her PIVC site, including the swabbing of a substance found near her PIVC site after the PIVC was removed. Staff also omitted to document verbal advice given to the woman, and did not communicate the taking of the swab to her GP.

3. One day after discharge, the laboratory reported that the swab showed heavy growth of *Staphylococcus aureus*, a type of bacteria that is a common cause of skin infection.

4. Two days after her discharge, the woman presented to her GP. Her GP assessed her as needing urgent care and sent her by ambulance to hospital where she was diagnosed with septicaemia. While the woman was at the hospital, the swab result from the previous day was viewed for the first time. Sadly, the following day the woman died from a cardiac arrest caused by septicaemia.

Findings

5. The Commissioner found that "Auckland DHB's care of [the woman] was suboptimal in several respects:

   a) PIVC check documentation fell below the standard of care, especially at the time of taking the swab. All the nurses caring for [the woman] omitted to document relevant PIVC observations in the clinical record.

   b) Verbal instructions given to [the woman] were not documented either in the clinical record or in the discharge summary.

   c) The discharge summary omitted reference to the swab, the expected test results, or to notify the GP to follow up test results if consulted by the patient.

   d) The GP was not informed of the test results."

6. The Commissioner stated that "[p]olicies and practices need to ensure that the right information gets to the right providers regardless of the consumer's domicile".

Recommendations

7. The Commissioner recommended that Auckland DHB: (a) provide a formal written apology to the family; (b) confirm the implementation of various policies proposed in its Root Cause Analysis of the woman's death; and (c) consider implementing several further policies.

Complaint and investigation

8. The Health and Disability Commissioner (HDC) received a complaint from Ms B about the services provided by Auckland DHB to her daughter, Ms A. The following issue was identified for investigation:

- *Whether Auckland District Health Board provided Ms A with an appropriate standard of care in 2017.*

9. The parties directly involved in the investigation were:

Ms B	Ms A's mother/complainant
Auckland DHB	Provider/district health board

10. Further information was received from:

Ms B's advocate	
Ms A's father	
Ms A's general practitioner	
DHB2	District health board
RN C	Registered nurse
RN D	Registered nurse
RN E	Registered nurse
RN F	Registered nurse
RN G	Registered nurse
Dr H	House officer
Dr I	House officer

Also mentioned in this report:

Dr J	General practitioner

11. HDC obtained independent expert advice from a former chief medical officer, Dr Iwona Stolarek. This is included as Appendix A.

Information gathered during investigation

Background

12. At the time of these events, Ms A was 20 years old and had a complex medical history. Since childhood she had suffered from asthma, eczema, and susceptibility to skin infections. The doctor who had often treated Ms A, told HDC:

> "[Ms A had] a long history of significant atopic and flexural eczema, dating back to at least 2001. As such, she was likely more susceptible to skin infections, due to the dryness of her skin and the reduction in normal barrier function."

13. The doctor also noted that Ms A "had self cared well using both steroid creams and emollients", and had avoided using systemic antibiotics for many years.

14. On 13 Month1[1], while she was living in Auckland, Ms A was admitted to Auckland DHB with chest pains. She was diagnosed with aortic dissection,[2] and underwent emergency repair of the dissection that day. On 21 Month1, she received a pacemaker, and on 28 Month1, she underwent surgery for an aortic aneurysm.[3]

15. On 6 Month2, Ms A was discharged, and she returned to her home region to be with her whānau. Her discharge summary noted that she would return to Auckland DHB for postoperative treatment and tests in Month3, and that her GP would arrange for an MRI brain scan[4] to be taken six weeks after the date on which her pacemaker was inserted.

Admission to Auckland DHB 16 Month3

16. On 16 Month3, Ms A returned to Auckland DHB for postoperative treatment and tests. She was accompanied by her mother, Ms B. Ms A's scheduled procedures included a CT scan,[5] a review at the pacemaker clinic, an appointment with the Clinical Genetics Service, and review by both the vascular[6] and cardiothoracic[7] services.

17. At 2pm, Ms A was admitted to the vascular ward by a house officer, Dr H, under the care of a consultant vascular surgeon. Dr H noted that Ms A had not had the planned MRI brain scan, even though more than six weeks had elapsed since her pacemaker had been inserted. Accordingly, he scheduled a scan for the following day.

18. At 7pm on 16 Month3, Registered Nurse (RN) RN C took Ms A's observations, and these were stable. RN C recorded that Ms A was nil by mouth for the CT scan scheduled for the following day. RN C recorded that a peripheral intravenous catheter (a PIVC)[8] had been inserted into Ms A's arm. RN C did not record who inserted the PIVC, or the precise site of the PIVC.

19. In the absence of documentation, Auckland DHB could not confirm who inserted the PIVC. However, it stated that the PIVC was inserted by one of its phlebotomists[9] who was trained and competent in the placement of peripheral IV catheters. Auckland DHB said that the PIVC was inserted to facilitate the tests that Ms A was to undergo the following day.

[1] Relevant months are referred to as Months 1-3 to protect privacy.
[2] A tear in the wall of the aorta (the major artery that carries blood to the heart).
[3] An abnormal bulge in the aorta.
[4] A Magnetic Resonance Imaging scan generates images of the organs in the body.
[5] A Computerised Tomography scan uses multiple X-ray images to generate a three-dimensional image.
[6] Diagnosis and treatment of disorders of the arteries and veins.
[7] Diagnosis and treatment of disorders of the heart and lungs.
[8] A small flexible tube used to draw blood or insert fluids into the bloodstream.
[9] A specialist in the drawing of blood for transfusion, treatment, or diagnostic testing.

Monitoring of the PIVC

16/17 Month3

20. RN D cared for Ms A overnight between 11pm on 16 Month3 and 7.15am on 17 Month3. RN D told HDC that she was "aware of the need to monitor PIVC sites for redness, swelling, warmth, and pain as this can indicate signs of infection or incorrect placement". However, she could not recall whether she looked at Ms A's PIVC overnight.

21. On 17 Month3, RN F cared for Ms A between 7am and 2.30pm. RN F stated that she would have checked the PIVC following handover from RN D, around 7.15am. RN F said that she would have checked Ms A's PIVC again at about 12.55pm when reviewing her status for the house surgeon. RN F stated: "I regret that I did not make clear and detailed documentation about the PIVC site when I provided care to [Ms A] on 17 [Month3]."

18 Month3

22. Ms A left the hospital some time after 2.30pm on 17 Month3, and returned at about 7am on 18 Month3. RN E cared for Ms A on 18 Month3 between her return to the hospital and her discharge at 11.30am. RN E told HDC that at 8.15am she checked Ms A's vital signs and found these to be consistent with Ms A's previous observations.

23. Ms A's clinical notes do not indicate that any of the nursing staff checked her PIVC at any point, and following insertion of the PIVC at 7pm on 16 Month3, there is no further reference to it.

Overnight leave

24. For reasons discussed later in this report, Ms A's MRI scan was postponed from its original time on 17 Month3 to the morning of 18 Month3.

25. At 2.30pm on 17 Month3, RN F recorded that Ms A was "allowed leave overnight with parents", and that a member of the medical staff would call Ms A later that day to update her on the scheduled time for her MRI scan the following day.

26. Ms B told HDC that on 17 Month3, Ms A "asked the nurse if she could leave for the night", and that "the nurse gave her the ok". Ms B said that at 2.12pm her daughter sent her a text message saying that a nurse was checking whether she could leave the hospital for the night, and at 2.46pm, her daughter sent another text message saying that she had the "all clear" to leave.

27. The clinical notes do not indicate who made the decision to allow Ms A to leave the hospital overnight, or when Ms A actually left the hospital.

28. RN F told HDC that she did not give Ms A permission to leave the hospital overnight — rather, she "simply recorded the verbal instruction received from the medical team that the patient was allowed overnight leave with her parents". RN F could not recall who made the decision, and said: "I regret that I did not specifically record this in my documentation."

29. RN F stated:

> "Had I discharged [Ms A] during my shift on overnight leave with the written instruction from the medical team, I would have given the patient health education on how to look after the luer[10] site and what symptoms to look for on [the site] such as redness, tenderness or pain, and advised her that she needed to come back to the hospital immediately if she experienced any of these symptoms. I would have also secured the luer site with a bandage."

30. The clinical notes do not record that Ms A received any advice about how to take care of her PIVC or how to monitor it for any concerning symptoms. Ms B said that she was not aware that Ms A had received any such advice.

31. Ms A left the hospital with the PIVC bandaged to her arm.

32. Auckland DHB said that it is unclear who made the decision to allow Ms A to go on leave from the ward with a PIVC in place. It said that the vascular surgeon was unaware that the IV line had been left in situ[11] during Ms A's overnight leave.

33. Auckland DHB also advised that its current guidelines for IV luer management do not include information on IV luers that are left in situ when a patient goes on leave.

Concerns about PIVC site

34. At 7am on 18 Month3, Ms A and Ms B returned to Auckland DHB. Ms A's father was also present. Ms B said that Ms A was complaining that her arm was sore and she was unable to bend it.

35. Ms B told HDC that at about 8am a nurse removed the bandage from Ms A's arm. Ms B recalled that when the bandage was removed, she observed pus spots near the PIVC site and asked the nurse about these. The nurse replied that Ms A's arm was fine. RN E told HDC that at 8.15am she took Ms A's vital signs, and these were consistent with the observations recorded on previous shifts.

36. At approximately 10.30am, a vascular nurse specialist, RN G,[12] removed the PIVC from Ms A's arm. Ms B told HDC that she asked RN G about the pus spots and pain in Ms A's arm.

37. RN G told HDC:

> "[I recall] both [Ms A] and her mother noting that she had some pain around the IV cannula site[13] [but that] [t]he pain in the site did not seem alarming given [Ms A] had been undertaking normal activities and moving her arm with a cannula inserted."

38. RN G stated that when he removed the PIVC he "observed a very small amount of slough which appeared to be dead skin cells", and that the substance was "serous coloured"[14] and "blood stained". He did not consider there to have been "any strong evidence of infection

[10] A "luer" is synonymous with a "PIVC".
[11] In place.
[12] Employed in the role of vascular nurse specialist at ADHB since 2001.
[13] "IV cannula" is synonymous with "PIVC".
[14] The colour of blood serum — a yellow-to-transparent colour.

at the insertion site" because "[t]here was no particular inflammation, cellulitis,[15] ooze, or redness at the insertion site". He also noted that a "small amount of slough" was "not unusual for an IV cannula insertion site". RN G took a swab of the substance at Ms A's PIVC site.

39. Dr H told HDC that he remembered examining Ms A's PIVC site at the time and observing a "small amount of exudate", but "no evidence of erythema[16] or cellulitis". He could not recall Ms A having complained about pain in her arm, and said that "[t]here were no concerns relayed through to [the medical team] from [Ms B] regarding the possibility of a PIVC infection".

40. Dr I recalled that "there was no redness, but there was a small amount of exudate in the insertion site". She noted that Ms A's vital signs were normal, apart from her elevated heart rate on this admission. Dr I did "not recall the patient complaining of any pain in her arm or difficulty moving it". Dr I said that the "insertion site did not look obviously infected", and Ms A looked otherwise well, and that a swab was taken as a precaution. She acknowledged, however, that her memory of these events was "somewhat imperfect", as she "had limited involvement in [Ms A's] care", and "[Ms A's] admission was nearly two years ago".

41. In response to my provisional opinion, Ms B told HDC that she does not recall either Dr H or Dr I viewing the substance on Ms A's PIVC site.

42. RN G also told HDC that he took the swab as a precaution, and that "[s]wabbing IV insertion sites are routine practice on the Vascular Ward for any concern regarding infection". He recalled that "[t]here was only a small volume" of fluid — "enough to cover maybe half of the cotton bud swab". RN G sent the swab to the laboratory for assessment, and advised Dr H and Dr I that there were no particular signs of infection but that he had taken a swab as a precaution.

43. RN G told HDC:

> "[A]t the time I took the swab, I was expecting to see [Ms A] before she went for her [MRI] to insert a new IV cannula … I was not expecting that she would be discharged immediately."

44. Conversely, in response to my provisional opinion, Ms B told HDC that she told RN G that Ms A would be leaving rather than undergoing her MRI. She said that she explained this to RN G when he was preparing to replace Ms A's PIVC in anticipation of the MRI.

45. Ms B told HDC that at the time the swab was taken, she thought that her daughter's PIVC site looked infected. Ms B said that during her daughter's Month1–Month2 stay at Auckland DHB, the vascular surgeon had advised her that if she cut her hand, had dental treatment, or even scraped her knee, she should receive antibiotics urgently. Ms B said that she told RN G that she thought that the PIVC site looked infected, and asked him

[15] Skin infection.
[16] Redness of the skin.

whether Ms A should be given antibiotics. However, the medical staff did not prescribe antibiotics.

46. Dr I told HDC that she "did not consider that antibiotics were required". However, she stated:

> "[Had Ms A] complained of pain in the insertion site, had difficulty moving her arm or if she had had a fever or was otherwise systemically unwell, we would have started antibiotics and I expect that advice would have been sought from one of the seniors about administering antibiotics intravenously rather than orally."

47. Neither Ms A's clinical notes nor her discharge summary record the nurse's observation of pus spots on removal of the bandage from Ms A's arm, or RN G's removal of the PIVC (although the PIVC removal was recorded on Ms A's "Assessment to Discharge" form). There is no record of any observations of the PIVC site, Ms A's arm, or the substance seen on Ms A's arm, or of any discussion with Ms B about whether her daughter's arm was infected or whether she needed antibiotics. In addition, RN G did not record that he had taken a swab and sent it to the laboratory. RN G told HDC:

> "At the time it was Vascular Ward practice to document by exception rather than rule, although it has come to my attention during this investigation that this is not hospital wide policy."

48. The senior practitioner with overall responsibility for Dr H and Dr I told HDC that he has no personal memory of Ms A's Month3 admission.

Discharge from Auckland DHB on 18 Month3

49. Ms A and Ms B had a flight booked to go home, due to leave at 1pm on 18 Month3. They had anticipated that Ms A's medical tests would be completed before that time. However, Ms A's MRI scan was postponed from its original time on 17 Month3 to 11am on 18 Month3, and it was then postponed again to 2pm that day (for reasons explained later in this report). Dr I endeavoured to obtain a change of flights but was not successful. When it became obvious that Dr I would not be successful, Ms A asked to be discharged, and the medical staff decided to discharge her so that she could catch her flight at 1pm.

Safety-netting advice prior to discharge

50. Ms B told HDC that "advice was never given prior to discharge regarding signs of infection".

51. As noted above, RN G told HDC that he was not expecting Ms A to be discharged before undergoing her MRI scan. He did not recall giving Ms A discharge advice. He also said that if a patient expressed concern about the possibility of infection (as Ms B did on Ms A's behalf), his usual practice was "to suggest that the patient and family continue to observe the site for signs of infection and give examples of signs of infection including fever, redness and ooze".

52. Dr H told HDC:

> "[RN G], [Dr I], and myself gave strict return advice to [Ms A] and [Ms B] prior to discharge. If there was any evidence of developing erythema,[17] increasing exudate[18] (with these terms explained in laypersons terms), or fever, we suggested the family to immediately present to her GP or the emergency department."

53. Dr I told HDC:

> "With [Ms A's] discharge imminent (unless flights were able to be changed), [RN G], [Dr H], and myself spent some time explaining to [Ms A] and to her mother that if her arm should become red or painful, if there should be more pus, or if she should become unwell or develop fevers, then medical attention should be sought immediately. My impression was that both [Ms A] and her mother understood the advice, and were happy with it."

54. Ms A's clinical notes do not record that advice was given about what to do if she displayed signs of infection.

Discharge documentation

55. Dr H was responsible for completing Ms A's discharge summary. Because of the urgency with which Ms A and Ms B had to leave the hospital for the airport, Dr H was unable to complete the discharge summary before they left. Instead, he agreed to prepare the discharge summary later that day and email it to Ms B.

56. Ms A was discharged at about 11.30am on 18 Month3, and she left the hospital with her mother almost immediately afterwards.

57. Dr I told HDC:

> "[My expectation was that] [Dr H] would complete the discharge summary and the patient notes. That is why I did not make my own record in the patient's notes. I do not know why there was no record of the swab that was taken."

58. Dr H completed Ms A's discharge summary at 1.57pm on 18 Month3, and addressed it to Ms A's general practitioner. The summary did not contain any advice about what to do if Ms A displayed signs of infection.

59. Dr H stated:

> "It is difficult to recall the reason why [the advice to Ms A] was not documented in the clinical notes or in the discharge summary that was completed after the patient's departure. Perhaps we felt the strong verbal advice and return plan was sufficient, or perhaps it had been lost in the workload that had to be completed after discharging the patient.
>
> …

[17] Redness of the skin.
[18] Pus.

> Safety netting advice regarding the PIVC insertion site was omitted because the patient departed prior to receiving the discharge summary. Because the advice had been given orally before the patient departed, I did not see a need to set it out in writing (as I appreciate now that I also should have) … Following the departure of the patient, other clinical duties took over my priority list. The discharge summary had to be completed promptly in order to move onto other jobs left for the vascular ward. Perhaps this was the reason why such advice was omitted, as I felt the verbal advice was sufficient."

60. Although Dr H completed Ms A's discharge summary at 1.57pm on 18 Month3, Auckland DHB did not send a copy of the summary to Ms B until 9.03am on 20 Month3, when she telephoned Auckland DHB to request it.

Coordination of Ms A's MRI scan (16–18 Month3)

61. On 16 Month3, Dr H arranged for Ms A to undergo an MRI scan the following day, as the scan that had been scheduled following the insertion of her pacemaker had not been completed.

62. However, Ms A's MRI scan was postponed twice. The first time, it was postponed until 11am on 18 Month3 because the on-call pacemaker technician had incorrectly advised the on-call MRI technician that Ms A would have to wait 12 weeks after receiving her pacemaker before undergoing an MRI scan. This was a mistake, as Ms A's pacemaker allowed an MRI scan within six weeks of insertion. The MRI technician cancelled Ms A's appointment without consulting Dr H. The scan was postponed a second time — to 2pm on 18 Month3 — because the MRI suite was unexpectedly required for an emergency situation.

63. As noted above, this conflicted with Ms A's flight at 1pm, and she decided to try to arrange an MRI scan at a hospital at home.

Follow-up of swab results (18–20 Month3)

64. At 3.59pm on 18 Month3, the laboratory produced an interim swab report, which noted: "Moderate amounts of neutrophils[19] seen. Large amounts of gram positive cocci[20]."

65. At 12.52pm on 19 Month3, the laboratory produced a further report, which noted: "Heavy growth of *Staphylococcus aureus*[21] — susceptibilities to follow."

66. Auckland DHB told HDC that although these results were generated on 18 and 19 Month3 respectively, they were not viewed by Auckland DHB staff until the evening of 20 Month3, "presumably at the request of staff at [DHB2] who were caring for [Ms A] at the time".

67. Auckland, Counties Manukau, Northland, and Waitemata DHBs all use the TestSafe clinical information sharing service. This service allows health practitioners within the boundaries of those four DHBs to share clinical information easily. Auckland DHB told HDC:

[19] A type of white blood cell.
[20] Bacteria that turn violet when subjected to a Gram stain test.
[21] A bacterium that is a common cause of skin infections, and can cause septicaemia.

> "[Had Ms A's] GP been in the Northern Region (i.e., the catchment area of Auckland, Counties Manukau, Northland, and Waitemata DHBs), the swab results would have been on the TestSafe system and would have been available to review by a GP immediately."

68. Auckland DHB stated:

> "Because the Vascular Surgery Service very rarely has patients from outside [the four DHBs that use TestSafe], and [Ms A] had previously been admitted whilst living in Auckland (she had listed [an Auckland] address during her admission in [Month1–Month2]) it was not at the forefront of mind for the staff involved that they needed to be more proactive on this occasion around ensuring result transmission to [Ms A's] GP."

69. Further, Dr H told HDC:

> "My rationale for taking the swab was not to actively chase the results with a view to treatment by the ADHB. Microbial growth from skin commensals and S. aureus would be expected even in intact skin. Treatment should be guided based on clinical evidence of infection. The swab results at 4pm showing gram positive organisms would not have changed our management. The swab results would have been beneficial if, for example, the patient re-presented to hospital with sepsis and we had the results available from the prior swab (very helpful if it showed MRSA). I was not aware that neutrophil growth from swab results indicated active infection (at the time).
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> …
>
> The house officers involved in the incident would be responsible for communicating the results to the GP, as appropriate. My own thought process was that the swab results would be irrelevant without reviewing the patient's infection site … At the time, I felt that the swab results were not useful for the patient's GP for the above reasons.
>
> …
>
> I … now appreciate that I should have documented the PIVC insertion site findings and swab results for the patient's GP."

Presentations to GP and Mid-Central DHB (20–21 Month3)

70. On the morning of 20 Month3, Ms B observed that Ms A was very lethargic. Ms B took her daughter to the medical centre where she saw Dr J at about 10am. Ms A's discharge summary from Auckland DHB contained no reference to a swab having been taken, so Dr J had no indication to contact Auckland DHB to request the result, and could not check for any laboratory results directly, as the DHB in the region does not use the TestSafe service.

71. Dr J assessed that Ms A needed urgent care, and she was taken by ambulance to DHB2, where she arrived at 1.50pm. Medical staff diagnosed Ms A with septicaemia and

prescribed high doses of both vasopressors and antibiotics. However, Ms A deteriorated rapidly and, sadly, she died at 9.20am on 21 Month3 following a cardiac arrest caused by septicaemia.

Further information — Ms B

72. Ms B told HDC:

> "I believe my daughter would still be alive had certain events not taken place in the first place. I believe these small details, were either omitted, ignored or not taken seriously. She had prior medical records of skin infections, she had AAA surgery, she was implanted with a pacemaker, the swab was never taken seriously."

Further information — Auckland DHB

Policies

73. Auckland DHB's guideline document "Intravenous Catheters — Peripheral — in Adults and Children" was in place at the time of events. It states the following:

- When an Auckland DHB employee inserts a PIVC into a patient, the employee must (as a minimum requirement) record in the clinical notes the type of venous access device used, the gauge, the insertion site, the employee's own name, and the date and time of insertion.[22]
- For adults, PIVCs should be monitored at least every eight hours.[23]
- "[I]n adults the PIV catheter should be changed/re-sited routinely every 96 hours provided no catheter related complication requiring catheter removal are encountered before this."[24]
- "[I]n general, adult patients should not be discharged with a peripheral catheter in situ."[25]

74. Auckland DHB acknowledged that its "PIVC check documentation is not 100%". On 31 October 2018, it "took an all-hospital snapshot of PIVCs at [Auckland DHB]". Of the 566 admitted patients who were not off-ward and not being discharged, about 50% had a PIVC in place, about 40% had a PIVC in place with no date of insertion recorded, and 21% had a PIVC in place with no clinical indication for its presence. Auckland DHB accepted that "these results are far from optimal", but noted that "they are comparable to, if not better than, those in the published literature".

Root Cause Analysis

75. Following Ms A's death, Auckland DHB commissioned a Root Cause Analysis (RCA) team to identify the factors that contributed to Ms A developing septicaemia. The RCA team issued a report on 15 January 2018, and this was approved by Auckland DHB on 18 January 2018.

[22] ADHB, "Intravenous Catheters — Peripheral — in Adults and Children" (2013), Part 6.
[23] Ibid, Part 8.
[24] Ibid, Part 12.
[25] Ibid, Part 16.

76. The RCA stated: "[t]he patient received a PIVC earlier than she needed to. Whilst bacteraemia associated with PIVCs may never be totally eradicated, there is good evidence that the rate of bacteraemia is associated with PIVC indwell time and with both poor technique in either insertion or use of the cannula. The longer PIVC in-dwell time in this case increased the chance of an infective complication.

> …
>
> If the patient had remained in the hospital during the afternoon for the MRI scan, her deteriorating clinical state might have been detected by the ward staff. The verbal advice given around what to do if the PIVC site worsened after the discharge may not have been adequately communicated as a result of the haste around the discharge.
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> …
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> The DHB paying for a change in flight might also have allowed time for the electronic discharge summary to be given to the patient prior to leaving. This paperwork might also have been more complete as the extra time may have allowed the HO to document the verbal advice given about the PIVC site. Written advice on how to recognise developing infection at the PIVC site or systemic infection might have led to the patient seeking medical advice sooner than she did after the discharge from the hospital.
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> …
>
> Antibiotics should only be supplied when infection is definitely present as per the guideline in the RMO handbook. This is the action that HOs are trained to take. Based on the observations of the three clinicians that the site was not infected at the time the PIVC was removed, not commencing antibiotics cannot be considered a contributor to this adverse event. Infection of a PIVC site may develop up to 48 hours following removal of a PIVC (NSW guideline).
>
> …
>
> Following up the swab result may have had an effect on this adverse event. However, HOs are trained to only treat infection when it is definitely present and to primarily base their decision on clinical examination. The presence of moderate neutrophils on the initial gram stain is a sign to an experienced Infectious Diseases physician that active infection may be present. Prompt follow up of the preliminary swab result (available on the afternoon of discharge) together with education as to the significance of the presence of neutrophils in the specimen might in the future trigger RMOs to consult with a more senior clinician … The GP not having access to the swab result and the discharge summary at the time of the patient's consultation does not materially seem to have affected the patient's care as the appropriate decision was taken and the patient was referred directly into hospital by ambulance. Easy GP access to such information would clearly be desirable in the long term."

Changes made by Auckland DHB following these events

77. Concerning the coordination of Ms A's MRI scan, Auckland DHB told HDC that it "acknowledges that it can make improvements to ensure patients who are involved with several different services have their care coordination improved".

78. Auckland DHB told HDC that it has undertaken the following:

- An open book of the key learnings from Ms A's case was disseminated to staff.
- Its PIVC guidelines were amended to state that patients should not go home on leave with a PIVC in place.
- A clinical audit of PIVC use reviewed the extent to which PIVCs remain in place when no longer needed, and made recommendations on the appropriate length of time a PIVC should remain in place.
- It approved changes to the electronic discharge summary to allow pro forma advice to be given to patients relating to PIVC follow-up, and plans to institute these changes in early 2019.

79. Auckland DHB obtained permission from Ms A's parents to use their daughter's case "to increase awareness and aid learning across the DHB", and to "illustrate the importance of infection prevention and control". Auckland DHB told HDC that it plans to "continue to use [Ms A's] story" as it does "more to improve [its] PIVC surveillance and management".

80. The Chief Medical Officer of Auckland DHB told HDC:

> "On behalf of Auckland DHB, I would like to say how sorry I am for the tragic outcome of [Ms A's] care. I hope that we can continue to build on what we have done already to improve the care we provide to others to reduce the chance of a similar event occurring in future."

Responses to provisional opinion

Ms B

81. Ms B was provided with an opportunity to respond to the "information gathered" section of the provisional report. Her responses have been incorporated above as appropriate.

82. Ms B expressed frustration at Auckland DHB staff's failure to heed her or her daughter's concerns at the time, or to document their observations.

Auckland DHB

83. Auckland DHB was provided with an opportunity to respond to the provisional report. Its responses have been incorporated above as appropriate.

Relevant standards

84. The Standards New Zealand "Continuum of service delivery" standard in place at the time of these events states that a health service must be "coordinated in a manner that promotes continuity of service delivery and promotes a team approach where appropriate".[26] It also states that providers must "facilitate a planned transition exit, discharge, or transfer in collaboration with the consumer whenever possible and this is documented, communicated, and effectively implemented".[27]

85. The New South Wales Ministry of Health guideline "Peripheral Intravenous Cannula (PIVC) Insertion and Post Insertion Care in Adult Patients" was referred to in Auckland DHB's RCA report, and was current at the time of these events. The New South Wales guideline states that "PIVCs should not routinely remain in situ for longer than 72 hours", and that "[t]he responsible Medical officer should review the PIVC at as close as possible to 72 hours after insertion to determine whether it should be removed or replaced".[28]

86. The Medical Council of New Zealand standard "The Maintenance and Retention of Patient Records" in place at the time of these events states that medical practitioners "must keep clear and accurate patient records that report relevant clinical findings, decisions made, information given to patients, any drugs, or any other treatment prescribed", and that medical practitioners must "[m]ake these records at the same time as the events [they] are recording or as soon as possible afterwards".[29]

87. Similarly, the Nursing Council of New Zealand standard "Competencies for registered nurses" in place at the time of these events states that registered nurses should maintain "clear, concise, timely, accurate, and current health consumer records".[30]

88. The Standards New Zealand "Consumer information management systems" standard in place at the time of these events states that consumer information must be accurately recorded, current, and accessible when required.[31]

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[26] Standards New Zealand, *Health and Disability Services (Core) Standards* (2008) "Continuum of service delivery", NZS8134.1.3.3.4.
[27] Ibid, NZS8134.1.3.10.1.
[28] New South Wales Ministry of Health, *Peripheral Intravenous Cannula (PIVC) Insertion and Post Insertion Care in Adult Patients*, cl 9.41.
[29] Medical Council of New Zealand, *The Maintenance and Retention of Patient Records* (August 2008), Standard 01.
[30] Nursing Council of New Zealand, *Competencies for registered nurses* (December 2007), Competency 2.3.
[31] Standards New Zealand, *Health and Disability Services (Core) Standards* (2008) "Consumer information management systems", NZS8134.1.2.9.

Opinion: Auckland DHB — breach

Introduction

89. DHBs are responsible for the operation of the clinical services they provide, including any service failures. It is incumbent on all DHBs to support their staff with systems that guide and support good decision-making and promote a culture of safety.

Standard of care provided — breach

Documentation of care provided to Ms A

90. RN C recorded that at 7pm on 16 Month3 a member of the nursing team inserted a PIVC into Ms A. It is not recorded who inserted the PIVC or precisely where it was inserted.

91. Ms A was cared for by RN D between 11pm on 16 Month3 and 7.15am on 17 Month3, by RN F between 7am and 2.30pm on 17 Month3, and by RN E between 7am and 11.30am on 18 Month3. Although RN F says that she would have checked Ms A's PIVC at 7.15am and 12.55pm on 17 Month3, and RN E says that she checked Ms A's "vital signs" at 8.15am on 18 Month3, there is no documentation in the clinical notes that any of the nurses checked Ms A's PIVC.

92. My independent clinical advisor, Dr Iwona Stolarek (a former chief medical officer), referred to Auckland DHB's "Intravenous Catheters — Peripheral — in Adults and Children" guideline, which states that when employees insert a PIVC into a patient, they should record in the clinical notes the type of venous access device used, the gauge, the insertion site, their own name, and the date and time of insertion.[32] The guideline also advises that PIVCs inserted into adults should be monitored at least every eight hours.[33] Dr Stolarek also referred to the Nursing Council's expectation that registered nurses will maintain "clear, concise, timely, accurate, and current health consumer records".[34]

93. Dr Stolarek advised HDC:

> "PIVC check documentation especially at the time of taking a swab falls below the accepted standard of care and I would consider was a moderate departure from the standard."

94. I accept this advice. It is concerning that all the nurses who cared for Ms A omitted to document relevant PIVC observations in the clinical notes.

95. I have considered Auckland DHB's statement that although Auckland DHB's "PIVC check documentation is not 100%", it is "comparable to, if not better than, those in the published literature". This statement aligns with Dr Stolarek's advice that "[t]he lack of documentation of the person who inserted the PIVC … is not unusual and could likely happen in other DHBs", and that "PIVC check documentation is not 100%" across New Zealand healthcare providers. This does not alter the fact that Ms A's PIVC documentation fell below the accepted standard.

[32] Auckland DHB, "Intravenous Catheters — Peripheral — in Adults and Children" (2013), Part 6.
[33] Ibid, Part 8.
[34] Nursing Council of New Zealand, *Competencies for registered nurses* (December 2007), Competency 2.3.

Omission of material information in discharge summary

96. On the morning of 18 Month3, Ms A and the Auckland DHB staff caring for her were uncertain whether she would be able to undergo the MRI scan scheduled for 2pm, or whether she would have to leave in order to catch her scheduled 1pm flight out of Auckland. Dr I spent some time trying to persuade the airline to change Ms A's flight, but was unsuccessful. Consequently, by the time Ms A decided that she would leave the hospital to catch her flight, Dr H had little time to carry out the standard discharge process.

97. Dr H and Ms B agreed that Dr H would complete Ms A's discharge summary later that day and email it to Ms B. Dr H completed the discharge summary at 1.57pm.

98. Dr H's discharge summary omitted to:

a) Document that a substance was observed on Ms A's arm, near the PIVC site;

b) Document that a swab had been taken of this substance and that it had been sent to the laboratory for assessment; and

c) Advise what Ms A should do if she developed further symptoms.

99. Dr H explained to HDC that he may have omitted the advice to Ms A in the discharge summary because he "felt the strong verbal advice was sufficient". Similarly, he did not record the taking of the swab because his "rationale for taking the swab was not to actively chase the results with a view to treatment by ADHB". Dr H further told HDC:

> "Following the departure of [Ms A], other clinical duties took over my priority list. The discharge summary had to be completed promptly in order to move onto other jobs left for the vascular ward."

100. Dr Stolarek referred to the "Continuum of service delivery" standard, which requires providers to give consumers a planned and coordinated discharge from services, and to document, communicate, and effectively implement that discharge.[35] She advised HDC:

> "Failure to document verbal instructions given to the patient either in the clinical record or in the discharge letter fell below the standard of accepted practice and I would consider was a moderate departure from the standard of care due to a lack of documentation of steps taken and reasons why.
>
> The documentation in the discharge letter in the advice to the GP does not mention the PIVC exudate and resulting swab taken or state an expectation for the GP to follow up the swab results if the patient consulted them. This falls below the standard of accepted practice and I would consider was a moderate departure from the standard of care."

[35] Standards New Zealand, *Health and Disability Services (Core) Standards* (2008) "Continuum of service delivery", NZS8134.1.3.10.1.

101. I accept Dr Stolarek's advice. I have considered Dr H's explanation that at the time he believed that the verbal advice given by staff to Ms A was sufficient. However, as outlined by my expert, the standard of practice is clear.

102. I have also considered Dr H's explanation that the swab was not taken with the expectation of actively chasing the results. As noted above, the swab was taken for the purposes of testing. The result would be material to subsequent care. I note that Dr H "now appreciate[s] that [he] should have documented the PIVC insertion site findings and swab results for the patient's GP".

103. I am critical of Auckland DHB for not ensuring that this information was recorded in Ms A's discharge summary. I note Dr H's statements that once Ms A had left the hospital, "other clinical duties took over [his] priority list", and that "[t]he discharge summary had to be completed promptly in order to move onto other jobs". The completion of an accurate discharge summary containing relevant information is a basic requirement. It should have been met.

Failure to inform general practitioner of swab results

104. Auckland DHB did not advise the medical centre that it had taken a swab from Ms A's PIVC site, or provide the results of the swab when they became available. Consequently, when Dr J saw Ms A, she was not aware that a swab had been taken, and did not follow up on the results.

105. A second swab report (received at 12.52pm on 19 Month3) indicated a "heavy growth of *Staphylococcus aureus"*, a bacteria that is a common cause of skin infection.

106. Dr Stolarek advised HDC: "Failure to inform the GP of follow up of results would be considered a moderate departure from the standard of care by my peers …" I accept Dr Stolarek's advice.

107. I have considered Auckland DHB's explanation that "[b]ecause the Vascular Surgery Service very rarely has patients from outside [the four DHBs that use TestSafe], and [Ms A] had previously been admitted whilst living in Auckland (she had listed [an Auckland] address during her admission in [Month1–Month2]) it was not at the forefront of mind for the staff involved that they needed to be more proactive on this occasion around ensuring result transmission to [Ms A's] GP".

108. Policies and practices need to ensure that the right information gets to the right providers regardless of the consumer's domicile. I am critical that this did not happen in this case.

Conclusion

109. Auckland DHB's care of Ms A was suboptimal in several respects:

a) PIVC check documentation fell below the standard of care, especially at the time of taking the swab. All the nurses caring for Ms A omitted to document relevant PIVC observations in the clinical record.

b) Verbal instructions given to Ms A were not documented either in the clinical record or in the discharge summary.

c) The discharge summary omitted reference to the swab the expected test results, or to notify the GP to follow up test results if consulted by the patient.

d) The GP was not informed of the test results.

110. For these reasons, I find Auckland DHB did not provide services with reasonable care and skill, and breached Right 4(1) of the Code of Health and Disability Services Consumers' Rights.[36]

Coordination of MRI scan — adverse comment

111. The MRI scan that Dr H scheduled for Ms A was postponed twice — the first time because of a miscommunication between himself, the on-call pacemaker technician, and the on-call MRI technician; and the second time because the MRI suite was required urgently for another patient. Concerning the first postponement, Dr Stolarek advised:

> "I consider that the coordination of the MRI brain [scan] was not ideal and that clarity as to where the MRI was being carried out or who would take responsibility in organizing the test was not evident in the discharge letter in [Month2]. I note that the test was not urgent, and that that when it was realised that the test had not occurred during the elective admission in [Month3], an attempt was made to arrange the test whilst an inpatient to minimise inconvenience for the patient. Differing advice regarding the wait time for MRI post PPM insertion from the cardiac physiology specialty led to a further cancellation and delay in the MRI.
>
> I consider the standard of care fell below accepted practice and as not an urgent test was a mild departure from the standard of care, though resulted in a longer dwell time of the PIVC."

112. I accept this advice. Ms A's original 17 Month3 MRI scan was cancelled unnecessarily, not only because the pacemaker technician was unaware of the nature of Ms A's pacemaker, but also because the MRI technician did not consult with Dr H before cancelling Ms A's appointment. Clearly, in future the DHB should endeavour to avoid such unnecessary cancellations caused by a lack of consultation.

Other issues

Length of time PIVC remained in situ — other comment

113. RN C recorded that a member of the nursing team inserted a PIVC into Ms A at approximately 7pm on 16 Month3. RN G removed the PIVC at approximately 10.30am on 18 Month3. The PIVC had been in situ for about 40 hours.

114. Several factors contributed to the length of time Ms A's PIVC remained in situ. First, the PIVC was inserted on the evening of 16 Month3, rather than on the morning of 17 Month3

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

when Ms A was scheduled to undergo tests. Second, Ms A was allowed to leave the hospital with the PIVC in place on the afternoon of 17 Month3, rather than removing it and inserting another PIVC the following day. Third, the postponement of the MRI scan prolonged Ms A's stay in hospital.

115. The Auckland DHB RCA report noted that PIVCs "do represent a hazard to patients", and that Ms A received a PIVC earlier than she needed to. The report concluded that the early PIVC insertion, combined with the delays in arranging the MRI scan, resulted in a longer than desirable time for the PIVC to remain indwelling. This increased the chance of Ms A developing an infective complication.

116. However, Dr Stolarek advised HDC that it was "standard practice" to insert a PIVC into a patient on the evening before a day of testing, since this saved time on the day of testing. Therefore, she advised that the decision to insert the PIVC on the evening of 16 Month3 "would be considered standard practice by [her] peers". I accept this advice.

117. Dr Stolarek further advised:

> "In the absence of any concerns regarding the PIVC, it would be considered reasonable by my colleagues to send a patient home with a PIVC line as often patients are sent home for IV treatments with daily follow-up from district nurses such as the 'hospital at home' models of care."

118. I accept this advice. I note that Auckland DHB's "Intravenous Catheters — Peripheral — in Adults and Children" guideline advises that "[i]n general, adult patients should not be discharged with a peripheral catheter in situ".[37] However, in this case, Ms A was not discharged from care but rather allowed leave to spend the night outside the hospital.

119. Dr Stolarek referred to the requirement in Auckland DHB's PIVC guideline that PIVC sites should be "changed/re-sited routinely every 96 hours provided no catheter related complication requiring catheter removal are encountered before this".[38] She compared this with the New South Wales Ministry of Health's guideline that "PIVCs should not routinely remain in situ for longer than 72 hours".[39] Dr Stolarek advised HDC that, given this: "[A] dwell time of 40 hours I would view as within an appropriate standard of care and be viewed as such by my peers." I accept this advice.

Provision of antibiotics — other comment

120. Ms B and Auckland DHB staff provided HDC with differing accounts of their observations of Ms A's PIVC site on the morning of 18 Month3. Ms B told HDC that her daughter told her that her arm was sore and she was unable to bend it. Ms B said that she observed pus spots near the PIVC site, and asked RN G whether her daughter should be prescribed antibiotics to deal with a possible infection.

[37] Auckland DHB, "Intravenous Catheters — Peripheral — in Adults and Children" (2013), Part 16.
[38] Ibid, Part 12.
[39] New South Wales Ministry of Health, *Peripheral Intravenous Cannula (PIVC) Insertion and Post Insertion Care in Adult Patients*, cl 9.41.

121. Conversely, Dr H, Dr I, and RN G all told HDC that they do not recall Ms A's arm displaying signs of infection. Dr H and Dr I cannot remember Ms A complaining about her arm, or Ms B asking about antibiotics, while RN G does remember these discussions. However, RN G considers that Ms A's arm pain was not a sign of infection but rather a consequence of having had a PIVC in situ for 40 hours. He does not remember Ms A having difficulty moving her arm.

122. In response to my provisional opinion, Ms B also told HDC that she did not remember Dr H or Dr I viewing Ms A's PIVC site when RN G removed the PIVC from her arm, or when he took the swab. Conversely, Dr H and Dr I both provided descriptions of Ms A's PIVC site to HDC.

123. Noting the similarities between Ms B's and RN G's recollections, I accept that Ms A did complain about her arm at the time, and that Ms B did ask RN G about antibiotics for Ms A. However, I am unable to determine further the observations made by Auckland DHB staff and Ms B that morning.

124. I have considered whether the taking of the swab indicated that the medical staff suspected that Ms A's arm might be infected. However, I accept RN G's explanation that "[s]wabbing IV insertion sites are routine practice on the Vascular Ward for any concern regarding infection". As Ms B had drawn attention to the substance on Ms A's arm, it was appropriate for RN G to take a swab, whether or not he considered that it indicated a possible infection or not.

125. The Auckland DHB RCA report affirmed that "antibiotics should only be supplied when infection is definitely present". Similarly, Dr Stolarek advised HDC: "I consider the actions taken regarding the possibility of infection (swabs) were accepted standard of practice." I accept this advice. Since the staff ascertained that Ms A was probably not infected (based on their observations), it was appropriate for them not to prescribe her antibiotics at that time.

126. The interim swab report (results produced at 3.59pm on 18 Month3) indicated "[m]oderate amounts of neutrophils". Dr H told HDC that at the time, he was not aware that neutrophil numbers in swab results could suggest active infection.

127. The RCA report noted that house officers would not be expected to know that the presence of moderate neutrophils was very suggestive of active infection. The report concluded that ideally medical staff should follow up swab results, and that staff should be educated to consult with senior clinicians when swab results indicate the presence of moderate neutrophils. I endorse this comment.

Recommendations

128. I recommend that Auckland DHB:

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

b) Confirm the implementation of:

i. Its new policy of giving doctors direct access to an MRI radiologist for discussion when referring a patient for an MRI scan;
ii. Changes to its electronic discharge summary that will allow pro forma advice to be given to patients relating to PIVC follow-up;
iii. Its new policy of not routinely inserting PIVCs into patients in the Vascular Ward;

and conduct a review of the effectiveness of these new policies and changes and report back to HDC on the outcome of its review, within three months of the date of this report.

c) In light of this report and Dr Stolarek's comments, provide evidence that the recommendations set out in the Auckland DHB Root Cause Analysis report have been implemented, and report on any further changes that occurred following the implementation of those recommendations, within three months of the date of this report.

d) Use this report as a basis for training staff at Auckland DHB, and provide evidence of that training to HDC within three months of the date of this report.

e) Provide HDC with a copy of the "open book" proposed in the Root Cause Analysis report, within three months of the date of this report, for HDC to consider sharing with other DHBs.

f) Consider whether it should amend its policies on:

i. Follow-up of abnormal investigation results, particularly in relation to consumers discharged to areas outside the TestSafe area; and
ii. Automatic signoff of abnormal investigation results in general;

and report back to HDC on the outcome of its consideration, within three months of the date of this report.

g) Consider the changes it could make to improve the care coordination of consumers who are involved with several different services, and report to HDC on the outcome of its consideration within three months of the date of this report.

h) Consider whether it should advise its medical staff to consult with senior clinicians when swab results indicate the presence of moderate neutrophils, and report to HDC on the outcome of its consideration within three months of the date of this report.

Follow-up actions

129. Upon receipt of the "open book" proposed in the Root Cause Analysis report, HDC will consider sharing the open book with other DHBs.

130. A copy of this report with details identifying the parties removed, except the expert who advised on this case and Auckland DHB, will be sent to the Health Quality & Safety Commission and Central Region Technical Advisory Services Limited, and placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

Appendix A: Independent advice to the Commissioner

The following expert advice was obtained from Dr Iwona Stolarek on 3 August 2018:

"1. I have been asked to provide an opinion to the Commissioner on case reference C17HDC01589.

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

3. My qualifications are as follows MBChB, MMEd, PGDipHSM, MRCP (UK), FRACP, FRACMA.

4. I have had over 30 years of clinical experience both in United Kingdom and New Zealand. My training and experience relative to the area of expertise called upon reflects my 5 years as Chief Medical Officer a role that focused on clinical governance matters at a district health board level, my RACMA training, and my three years as Medical Director at the Health Quality & Safety Commission New Zealand. I have also completed a quality improvement advisor course.

5. Declaration of conflicts of interest — None

6. My instructions from the Commissioner were to provide expert advice and commentary regarding:

   a. Coordination of the MRI scan.

   b. The appropriateness of inserting IV (intravenous) line at the time of admission.

   c. The appropriateness of leaving the IV line in situ, both while in hospital and while on overnight leave.

   d. Actions taken regarding the possibility of infection at the IV site.

   e. The adequacy of the discharge process and the information provided to the family at that time.

   f. Auckland DHB's (ADHB) communication with other relevant health care providers.

   g. The quality of the relevant clinical documentation.

   h. Any other matters in this case that I consider amount to a departure from accepted standards of care.

7. For each question I have been asked to advise:

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

   b. If there has been a departure from the standard of care or accepted practice how significant a departure do I consider this to be?

   c. How would it be viewed by my peers?

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

8. In considering these cases I have received documentation from the Commissioner as follows:

   a. Letter of complaint dated […] from the Health and Disability advocate.

   b. ADHB's response dated 3 October 2017.

   c. Further response from ADHB's response dated 30 November 2017, along with the relevant DHB policies.

   d. ADHB's root cause analysis (RCA) report dated […].

   e. Clinical records from ADHB covering the period 16–18 [Month3], and previous discharge summary from ADHB ([Month1]).

   f. Comments and clinical record from [DHB2] for admission of 20–21 [Month3].

   g. Comments from complainant on Auckland's response dated 25 October 2017.

   h. Auckland DHB's Intravenous catheters — Peripheral — in Adults and Children guideline published October 2013, unique identifier CP01/BRD/019.

9. Auckland DHB's Intravenous catheters — Peripheral — in Adults and Children guideline published October 2013, unique identifier CP01/BRD/019 (I have used the abbreviation Peripheral Intravenous Catheter (PIVC) and referred to the document as the ADHB PIVC guideline). This document is a guideline and applies to all clinical departments (excluding newborn), and all Auckland District Health Board clinicians. The version I have been provided was first published in October 2013 with the next scheduled review due in October 2016. I have assumed this guideline has remained the most up-to-date version and was current and in use during the patient admissions in [Month1] and [Month3]. The guideline covers the management of short peripheral IV lines to minimise the risk of nosocomial infections and catheter related complications.

10. The guideline states the following points of relevance to the case —

    a. that PIVC insertion should only be undertaken by staff members who have completed a locally approved training program for peripheral IV cannulation

    b. that maintenance and discontinuation of the peripheral IV catheter should be undertaken by staff members who have completed the necessary training and competency assessment program

    c. hand hygiene and aseptic technique for insertion is emphasised

    d. guidance is given on catheter size depending on age, duration of therapy, suggesting a 20 gauge luer for CT scans, (a midrange gauge catheter which the guidelines state would allow blood flow around the catheter lessening the risk of phlebitis)

e. the guideline states that lines in the antecubital fossa should not be routinely used for insertion of peripheral catheters as it may limit the patient's range of movement, however the guideline states this site may be required for initial or short-term placement for CT scan injector pump use (though short term is not defined)

f. the guideline states that the minimum documentation required is documentation of date and time of insertion at the insertion site using the self adhesive label supplied with the cannula, with this placed on the outside of the transparent dressing

g. the guideline states that the minimum documentation in the clinical record should include type of venous access device, gauge, insertion site, identification of individual who carried out the insertion and date and time of insertion

h. the guideline states that if no details are recorded on the IV dressing then the first person evaluating the site should record it on the IV dressing and in the clinical notes

i. the guideline states any patient with an intravenous device should have the catheter site monitored either visually or by palpation eight hourly as an adult inpatient and daily if in the community, with assessments undertaken using the infiltration and phlebitis scales (Royal College of Nursing 2005, both provided in the guideline)

j. the guideline states that the assessment of peripheral sites for signs of catheter complications or malfunction should be recorded in the clinical record a minimum of once a shift

k. the phlebitis scale is provided on page 10 and the guideline states that use of the scale has been shown to aid in the early detection of phlebitis and to improve the accuracy of site assessments

l. the phlebitis scale gives clinical criteria and management actions depending on the grade of phlebitis and states that this can be due to physical, chemical or bacterial irritants

m. guidance on replacements of IV lines states that in adults the peripheral IV catheter should be changed/re-sited routinely every 96 hours provided no complications requiring removal occur prior

n. guidance is also given for suspected infection which the guideline states can be local or systemic or both. It states that peripheral line infections usually occur at the site of insertion. If infection is present the catheter should be removed, the insertion site swabbed, and medical staff asked to review and documentation in the clinical record and a Risk Monitor Pro be completed

o. IV catheter removal should be documented in the clinical record

p. there is a section on discharging the patient with a peripheral IV catheter which states that in general adult patients should not be discharged with a peripheral catheter in situ

q. there is no mention of PIVC and overnight leave

r. education programmes are noted with e-learning for adult IV lines

s. supporting evidence sources have been used to develop the guidance.

11. I have reviewed the clinical notes provided to me and my own summary of the timeline is in keeping with the RCA review timeline pages 5–6. I have not been provided with observation charts nor full Concerto access information noted in the RCA. RCA was undertaken 8 months after the event and includes information from staff interviews.

12. The RCA was finalised on 19.02.18. The New South Wales guideline for PIVC insertion and post insertion care (Dec 2013) was referenced in the RCA along with 3 other papers.

13. Key points noted in the RCA review were as follows:

a. This was a planned elective admission on 16 [Month3] for clinical review and a contrast CT scan on 17 [Month3].

b. A PIVC line was inserted on 16 [Month3] in the antecubital fossa for contrast injection.

c. A follow up MRI brain with contrast was booked so the PIVC was kept in situ.

d. The patient was allowed home on overnight leave on 17 [Month3], with the PIVC in situ, while awaiting the MRI scan.

e. The PIVC was therefore in place from admission till discharge a total of 40 hours.

f. On the day of discharge (18 [Month3]) the RCA states that when the peripheral IV line was removed the staff noticed an abnormality at the insertion site. The site was swabbed and this was sent for microbiological culture. The patient remained afebrile and was discharged from the hospital at approximately 2 PM with some urgency in order to catch a pre-booked flight home which staff had attempted to delay.

g. Interim swab results were available in the electronic laboratory system at 4 PM the same day. This showed gram positive cocci (a class of bacteria) and neutrophils (white cells which can be indicative of infection).

h. These results were not actively communicated to the patient's GP.

i. Two days later the patient was taken to [her GP] unwell and was admitted to [DHB2] where she subsequently died from septic shock with a Staph. aureus bacteraemia.

14. My response regarding the coordination of the MRI scan (as per point 6a):

15. During the first admission to ADHB in [Month1] for type A aortic dissection the patient underwent aortic root replacement, repair of aortic valve, re-implantation

of coronary arteries, and repair of an infra renal abdominal aortic aneurysm measuring up to 5 cm. A CT angio of head, thoracic aorta and carotid arteries showed that the arteries of head and neck were unusually torturous for age suggesting a connective tissue disorder. A distended vein adjacent to right vertebral artery at C1 suggested the possibility of AV shunt so further examination by MRI with contrast was suggested in light of a possible connective tissue disorder.

16. From the RCA notes this was requested on 17 [Month1].

17. Unfortunately, the patient developed complete heart block requiring a permanent pacemaker (PPM) to be inserted on 21 [Month1]. The discharge summary from this admission notes that a MRI compatible PPM was used but cardiology suggested a 6 week delay before MRI in order to allow the PPM leads to be embedded. Neurosurgery were happy with the 6-week delay.

18. The RCA timeline notes that on 1 [Month1] in the Concerto electronic system the MRI request was declined and cancelled due to '*no follow up regarding this request. Please re request and re discuss with radiologist if MRI still needed*'.

19. On 06 [Month1] the patient was discharged from ADHB. Plan at discharge from the discharge letter regarding the MRI is not clear. The main body of the discharge letter states that the *Neurosurgery team would arrange FU for the R vertebral AVM with USS/MRI brain and then +/- neurointerventional procedure either at* ADHB or [DHB3]. (Note the patient was [living] in Auckland but parent's home was in [DHB3] neurosurgery catchment area hence different DHB follow ups).

20. The same discharge letter in the Advice to GP states '*please ensure that a MR brain occurs 6 weeks after PPM insertion and this should be followed up by the neurosurgical/interventional team'*.

21. The RCA states that there was uncertainty about where the patient was to undergo the MRI.

22. During the second admission in [Month3] it was noted by the house officer (HO) that the MRI brain had not been organised, so they tried to organise this as an inpatient recognising that this would be more convenient for the patient who was having other tests and follow ups. The RCA also notes that the pacemaker issue was noted in the HO electronic request and that *cardiac physiology had recommended that a 6 week wait was sufficient for safety of MRI compatibility*.

23. The RCA states that next day (17 [Month3]) the MRI technician checked directly with the on-call pacemaker technician who gave 12 week stand down advice and so the MRI was cancelled and request declined on 17 [Month3]. This was communicated to the HO who checked with a more senior pacemaker technician who restated the 6 week advice.

24. As the MRI had to have the physical presence of a pacemaker technician to reprogram the PPM as a precaution, the MRI was rescheduled for the next morning (18 [Month3]).

25. As a result the PIVC was left in situ as the MRI brain would require a contrast injection. These delays resulted in the indwell time being prolonged further.

26. The clinical notes from the HO state that on Wednesday morning (written on 18 [Month3] in retrospect) they were advised the MRI was booked for 1400. The HO states that they attempted to delay the patient's flight home but this was not possible so the MRI was not carried out. HO advised neurosurgery registrar and the HO notes state they would organise in [DHB3].

27. In addressing the question of standard of care regarding coordination of MRI, I have compared the standard of service delivery against that described in the New Zealand Standard Health and Disability Services (CORE) Standards (NZS 8134:2008) and guidance. The relevant sections of the New Zealand standards are:

28. NZS 8134.1.3 continuum of service delivery with outcome 3 being that consumers receive services that are planned and coordinated in an appropriate manner. The following subsections apply:

29. Standard 3.3.4: the service is coordinated in a manner that promotes continuity in service delivery and promotes a team approach where appropriate.

30. Standard 3.10.1: consumers experience a planned and coordinated transition exit discharge or transfer from services.

31. I consider that the coordination of the MRI brain was not ideal and that clarity as to where the MRI was being carried out or who would take responsibility in organising the test was not evident in the discharge letter in [Month2]. I note that the test was not urgent, and that when it was realised that the test had not occurred during the elective admission in [Month3], an attempt was made to arrange the test whilst an inpatient to minimise inconvenience for the patient. Differing advice regarding the wait time for MRI post PPM insertion from the cardiac physiology specialty led to a further cancellation and delay in the MRI.

32. I consider the standard of care fell below accepted practice and as not an urgent test was a mild departure from the standard of care, though resulted in a longer dwell time of the PIVC.

33. In response to how this would be viewed by my peers — issues in appointment systems were reported from a variety of settings in the Commission's Learning from Adverse Events publications in [Month2], and delays in referral and follow up also featured in the 2017 publication.

34. Problems with coordination of appointments especially across specialties and across different DHBs are not unique to ADHB. Referral and appointment systems are complex with many stages from the initial referral through to the actual follow-up appointment. There are different transition points and handovers between staff. The system often is a mix of paper and electronic. Many organisations are trying to address and improve this complex system. Often the needs of different areas are not similar, so solutions need to be tailored to different work practices and flows. Although much is electronic there are still manual processes at some steps dependent on people. As such people are vulnerable to distractions, and interruptions etc.

35. Making referrals and appointment times transparent to both consumers and referrers is key. This allows visibility across the continuum of care. Patient management systems in primary and secondary care have usually developed independently. Much work has occurred over the past years to allow greater visibility of information across the continuum of care settings. Patient portals are also being rolled out which give patients better access to their health information.

36. Given this context the same could likely occur in other organisations and as such may not be unexpected when viewed by my peers.

37. Recommendations for improvement that may help to prevent a similar occurrence in future have been noted in the RCA recommendations with a planned review of the process of booking MRIs for patients with PPM. This was due to have occurred by May 2018 and should be followed up. The review needs to also consider the lack of clarity noted in points 19–21 as to who was to organise the MRI.

38. My response regarding the appropriateness of inserting an IV (intravenous) line at the time of admission (as per point 6b):

39. The clinical record nursing notes on 16 [Month3] at 1900 state bloods sent, IV (Luer inserted) obs stable and NBM (nil by mouth) for CT tomorrow. On 17 [Month3] at 0830, CTA with IV contrast was undertaken.

40. In view of the early CT scan, insertion of the PIVC the evening before for an inpatient could be considered standard practice. Further a PIVC would enable fluids etc. to be given if necessary as the patient was noted to be nil by mouth (NBM in clinical record). It would also assist radiology colleagues in terms of procedure time saving the insertion of a PIVC.

41. The RCA notes that if the patient had not been admitted as an inpatient and the tests were done as an outpatient, the PIVC line would be inserted in radiology and removed post test.

42. In addressing the question of standard of care regarding appropriateness of inserting IV (intravenous) line at the time of admission, I feel the standard of care

was that of accepted practice (though I cannot comment on the aseptic technique used).

43. The practice of inserting a PIVC at the time of admission for a test the next day is not unique to ADHB and therefore I feel would be considered standard practice by my peers.

44. In terms of the placement in the antecubital fossa I have also noted the DHB's own PIVC guideline states that lines in the antecubital fossa should not be routinely used for insertion of peripheral catheters as it may limit the patient's range of movement, however the guideline states this site may be required for initial or short-term placement for CT scan injector pump use but does not specify the time of 'short term' placement.

45. My response regarding the appropriateness of leaving the IV line in situ, both while in hospital and while on overnight leave (as per point 6c):

46. In terms of leaving the PIVC line in situ while in hospital, the RCA notes a total PIVC dwell time of 40 hours. The ADHB's PIVC guideline guidance on replacements of IV lines states that in adults the peripheral IV catheter should be changed/re-sited routinely every 96 hours provided no complications requiring removal occur prior. The PIVC was therefore in place from admission till discharge a total of 40 hours. This time is in keeping with the DHB's PIVC guideline however the lack of documentation of inspection of the PIVC site for phlebitis etc. is noted in the RCA making the appropriateness difficult to comment on.

47. The guideline states any patient with an intravenous device should have the catheter site monitored either visually or by palpation eight hourly as an adult inpatient and daily if in the community with assessments undertaken using the infiltration and phlebitis scales (Royal College of Nursing 2005, both provided in the guideline).

48. A systemic review of short-term Peripheral Venous Catheter-related bloodstream infections (PVC-related BSIs) by Leonard Mermel published in Clinical Infectious diseases in 2017[40] which post dates this case found that the incidence of PVC-related BSIs was 0.18%. This is a little higher than the 0.1% (0.5 per 1000 IV days) noted in the evidence used in the ADHB PIVC guideline of 2013.[41] Both research papers note that there is a greater incidence with central venous lines than PIVC lines. Prolonged dwell time, PIVC inserted in emergent conditions increase the risk of PVC-BSIs.

49. Mermel notes a mean of 22% of nosocomial catheter related BSIs were due to PVCs (range 7%–60%). He also notes that a PIVC dwell time of greater than 3 days

[40] Short-term Peripheral Venous Catheter-Related Bloodstream Infections: A Systematic Review. Mermel L. Healthcare Epidemiology. Clinical Infectious Diseases 2017;65(10):1757–62.
[41] Maki D.G., Kluger D.M., Crnich C.J. The risk of bloodstream infections in adults with different intravascular devices: A systemic review of 200 published prospective studies; Mayo Clin Proc. Sep 2006.

increases risk of catheter colonisation and independently increases risk of PVC-related BSIs.

50. Mermel notes that in the last 2 decades there has been a focus on reducing infection risk with central lines with national campaigns and in comparison little attention has been paid to the risk of PVC-related BSIs despite the fact that 1 in 3 healthcare associated Staph aureus CR-BSIs are due to PVCs.

51. Mermel suggests some pragmatic interventions such as education and compliance monitoring in regard to limiting the dwell time to 3–4 days, daily assessment of the insertion site, justification clinically for continued catheterisation or removal, and replacement of PIVCs inserted under emergent conditions.

52. Mermel notes that due to the estimated incidence of PVC-related BSIs clinicians should have a high index of suspicion for the PIVC as a source of BSI. He suggests the PIVC be inspected daily for evidence of localised infection, or if a patient develops signs of an infection. He states that although phlebitis may not be infectious in etiology it should prompt catheter removal and culture of the exudates; and if there are systemic symptoms, blood cultures.

53. The New South Wales Peripheral intravenous Cannula (PIVC) insertion and post insertion care in adult patient guideline (Dec 2013) state that PIVC should not normally remain in situ for longer than 72 hours.

54. If one compares the total PIVC dwell time of around 40 hours this is within guidance in Mermel's review, the ADHB's own PIVC guideline, and the NSW guidelines.

55. ADHB's PIVC guidelines suggest inspection of the PIVC 8 hourly and documentation in clinical record, Mermel's suggests daily inspection, and NSW guideline states that the PIVC should be reviewed each time it is accessed for pain, tenderness and redness etc, and that any actions taken be documented in the clinical record.

56. The RCA acknowledges that documentation of inspection after the initial noting of PIVC insertion (though site not specified) was lacking in the notes, which I concur with.

57. In response as to my advice and commentary regarding the appropriateness of leaving the IV line in situ for 40 hours while in hospital, it is difficult to comment as there was no clinical documentation of a PIVC check and no comments regarding the presence or absence of phlebitis related to the PIVC. The RCA notes that on day of discharge observations on discharge were HR 105, BP 90/50, sats 98%, and temp was 36.5 (normal). The notes record that the patient had stated they were normally relatively hypotensive and tachycardic. The RCA states that from staff interview a small amount of discharge was noted at the insertion site

on removal of the PIVC, so a swab was taken. The description of the discharge varies.

a. If the PIVC had been viewed and the checks documented as nil abnormal, and in the absence of fever or signs of an infection, a dwell time of 40 hours I would view as within an appropriate standard of care and be viewed as such by my peers.

b. A failure to document a normal PIVC check in itself would be a mild departure from accepted practice and viewed as such by my peers.

c. The RCA notes the complainant letter stated the patient said their arm was sore and couldn't bend it. There was no documentation of this discussion in the clinical notes and the RCA states that staff could not remember this discussion. The RCA notes that on the day of discharge (18 [Month3]) when the PIVC was removed the staff noticed an abnormality at the insertion site. No fever was noted on day of discharge. If phlebitis related to the PIVC had been present at any time this would prompt further actions as described in the ADHB PIVC guidelines. Phlebitis in the absence of fever (pyrexia) in the ADHB guideline states that the PIVC should be re-sited, medical staff should review and treatment be considered. If there is phlebitis and fever then purulent thrombophlebitis should be considered. If there is suspected infection the catheter should be removed, a swab taken and medical staff should review. The RCA states that site was swabbed and this was sent for microbiological culture though staff felt the site was not infected. The RCA also states that from interviews with staff the PIVC site was reviewed by two HOs of different seniority on 18 [Month3].

i. If phlebitis was present as the abnormality noted above in the RCA and observations of phlebitis not documented, but actions as per policy (phlebitis in absence of fever) initiated, this would be seen as a moderate departure from accepted practice due to a lack of documentation of steps taken and reasons why.

ii. I note that the discharge on 18 [Month3] was expedited in order for the patient to catch a flight. This may have impacted on the clinical documentation of steps undertaken at the time.

58. With respect to the appropriateness of leaving the IV line in situ, while on overnight leave the clinical notes do not document instructions regarding overnight leave on 17 [Month3]. The nursing notes at 1430 state *MRI on 18 [Month3] at 1100. Allowed leave overnight with parents. Plan was to ring patient once MRI protocol was sorted.* There are no notes regarding discharge with PIVC, nor care/actions to be taken nor that a normal PIVC check had been noted that day.

59. Nursing notes 2120 state *no protocol received so rang and left message on phone to come in by 0800 next day for ward round.*

60. The ADHB PIVC guideline regarding discharging a patient with a PIVC states that in general adult patients should not be discharged with a peripheral catheter in situ. There is no mention of overnight leave.

61. The RCA notes that nurses would normally obtain 'permission' from a doctor for a patient to go home on overnight leave with a PIVC in situ… [T]here was no recollection who might have been consulted and no documentation regarding this.

62. Total insertion time was within the guidelines and the decision to keep the PIVC would have been made weighing risks and benefits of removing the line and inserting a second PIVC the next day. In the absence of any concerns regarding the PIVC, it would be considered reasonable by my colleagues to send a patient home with a PIVC line as often patients are sent home for IV treatments with daily follow-up from district nurses such as the 'hospital at home' models of care.

63. I consider the standard of care of sending a patient home with a PIVC line in situ was that of accepted practice and the discharge on leave with the PIVC in situ did not breach internal policies. The lack of documentation of inspection of the PIVC and advice to the patient regarding care of the PIVC on leave will be commented on separately.

64. The RCA recommendation is that an open book for the hospital of the key learnings from this case be disseminated and the ADHB PIVC guideline be updated with a new section to state that patients should not go home on leave with a PIVC. These were to be in place by May 2018. The open book should be considered for sharing with other DHBs.

65. I note from the RCA recommendations that the Chief Nursing Officer will undertake a clinical audit of PIVC and the extent to which they remain in situ when no longer needed and make recommendations regarding reducing dwell time. This will be undertaken in June–December 2018.

66. My response regarding the appropriateness of actions taken regarding the possibility of infection at the IV site (as per point 6d):

67. The RCA states that from staff interviews a small amount of discharge of varied description was seen at the insertion site so a swab was taken. The RCA states that from the Concerto system it could be seen that a specimen was collected at 1030, sent to the lab and received by them at 1139.

68. There was no documentation of patient symptoms in the clinical record though the RCA states that observations on discharge were HR 105, BP 90/50, sats 98%, and temp was 36.5 (normal). No fever had also been noted in the clinical record on 17 [Month3], nor on admission. A normal white cell count was present on admission.

69. The discharge planner shows that the PIVC was ticked as having been removed. There was no commentary regarding phlebitis or exudates.

70. RCA states that from interviews with staff the PIVC site was reviewed by two HOs of different seniority. The RCA states that the HOs are trained to supply antibiotics only when infection is present as per the ADHB RMO handbook (2017).

71. The letter from the Health and Disability Advocate indicates that on return from overnight leave on 18 [Month3] the patient complained the arm was painful and was unable to bend the elbow. The complainant stated that there were signs of infection at the IV site and insisted that a swab be taken. The complainant took pictures of the IV site when the line was removed and the letter states these were available on request. RCA states that these had not been viewed by ADHB staff though requested by the RCA team.

72. Mermel's review states that although phlebitis may not be infectious in etiology it should prompt catheter removal and culture of the exudates; and if there are systemic symptoms, blood cultures. The ADHB PIVC guideline states that if there is phlebitis to check vital signs and if the patient is febrile to consider purulent thrombophlebitis and to notify medical staff for urgent attention. Guidance is also given for suspected infection which the guideline states can be local or systemic or both. It states that peripheral line infections usually occur at the site of insertion. If infection is present the catheter should be removed, the insertion site swabbed, and medical staff asked to review and document in the clinical record, and a Risk Monitor Pro be completed. The New South Wales PIVC guidelines state that if the patient complains of pain/ burning at the PIVC site among other checks to inspect for signs of local infection, remove the PIVC and inform medical staff. No guidance re swabs is given but the guideline states that if pus is noted at the insertion site (which can be caused by a bacterial infection and that the patient maybe febrile) the NSW guidance is to remove the PIVC and inform medical staff. Again no guidance regarding swabs is given.

73. In the absence of fever the actions taken are in keeping with recommendations from Mermel's review and NSW guidelines, and not starting antibiotic treatment is also in keeping with the ADHB PIVC guideline.

74. From RCA notes the vascular HO checked the lab swab result at 1340 but this was too early as the interim report only appeared on Concerto at 1559.

75. I consider the actions taken regarding the possibility of infection (swabs), were accepted standard of practice. I will comment later on documentation and follow up of results.

76. My response regarding the adequacy of the discharge process and the information provided to the family at that time, and ADHB communication with other relevant health care providers (as per point 6e and f):

77. It is difficult to comment on this as there was no documentation of a discussion with the patient or family in the clinical record. There was no 'advice to patient' paragraph in the discharge letter on 18 [Month3]. Further in the advice to the GP there was no mention of a swab or follow up of swab results.

78. The RCA from staff interviews states the patient was given verbal advice that if they became febrile or developed pain in the arm or redness at the PIVC site to go to the GP. This however was not noted in the discharge planner nor discharge letter, which from the complaint letter information was received in hard copy a few days after discharge.

79. The discharge letter was done on 18 [Month3] at 1357 so the interim swab results would not have been available. From the RCA the interim results did not appear until 1559 on Concerto, showing heavy growth Staph aureus and moderate number of NPLs. Again from RCA review an interim result of a heavy growth of Staph aureus with antibiotic susceptibilities to follow was available in Concerto at 1252 on 19 [Month3].

80. From the RCA, staff assumed the swab result would be followed up by the GP in the event that there were signs of infection and felt they had warned the patient and family adequately. However, the GP was out of region and would not have had ready access to the results.

81. I note that discharge was expedited in order to catch a flight, however I am not able to consider whether any other human and system-derived factors for example fatigue, interruptions or distractions on the day, workload and acuity may have impacted on documentation. The RCA did not comment on this.

82. The NSW guidelines suggest that the PIVC site should be observed for 48 hours after removal for post infusion phlebitis and if the patient is discharged within that period they be advised who to contact if pain swelling or discharge at the site happens, or if systemic signs of infection develop. The RCA states that written advice on how to recognise developing infection at the PIVC site or systemic infection might have led to the patient seeking medical advice sooner.

83. In addressing the question of standard of care regarding adequacy of the discharge process and the information provided to the family at that time, I have compared the standard of service delivery against that described in the New Zealand Standard Health and Disability Services (CORE) Standards (NZS 8134:2008) and guidance. The relevant sections of the New Zealand standards are:

84. NZS 8134.1.3 continuum of service delivery with Standard 3.10 stating that consumers experience a planned and coordinated discharge from services, and that this is documented, communicated and effectively implemented.

85. I have also considered that documentation is a key function of all Registered Nurses as described in competency 2.3 of the New Zealand Nursing Council

Registered Nurse scope of practice document. It is also a key function of medical practitioners with Medical Council advising keeping clear and accurate records that report relevant findings, decisions made, and information given to the patient.

86. On 18 [Month3] I note that the discharge was expedited in order for the patient to catch a flight, and this may have impacted on the quality of clinical documentation. There was no documentation in the clinical notes or discharge letter of the discharge advice and verbal instructions given to the patient.

    a. I note the RCA reports the verbal advice given to the patient was that if the patient became febrile or developed pain in the arm or redness at the PIVC site they were to go to their GP. If advice regarding seeking GP attention for pain in the arm, redness at the PIVC site, or a fever was not given verbally then this would fall below accepted standard practice and be a moderate to severe departure from the standard of care, given that a swab of the PIVC insertion site discharge was taken.

    b. Failure to document verbal instructions given to the patient either in the clinical record or in the discharge letter fell below the standard of accepted practice and I would consider was a moderate departure from the standard of care due to a lack of documentation of steps taken and reasons why.

    c. The documentation in the discharge letter in the advice to the GP does not mention the PIVC exudate and resulting swab taken or state an expectation for the GP to follow up the swab results if the patient consulted them. This falls below the standard of accepted practice and I would consider was a moderate departure from the standard of care.

87. In response to how this would be viewed by my peers —

88. The Health Quality & Safety Commission national inpatient experience survey shows that three areas of the survey consistently rate relatively low; medication side effect information on discharge, inclusion of family/whānau in discussion about care, and receiving information to manage conditions post-discharge. This has led to the development by some DHBs of a number of small-scale quality improvement initiatives aimed at these lower-scoring areas of the survey, and the Commission's Partners in Care programme will have a role in sharing the lessons from these initiatives. As such the lack of clinical documentation regarding the discharge advice and verbal instructions given and advice to GP is likely to happen in other organisations. I am not able to consider whether any other human and system-derived factors for example fatigue, interruptions or distractions on the day, workload and acuity may have impacted on documentation. The RCA did not comment on this.

89. I note that the RCA recommended exploring the electronic discharge software to allow proforma advice to patients relating to PIVC follow up if a box is checked to say PIVC removed within 48 hours. This will include illustrations to observe for

infection. This would be a good development and should be shared with other DHBs to consider adopting.

90. Failure to inform the GP of follow up of results would be considered a moderate departure from the standard of care by my peers as per point 86c.

91. My response regarding the quality of the relevant clinical documentation (as per point 6g):

92. Clinical documentation other than that of the discharge, detail of overnight leave, and PIVC insertion and aftercare, appears to be of acceptable standard practice. I have already commented on discharge documentation above.

93. The initial insertion of the PIVC was noted in the nursing entry though who inserted the PIVC was not recorded as noted in the RCA. The ADHB PIVC guideline states that if no details are recorded on the IV dressing then the first person evaluating the site should record it on the IV dressing and in the clinical notes. At RCA interview it was noted that the nurse who documented the PIVC in the clinical notes did not insert it herself.

94. The RCA notes that the staff member inserting the PIVC could not be identified, nor information about the aseptic technique used.

95. There were no further clinical notes regarding the PIVC though in some organisations these checks were recorded on observation charts. The introduction of the national early warning score (NEWS) observation chart has not included an area for PIVC review documentation.

96. In addressing the question of standard of care regarding adequacy of relevant clinical documentation, I have compared the standard of service delivery against those described in paragraph 84 and 85.

97. PIVC check documentation especially at the time of taking a swab falls below the accepted standard of care and I would consider was a moderate departure from the standard.

98. In response to how this would be viewed by my peers —

99. Information (personal discussion) from audits in other organisations, shows that PIVC check documentation is not 100%. Although education and feedback can increase documentation of PIVC checks, recording of this information needs to align with normal nursing work flow. Often a PIVC check is done when other vitals are observed and was in some organisations previously recorded on the observation chart at the bedside. The introduction of the NEWS observation chart reduced the percentage of PIVC recordings with PIVC not being as well documented in clinical notes. Policies and systems need to be written and designed with health care workers to take into account the everyday work environment in order to be successful. Recordings need to fit with the everyday

work flow, need to be easy to do and take into account service complexity. The lack of documentation of the person who inserted the PIVC and the aseptic technique used is not unusual and could likely happen in other DHBs.

100. Other comments (as per point 6h):

101. The RCA notes that a small number of phlebotomists are credentialed to insert PIVCs but did not routinely record insertion in the notes. This has now changed. The RCA also notes that resident medical officers (RMOs) are not credentialed by the DHB for PIVC insertion and it is assumed that reliability of the process is done by the medical schools. The DHB will now ensure that HOs and trainee interns employed by ADHB are adequately credentialed during training or at orientation.

102. From the RCA the interim swab result was not available until after discharge. The subtlety of the presence of NPLs was noted by an Infectious Diseases expert to be very suggestive of active infection but not something that HOs or GPs would be expected to know. However the interim swab result was not followed up by any staff until the night of the patient's admission to another DHB. The RCA states the result was not 'finalised' until after the patient had attended her GP locally. The result was not 'accepted' (presumably viewed and signed off) by a doctor and was eventually 'auto-accepted' by the Concerto system. I am not sure how long it takes before results are auto accepted but this would be worth reviewing as well as to whether abnormal results can be auto-accepted? I can understand the 'auto accept' of normal results that otherwise accumulate in the system awaiting 'acceptance' but perhaps the same should not apply to abnormal results.

103. I have made comment already on a shared electronic health record in points 34 and 35.

104. As a final comment my report is based on the assumption that the patient's diagnosis of Loeys Dietz syndrome, which I am not expert on, would not change the clinical risks associated with a PIVC."

The following expert advice was obtained from Dr Iwona Stolarek on 29 April 2019:

"Many thanks for your email dated 28.02.19 and the subsequent emails with attachments. I confirm that in addition to a copy of my original letter of advice you have sent me the following attachments

1. A copy of Auckland DHB's (ADHB) response to my previous letter of advice including a cover letter from [the CMO] dated 18.12.18
2. A statement from [RN D] (25.11.2018)
3. A statement from [RN E] (27.11.2018)
4. A statement from [RN F] (13.12.2018)
5. Evidence of various ADHB staff receiving 'Practical Assessment Training'

6. A statement from [RN G] (22.11.2018)
7. ADHB's house officer orientation pack
8. ADHB Guidelines for intravenous catheters peripheral in adults and children superseded on 16.10.2018
9. Guidelines for intravenous catheters peripheral in adults and children final dated 20.07.2018
10. An extract from the orientation manual on vascular surgery with regard to management of suspected intravenous line infection (peripheral and central IV lines) undated
11. A transcript from a meeting between [Ms A's] mother and various staff at ADHB on 20.07.18
12. A HQSC memorandum
13. ADHB's learning from adverse events executive summary appendix l ([Month3])
14. ADHB's learning from adverse events executive summary appendix n ([Month3])
15. An infographic on PIVC related infections
16. A copy of [Dr I's] response including both a statement and covering letter from her barrister (11.12.2018)

1. I have had the opportunity to review these documents and to consider whether they alter the opinion given to the Commissioner on case reference C17HDC01589, dated 3.8.2018.

2. Regarding:

   a. Coordination of the MRI scan

      i. My advice remains unchanged. Although the vascular staff were uncertain as to where the MRI was to happen (was being organised by neurosurgery) by the time of admission in [Month3] the MRI had still not happened. The vascular unit staff tried their best to organise the MRI during the admission. My advice points 31–37 stand, that ADHB had the responsibility for organising and coordinating the MRI appointment. The ADHB letter states the process of MRI for pacemaker patients has been reviewed and improved.

   b. The appropriateness of inserting IV (intravenous) line at the time of admission.

      i. My advice remains unchanged. I note that ADHB has reviewed the practice of routine PIVC insertion and are striving to ensure that all PIVCs are clinically indicated and do not remain 'idle'. This is monitored by audit. I commend their review of PIVCs insertion practice and their keenness to be part of the Health Quality & Safety Commission's programme to reduce PIVC infections. The updated information provided has also noted that a phlebotomist inserted the PIVC, notes that the phlebotomists have high

hand hygiene rates, and that staff are assessed on their aseptic technique. I note that ADHB now will also assess RMO practice.

c. The appropriateness of leaving the IV line in situ, both while in hospital and while on overnight leave.

   i. My advice remains unchanged. I note that staff note that although they would have checked the PIVC they did not make any documentation, or some staff documented in clinical notes by exception in the vascular unit. The staff state that they did not feel there was clinical evidence of erythema or cellulitis at the PIVC site. Auckland DHB acknowledges the lack of documentation. The updated guidelines provided now give advice on patients going on leave with a PIVC, with staff to assess risks and benefits. The guidance states that in general, adults should not go home with a PIVC. It may be helpful to add in the guide that patients be given advice on looking after the PIVC if they do go on leave with one in situ. The DHB also note that if [Ms A] had been dealt with as an outpatient the PIVC would have been inserted for the CTA and then removed, and a further one inserted for MRI. The DHB have reviewed the practice of admitting 'out of town' patients to the ward and are reviewing their management on an outpatient basis.

d. Actions taken regarding the possibility of infection at the IV site.

   i. The updated reponse states that [Ms A] had eczema which was not noted in the RCA or in my previous advice. This would not appear to have been documented in either the discharge letter in […] or in the admission in […]. I note that known eczema is noted by [Ms A's] GP in the referral to [DHB2]. I note that this was felt by the DHB to potentially have contributed to the PIVC site appearing to have skin slough and to increase [Ms A's] risk of carrying Staph aureus. The additional advice provided notes that Loeys Dietz syndrome does not increase risks with a PIVC. Although [Ms A's] prosthetic material in vascular grafts and PPM leads increased her risks of consequence of bacteremia, advice from the ADHB Antimicrobial Stewardship Committee was that this should not have prompted more aggressive or earlier antibiotic treatment. The updated letter has also clarified the auto accept system for results. My overall advice remains unchanged.

e. The adequacy of the discharge process and the information provided to the family at that time and

f. Auckland DHB's (ADHB) communication with other relevant health care providers.

   i. I note the updated information has statements from staff indicating that verbal advice on monitoring for infection after PIVC removal and swab would be their usual practice. A further statement indicates that advice was given verbally by 3 staff members to [Ms A] and her mother regarding redness, pain, pus, fevers or becoming unwell and that medical attention

be sought in response to these developing. In light of this I would add an addendum to point 86 a to say:

Since my original report was written further information has been provided indicating that verbal advice on monitoring for infection after PIVC removal, would be their usual practice and a swab was routine practice on the vascular unit if there was concern regarding infection. A further statement indicates that advice was given verbally by 3 staff members to [Ms A] and her mother regarding redness, pain, pus, fevers or becoming unwell and that medical attention be sought in response to these developing.

My advice 86 b and c remains unchanged.

The updated information reconfirms that the discharge was expedited to enable a flight to be caught and that there was no documentation of verbal advice given to [Ms A] and her family in the subsequent discharge letter sent to the GP. I note that ADHB have changed the discharge summary to now include proforma advice for patients regarding PIVC follow up, and this is being implemented. I also note that the updated ADHB intravenous peripheral catheter guidelines specify that in suspected infection with a PIVC, advice on symptom monitoring should be given to the patient +/- the caregiver when the patient is bring discharged or transferred. The updated information also notes that Auckland region GPs can access results on the TestSafe system but this would not have been available to [Ms A's] GP]. [Ms A's] address was listed as an Auckland one in the initial […] admission however her […] inpatient label had [her home address]. The […] discharge letter had been copied to [her GP], as had the […] discharge letter. The DHB notes that staff may not have been as proactive in ensuring results transmission to [her GP] and may not have been aware that the TestSafe system was not available to [Ms A's] GP.

g. The quality of the relevant clinical documentation.

i. My advice remains unchanged. The DHB note the suboptimal documentation of both PIVC insertion and PIVC site assessment. They note this is a problem worldwide especially in Australia and New Zealand and note their own rates in comparison are comparable or better than Australasian figures. ADHB have also noted at a family meeting that a discharge summary is a key piece of information transfer not only to patients but their GP and other health care practitioners or providers. They have started work to ensure that staff understand and see this important aspect of a discharge letter.

Other comments

The additional information provided has shown the ongoing commitment by the DHB to addressing and implementing recommendations made in their RCA. They are to be

commended on the developments made especially with regard to ending the practice of routine PIVC insertion when there is no clinical indication. I note also that they have strengthened infection prevention and control clinical governance, with approval to fund a dedicated part time senior medical clinical lead. They are keen to share their learnings with the wider sector.

I also note that the DHB have developed a learning piece for staff using [Ms A's] picture and story with her parents' generous permission. This is reported by them as having a powerful impact in illustrating the importance of infection prevention and control."