HEALTH & DISABILITY COMMISSIONER
TE TOIHAU HAUORA, HAUĀTANGA

Lack of coordinated care contributing to prolonged high steroid dose and patient deterioration

1. The Coroner's Office referred a complaint to HDC from Ms A regarding the care provided to her late mother, Mrs B, by Health New Zealand|Te Whatu Ora (Health NZ) Whanganui and Health NZ Capital, Coast and Hutt Valley. Ms A raised concerns that inadequate communication and coordination of care between the two hospitals led to errors in the dosage of her mother's dexamethasone.[1]

2. Mrs B had a medical history of rheumatoid arthritis, which had been managed by methotrexate[2] since at least 2016, and type 2 diabetes, which was controlled by diet. In late June 2021 Mrs B was diagnosed with a brain tumour. Sadly, following multiple hospital admissions from June through to August 2021, Mrs B passed away. I offer my sincere condolences to Mrs B's family for their loss.

June 2021 admission — Public Hospital 1

3. On 29 June 2021 Mrs B was admitted to Public Hospital 1's Emergency Department (ED) with left-sided weakness, sudden onset of confusion, and slurring of words. A head CT scan showed a large extra-axial[3] mass indicative of a meningioma,[4] which was confirmed by a subsequent MRI scan. A resident medical officer (RMO) recorded that she discussed Mrs B's case with a neurosurgical registrar, who advised starting a 4mg dose of dexamethasone twice daily and pausing the administration of methotrexate.

4. Mrs B was seen by senior medical officer Dr C the next morning (30 June 2021). Dr C recorded that he discussed the findings of the CT scan with Mrs B's family and prescribed a dexamethasone dosage of 8mg twice daily. This dosage was then increased to 16mg BD[5] on Mrs B's drug chart the same day. No reasoning for either of the dosage increases was documented in the clinical records, and the new dosage of 16mg BD was carried over throughout Mrs B's admission at Public Hospital 1, and it continued on Mrs B's discharge on 2 July 2021.

5. Another RMO told HDC that he was responsible for charting Dr C's direction under supervision, and that the change in dosage was recorded to reflect Dr C's decisions, which were made at Mrs B's bedside. The RMO told HDC that the decision to continue the 16mg BD dose upon discharge reflected Dr C's wish to review Mrs B's condition and this dosage following a multidisciplinary meeting (MDM).

---

[1] A steroid medication that works by calming or suppressing the body's immune system. It is used to treat and prevent conditions that cause inflammation, including some cancers.
[2] A medication that suppresses the immune system and is used to treat inflammatory conditions such as rheumatoid arthritis.
[3] 'Extra-axial' in the context of a mass refers to a growth that is located outside the brain tissue.
[4] A brain tumour that begins in the layers of tissue covering the brain and spinal cord.
[5] Abbreviation for twice a day/twice daily.

Names (except Health NZ Whanganui, Health NZ Capital, Coast and Hutt Valley, and my clinical advisor on this case) have been removed to protect privacy. Identifying letters are assigned in alphabetical order and bear no relationship to the person's actual name.

6. Dr C told HDC that he decided to add in high-dose pulses of dexamethasone as there were no 'real improve[ments]' in Mrs B's clinical condition on the initial 4mg dosage of dexamethasone. Dr C said that acutely high-dose pulsed dexamethasone is often used to recover neurological function, and clinically this was more important to Mrs B than the risk of side effects. Dr C told HDC that Mrs B made a full neurological recovery after this increased dose, which provided the opportunity for Mrs B to be referred to Public Hospital 2 for potential surgery.

12 July 2021 neurosurgery clinic — Public Hospital 2 (Health NZ Capital, Coast and Hutt Valley)

7. Mrs B was subsequently seen by neurosurgeon Dr D at Public Hospital 2 on 12 July 2021. At this stage,[6] Mrs B would have been taking 32mg of dexamethasone daily for 10 days.

8. Dr D noted in his clinic letter that he discussed the scan and MDT findings with Mrs B and her family, as well as options for surgery and radiation therapy. Mrs B did not want to pursue surgery at this time and preferred to explore the option of radiotherapy. Dr D also recorded that Mrs B could restart her methotrexate and wean her steroids until she was to be reviewed by the radiation oncologists. On 13 July 2021 Mrs B was discharged with a weaning regimen[7] and a reduced dexamethasone dosage of 4mg QID.[8]

9. Dr D told HDC that '[i]t is not unheard of' for patients to be on high-dose steroids up to 32–64mg a day for short durations to control cerebral oedema,[9] but the normal dosage would be 4mg QID (ie, 16mg a day). Dr D said that Mrs B's rheumatoid arthritis and long-term methotrexate use would have caused an immunocompromised state, and the unavoidable addition of dexamethasone would have predisposed Mrs B to raised levels of blood sugar and infection.

10. Dr D told HDC that as Mrs B did not want neurosurgery, she was then discharged to Public Hospital 1 and therefore, the Public Hospital 2 staff did not have control over how Mrs B was managed subsequently in Public Hospital 1. In response to the provisional report, Health NZ Capital, Coast and Hutt Valley stated that a discharge summary was completed, and information was provided to the referring hospital, and it was up to Public Hospital 1's team to contact Public Hospital 2 with any queries.

14 July 2021 admission — Public Hospital 1

11. On 14 July 2021 Mrs B was re-admitted to Public Hospital 1 with lower extremity weakness and high blood-sugar levels. Dexamethasone 16mg BD was administered, with no documented reasoning for the increased dose.

12. On 15 July 2021 Mrs B was seen by consultant Dr E, who recorded that dexamethasone was affecting Mrs B's diabetes and lower limb weakness. However, Dr E made no changes to the dexamethasone dosage. Dr E considered that Mrs B's high blood pressure was being caused and/or worsened by dexamethasone, and that seemingly Mrs B's lower extremity weakness

[6] Presuming that Mrs B had taken the discharge medication as prescribed.
[7] 4mg QID (four times daily) to 4mg TDS (three times a day) to 4mg BD to 4mg OD (once daily) to 2mg OD — each dosage to last for 5 days.
[8] Four times daily.
[9] Swelling of the brain.

was a result of the brain tumour and steroid-induced myopathy,[10] which is a common and expected side effect. Dr E told HDC that Dr D's clinic letter was unavailable to her at the time, so she was unaware that the dexamethasone dosage had changed, and therefore she had relied on the dosage as set out in the discharge plan of 2 July 2021.

13. A medicine reconciliation was initiated by a pharmacist on 15 July 2021 after discrepancies were identified between the 2 July 2021 discharge summary and the 14 July 2021 doses. The medicine reconciliation noted a weaning regimen for dexamethasone consistent with Dr D's regimen set from 12 July 2021 and starting methotrexate from 19 July 2021. Despite these notes, 16mg BD doses of dexamethasone were administered until 18 July, after which dexamethasone was re-prescribed at 4mg TDS from 19 July until discharge. There is no documented reasoning behind these changes.

14. Dr E told HDC that the reason why the dosage was not changed until 18 July 2021 was because although the medicine reconciliation form was completed on the evening of 15 July 2021, her team were not alerted to the final dose changes until 18 July 2021.

15. On 19 July 2021 a physiotherapist completed an incident report as Mrs B had fallen to the ground after becoming fatigued and having experienced lower blood pressure after mobilising. An hour later, Mrs B was assessed by an RMO, who recorded that this episode of low blood pressure seemed to be due to anti-hypertensive medication. On 20 July 2021 the RMO discussed Mrs B's fall and discharged Mrs B with an immediate stop to the anti-hypertensive medications. Mrs B was also discharged with a dexamethasone weaning regimen[11] (intended to end on 9 August 2021).

16. Ms A told HDC that she was shocked that her mother was discharged on 20 July 2021 despite having experienced a fall and having limited mobility. Dr E told HDC that Mrs B was stable from her admission on 14 July until 19 July, her mobility was improving with assistance, and no new issues or concerns were raised or reported at this time. As Mrs B had improved clinically, there was 'nothing else' that the hospital could do for her, and therefore she was medically cleared for discharge after the MDM review. Regarding the fall on 19 July, Dr E told HDC that this was considered to have been an episode of hypotension[12] due to anti-hypertensive medication, and that when reassessed on 20 July 2021 Mrs B was stable, normotensive,[13] and afebrile.[14]

17. Ms A told HDC that for the next few days the family tried to support Mrs B, but she collapsed twice, and on one occasion they needed to call an ambulance.

18. On 26 July 2021 Mrs B's GP made a home visit at Ms A's request. The GP told HDC that at this visit he considered that Mrs B's diabetes had been exacerbated by the dexamethasone

[10] Disease or disorder that affects the skeletal muscles, causing them to function abnormally or become weak.
[11] The weaning regimen was the same as Dr D's except the 2mg dose was to be for 5 days and then stopped (instead of maintained for maintenance).
[12] Low blood pressure.
[13] Normal blood pressure.
[14] No fever.

but at the time of the home visit was well controlled, and Mrs B's rheumatoid arthritis was a 'perpetual concern' for her.

1 August 2021 admission — Public Hospital 1 and Public Hospital 2

19. On 1 August 2021 Mrs B was admitted to Public Hospital 1's ED via ambulance. She had experienced a general decline in the past three days, including an ulcerated mouth and lethargy. Mrs B was transferred to the General Medicine ward with a plan to hold her methotrexate until this was discussed further with the Neurosurgery Department, but to continue her dexamethasone dosage as planned. A medicines reconciliation form dated 2 August 2021 noted a reducing dose of dexamethasone of 4mg OD until 3 August, then 2mg from 4 August for 5 days and then a complete stop.

20. On 2 August Dr E assessed Mrs B as stable and planned to transfer her to Public Hospital 2 the next day. On the evening of 2 August 2021, an RMO reduced the dexamethasone dosage to 2mg OD after receiving a call from a neurosurgery registrar in Public Hospital 2.

21. On 3 August Mrs B was transferred to Public Hospital 2 for ongoing care. Mrs B was admitted to Public Hospital 2 ICU a few days later after she developed fevers and increased oxygen requirements. Subsequently, Mrs B passed away due to pneumocystis pneumonia[15] thought to be caused by immunosuppression in conjunction with meningioma treatment.

Subsequent actions

22. On 13 August 2021 Health NZ Capital, Coast and Hutt Valley reported a medication event regarding the dosage changes in dexamethasone for Mrs B during the care period June 2021 to August 2021. Health NZ Capital, Coast and Hutt Valley concluded that there was a 'significant discrepancy' between the dose advised by Public Hospital 1's neurosurgical team, and the dose prescribed by the team on 2 July 2021. Health NZ Capital, Coast and Hutt Valley noted that the medication had been weaned in response to this discrepancy.

23. After receiving notification from Health NZ Capital, Coast and Hutt Valley, Health NZ Whanganui filed an incident report on 21 September 2021 regarding the potential medication error. The incident report noted that on 1 July 2021 Dr C had made an intentional increase from 4mg BD to 8mg BD after he had assessed Mrs B and reviewed her imaging. As a result of the findings in the report, Health NZ Whanganui noted that the change to be implemented was to ensure that medical staff document the rationale for increasing from recommended dosages in patient notes.

24. Health NZ Whanganui also conducted a chart review on 27 September 2021, which confirmed that the dose of dexamethasone had been increased to 16mg BD intentionally on 30 June 2021, and that Mrs B's symptoms had improved as a result. This dose continued for 12 days, when Mrs B was already immunocompromised due to the methotrexate she was taking to treat her arthritis.

25. The review accepted that no rationale was documented for the 30 June increase but that the relevant clinician stated that the increase was to 'manage the significant cerebral oedema visible on CT scan'. The review also noted that the rationale for the further increase

[15] A lung infection.

on 2 July was not documented, and that the relevant clinician cannot recall prescribing a further increase. The review again recommended that the rationale for changes to medication dosages should be documented in the clinical record, and that the appropriate outcome measure would be an audit (to be reviewed in March 2022).

Further information

26. Public Hospital 1's Medical Procedure in place at the time states:

> 'The prescribing of medicines is in accordance with best practice treatment principles for the patient's condition with awareness of contraindications, allergies, organ function and medicine interactions. The reason for prescribing a medicine is documented in the patient's health record.'

27. My independent clinical advisor, geriatrician Dr Nigel Millar, advised that for dexamethasone, the New Zealand Formulary recommends referring to a local protocol or initially 8–16mg by injection then 4–16mg daily in one to four divided doses, with an added caveat that higher doses may be necessary under specialist review. The New Zealand Formulary states that the dose should be adjusted to response, and to use the lowest dose for the shortest possible time.

28. Dr Millar also advised that high-dose steroids suppress the immune system and make infections more likely and potentially more severe. Steroids may also mask the symptoms, signs, and laboratory changes of serious infection associated with steroids.

Independent clinical advice

29. Dr Millar advised that the care provided to Mrs B was 'less than ideal' in several respects and affected her adversely. He considered that some of the problems resulted from poor coordination of care between Public Hospital 1 and Public Hospital 2.

30. Dr Millar identified the following departures from standards of care for Health NZ Whanganui:

a) The prescribed steroid regimen during Mrs B's initial admission (29 June to 2 July 2021) — moderate departure.

b) The 2 July discharge plan and associated dosage of dexamethasone with no reduction plan — severe departure.

c) The quality of documentation regarding clinical decisions at multiple points of Mrs B's care — moderate departure.

d) The level of communication and consultation between Health NZ Whanganui and Health NZ Capital, Coast and Hutt Valley regarding prompt communications in urgent or critical situations — moderate departure.

e) The reversion and continuation of a high 32mg dosage of dexamethasone at the 14 July 2021 admission — severe departure.

Responses to provisional decision

31. Ms A was provided with an opportunity to comment on the 'information gathered' section of the provisional decision. She confirmed that she had no further comments to make.

32. Health NZ Whanganui was provided with an opportunity to comment on the provisional decision. Health NZ Whanganui confirmed that it had no further comments to make. It also provided a copy of its recent audit on documentation for changes in medication and confirmed that a quarterly reminder has been set for this audit.

33. Health NZ Capital, Coast and Hutt Valley was provided with an opportunity to comment on the provisional decision. Information provided by Health NZ Capital, Coast and Hutt Valley has been incorporated into this report where relevant.

Decision

34. Specifically, between June and August 2021 Mrs B's care was affected by several medication errors in her dosage of dexamethasone, as well as a lack of communication, consultation, and documentation regarding discharge plans and follow-up actions. Although it is difficult to make a clear finding regarding the connection of these actions to Mrs B's passing, it is clear that overall, Mrs B did not receive care of an appropriate standard.

Health NZ Whanganui — breach

35. On 30 June 2021 Dr C prescribed a dexamethasone dosage four times the dosage recommended by a neurosurgical registrar, without any further consultation with the prescribing neurosurgical team. This high dosage was continued throughout Mrs B's admission and discharge, until she was seen again on 12 July 2021, again with no evidence of consultation occurring with the neurosurgical team.

36. I am critical of Health NZ Whanganui's lack of effective communication and follow-up to ensure that Mrs B was being cared for appropriately during her admission and upon discharge, and that it was unclear who was leading and coordinating Mrs B's care. There is no documented evidence that advice was provided to Mrs B's family or her GP about following up regarding the markedly high dexamethasone dosage (and its subsequent side effects and risks). It is also unclear what actions (if any) were considered following the MDM, which Dr C told HDC he was waiting on before making any changes to the dexamethasone dosage. Dr Millar advised that it is the responsibility of the prescribing physician to ensure that a plan is in place, or to clearly delegate and communicate the responsibility to another clinician (in this case Mrs B's GP). I accept this advice.

37. There are also clear gaps in accessibility of documentation between the hospitals and even between teams within the same hospital, which directly contributed to inappropriate clinical decisions based on incomplete information. Dr E told HDC that she did not have access to Dr D's discharge summary for 13 July 2021, and that her team was not informed of the 15 July medicines reconciliation until 18 July. This meant that Dr E relied on information from 2 July 2021 to revert to the exceptionally high dosage of dexamethasone, instead of Dr D's intended weaning regimen. I am critical that Health NZ Whanganui did not have an effective clinical portal system to avoid these clear missed opportunities where key

documents needed to be accessed and considered but were unavailable, meaning that incorrect clinical decisions were made.

38. I also consider that poor record-keeping practices contributed to ineffective communication and co-ordination of Mrs B's care, noting that the rationale for key decisions such as dosage changes were not documented on multiple occasions, and it was unclear from the discharge plans what (if any) information was provided to Mrs B, Mrs B's family, and Mrs B's GP about dexamethasone dosage and appropriate follow-up actions.

39. Having carefully reviewed all the information above, I consider that Health NZ Whanganui breached Right 4(5) of the Code of Health and Disability Services Consumers' Rights[16] in its provision of care to Mrs B due to inadequate communication and consultation, ineffective clinical portal systems, and poor record-keeping practices, all of which did not support the coordination of care between and within the hospitals.

Health NZ Capital, Coast and Hutt Valley — educational comment

40. Dr D restarted Mrs B on methotrexate upon discharge on 12 July 2021, contrary to the discharge advice set out by Health NZ Whanganui on 2 July 2021, and the rheumatologist advice dated 1 July 2021. There is no evidence that Health NZ Whanganui and/or the rheumatologist was consulted in making this decision. I do note, however, that the reason for restarting the methotrexate is documented clearly in Dr D's clinic letter to Mrs B's GP, a copy of which was to be sent to the rheumatologist. I remind Health NZ Capital, Coast and Hutt Valley of the value in consulting with specialists and initial prescribing clinicians before making any critical decisions on dosage changes, particularly in cases such as this, where both dexamethasone and methotrexate are considered immunosuppressive medications.

41. Information sharing and transfer of care is a two-way relationship. I consider that Health NZ Capital, Coast and Hutt Valley also holds a level of accountability/responsibility in ensuring effective coordination of care with Health NZ Whanganui and ensuring that all documentation was sent and received appropriately. I encourage Health NZ Capital, Coast and Hutt Valley to work with Health NZ Whanganui proactively to ensure that effective information sharing and co-ordination of care is taking place at all times.

Recommendations and follow-up actions

42. I recommend that Health NZ Whanganui:

a) Provide a written apology to Mrs B's family for the deficiencies outlined in this report. The apology is to be sent to HDC within three weeks of the date of this report, for forwarding to Mrs B's family.

b) Develop and conduct an audit to evaluate compliance of the quality of documentation standards in clinical decision-making regarding medication dosage. Noting the findings from the first round of the audit, please provide HDC with an action plan of corrective actions to be implemented, and a further copy of the findings for the next quarterly audit, within three months of the date this report.

[16] Right 4(5) states: 'Every consumer has the right to co-operation among providers to ensure quality and continuity of services.'

c) Work collaboratively with Health NZ Capital, Coast and Hutt Valley to review its standards and guidelines regarding inter-hospital information sharing, co-ordination of care, and clinical portal access, and develop a policy on expected standards of inter-hospital information sharing, and a documented process for expectations regarding regional clinical portal access. A copy of these policies and processes is to be provided to HDC within six months of the date of this report.

43. In light of the findings in this report, I recommend that Health NZ Whanganui and Health NZ Capital, Coast and Hutt Valley consider a review of current regional guidelines on the use of dexamethasone for treatment of cerebral oedema associated with tumour, in partnership with specialist services and regional clinical services. If no such guidelines exist, I recommend that Health NZ consider developing regional guidelines for dexamethasone dosage in this context. An update regarding the progress of this work is to be provided to HDC within three months of the date of this report.

44. A copy of this report with details identifying the parties removed, except Health NZ Whanganui, Health NZ Capital, Coast and Hutt Valley, and my clinical advisor, will be sent to Health New Zealand|Te Whatu Ora and Te Tāhū Hauora|Health Quality and Safety Commission and placed on the Health and Disability Commissioner website, www.hdc.org.nz, for educational purposes.

Carolyn Cooper
Deputy Health and Disability Commissioner

Appendix A: Summary of dexamethasone dosage changes

Date	Dosage	Hospital
29 June 2021	4mg BD	Public Hospital 1
30 June 2021	8mg BD	Public Hospital 1
30 June 2021	16mg BD	Public Hospital 1
12 July 2021	4mg QID	Public Hospital 2
13 July 2021	Wean 4mg QID 4mg TDS 4mg BD 4mg OD 2mg OD	Public Hospital 2
14 July 2021	16mg BD	Public Hospital 1
18 July 2021	4mg TDS	Public Hospital 1
20 July 2021	Wean 4mg TDS 4mg BD 4mg OD 2mg OD	Public Hospital 1
1 August 2021	4mg OD	Public Hospital 1
3 Aug 2021	2mg OD	Public Hospital 2

Appendix B: Independent clinical advice to Commissioner

The following independent clinical advice was obtained from geriatrician and physician Dr Nigel Millar:

Mrs [redacted]

Advice to the Health and Disability Commissioner

Dr Nigel D. Millar FRACP FRACMA FHINZ

Table of Contents

1 Personal information and qualifications

My name is Nigel Millar of Christchurch. I am a registered with the Medical Council of New Zealand with vocational registration in internal medicine and medical administration. I graduated in medicine from the University of Newcastle upon Tyne, UK in 1980. I completed my post graduate training in the UK, Membership of the Royal College of Physicians (MRCP) 1984, advanced training in General (Internal) Medicine and Geriatric Medicine (JCHMT) in 1992. I was appointed as a Geriatrician to The Princess Margaret Hospital Christchurch in 1992 and shortly after as a General Physician to Christchurch Hospital. I hold Fellowships of the Royal Australian College of Physicians (1996) and the Royal College of Medical Administrators (2012). I worked as a geriatrician and as acute medicine physician for 29 years until 2021. In 2003 I was appointed as Chief Medical Officer to Canterbury DHB and moved to the same role in Southern DHB in 2016. I continued clinical practice part time, predominately in acute medicine, during my time as a chief medical officer with short intermissions related to the Christchurch earthquakes and Covid 19. During my time in Christchurch, I was regularly on call for the general medicine services and in Dunedin I also spent periods covering acute call in the internal medicine service.

I am currently working independently providing advice to health services on systems, informatics, and leadership.

I have not worked in [redacted] nor [redacted] and I do not know the medical practitioners related to the matters I have been asked to review. I do not believe that I have any conflict of interest.

2 Request and information from the Office of the Health and Disability Commissioner

I have been asked to provide an opinion on the care provided by Te Whatu Ora - Whanganui to [redacted] between 29 June 2021 and 10 August 2021.

2.1 Background

This advice relates to the care of Mrs [redacted] during June, July, and August 2021. Sadly, [redacted] died [redacted]. I wish to express my condolences to the family of [redacted] for their loss. I recognise their distress related to their experiences in 2021. The statement to the Coroner [redacted] makes for sad reading and I recognise in that the intention to reduce the risk of other patients and families suffering similarly.

The complaint was referred to HDC by the Coroner's Office reflecting concerns [redacted] about the dose of steroids, communication, and quality of care.

[redacted] was admitted to [redacted] hospital with difficulty swallowing and left limb weakness. Diagnostic tests revealed a brain tumour and following consultation with Neurosurgery at [redacted] Hospital she was prescribed 4mg of Dexamethasone twice a day. During her admission this was increased to 16mg twice a day which is the dose she was discharged on.

[redacted] went on to develop: an exacerbation of her previously diet controlled diabetes, steroid induced mobility issues and subsequently passed away from pneumonia some time later.

2.2 Expert advice requested.

I have been asked to review documentation provided by the office of the Health and Disability Commissioner and advise whether I consider the care provided to [redacted] Te Whatu Ora - Whanganui was reasonable in the circumstances, and why.

In particular, to comment on:

Te Whatu Ora – Whanganui's care with regards to

1. Whether the prescribed steroid regime was appropriate during [redacted] acute admission of 29 June 2021- 2 July 2021
2. Whether [redacted] was discharged on the appropriate medication
3. Quality of documentation regarding clinical decisions
4. Communication and consultation between [redacted] and [redacted] Hospitals
5. Any other matters that you consider warrant comment.
   For each question I have been asked 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,
   c. how significant a departure (mild, moderate, or severe) do you consider this to be?
   d. How would it be viewed by my peers?
   e. Recommendations for improvement that may help to prevent a similar occurrence in future.

2.3 Documentation provided by the office of the Health and Disability Commissioner

The following information was supplied to me by the office of the Health and Disability Commissioner:

- In-patient medical records related to three admissions to [redacted] Hospital
- some outpatient documents
- report from Dr [redacted] who was the responsible SMO for the second admission to [redacted] Hospital

- report from [redacted]
- statement to the Coroner from [redacted] (Daughter)

3 Summary of Events

3.1 Timeline of care events

29/06/2021 – 02/07/2021	First admission to [redacted] Hospital
06/07/2021	First MDT team meeting
12/07/2021	Admission overnight to [redacted] Hospital
13/07/2021	Second MDT meeting
14/07/2021 – 20/07/2021	Second admission to [redacted] Hospital
01/08/2021 – 04/08/2021	Third admission to [redacted] Hospital
04/08/2021	Transfer to [redacted] Hospital
[redacted]	Death of [redacted]

3.2 First admission to [redacted] Hospital – 29th June to 2nd July 2021

[redacted] was diagnosed with a brain tumour in the [redacted] Hospital Emergency Department on the evening of the 29th of June 2021. The tumour was causing focal neurological signs and confusion. The initial CT scan showed oedema (brain swelling) surrounding the tumour. Steroids, usually Dexamethasone, are commonly used in these circumstances. The intention is to reduce the oedema which will improve the neurological dysfunction experienced by the person. It will also lessen the risk of an acute deterioration if the oedema were to progress.

A letter from the Rheumatologist describes that [redacted] had been suffering tingling in her left hand for some time and there had been a plan for her to be seen in the Rheumatology outpatients for this on the 30th of June. [redacted] had a long history of rheumatoid arthritis. A common cause of tingling in a hand in such a patient would be carpal tunnel syndrome. With hindsight those symptoms were likely to have been caused by the tumour.

There is a record of discussion with the Neurosurgical Registrar in [redacted] whilst [redacted] was in the [redacted] Emergency Department. A recommendation from the neurosurgical registrar for Dexamethasone 4 milligrams twice daily was noted in the [redacted] notes. A 'Stat' dose of 4 milligrams Dexamethasone was given in the Emergency Department at 22:23 on the 29th. Dexamethasone was also prescribed as an oral medication at 4 milligrams twice daily as a regular medication. [redacted] was admitted to the ward at 01:00. A subsequent dose of 4 milligrams of Dexamethasone was given orally on the morning of the 30th at 08.35. A separate 'Stat' dose of 4 milligrams Dexamethasone was prescribed on the 30th it appears that it was not administered because there is a clear "N"[1] in the "Given by" section and there is a note made by the Nurse at 15:35 reading "Stat Dexamethasone unable to be given as not following directions".

[redacted] was reviewed on the ward by [redacted] Physician, at 10:30 on the 30th. Plans were noted, among other things, to arrange further imaging and to prescribe an increased dose of Dexamethasone of 8 milligrams orally twice daily. This dose was prescribed, but it was not administered. The 8 milligram twice daily dose was then discontinued and a dose of 16 milligrams

[1] "N" is the standard non-administration for the National Medication Chart with the expectation that a note is made in the record giving the reason.

twice daily was prescribed. The time this prescription was made is not recorded. This is shown on the drug chart as "PO/IV" (meaning oral or IV). There is no note in relation to this change and the reasoning is not in the record. The first 16 milligram dose was administered that evening at 19:25. The route of administration is not recorded for this, nor is it recorded for subsequent doses whilst an in-patient. There is not a space on the drug chart to record the route of administration where an option is provided in the prescription in this way. It is noted in the nursing record that [redacted] could not be administered the oral medicines on the afternoon of the 30th because she was not able to cooperate. It may be that the "/IV" was annotated to the prescription because of this, but there is no note to corroborate this, so this is speculation.

There is no subsequent comment in the records about this choice of dosage. In summary the following doses of Dexamethasone are recorded as being administered during that first admission to [redacted] Hospital.

Dexamethasone doses administered in hospital 1st admission			
Date	Time	Dose	Route
29/06/2021	22:23	4 milligrams	Oral
30/06/2021	08:35	4 milligrams	Oral
30/06/2021	19:25	16 milligrams	not recorded
01/07/2021	06:25	16 milligrams	not recorded
01/07/2021	18:10	16 milligrams	not recorded
02/07/2021	06:00	16 milligrams	not recorded

The discharge prescription in [redacted] hospital appears to be generated from the discharge summary (this is a common feature in the Orion Clinical Portal). The line relating to Dexamethasone in the discharge summary list entitled Discharge Medications is:

> *. dexamethasone 4 mg tablet, 16mg PO BD, Unknown Duration, 1 month (Print on Script) , [Brain mass]*

The list of community dispensed medications used in the subsequent admission confirms that this it was dispensed as per this line in the discharge summary. Thus, it was presumably taken by [redacted] as listed i.e. 16 milligrams twice daily. Assuming that the Dexamethasone was taken as prescribed the then 32 milligrams per day would have been taken from discharge on 02/07/2021 until the overnight admission to [redacted] Hospital on 12/07/2021 that is 10 days. So, by the time of admission to [redacted] Hospital [redacted] had been on 32 milligrams of Dexamethasone daily for 12 days.

On the 12th of June [redacted] appears to have been admitted overnight to [redacted] Hospital to be seen and assessed by the Neurosurgery Service and to see the Neurosurgeon. During that admission, the dose of Dexamethasone was reduced with a plan to continuing tapering it. This change was recorded in the [redacted] Hospital Neurosurgery discharge summary.

[redacted] was discharged from [redacted] Hospital on the 13th of July with the following prescription:

> *. Dexamethasone PO, I month (script given), Instructions/Comments: Wean to maintenance. - 5/7 4mg QID --> 5/7 4mg TDS --> 5/7 4mg BD --> 5/7 4mg OD --> 2mg OD maintenance*

This means that [redacted] was to take a total of 16 milligrams per day then reduce the total daily dosage by 4 mg every 5 days, and then continue at 2 milligrams per day as maintenance.

3.3 Second admission to [redacted] Hospital – 14th-20th July 2021

[redacted] was readmitted to [redacted] Hospital on the 14th of July; the day after being in [redacted] under the Neurosurgical Team. She had become weak and unwell at home and on the advice of the cancer nurse was brought to [redacted] Hospital where she was re-admitted to Medicine. The initial assessment in the Emergency Department identified high blood glucose which was stated as being secondary to the Dexamethasone and increasing weakness, reduced ability to walk and unsteadiness.

There were further issues with the Dexamethasone dosing during this admission. For reasons that are not documented the dose of Dexamethasone was recommenced at 16 milligrams twice daily in [redacted] Hospital. The first dose of 16 milligrams was given at 21:55 on the 14th. And the second dose at 08:50 on the 15th.

At 09:00 on the 15th [redacted] was assessed by the [redacted] Physician. The impression noted was

Dexamethasone → Diabetes and LL myopathy

(I take this to mean that the predominate problems were high blood sugar caused by the steroids and weakness of lower limb muscles also due to the steroids). It was noted as well the left leg had less power than the right. Medications were commenced to control the high blood glucose with a plan to monitor blood glucose, provide some IV fluid and seek allied health assessment. No mention was made in this note about the Dexamethasone dosage prescribed.

There is a note timed at 16:40 that day indicating that a medicines reconciliation process had been initiated by the Pharmacist. This states:

RV dexamethasone + levitirocetamen dose
-> charted as per 2/7/21 discharge
-> doses changed 17/7/21 after ?appt in [redacted]
levitirocetamen ↑ & dexamethasone to taper ↓

There is an undated and unsigned note in the "Pharmacy and special instructions" section of the Dexamethasone prescription line on the medication chart –

4 mg tabs in Pyxis

followed by

RV see note

The handwriting of these notes is like the medicines reconciliation note by the pharmacist. The fist note directs the nursing staff to source the tablets from the Pyxis machine and the second is a prompt to review the dosing as per the note in the patient's record (above).

The dose of Dexamethasone remained unchanged at 16 milligrams twice daily until Sunday the 18th when the last dose of 16 milligrams was given at 08:?? (writing unclear). The dexamethasone was re-prescribed at 4 milligrams 3 times daily to start on the 19th. This dose was continued to discharge the next day. There is no note corresponding to this change to explain the timing or reasoning.

The prescription line in the [redacted] Hospital discharge summary on the 20th was:

. dexamethasone 4 mg tablet, Weaning dose as follows: 4mg PO TDS for 5x further days from 20/07/21 4mg PO BD for 5x days from 25/07/21 4 mg PO Daily for 5x days from 30/07/21 2 mg PO daily for 5x days from 04/08/21 then stop, 20 Day(s) Fixed duration Start date 20-Jul-2021, 20 days (print on script)

This revised prescription was very close to the plan from Neurosurgery with the exception that the final 2 milligram dose was intended by Neurosurgery to be for ongoing maintenance.

In summary during this admission the following doses of Dexamethasone were administered:

Dexamethasone doses administered in hospital 2nd admission			
Date	Time	Dose	Route
14/07/2021	21:55	16 milligrams	oral
15/07/2021	08:50	16 milligrams	oral
15/07/2021	21:30	16 milligrams	oral
16/07/2021	09:00	16 milligrams	oral
16/07/2021	21:15	16 milligrams	oral
17/07/2021	08:30	16 milligrams	oral
17/07/2021	20:45	16 milligrams	oral
18/07/2021	08:77	16 milligrams	oral
19/07/2021	08:40	4 milligrams	oral
19/07/2021	14:00	4 milligrams	oral
19/07/2021	20:00	4 milligrams	oral
20/07/2021	08:00	4 milligrams	oral

During this admission [redacted] suffered several episodes of hypotension. These were felt to be secondary to the medications prescribed for hypertension during the first admission to [redacted] Hospital. It is possible that the tumour and oedema had driven the high blood pressure and now that the oedema had diminished the antihypertensive drugs were no longer required. She may also have been dehydrated due to the hyperglycaemia, which would have contributed to hypotension. In my opinion, the hypotension is not likely to be due to adrenocortical suppression from the high doses of Dexamethasone firstly because it was still less than three weeks since the original prescription of steroids but mainly because [redacted] was still receiving a dose of steroids well above that normally produced by the adrenal glands.

4 Dexamethasone usages, dosing, and common side effects

Dexamethasone is a potent steroid. 4 milligrams of Dexamethasone is equivalent to about 25 milligrams of Prednisone or 125 milligrams of Hydrocortisone[2]. When prescribing for cerebral oedema related to tumour, high doses of steroid are used in the form of Dexamethasone. Use of Dexamethasone in the circumstances of [redacted] is an approved indication in the New Zealand Formulary (NZF). The New Zealand Formulary (NZF) recommends reference to a local protocol, or 8 to 16 mg by injection daily in one to four divided doses[3]. There is an added caveat that higher doses may be necessary under specialist review. The NZF also states that the dose should be adjusted to response and to use the lowest dose for the shortest possible time.

There are also recommendations in the various manufacturer data sheets (Data sheets are standardised publications required and approved by MedSafe which outline the intended use, dosing, side effects and other relevant information for prescribers.)

[2] New Zealand Formulary 6.3.2 Glucocorticoid therapy. Equivalent anti-inflammatory doses of corticosteroids. https://nzf.org.nz/nzf_3802 Accessed Feb 2023

[3] New Zealand Formulary. Dexamethasone (systemic): Cerebral Oedema https://nzf.org.nz/nzf_3838 Accessed Feb 2023

There are several Data Sheets listed by MedSafe for systemic Dexamethasone treatment[4]. There are three companies providing data sheets for Dexamethasone for injection and one for oral administration. (Appendix 1)

The data sheets from the 3 pharmaceutical companies providing Dexamethasone for injection have an almost identical statement regarding the dose and method of administration of Dexamethasone for cerebral oedema. (The only data sheet for the oral form does not have such detailed dosing recommendations.)

> Data Sheet for IV Dexamethasone
>
> *The treatment schedule and route of administration should reflect the severity and aetiology of the cerebral oedema. Treatment needs to be tailored to the individual response. An initial dose of 10 mg intravenously followed by 4 mg intramuscularly every 6 hours until the symptoms of oedema subside (usually after 12 to 24 hours). After 2 to 4 days the dosage should be reduced and gradually stopped over a period of 5 to 7 days. Patients with cerebral malignancy may require maintenance therapy with doses of 2 mg intramuscularly or intravenously 2 to 3 times daily.*
>
> There is also an additional section on a high dose regimen for 'acute cerebral oedema' from all the companies.
>
> *High doses of dexamethasone may be used to initiate short term intensive therapy for acute cerebral oedema. Following an initial high loading dose, the dose is scaled down over the 7 to 10 day period of intensive therapy, and subsequently reduced to zero over the next 7 to 10 days.*

This is followed by a table outlining a high dose regimen starting with a single dose of 50 milligrams intravenously and then 8 milligrams every 2 hours for 3 days then reducing to 4 milligrams every 2 hours for a further 4 days and after this reducing by 4 milligrams daily. There is no clarification of the term "acute cerebral oedema". The word acute is problematic in that it may mean 'of sudden onset', or it might mean 'severe [redacted] had cerebral oedema related to tumour that had caused the recent sudden deterioration in symptoms. The original tingling in her hand probably related to the tumour had extended to more severe neurological symptoms. This may have indicated a recent onset or extension of already existing tumour associated oedema. The oedema was not described as severe in the scans and did not include features such as movement of the midline structures in the brain. Overall, I would not interpret the clinical situation of [redacted] and initial scan findings to indicate 'acute cerebral oedema'. It is my opinion and, I believe that of my peers, that for a person in the situation of [redacted] a modest dose of Dexamethasone as suggested in the NZF would be sufficient, noting the caveat that it should be reduced to a minimum as soon as possible. As a general physician one would not normally expect to exceed 16 milligrams in total per day except upon specialist advice or in an unusual circumstance.

Even with the more modest doses recommended in the NZF and in the Data sheets Dexamethasone will carry a significant risk of side effects which require monitoring. They are :

- Gastrointestinal ulceration and/or bleeding
- Hyperglycaemia
- Emotional lability or psychosis
- Proximal myopathy
- Infection
- Osteoporosis and consequent fractures

---

[4] MedSafe Data Sheets and Consumer Medicine Information
https://medsafe.govt.nz/Medicines/infoSearch.asp Search term "Dexamethasone" Accessed Feb 2023

- Thinning of the skin and consequent skin injury

5 Potential Side Effects of Dexamethasone as they relate to the circumstances of [redacted]

5.1 Gastro-intestinal

This risk was anticipated. Omeprazole was prescribed on the 29th of June and it was specifically noted that this was to provide cover for this risk.

5.2 Hyperglycaemia

Noted in the inpatient record at 1PM on the 30th (Day 1 of admission) in the past history section was 'T2DM' this presumably means Type 2 Diabetes Mellitus. There were no further mentions of this in the medical record for this first admission. The nursing assessment notes a plan for 'BGL BD' which presumably means Blood Glucose Level twice daily. There is a chart 'Blood Glucose Record' in the notes from the first admission. There were 5 blood glucose recordings listed all of which were above 10 (range 11.6 to 13.9). There were no notes I could find in the record about these abnormal readings and no notes about actions related to the potential risk of diabetes.

The fact that [redacted] has a history of Diabetes and has abnormally high reading whilst Dexamethasone is being initiated puts her at elevated risk of significant hyperglycaemia whilst receiving high dose steroids. If the later problems with high blood sugar had been anticipated then steps could have been taken to inform [redacted] her family, and her GP. Additionally, a plan to monitor blood glucose could have been made.

Failure to reduce the Dexamethasone dosage after the initial improvement and to provide a tapering plan is highly likely to have contributed to the high blood glucose related to the second admission.

5.3 Psychological Effects

Many people will experience sleep disturbance and anxiety from high dose steroids. Occasionally some people may suffer a more profound disturbance with psychosis. There were several notes made in the record about [redacted] being anxious and at times distressed. No comment was made about the possible contribution of steroids to this. It is expected practice to specifically warn the person and their carers of the sleep disturbance and to seek help if they feel mentally distressed. There was no mention of such a discussion in the notes.

5.4 Proximal myopathy

High dose steroids cause weakness and wasting in proximal muscles5,which may affect 60% of people6. This usually affects the muscles of the pelvic girdle and presents with difficulty standing, walking and possibly falls. It was noted during the first admission (Day 3 Physiotherapy assessment) that, although [redacted] could stand from sitting without assistance, it took increased effort. It was not noted whether she needed to use her arms for this. It is likely that her ability to stand with ease, and to walk independently had been affected by her long-standing rheumatoid arthritis. This then had been made worse by the illness that brought her into hospital. This then would place her at high risk of losing independent standing and walking, or suffering falls, from only a modest additional impairment of proximal limb strength as might occur with high dose Dexamethasone. Expected practice would be to warn her and her family of this and the need to maximise activity to preserve strength through regular standing and walking. Failure to reduce the Dexamethasone dosage after

---

[5] New Zealand Formulary 6.3.2 Glucocoticoid therapy. https://nzf.org.nz/nzf_3807 accessed Feb 2023

[6] Pereira, R. M. R., & Freire de Carvalho, J. (2011). Glucocorticoid-induced myopathy. *Joint Bone Spine*, *78*(1), 41–44. https://doi.org/10.1016/j.jbspin.2010.02.025 Accessed Feb2023

the initial improvement and to provide a tapering plan is very likely to have contributed to the leg weakness and impaired mobility which contributed to the second admission.

5.5 Osteoporosis

It appears that [redacted] had already an established risk of osteoporotic fracture. The fracture risk assessment from 2017 (documented in outpatient letter from Rheumatology – 1st July 2021) was noted as 8.3% over 10 years. She had been prescribed medications to reduce fracture risk. Adding high dose steroids would increase the risk of fracture if they were given over the longer term. The short-term effects would be modest, but it would still be good practice to minimise the steroid dosage as far as possible.

5.6 Skin effects

The effects on skin are related to medium to long term steroids and less relevant in the situation here. Nevertheless, it would be good practice to minimise the steroid dosing as far as possible.

5.7 Infections

High dose steroids suppress the immune system and make infections more likely and potentially more severe. Steroids may also mask the symptoms, signs and laboratory changes of serious infections leading to potential delay in diagnosis. Oral-pharyngeal candidiasis (thrush) is a common infection associated with steroid. It was noted in the third admission that [redacted] was suffering from mouth ulceration, and she was then prescribed treatment for presumed thrush infection. On the first admission [redacted] appeared to have had an infection in her blood stream, but the source was uncertain. The C-Reactive Protein was modestly raised at 39 on the 29th of June and a positive blood culture was reported with an unusual organism. It was noted that this was possibly secondary to a urinary infection but there was not laboratory evidence of this. [redacted] was treated with appropriate broad-spectrum antibiotics intravenously and then oral antibiotics on discharge. This infection preceded the prescription of steroids. [redacted] appeared to respond well to this treatment. At the second admission there was a raised white cell count but no other obvious signs, symptoms, or laboratory tests to suggest infection and the Chest X-ray was reported as normal. In the absence of other suggestions of infection, it is likely that the high white cell count was caused by the Dexamethasone itself. At this time, the C-Reactive Protein was 7 also making an infection less likely.

[redacted] had been on long term immunosuppressive therapy with Methotrexate. This means that she would be at a compounded risk of infection if combined with steroids. The Methotrexate was stopped initially on the advice of the Rheumatologist as not being necessary for the rheumatoid arthritis as she was on high dose steroids. It appears that the Methotrexate was re-started on discharge from [redacted] Hospital on the 12th of July. On the second admission to [redacted] Hospital (14th July) Methotrexate was noted as an existing medication and continued in hospital. Consequently, [redacted] left [redacted] Hospital on the 13th of July to take weekly Methotrexate and still on a high dose of steroids. This combination may have made her more open to infection or to delayed diagnosis of such due to suppression of the usual symptoms, signs, and laboratory signs of infection. This combination of immunosuppressive medications continued there-onwards.

5.8 Doses of Dexamethasone

5.9 Dexamethasone dose - Follow up plans - [redacted] Hospital admissions 1 and 2

During the first admission there was a discussion with the Oncology service by the Physician and a plan made for discussion in the Multi-disciplinary Meeting (MDM). The Cancer Nurse visited [redacted] on the ward and explained the process also providing contact details. The in-patient notes did not otherwise include a note about follow up. The discharge summary stated that there was to be no follow up and no advice was provided for the GP about follow up care. Given the complex diagnosis and high dose of steroids it would have been good practice to ask [redacted] or her family to make an

appointment with their GP. Specifying when they should be seen by the GP in the discharge summary would also be expected with advice on the matters to be followed up. It is not entirely clear from the record which was to be the lead and coordinating service for the care of [redacted]. The oncology service did however provide some support in being available to the family by phone when [redacted] became unwell later in July.

5.10 Dexamethasone dose and Methotrexate restart - Admission to [redacted] Hospital

[redacted] travelled with her family to [redacted] hospital to be seen by the Neurosurgeon where she was admitted overnight, or so it seems from the discharge summary. A plan was made to reduce and continue tapering the Dexamethasone dosage. Initially the dosage was halved to 4 milligrams 4 times daily to be given for 5 days with further reductions planned of 4 milligrams per day every 5 days. Although the initial halving of the dose (from 32 to 16 milligrams daily) may seem a large change it was in my opinion appropriate. [redacted] had been taking the 32 milligrams for 15 days. She would not have any significant persisting adrenocortical deficit after this relatively short time and was at risk from the high dose continuing. The planned tapering of dosage there onwards was also in my opinion appropriate. The outcome of this admission/attendance at [redacted] Hospital was documented in the discharge summary, which appears to have been completed on the afternoon on the 13th of July. One would expect this to available to health professionals at [redacted] Hospital from then.

It appears from the discharge summary from [redacted] Hospital that the Methotrexate was recommenced during this admission, or restarted on discharge. It is recorded as an ongoing medication on discharge as follows:

Methotrexate 20mg, PO Weekly, 1 month (script given), Instructions/ Comments Monday

The discharge summary from [redacted] Hospital prior to this stated that the Methotrexate was to be withheld on the advice of the Rheumatologist. This [redacted] Hospital discharge letter and the letter from the Rheumatologist would have been available to the Neurosurgical Team in [redacted] Hospital via the regional clinical portal. It is not clear how the documents are organised on the portal and thence how easy they were for the [redacted] clinical team to access.

5.11 Dexamethasone dose - Third Admission [redacted] Hospital 1st -3rd August 2021

On the 1st of August [redacted] had been non-specifically unwell at home for some days and had that become more immobile and lethargic. On the advice of the Neurosurgeon to the family an ambulance was called, and [redacted] was re-admitted to [redacted] Hospital. At the initial assessment there were no specific findings that gave an indication of the cause for the deterioration in [redacted] health. Vital signs were largely normal except for 2 occasions when the pulse rate was over 100. Blood tests were normal except for the C-Reactive Protein which was 78. A note was made of this in the record at the time of admission, but it is not mentioned further. Chest X-ray was also normal. During the 2 days [redacted] was in [redacted] Hospital she was hypoglycaemic on two occasions and the oral drugs for diabetes were reduced.

At the time of admission on the 1st [redacted] was taking 4 milligrams of Dexamethasone once daily as intended. During the admission this was reduced to 2 milligrams on the advice of neurosurgery. [redacted] also appeared to have been prescribed weekly Methotrexate since discharge from [redacted] Hospital on the 13th of July.

5.12 Transfer to [redacted] Hospital 3rd August 2021

[redacted] was transferred to [redacted] Hospital from [redacted] on the 3rd. I have not had access to the [redacted] Hospital records to review this in detail. I have read the statement by [redacted]

daughter which describes events in [redacted] Hospital. This indicates that she had pneumonia and died on [redacted]. By this time the Dexamethasone dose had been significantly reduced but [redacted] had been prescribed Methotrexate and Dexamethasone together from the 13th of July until the 2nd of August. The Methotrexate was a once weekly dose to be taken on Mondays. This means that Methotrexate would have been due on the 19th & 26th of July and the 2nd of August. The Methotrexate dose due on the 19th is recorded as being given in hospital on the 20th of July and presumably [redacted] took the dose due on the 26th of July at home. The dose due for the 2nd of July was withheld and not given.

5.13 Immunosuppression – Dexamethasone and Methotrexate

[redacted] received an unusually high dose of Dexamethasone for 10 days from the 30th of June and again for 4 days in hospital from the 14th of July. [redacted] also received lower doses of Dexamethasone for the remainder of the time before transfer to [redacted] in August. For two weeks in July [redacted] received Methotrexate as well. During this period, the Dexamethasone, and combined with Methotrexate would have left [redacted] immunosuppressed and open to infection.

6 Summary

6.1 Dexamethasone dosing

There are issues of concern regarding the initial Dexamethasone dosing and follow up Dexamethasone dosing [redacted] was on high doses Dexamethasone for a prolonged period. The Dexamethasone gave rise to hyperglycaemia and proximal myopathy. For part of the time was prescribed Dexamethasone and Methotrexate both of which suppress the immune system leaving [redacted] at higher risk of infection and suppression of the symptoms that usually accompany infection and aid an early diagnosis.

6.2 Specific issues regarding dosing of Dexamethasone are:

1. The initial dosing is high. It is higher than advised by the Neurosurgical Registrar. Whilst it would not be unreasonable to increase the dose in the short term if there were concerns about delayed response or the severity of [redacted] condition it does seem unwise to do so to the extent that it was without direct consultation with the Neurosurgical service.
2. The initial dosing of Dexamethasone was significantly higher than that advised in the NZF or Data Sheet. No reasons that justify this high dose were recorded.
3. Steps were not taken to reduce the Dexamethasone dosing when improvement was apparent. It is unreasonable not to have made a reduction in dose before discharge.
4. [redacted] was discharged without a documented plan to manage the Dexamethasone dosage with a reducing dosage. It is the responsibility of the prescribing physician to ensure there is a plan or to clearly delegate and communicate that responsibility to another, for example the General Practitioner.
5. The abnormal blood glucose measurements were not noted nor responded to in the first admission and no plan was made for ongoing monitoring after discharge.
6. There is no record that the patient nor family were warned about the potential effects of high dose steroids and what to look out for.
7. There was no clear communication to the General Practitioner of the expectation and requirements for follow up from the 1st admission. The discharge summary from the second admission suggested an appointment with the GP in 4 weeks time – which in the circumstances is a considerable time.
8. The dose of Dexamethasone was increased again at the start of the second admission and there was no reason recorded for this. It may have been an error in that the admitting team followed the dosing in the discharge summary from the original admission and did not refer to the recent discharge summary from [redacted] hospital.

9. There was no comment in the notes about the reversion to a high dose of Dexamethasone related to the ward round on the day following the second admission to Hospital. It is expected practice that the SMO on such a post take round would review the medication chart. This is an imperative when a person has been admitted because of a side effect of medication.
10. The medicines reconciliation notes on the day after the second admission to Hospital noted that the dose of Dexamethasone was incorrect. There were no notes about the planned steps to correct the dosing error. It was not corrected for 3 more days.
11. Methotrexate was restarted at the admission to Hospital despite the advice received during the first admission from the Rheumatologist that it should be withheld whilst was receiving Dexamethasone.
12. The combined immunosuppressive treatment of Dexamethasone and Methotrexate continued through the second admission to Hospital until the third admission to Hospital.

7 Quality of documentation regarding clinical decisions

There is no documentation that covers the decision made in respect of

- The initial dose of Dexamethasone
- The abnormal high Glucose levels
- The plan for post discharge care covering the risks from Dexamethasone
- The plan to provide information and education for and her family
- The reversion to high dose Dexamethasone during the second admission
- The plan for correction of Dexamethasone dosage after an error had been identified during medicines reconciliation.
- The reason for restarting Methotrexate at the first admission to Hospital.

7.1 Documentation of decision-making regarding Dexamethasone

When prescribing is outside of the usual pattern, as it was in respect of Dexamethasone initially, it is expected practice that the reasoning for this is documented. This is important so that other health professionals can understand the clinical reasoning and plan of care. Furthermore, when a drug will need future dose adjustments, as is the case for Dexamethasone prescribed for it is expected practice that the plan for future dose adjustment is documented.

Documentation Abnormal High Glucose Results

Noting that was receiving high dose steroids and had pre-existing diabetes it would be expected practice that the clinicians providing care would seek out the Blood Glucose measures and document the planned response. Furthermore, it is expected practice that the Nursing team having recorded the abnormal results document the problem and bring it to the attention of the medical team. This may relate to poor keeping of records and poor teamwork in the ward.

7.2 Post discharge plans

Duty of care does not stop when a person leaves hospital. It requires formulation of a plan for care then communication of that to the persons, their family and those providing ongoing care for example the General Practitioner. This was poorly documented.

7.3 Information and education for patient and family

It is an expected standard of care that people are provided with information to assist their understanding of their health issues. This includes providing information regarding significant changes to medication especially where there is a risk of adverse effects. There was little documentation that the medicines effects were communicated, nor the ongoing plan of care.

8 Communication and consultation between [redacted] and [redacted] Hospitals

8.1 Communication - first admission [redacted] Hospital 29/06/2021 - 02/07/2021

[redacted] received prompt investigation in the Emergency Department and a presumptive diagnosis of a brain tumour was made. The Neurosurgery Registrar was contacted that night and the matter discussed. The Neurosurgery Registrar gave advice on the required investigations and plans were made for these there and then. Advice was provided on commencing Dexamethasone which was promptly done. To this point communication appeared to be excellent.

On Day 1 of the admission the dose of Dexamethasone was changed to an unusually high dose, but the Neurosurgery Service (the expert service) were not consulted nor specifically advised of this. This is a failure of communication. The expected practice would be that once advice is taken then if there is to be a meaningful change then there should be discussion with the specialist service. It was unreasonable for the Physician to unilaterally change the dosage to such a high level without communication with Neurosurgery. If there was some doubt about the advice from the Neurosurgery Registrar, then it would be expected that the matter would be discussed with the someone more senior e.g., the Neurosurgeon.

8.2 Communication – MDT meeting and Oncology planning

On discharge from hospital on the 2nd of July a plan had been made, for [redacted] case to be discussed at the Neurosurgery MDT meeting. The initial meeting occurred within 4 days of discharge. This would have been informed by the documentation from [redacted] and the previous conversations between the [redacted] Physician and Oncology. The Safety and quality manager from [redacted] Hospital states that there is a regional clinical portal covering both [redacted] Hospital and [redacted] Hospital. One would then expect that the clinicians in the MDT team meeting would have had access to the discharge summary from [redacted] Hospital. The focus of this meeting was planning investigation, surgery, or other treatment for the tumour. There would have been potential for the abnormal dosing of Dexamethasone to be picked up at this point, but review of this would not have been the primary purpose of the meeting. Both the MDT team meetings were documented and available in the regional clinical portal.

8.3 Communication - Admission and Assessment to [redacted] Hospital Neurosurgery

During this admission, the high dose of Dexamethasone was picked up and changes made to reduce and further taper this. These changes were recorded in the discharge summary. The discharge summary was signed on the afternoon of the 13th of July. It would therefore have been available via the regional clinical portal to the admitting team at [redacted] Hospital on the next day. This is the day that [redacted] was admitted to [redacted] Hospital for the second time at 8 PM. The practicalities of access to the discharge summary by the [redacted] Hospital team would depend upon how the clinical documents are stored and made visible in the regional clinical portal. There was also a letter from the Neurosurgeon documenting their assessment of [redacted] This included detail on the changes to and planned dosing of Dexamethasone. This was dictated on the 12th of July, typed on the 14th and authorised on the 15th. The draft version may have been available to the admitting team a [redacted] depending upon the systems and policy which control access to clinical documents after typing and before authorisation in the regional clinical portal.

8.4 Communication – Patient Portal

On two occasions it appears that clinicians were not aware of important information about patient care and consequently errors arose with medication prescribing. The first occasion was when

[redacted] was admitted to [redacted] Hospital at which time the Methotrexate was restarted. This was despite two documents from [redacted] which stated that the Methotrexate was to be withheld (the letter from the Rheumatologist and the recent Discharge Summary from [redacted]. The second was when [redacted] was admitted to [redacted] Hospital on the second occasion at which time the Dexamethasone was restarted at the high dose, which was set on the first discharge from [redacted] and not the revised reduced and tapering dosage prescribed at the interim admission to [redacted] Hospital. This calls into question how the information is organised in the clinical portal that the clinicians were using.

9 Response to Specific Questions and commentary

9.1 Answers to the specific questions posed.

1. Whether the prescribed steroid regime was appropriate during [redacted] acute admission of 29 June 2021- 2 July 2021
   a. What is the standard of care/accepted practice?
   The expected standard is that:
      i. **The initial prescription of Dexamethasone for a person in the situation of [redacted] would align with the guidelines in the NZ Formulary unless there were special circumstances in which case the matter should be discussed with the specialist service that had already advised a dosage.**
      ii. **The dexamethasone dose is reduced as soon as symptoms improve.**
   b. If there has been a departure from the standard of care or accepted practice,
   Yes there has been a departure from expected standard of practice.
   c. how significant a departure (mild, moderate, or severe) do you consider this to be?
   I consider this specific matter to be a moderate departure from accepted practice
   d. How would it be viewed by my peers?
   I believe that my peers would hold a similar view.
   e. Recommendations for improvement that may help to prevent a similar occurrence in future.
   For this specific matter - there should be regional, or national guidelines for treatment of cerebral oedema associated with tumour which are formulated by the specialist service in partnership with relevant regional clinical services.
2. Whether [redacted] was discharged on the appropriate medication
   a. What is the standard of care/accepted practice?
   The accepted standard is that:
      i. **The dose of Dexamethasone should be reduced as soon as possible and continuously tapered to reach a minimal basal dose.**
      ii. **The discharge plan should clearly communicate this.**
   b. If there has been a departure from the standard of care or accepted practice,
   Yes there has been a departure from accepted practice in that [redacted] was discharged on a high dose of Dexamethasone with no apparent plan to reduce it nor to monitor for adverse effects.
   c. how significant a departure (mild, moderate, or severe) do you consider this to be?
   I consider this to be a severe departure from accepted practice.
   d. How would it be viewed by my peers?
   I believe that the majority of my peers would view this similarly.
   e. Recommendations for improvement that may help to prevent a similar occurrence in future.
   For this specific matter - there should be regional, or national guidelines for treatment of cerebral oedema associated with tumour which are formulated by the specialist service in partnership with relevant regional clinical services.

3. Quality of documentation regarding clinical decisions
   a. What is the standard of care/accepted practice?
      The accepted practice in a situation such as this is:
      i. **Where a significant deviation from usual prescribing is made that there is clear documentation of the reasons for this**
      ii. **Also, that there is a documented plan to continue care in a safe and planned way.**
   b. If there has been a departure from the standard of care or accepted practice,
      Yes, it is my opinion that there has been a significant departure from the standard of care.
   c. how significant a departure (mild, moderate, or severe) do you consider this to be?
      I consider this to be a moderate departure from the standard of care.
   d. How would it be viewed by my peers?
      I believe that my peers would view this similarly.
   e. Recommendations for improvement that may help to prevent a similar occurrence in future.
      [redacted] **hospital should have processes in place to regularly audit the quality of documentation of clinical decision making.**
4. Communication and consultation between [redacted] and [redacted] Hospitals
   a. What is the standard of care/accepted practice?
      The expected standard is that:
      i. **There are shared records between services and hospitals and the clinical portal presents important clinical information in a regional integrated set to users.**
      ii. **In urgent or critical situations there is prompt communication for example by phone**
   b. If there has been a departure from the standard of care or accepted practice,
      i. **There is a regional clinical portal which shares information, but it is not possible to determine how the information is presented to users.**
      ii. **There was a departure from the accepted standard of care in that there was not a further phone discussion between the [redacted] Hospital team and the specialist Neurosurgery service when there was a deviation from the Neurosurgery recommended plan.**
   c. how significant a departure (mild, moderate, or severe) do you consider this to be?
      I cannot determine whether there has been a significant departure from standard of care for (i)
      I consider (ii) to be a moderate departure from expected standard
   d. How would it be viewed by my peers?
      I believe my peers would see this similarly.
   e. Recommendations for improvement that may help to prevent a similar occurrence in future.
      The expectations for communication between the regional hospitals and the specialist services should be included in the common set of guidelines for management of common conditions for the region.
      The clinical portal should present an integrated set of information for the region as the primary view
5. Any other matters that you consider warrant comment
   These are outlined below

9.2 Dexamethasone dosage during second admission to [redacted] Hospital

This refers to the reversion to a high dosage of Dexamethasone (32 milligrams per day) and the continuation of this dosage.

a. What is the standard of care/accepted practice?
The SMO should personally review the medicine chart on the post-take round when a person is admitted to hospital directly as a result of an adverse effects of medication.

b. If there has been a departure from the standard of care or accepted practice,
There was a significant departure from standard of care

c. how significant a departure (mild, moderate, or severe) do you consider this to be?
I consider this to be a severe departure from expected standard of care.

d. How would it be viewed by my peers?
I believe that my peers would regard this similarly

e. Recommendations for improvement that may help to prevent a similar occurrence in future.
A peer review programme with direct observation of practice by peers would highlight significant differences in practice and potential situations for error.

9.3 Report by Dr [redacted] dated 15 Dec 2021

This report does not seem consistent with information in the medical record. The dose of Dexamethasone prescribed and administered during the second admission to [redacted] Hospital differs from the medicines record. The medicines chart indicates that 16 milligrams twice daily was administered for several days. Dr [redacted] gives a different account in the report.

9.4 Documentation and teamwork in [redacted] Hospital medicine service

There are several instances where documentation is missing for important decisions and observations. It is understandable when services are under pressure[7],[8] that documentation may be brief, but it is important to clarify why decisions are made. It is important that simple matters which facilitate documentation are addressed. Examples would be:

- Ensuring that paper notes are readily available in a standard location when not in use.
- Ensuring that paper charts are similarly managed.

There are occasions in the course events where teamwork may have been less than ideal. The examples are the blood glucose results that were not acted upon in the first admission and when the medicines reconciliation process in the second admission was not converted promptly into action to correct the error in the Dexamethasone dosage. A collegial workplace where there is good interdisciplinary communication should reduce the likelihood of such failures. There should be mutual support between professions and willingness to communicate and hear concerns about care.

9.5 Regional Clinical Portal

Having a regional clinical portal with information shared between the regional hospitals is a welcome and effective way to improve communication and reduce risk. It is important that the information is presented to clinicians in a logical way that is patient focussed and not entirely built around location or department of service. During the care of [redacted] there are occasions when opportunities to

---

[7] I have not been able to review the overall activity in [redacted] around the time of each of the admissions.

[8] The care of [redacted] occurred at a time when there may have been some disruption to services due to Covid. Mid 2021 was not a time of high case numbers but the risk of Covid meant that additional precautions were needed such as patient and visitor screening and use of personal protective equipment continuously.

avoid errors were missed because the clinical staff did not access available records, or did not see that there were documents that contained critical up-to-date information. Two examples are: Firstly, the error of Dexamethasone dosing at the second admission to [redacted] Hospital when the correct dose was in the discharge summary from [redacted]. Secondly, the prescription of Methotrexate on discharge from [redacted] hospital when there had been a recommendation to withhold it in a letter from Rheumatology and in the [redacted] discharge summary.

Designing and improving the user interface for clinicians to information systems is something that should be continuously done. Having a clinical portal or other information systems that can be rapidly accessed, does not need multiple login events, and makes essential information easy to find in a logical manner.

It is possible, but in my view unlikely, that the admitting teams on both occasions read and ignored the relevant documents from the other hospital. It is more likely that they remained unaware of them. This calls into question how the regional clinical portal is designed. One would expect that it would hold all the information from both hospitals in an integrated set. However, it is possible that each hospital has a separate view of information that is not integrated and that users must specifically look elsewhere for clinical information outside their usual view. This merits investigation.

As I understand it, in-patient electronic prescribing was not universal across the [redacted] Region at the time of [redacted] care. The paper system in [redacted] would not have been not visible via the clinical portal in [redacted]. A single in-patient prescribing system for the region would support better information sharing between the [redacted] hospitals.

9.6 Community Medicines Records

Unfortunately, is not uncommon for people to suffer harm from medicines, as sadly was the case for [redacted]. This can lead to hospital admission, which is a more frequent problem for older people. A proportion of these events are avoidable. For example, those that occur when clinicians do not have immediate access to a reliable medicines record. A list of community dispensed medicines is a very useful tool. This exists in the [redacted] Region, and it should be available to all clinicians via the clinical portal if this is not the case already. There is a good case for developing a national electronic consolidated medicines record supported by the current multiple electronic prescribing systems.

9.7 Readily available guidelines

One of the important issues in the care of [redacted] is the dosing of Dexamethasone. Ideally there should be easily accessible guidelines available for most common conditions encountered in hospital medical practice. This is a way to provide support to smaller nonspecialised hospitals and services on matters that they encounter infrequently. Such guidelines should be at least regional and agreed by the specialist services and the smaller hospitals. In the situation for [redacted] it would then have been evident to all concerned what the usual dose of Dexamethasone should be. The New Zealand Formulary's first option in dosing of Dexamethasone for tumour associated cerebral oedema is to follow a local guideline. It would be open to any member of the team to question an unusual dosage and provide opportunity to correct errors. Child Health services already have such systems nationally led by [redacted] Hospital in [redacted]. Consistency in practice is an important principle of safe, effective, and efficient clinical care and has a contribution to make towards equity.

9.8 Medicines reconciliation

Medication adverse effects are a major issue in caring for older people with complex conditions and taking multiple medications. It is important to have processes to reconcile medications at key transitions in a patient's journey. Acute admission is a high-risk scenario, and it is easy for errors to arise at admission or at discharge. Using electronic systems to support this can simplify the process.

[redacted]

APPENDIX 1
Listing of Data Sheets for systemic Dexamethasone – from MedSafe[10]

Trade Name	Sponsor	Reg. Status
DBL™ Dexamethasone Sodium Phosphate Solution for injection new formulation (pdf 301KB)	Pfizer New Zealand Limited	Approved
DBL™ Dexamethasone Sodium Phosphate Solution for injection new formulation (pdf 78KB)	Pfizer New Zealand Limited	Approved
Dexamethasone phosphate Solution for injectionhameln (pdf 225KB)	Max Health Limited	Approved
Dexamethasone Phosphate Panpharma Solution for injection 4 mg/1 mL (pdf 183KB)	Multichem NZ Limited	Approved
Dexamethasone Phosphate Panpharma Solution for injection 4 mg/mL (pdf 183KB)	Multichem NZ Limited	Approved
Dexamethasone-hameln (see Dexamethasone phosphate Solution for injection) hameln (pdf 225KB)	Max Health Limited	Approved
Dexmethsone Tablet Aspen Pharmacare Australia Pty Ltd (pdf 90KB)	Pharmacy Retailing (NZ) Ltd t/a Healthcare Logistics	Approve

[10] https://www.medsafe.govt.nz/Medicines/infoSearch.asp Search Term « Dexamethasone »