QUEENSLAND COURTS

CORONERS COURT OF QUEENSLAND

FINDINGS OF INQUEST

CITATION:	**Inquest into the death of Michael James Calder**
TITLE OF COURT:	Coroners Court
JURISDICTION:	Brisbane
FILE NO(s):	2014/2468
DELIVERED ON:	2 September 2016
DELIVERED AT:	Brisbane
HEARING DATE(s):	15 April 2016, 16 -18 August 2016
FINDINGS OF:	John Lock, Deputy State Coroner
CATCHWORDS:	Coroners: inquest, health care related death, private hospital admission, headache, concurrent prescription of slow release and fast acting opiate medication, death due to opiate toxicity, communication and documentation between doctors and nurses

REPRESENTATION:

Counsel Assisting:	Ms M Jarvis
Calder family:	Ms A Martens, Maurice Blackburn Lawyers
Dr R Brockett:	Ms K Mellifont QC i/b Avant Law
Holy Spirit Northside Private Hospital:	Ms J Rosengren i/b Minter Ellison
Nurse Meadowfair:	Mr B Hall i/b Creevey Russell

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Introduction

1. Michael James Calder was aged 33. Michael and his partner, Andrea Young had three young sons together. Andrea described Michael as having a great sense of humour and fun. He was a caring and very engaging father to his sons, and a loving partner, son and friend. His loss in these tragic circumstances remains raw for his family and friends.

2. Michael was referred by his GP to the Holy Spirit Northside Private Hospital (HSNPH) on 8 July 2014. He had a three day history of severe occipital headaches which were throbbing in nature and continuous. He also developed neck pain and stiffness with increasing severity of his headache. He was noted to be febrile. The GP referral letter noted he had similar symptoms four years previously when he was diagnosed with viral meningitis. It is now known that Michael also had a history of obstructive sleep apnoea, which had been treated at the same hospital. This history only became known to those treating him after he died.

3. Whilst in the HSNPH Emergency Department a number of tests were performed. He was given analgesia including IV morphine 10mg in total. He was then admitted to the ward under Dr Rodd Brockett, a specialist general physician.

4. During the course of his ward admission Michael received analgesia for the ongoing headache including subcutaneous morphine, oxycodone, Ordine (liquid morphine), MS Contin (slow release morphine), Gabapentin (neuropathic pain) along with paracetamol and ibuprofen.

5. Two early doses of morphine were given intravenously (10mg) on 8 July and by subcutaneous injection (5 mg) on 9 July 2014. The remaining doses were in oral form. Over time the doses and dose frequency of opiate analgesia increased for his ongoing pain.

6. Nursing notes indicate Michael was regularly checked on by nursing staff and there were no obvious signs of narcotisation and when asleep he was breathing normally. Subsequent retrospective reviews of the medical records indicated evidence of deterioration in his respiratory function including low oxygen saturations. Around 04:40 hours on 11 July 2014 Michael was found to be unresponsive and in cardiorespiratory arrest. CPR was performed however he was unable to be resuscitated and was pronounced deceased at 05:17 hours.

Issues for inquest

7. Michael's death was reported to the coroner by Dr Brockett because it was unexpected and the cause uncertain. An initial review of the medical records performed by Dr Adam Griffin of the Clinical Forensic Medicine Unit considered the circumstances of his sudden and unexpected death indicated a probable contributory factor was the level of opiate medication that was being provided to him in hospital. Subsequent autopsy examination found the cause of death to be due to opiate toxicity.

8. During the coronial investigation statements were obtained from the admitting physician, Dr Rodd Brockett and nursing staff. An independent expert report was obtained from Dr Charles Denaro who also expressed concern about the prescribing regime of pain medication and in particular the levels of slow release and fast acting oral morphine utilised in this case. The hospital also conducted

a Root Cause Analysis. As a result, a number of systemic recommendations were made and the Hospital provided details of the implementation of those recommendations.

9. As there continued to be some uncertainty about the precise circumstances which brought about Michael's death, a decision was made to hold an inquest. On 15 April 2016 at a pre-inquest hearing, the following issues for the inquest were determined:

    a. The findings required by s. 45 (2) of the *Coroners Act 2003*; namely the identity of the deceased, when, where and how he died and what caused his death.

    b. The circumstances leading up to the death.

    c. The appropriateness of the health care provided to the deceased at the Holy Spirit Northside Private Hospital from his admission on 8 July 2014 and up until his death.

The following witnesses were called to provide evidence.

- R.N. Greecezel Goudswaard
- R.N. Belinda Lewis
- R.N. Courtney Roach
- R.N. Sunshine Juan
- EEN Maryann Meadowfair
- R.N. Shelly Taylor
- R.N. Marie Ballinger
- Dr Rodd Brockett
- Dr Charles Denaro
- Dr Peter Lavercombe

Autopsy results

10. A full internal post-mortem examination was conducted by Dr Nadine Forde, Forensic Pathologist. Dr Forde found some mild swelling of the brain but there was no obvious cause of death. The lungs were heavy and there were moderate pleural effusions and histological evidence of acute aspiration pneumonia.

11. Toxicology analysis was performed on admission blood (i.e. blood taken on admission to the ED and before any medications were provided). Diazepam, sertraline and Ritalin were detected at non-toxic levels in the admission blood. Morphine and other opiates were not detected in admission blood.

12. Toxicology was also analysed on post-mortem femoral blood. Post-mortem blood levels found Gabapentin, ibuprofen and paracetamol, Ritalin, sertraline and diazepam in therapeutic or non-toxic ranges. Oxycodone was detected in above therapeutic but below toxic ranges. Morphine was found well within the lethal range.

13. The pathologist noted that morphine levels can be difficult to interpret as there is overlap between therapeutic and toxic/lethal levels. This is because individual responses can vary greatly, particularly in the setting of chronic use. However, it was also noted that Michael had no history of regularly taking such medication and there was no evidence of narcotic analgesia in his blood at the time of his

admission. Given his apparent lack of previous exposure to regular narcotic analgesia the pathologist opined he would have been more susceptible to its effects than an individual with more regular exposure.

14. The pathologist opined that the cause for his headache remains unclear and the possibility of resolving viral meningitis cannot be excluded, although other possibilities may include musculoskeletal pain or migraine. There were no autopsy findings to suggest that death occurred as a result of these.

15. There was evidence of acute pneumonia. His initial presentation to hospital did not fit with that of lower respiratory tract infection. Whilst in hospital there were no features, including an increase in respiratory rate clinical findings, suggestive of pneumonia. There was clinical evidence of reduced oxygen saturations requiring oxygen therapy at 08:00 hours on 10 July 2014. There were some small fragments of foreign material in the lungs and the findings and clinical history are suggestive of an aspiration event, possibly occurring around the time of this fall in oxygenation.

16. The level of morphine fell well within the range considered to be potentially lethal. Oxycodone is also an opioid analgesic, and whilst the level of oxycodone was below that considered to be toxic, its actions are similar to that of morphine and the effects would have been additive with the morphine.

17. The development of aspiration pneumonia was most likely caused due to the opiate effect causing a reduced level of consciousness impairing his ability to protect his airways.

18. The pathologist considered the death has occurred as a result of opiate toxicity, from both the combined effects of aspiration pneumonia and the immediate toxic effects of opiates on the central nervous system and respiration.

Medical and nursing care provided over 8 to 10 July 2014

19. Michael had a medical history of anxiety and previous viral meningitis in 2011. In 2009, sleep studies showed him to have severe obstructive sleep apnoea syndrome for which he received surgical treatment at Holy Spirit Northside Private Hospital. He was prescribed medications by his GP including Valium (diazepam) and Zoloft (sertraline), medications commonly used (as well as for other conditions) for treatment of anxiety.

20. Michael presented to the HSNPH Emergency Centre (ED) at approximately 14:40 hours on 8 August 2014. A provisional diagnosis of viral meningitis was made. A lumbar puncture was performed, which noted clear fluid and no elevation of white cell count. A CT head scan was normal with no evidence of intracranial haemorrhage. Other testing was unremarkable. Michael was commenced on anti-viral medication when he first presented to the ED. He was given analgesia and provided with IV morphine of a total of 10mg over a half hour period.

21. Michael was then admitted to the ward under Dr Rodd Brockett, general physician. At the time of admission unusually a Patient History form was not completed and hence a question contained on the form as to whether Michael suffered or ever suffered from sleep apnoea was not answered. A referral letter from the ED was provided and there was a discussion with Dr Brockett. As well the ED record was provided. It is apparent the ED is a separate entity to the

HSNPH. This ED record routinely was not considered by Dr Brockett due to its difficulty in being sensibly or easily digested and read. Dr Brockett was not aware of a previous history of sleep apnoea and did not read the entry in the ED records that at 19:20 hours in the ED there was an episode when Michael's oxygen saturations plummeted to 79% but rose on rousing.[1]

22. Michael arrived from the ED at around 20:15 on 8 July 2014. It is instructive to note that at the time nursing staff recorded vital signs observations in a Modified Early Warning Score (MEWS) chart. This chart complied with the Australian Commission of Safety and Quality in Health Care National Standards. The chart is said to be a tool to assist in the recognition of a deteriorating patient. Relevantly, in respect of oxygen saturations the MEWS chart provided as follows:

    i. If oxygen saturations fell between 87% and 92% they were to administer oxygen. If saturation levels continued to fall with increasing shortness of breath they were to inform the team leader immediately;
    ii. If saturation levels fell below 86% they were to apply oxygen and inform the Team Leader who will inform the treating Doctor;
    iii. If saturation levels fell below 80% they were to apply oxygen via a non-rebreather bag and institute a MET call. If they continue to drop or the patient does not respond to oxygen therapy they are to call a CODE BLUE.

23. Endorsed Enrolled Nurse (EEN) Maryann Meadowfair was involved in the care of Michael during the night shifts of 8, 9, 10 July 2014. She first provided a statement to the hospital at 08:20 hours very shortly after the death and her statement to the coroner was dated 31 July 2014. EEN Meadowfair was subsequently dismissed from her employment, it seems as a result of what occurred. EEN Meadowfair was a very experienced enrolled nurse and understood her limitations to practice, particularly regarding medications and the hospital policies.

24. EEN Meadowfair's shifts commenced at 22:00 hours and concluded at 07:00 hours. On each of the night shifts her patients included Michael in bed 19. It is apparent that during the night shift EEN Meadowfair had a patient load of about 10 patients. There were two other registered nurses rostered on the ward with a similar patient load. The day and afternoon shifts were rostered somewhat differently in that two nurses were allocated 10 patients cared for as a team or 'buddy' nursing system.

25. On the Tuesday of 8 July 2014, EEN Meadowfair recalls Michael had a lot of headaches and she gave him pain relief. His neck and back were sore and he stated that his head was pounding. She says in her statement that during handover he was admitted for viral meningitis, which he had previously in 2011, and *a history of anxiety and sleep apnoea.* In her evidence EEN Meadowfair was less certain about knowledge of the history of sleep apnoea and stated this was really a 'Query?' about sleep apnoea. R.N. Juan gave evidence that on 9 July she asked Michael if he had a history of respiratory difficulties such as sleep apnoea and received a negative response. It is probable that the respiratory difficulties including the possibility of sleep apnoea were discussed amongst

[1] This information was not referred to in the referral letter

nursing staff and it is in this context that EEN Meadowfair's 'query' about sleep apnoea was considered. It is fair to say the history of previous treatment for and diagnosis of sleep apnoea was not evident to treating staff, including Dr Brockett, until after the respiratory arrest.

26. It may be important to acknowledge at this point that Michael had previous surgery to alleviate the symptoms of sleep apnoea at the same hospital. It is apparent that the previous hospital admission records did not become immediately available on the ward as should have occurred.[2] As well, it was considered likely that Michael (similarly to other persons receiving this treatment) may have mistakenly thought the surgery cured him of sleep apnoea rather than alleviating some of the symptoms such as snoring. This may have been the basis for his negative response to the inquiry by R.N Juan.

27. R.N. Greecezel Goudswaard was involved in the afternoon shifts of 9 and 10 July 2014 from 14:00 hours until 22:30 hours. She made a note in the progress notes towards the end of her shift on 9 July 2014 that Mr Calder was alert and coherent, mobile and self-caring and his observations were stable and he was afebrile. He continued to make complaints of a severe headache and she noted she had given him pain relief for this with some effect. She gave him 40mg of Ordine at 05:15 and says this must have been on the basis that his pain was at the more severe end. The records note she took a number of observations, which are recorded in the observation chart and provided medication. His oxygen saturations were 95% on room air with other vital signs all within normal range. R.N. Goudswaard said she does not recall any discussions with Dr Brockett about Michael's condition or treatment plan and medications on any of her shifts. She said some doctors will speak to the nurses or the team leader while others will write the orders up in the chart.

28. On the night shift of Wednesday 9 July 2014, EEN Meadowfair thought Michael seemed a lot brighter although he still had headaches. She made no mention in the progress notes as to the level of pain and agreed with hindsight it would have been prudent to do so.

29. R.N. Courtney Roach was rostered on the morning shift of 10 July 2014 commencing at 06:30 hours until 15:00 hours. She recalls she was working with a buddy nurse R.N. Xie Juan . She is uncertain as to whether it was R.N. Juan or herself who administered 40mg OxyContin at 07:15 hours, although her signature is in the medication book. R.N. Juan recalls it was herself.

30. Prior to 07:50 hours R.N. Roach recalls R.N. Juan speaking to her regarding the prescription for Ordine. R.N. Juan was concerned that the order in the chart did not specify a frequency or maximum dose. Together they noted that the last dose had been given to him at 04:30 hours and they wanted to check whether it could be administered third hourly. Hospital policy required that all telephone orders must be communicated to two nurses. A telephone call was made by R.N. Juan to Dr Brockett and he confirmed it was to be third hourly and she believes that R.N .Juan wrote that in the chart and she co-signed. R.N. Juan gave Mr Calder another 20mg dose of Ordine at 07:50 hours. R.N. Juan says she intentionally kept the dose at the lower end of the ordered range as she was

[2] The evidence of Ms Ravn is that by interrogating the HSNPH clinical information system it seems the previous medical records were requested at 09:10 hours on 9 July 2014 and were in the ward by 10:56 hours. It remains unclear where the records were kept during 9 and 10 July but they were certainly present when Mr Calder was found unresponsive.

not aware of Mr Calder's need for or response to pain medication and she noted that he had also been given OxyContin (slow release) at 07:15 hours.

31. R.N. Juan performed observations at 08:00 hours on 10 July. Prior to this she noted his oxygen saturations were 85% to 88%. She recalls the oxygen probe alarmed at 85% when she first placed the probe on his finger but stabilised at 88% after a few seconds. She stated she applied oxygen but cannot recall whether she started with 1-2 L and increased to 3 L, but at 3 L his saturations came back to 92%. The formal recording of oxygen saturations at 08:00 hours was 88%. She recalls Mr Calder was surprised when advised that he needed oxygen. She recalls she was also surprised by the reading because clinically he appeared fine. She asked if he had any respiratory problems such as sleep apnoea and he said no. She recalls mentioning to R.N. Roach that the oxygen saturations had been low.

32. She returned to Mr Calder's room to check on his pain relief and to ensure his oxygen saturations remained acceptable. At 10:00 hours he advised his headache was as bad as it had been earlier and she gave him a further full dose of 40mg of Ordine. His oxygen saturations remained acceptable. Later she went to check on him again after the second dose and he was walking around and he said the headache had improved a little. She administered a further dose of 40mg Ordine at 13:40 hours as he had requested further pain relief. Each time she saw Mr Calder on the ward he was speaking clearly and did not seem drowsy.

33. R.N. Roach recorded his observations at 11:30 hours with his temperature 36.9, blood pressure 115/68, pulse 97, respiratory rate 18, oxygen saturations 93% and he was on 2 L of oxygen. She cannot remember the pain score as she did not record it. It is now her practice to record pain scores for each patient but at the time her usual practice was to ask but not necessarily record it every time.

34. R.N. Roach recalls Michael was awake but tired. He was in pain and wanted the room dark. She administered his regular midday 1g paracetamol and 400mg ibuprofen. She noted that prior to handover Dr Brockett had recently attended and made new medication orders, so she completed the times when the regular medication was to be given. She stated it was not unusual for doctors to not speak to the nurses about changes in medication or treatment and they would either speak to a team leader or write in the progress notes.

35. R.N. Greecezel Goudswaard also cared for Michael on the afternoon shift of 10 July 2014. R.N. Belinda Lewis was her buddy on the shift. R.N. Lewis took observations at 16:30 hours. Michael's temperature was 37.7, BP 120/72, pulse 100, respiratory rate 18 and he was on 2L oxygen via nasal prongs. She did not record his oxygen saturations but said with the machine on, it would have alarmed if it went below 90%. He complained of severe pain but she did not record it. She gave him 40mg Ordine at 16:45 hours as well as paracetamol and gabapentin at 18:00 hours. She recalls Michael kept taking off his nasal prongs as he found them irritating. He sounded coherent and was not slurring his words.

36. R.N. Goudswaard recalls that Michael remained troubled by headaches but was alert, coherent and conversing appropriately. In her statement she said he did not appear 'particularly drowsy' and was not slurring his words. She was unable to explain the choice of word 'particularly' and re-iterated he was not drowsy. He did not appear to be in any way confused. She gave Mr Calder MS Contin, ibuprofen and Movicol at 20:00 hours. The Doctor had ceased

OxyContin earlier that day and replaced it with 80mg MS Contin twice daily. She gave Mr Calder his first tablet of MS Contin at 20:00 hours. She also gave him 400mg ibuprofen and his second dose of gabapentin. She performed observations at 20:30 hours with temperature 37.1, BP 130/84, pulse 102, respiratory rate 20. She noted there had been a slight rise in his respiratory rate and heart rate but they were within an accepted range and he was not exhibiting any significant symptoms. At no time did Michael show signs of narcotisation. Unfortunately, she did not record his oxygen saturations and whether he was on room air or 2L nasal prongs. There were no oxygen saturation readings recorded for two observations and she was unable to say why that was. She recalled Michael kept taking his oxygen nasal prongs off and had to remind him to put it back on. She also recalls checking his oxygen saturations and with the oxygen probe on it would have alarmed if they went below 90% and this did not occur. She noted in the progress notes that his severe headache remained '+++' but was unable to explain how this reconciled with the fact she recorded the pain score on the observation chart as '0'. She handed over to EEN Meadowfair but cannot recall the substance of the handover.

37. When EEN Meadowfair commenced her shift on 10 July 2014 she recalls that Mr Calder was a lot brighter but still had the headaches and he had been put on different pain medication. She recalls checking on and recording observations of Mr Calder around midnight. Upon entering his room she recalls he was in a deep sleep and could hear him snoring loudly through the closed door. She was unsure why the door was closed and presumes he asked for it to be shut. She could not recall if she woke Michael. She checked on him again at 02:00 hours and he was asleep and snoring very softly.

38. EEN Meadowfair stated that they were doing hourly roundings but she cannot recall if she checked in on him in the period between 02:00 and 04:00.EEN Meadowfair said it was her practice to place patients on oxygen if their saturations went at or below 90%. She agreed the fact she placed him on oxygen was not recorded in the observation charts. At 24:00 she noted the saturations were 90% on room air but there is no notation anywhere that she used nasal prongs to introduce oxygen. Her version which was used to complete her statement was recorded within hours of the tragic events and also makes no reference to oxygen being supplied.

39. When EEN Meadowfair entered at 04:40 to check on Mr Calder and to do his observations, there was no snoring and she thought he looked different. She put a light on and noticed he looked pale and she hit the CODE BLUE cardiac arrest buzzer on the wall. She cannot recall the exact timing of events but has been informed the buzzer was hit at 04:41 hours.

40. R.N. Marie Ballinger had not been providing primary nursing care for Michael Calder. She heard the emergency call at around 04:40 hours and immediately went to room 19 where EEN Meadowfair had hit the emergency buzzer. On entering the room she saw EEN Meadowfair using voice commands to Mr Calder to determine if he was conscious. He appeared very pale and lifeless.

41. R.N. Ballinger commenced CPR. R.N. Shelly Taylor entered the room and R.N. Ballinger instructed her to bring the cardiac arrest trolley. R.N. Ballinger then initiated cardiac compressions. She inserted a Guedel's airway to assist with airway management and began using the breathing mask in combination with cardiac compressions. R.N. Taylor then assisted in the resuscitation. She recalls hooking up oxygen to the air viva bag. She believes they worked on the

patient for 30–45 minutes. Dr Brockett was called in as well as the Hospital Coordinator.

42. The arrest team from the ICU then attended the ward and began to lead the management of the arrest. The nurses then alternated completing cardiac compressions and performed other duties as instructed. The resuscitation ceased at 05:17 hours.

43. Resuscitation efforts lasted for more than half an hour when Dr Brockett declared Mr Calder deceased.

Evidence of Dr Rodd Brockett

44. Dr Rodd Brockett is a specialist physician and intensivist. It is important to record that at the inquest Dr Brockett provided an emotional apology to Ms Young and the Calder family and took responsibility for his practice and the treatment provided to Michael, which he now acknowledged was wrong. Ms Young very generously thanked him for that apology.

45. Dr Brockett provided three statements. In his first statement Dr Brockett described the treatment history. At the time he first saw Michael Calder he had already been given 5mg of Morphine subcutaneously and was receiving Endone 5mg four times a day. His pain was quite severe and his neck ache was also severe. He described a slightly improving photophobia. Dr Brockett appears to have seen Michael Calder on the ward at some time during 9 July 2014 but a time was not specified. At that time the plan was to continue IV antivirals. Dr Brockett noted a ++++ headache.

46. Dr Brockett stated that he tried to get on top of the pain by ceasing the regular Endone and changing it to OxyContin 40mg twice daily.

47. On 10 July 2014 it was noted that the headache had persisted. Dr Brockett appears to have seen Mr Calder around 11:30 hours on 10 July 2014 noting the headache persisted, chest clear, IV out and to increase analgesia. Dr Brockett increased the analgesia by giving him 160mg/day of MS Contin in two divided doses and continuing as needed dose of Ordine, ceasing the OxyContin and starting some Gabapentin (Neurontin) at 300mg to load him up with intention of going to a lower dose the next day.

48. Dr Brockett had no further contact with or about Michael until he was called at 04:44 hours on 11 July 2014 by the on duty nurse coordinator who said Michael was in asystolic arrest. He attended immediately and noted the efforts at trying to resuscitate him but it was agreed that after 30 minutes further continuation would be futile.

49. Dr Brockett disagreed with the initial assessment of Dr Griffin in relation to the chart review. He stated that *The Australian Medicines Handbook* adopts a scale that the approximate dose equivalent to 10mg of parenteral morphine is 30mg of oral morphine and 15mg of oxycodone.

50. Dr Brockett stated that when he first reviewed Michael sometime between 13:00 to 17:00 on 9 July 2014 he had received 10mg IV morphine, 5mg subcutaneous and 10mg oxycodone orally. He stated that this meant he had in the preceding 24 hours received approximately 40mg Endone with inadequate analgesia and therefore he doubled the dose to 80mg baseline Endone equivalent (40mg bd

of OxyContin) and provided 20-40mg oral morphine (3 hourly as required) on top of the baseline of the OxyContin, paracetamol and ibuprofen.

51. When Dr Brockett reviewed Michael the next day between 11:00 to 12:00 he was still in pain. In the intervening period he had received 180mg oral morphine and 80mg oral oxycodone–equivalent to 300mg of oral morphine or 100mg parenteral morphine. He ceased the OxyContin and continued the paracetamol, ibuprofens and as needed oral morphine order. He prescribed oral sustained-release morphine (MS Contin 80mg bd).

52. He states that at no point was there any indication that Michael was receiving too much morphine equivalent and he did not believe this was the case. Michael was noted on the nursing notes to be bright and alert and therefore he felt he was not affected by narcotics.

53. Dr Brockett provided his second statement shortly prior to the inquest and a short third statement prior to his evidence. Dr Brockett states that he genuinely believed he was acting in the best interest of his patient. Mr Calder's death has caused him to undertake further self-education and to reflect upon his actions. He states that he has reviewed many medical articles and abstracts relevant to the issue and this review has clearly brought home to him the complexities surrounding the variable absorption rates of oral narcotics, as well as the complexities of slow release narcotic preparations. There are conflicts within the journals about some of those issues. He states that this has brought him starkly to the conclusion that he cannot reliably dose slow release narcotics for acute nonsurgical pain and cannot reliably predict the effects of the narcotics on an individual. He realises that his practice was wrong.

54. He states that he now approaches acute pain management very differently. He is now following a framework that has been developed following substantial discussion at the Hospital's Morbidity and Mortality meetings. Essentially the transitioning to sustained release oral or topical narcotics would only occur once stable on a steady dose of the patient controlled analgesia. The framework is summarised as follows:

    i. Regular paracetamol if there are no contraindications;

    ii. Regular non-steroidal anti-inflammatory drug or COX2 inhibitor if appropriate for the type of pain and if there are no contradictions to the use;

    iii. Patient-controlled analgesia with either fentanyl or morphine if acute pain which would be postoperative pain or acute severe pain (pain not controlled with doses of oxycodone, or the equivalent of 20 mg/day or less for a patient who is under the age of 85 or over 65 kg, or more than 10 mg/day of oxycodone if they are less than 65 kg or over the age of 85. This would require use of intravenous or subcutaneous access and would also tie into the hospital's use of continuous oximetry;

    iv. Then it would be recommended to consider anti-elliptic drugs or Tri-Cyclic antidepressants as co-analgesics after doing some form of sleep apnoea screening. No co-analgesics should be

prescribed with neurological effects except by the primary physician/Surgeon/anaesthetist;

v. Finally, transitioning to sustained release oral or topical narcotics would only occur once stable on a steady dose of the patient controlled analgesia. This is where fentanyl may have certain advantages because the translation from a fentanyl PCA in terms of hourly use on average across the day to a patch is much easier and does not require any mathematical gymnastics which OxyContin and MS Contin may.

55. Dr Brockett stated that on admission to the ward he was not aware that Mr Calder's oxygen saturation level had dropped to 79 at 19:20 hours on 8 July 2014 whilst in the ED, with a respiration rate of 112. Had he been aware of these entries this would have raised queries to try to understand why the oxygen saturations were so low. He would not have prescribed sustained release narcotics and would have reduced the dose level of Ordine to half, but increasing the frequency.

56. Dr Brockett stated that although the full file comes from the Emergency Centre with a computer printout of the observations, it was not then his usual practice to go through each and every entry. His primary reference was to the letter of referral from the ED with an expectation that if there had been any significant observations of the patient, that it is recorded and commented on. Dr Brockett stated that now the ED print-out still comes to the ward but there is a transcription of the observations onto a new standard observation form Adult Deterioration Escalation Chart (ADEC), so that this information is readily available in a conventional way.

57. Dr Brockett also stated that he was not aware, at the time of his initial consultation, that Mr Calder had a history of obstructive sleep apnoea. Although he took a medical history, Mr Calder had not disclosed this to him. Dr Brockett states that this is not a criticism of Mr Calder as whilst taking the medical history his questioning style was intended to obtain all relevant information from the patient, but clearly it did not on this occasion. There was nothing in the hospital file or referring letter, which stated that Mr Calder previously had obstructive sleep apnoea. He also did not know that Mr Calder had previously been a patient of the hospital. It also occurred to him that patients who have had surgery for obstructive sleep apnoea, may well think they are cured because they no longer snore. However, such surgery does not in fact cure obstructive sleep apnoea, but rather prevents the noise of snoring. Dr Brockett states he has changed his questioning style so as to specifically ask the patient whether they have had any operations at all in the past. If he had been aware of the obstructive sleep apnoea this would have drastically changed his approach.

58. In relation to communication practices with nursing staff he stated that it continued to be difficult to find individual nurses as they are often with other patients. Now his practice is to speak to the team leader on the ward. In relation to documenting in progress notes he acknowledges that he should document his findings better but stated that as he was the sole person making the decisions this was basically a recording of his thought processes for future consideration by him.

59. Dr Brockett stated that he would expect to be told if oxygen saturations went below 91 or 92%.

60. Dr Brockett remained unsure as to the underlying cause of the headache. It could have been a viral infection or post viral.

Root Cause Analysis

61. The Holy Spirit Northside Private Hospital conducted a Root Cause Analysis (RCA) and this was finalised in January 2015. The HSNPH reviewed the RCA on two further occasions after the receipt of the Autopsy Report and after further interviews were conducted with all staff who provided care to Mr Calder. This resulted in a final RCA finalised in April 2015. The RCA was not informed by information from the treating doctor, Dr Brockett, as he declined to participate in the process on advice from his legal medical defence organisation.

62. The first RCA identified a failure by night shift nursing staff to recognise and respond to early signs of clinical deterioration (oxygen saturation levels of 90% at 2400 hours on 10 July 2014) as a factor that may have contributed to Michael's unexpected death.

63. Another possible causal factor was identified that due to the patient complaining of a headache throughout his admission with no other focal neurology, the Registered Nurses (RN) provided opioids as prescribed by the treating physician to manage the patient's headache, therefore a focused assessment of pain management was not considered by the RNs, which may have contributed to the patient's unexpected death.

64. The hospital acknowledged there were system issues identified that the hospital management team has been actively working on. This included a review of current clinical practice model to establish escalation process for clinical observations undertaken by enrolled nurses. Further as part of the handover program, pain management will be specifically addressed to enable clinical staff to consciously consider or discuss opioid usage.

65. The hospital also has met with Mrs Calder's partner by way of an open disclosure. It is understood that the hospital dismissed the enrolled nurse who was the subject of some criticism in failing to escalate the observations to other registered nurses on the shift.

66. The formal findings and recommendations of the first RCA were as follows:–

    i. Due to the enrolled nurse not recognising that an oxygen saturation level of 90% constituted clinical deterioration and therefore did not escalate to a registered nurse for review, this may have contributed to the unexpected death. It was recommended that there be a review of the current clinical practice model (PPM) to establish escalation process for clinical observations undertaken by Enrolled nurses. The intention was for the clinical practice model to clearly articulate how observations undertaken by and rolled nursing staff are to be communicated to the team leader/registered nurse for verification and actioned as required. This was to be implemented by June 2015.

ii. Due to the patient complaining of a headache with no other focal neurology, the staff provided opioids as prescribed by the treating physician to manage the headache, therefore a focused assessment of pain management was not considered, which may have contributed to the unexpected death. It was recommended that as part of the SHARED handover program, pain management will be specifically addressed under section "A" (assessment) to enable clinical staff to consciously consider or discuss opioid usage. The intention was for existing tools for using hand over to reflect that pain management will form part of the discussion held during clinical handover. There were two the clinical handover audits commencing February 2015.

iii. As a lesson learnt it was noted that during the RCA review, it was determined that the current method of recording clinical observations in the Brisbane Northside Emergency Centre was not in accordance with Standard 9 of the National Safety and Quality Health Care Standards and therefore critical deterioration is not observable using an improved "track and trigger" escalation chart. It was recommended that the use of the HSNPH Adult Deterioration Escalation Chart form within the Brisbane Northside emergency Centre to replace the existing observation recording process (which is electronic using MED TECH).

iv. Other factors identified including that staff did not administer oxygen when oxygen level fell below 92%. The policy was to apply oxygen as per MEWS form. Staff were also unaware of patient history of sleep apnoea. The staff did not recognise the patient had deteriorated and therefore did not escalate to Team Leader or senior nurse.

67. The Final RCA had the benefit of the Autopsy Report and findings. The RCA formal findings were as follows:

i. Due to current processes for monitoring and managing mandatory training, mandatory competency and performance appraisals, the identification of competency issues with staff, in particular permanent night staff, were not identified. This may have contributed to an enrolled nurse working on night shift with a knowledge deficit in recognising early signs of clinical deterioration (oxygen saturation levels of 90%), which may have contributed to the patient's unexpected death. It was recommended that there be a review of current mandatory training/competency/performance appraisal systems to ensure good governance to manage the clinical risk for monitoring and managing staff compliance with expected outcomes. The RCA report noted this has now been completed.

ii. Due to an informal professional practice model that did not highlight the scope of clinical practice for the R.N./EN/Team Leader and role responsibilities, there was no supervision of the EN and the decreased oxygen saturation levels at midnight was

not escalated to the R.N. for review which may have contributed to the patient's unexpected death. There was a recommendation for review of current professional practice model and a Professional Practice Manager was to be employed to develop an action plan to provide an overarching framework for nurses. It was noted that this was completed.

iii. Due to ward culture for clinical handover not including all nurses discussing all patients at the same time, the RNs were only aware of their own patient load and status history (which did not include this patient). This may have contributed to no supervision of the Enrolled Nurse practice on night duty and the decreased oxygen saturations at midnight was not escalated to the RN for review, which may have contributed to the patient's unexpected death. It was recommended there be a review of current handover practices in all clinical areas to establish guidelines for compliance with the National Standard. These efforts were ongoing.

iv. Due to the patient complaining of a headache throughout his admission with no focal neurology, the RNs provided opioids as prescribed by the treating physician to manage the patient's headache, therefore a focused assessment of pain management was not considered by the RNs, which may have contributed to the patient's unexpected death. It was recommended that as part of the SHARED handover program, pain management will be specifically addressed under section "A" (assessment) and "R" (risk) to enable clinical staff to consciously consider or discuss opioid usage. This aspect of the recommendations has also been completed.

68. The RCA also made note of a number of other lessons learnt. This had resulted in the adoption of a new Adult Deterioration Escalation Chart (ADEC), and the adoption of clear guidelines on Rounding for all patients on all shifts. As well there was a broad review of current processes and practices surrounding the management of the deteriorating patient, review of processes for pain assessment including opioid management and review of processes for the taking of patient history forms.

69. The Quality and Risk Manager of HSNPH, RN Donna Ravn also provided a statement detailing improvements made since the death of Mr Calder.

70. Given there was some confusion as to who the team leader was on the night shift of 10 July 2014 there has been an emphasis on documenting this information on daily staffing sheets and allocation boards located in all nursing stations. Ms Ravn also advised that enrolled nurses are no longer rostered on night shifts.

71. The Adult Deterioration Escalation Chart (ADEC) has now replaced the Modified Early Warning System (MEWS) observation chart although both were in compliance with the National Standards. ADEC provides greater ease of use, and clarity around required actions in response to observations that fall within a coloured trigger zone. When patients are admitted via the Emergency Centre, a set of observations are recorded on the ADEC chart so ward staff can clearly see what the most recent observations are. The *Recognising and Responding*

to Clinical Deterioration Policy now includes clear guidelines for appropriate application of oxygen therapy. A stand-alone policy titled *Oxygen Therapy Guidelines* has also been introduced to provide greater clarity regarding the appropriate use of oxygen therapy. The hospital has purchased a fleet of Nellcor continuous monitoring machines, which accurately monitor and measure oxygen desaturation episodes.

72. In relation to handovers the team leader for each shift receives a handover from the team leader on the previous shift. All nurses on the oncoming shift now receive a bedside handover for all patients allocated to their care on the next. Previously this took place at the nurse's station or in the corridor outside a patient's room. Pain management has become a much greater focus in handover discussions. The SHARED handover templates have been updated to specifically include flagging of respiratory risks, including sleep apnoea or oxygen therapy. Monthly audits including handover processes are conducted. Patient Communication Boards located in each patient room updated each shift. While these boards were in use prior to Mr Calder's death they have been redesigned to make them more focused on patient collaboration.

73. Each clinical ward now has a ward educator present for eight shifts per fortnight to provide an opportunity for the nurse educator to undertake any relevant mandatory training, assessments and performance appraisal. Permanent night staff are now required to work a minimum of four weeks per year on day shift to provide them with the opportunity to participate in ongoing professional development with the nurse educator. Further policies have been introduced to manage the process for ensuring staff competency through mandatory completion of performance appraisal and mandatory training programs by set dates.

74. R.N. Courtney Roach provided evidence that a Nellcor machine is now on the ward which attaches to a patient's finger and continuously monitors oxygen saturations and pulse. It will automatically alarm when certain parameters are exceeded. She believes it is below 90% oxygen saturations and around fifty-four pulse. It is a requirement that these are used for all patients on patient-controlled analgesia and an option for use by other patients if there are concerns for any reason. She also states that the Adult Deterioration Escalation Chart has replaced the previous observation chart and provides much better guidance on what to do with observations that fall within the shaded areas. The Nurse Unit Manager has been active in ensuring staff are diligent in recording all observations including pain scores. Nurses now perform SHARED (situation, history, assessment, risk, expectation, documentation) handovers at the bedside referring to the chart. There are also information boards at the end of the patient's bed to get updated around handover. Other nursing staff advised the inquest on a similar basis. RN Goudswaard for instance confirmed the changes to handover practices which now also involved the patient; that the observation chart has improved and highlighted a number of things and actions nurses have to take. There are a number of steps nurses can take where a patient is on pain relief and if they think the patient needs more observations; there was continuous monitoring if a patient comes from recovery and is on PCA; there is floating staff at the hospital to assist when the ward is busy; and a nurse educator is on the ward twice a month providing good continuing knowledge and clinical understanding.

75. It is apparent substantial compliance and knowledge of the outcome of recommendations has been achieved.

Expert review by Dr Charles Denaro

76. Dr Charles Denaro is a Consultant Physician and Clinical Pharmacologist and the Director of Internal Medicine and Aged Care at the Royal Brisbane and Women's Hospital.

77. Dr Denaro opined that he did not believe that the investigation, clinical management and prescribing practices were appropriate. He believed more action was required for the 24 hour care of this patient and he also believed that the opiate dosing was inappropriate.

78. Dr Denaro stated it was important to note that the patient was opiate naive. Dr Denaro also noted the patient was given a mixture of intravenous morphine, subcutaneous morphine, oral morphine, slow release morphine, oxycodone and slow release oxycodone. This made the interpretation of the total effect of these narcotics on the patient complex, but it could be teased out.

79. Dr Denaro stated it was important to appreciate that there is individual variation with the body's handling of these medications and that averages have been used in various tables in the literature to compare one narcotic with another and one preparation with another. There is also variation in the literature between different tables used to convert one narcotic preparation to another. Because of these uncertainties in both pharmacokinetics and pharmacodynamics, the dosing of opiates in non-terminal or non-cancer pain should be conservative. The Australian Medicines Handbook states to use small dose increments, as the dose required may vary more than 10-fold between patients of similar age, irrespective of weight.

80. Dr Denaro also noted that on average, oral morphine has a bioavailability range of from 15% to 60%, but on average only one third is absorbed and reaches the systemic circulation. On average the bioavailability of oxycodone is 50%, which means that approximately half of the dose is absorbed into the system circulation and is then equivalent to morphine potency. Thus oral oxycodone is more potent than oral morphine.

81. Dr Denaro then set out a detailed table of the narcotic exposure of Mr Calder over the days commencing 15:10 hours on 8 July 2014 to 21:00 hours on 10 July 2014.This is reproduced below.

82. Dr Denaro opined that over the total of 53.8 hours Mr Calder received by way of oral morphine equivalent 535mg to a maximum of 595mg. The Parental (intravenous) morphine equivalent was 178.3mg to a maximum of 198.3. Dr Denaro stated that there can be no doubt the doses of opiates in this opiate naive patient were extremely large over a time period of just over two days.

83. Dr Denaro stated that conventionally to control pain the opiate or narcotic dose escalation from one day to the next is conservative especially in non-cancer pain. It is often recommended that there should only be an increase in dose over the previous day by 25-50%. This convention is stated in the approved product information for slow release oxycodone (OxyContin). Dr Denaro stated that personally he has never escalated narcotic doses in this fashion for pain in a non-terminal condition.

Date	Time	Preparation	Dose	Oral Morphine Equivalent	Parental (Intravenous) Morphine Equivalent
8/7/14	1510*	Oral Oxycodone	10 mg	15 to 20 mg	5 - 6.6 mg
8/7/14	1620-1645	Intravenous Morphine	10 mg	30 mg	10 mg
8/7/14	2200	Oral Oxycodone	5 mg. It is not clear whether the patient received this.	7.5 to 10 mg	2.5-3.3 mg
Total Morphine for 8/7/14				Approx 45 mg to 50 mg to 60 mg if the 2200 dose was given.	15 to 16.6 mg or 20 mg if 2200 dose was given.
9/7/14	0800	Oral Oxycodone	5 mg	7.5 to 10 mg	2.5-3.3 mg
9/7/14	0845	Subcutaneous Morphine	5 mg	15 mg	5 mg
9/7/14	1200	Oral Oxycodone	5 mg	7.5 to 10 mg	2.5-3.3 mg
9/7/14	1715	Oral Morphine	40 mg	40 mg	13.3 mg
9/7/14	2000	Slow Release Oxycodone	40 mg	60 to 80 mg	20 to 26.7 mg
9/7/14	2200	Oral Morphine	20 mg	20 mg	6.7 mg
Total Morphine for 9/7/14				150 mg to 175 mg	50 mg to 58.3 mg
10/7/14	0430	Oral morphine	20 mg	20 mg	6.7 mg
10/7/14	0750	Oral morphine	20 mg	20 mg	6.7 mg
10/7/14	0800	Slow Release Oxycontin	40 mg	60 to 80 mg	20 to 26.7 mg
10/7/14	1000	Oral morphine	40 mg	40 mg	13.3 mg
10/7/14	1340	Oral morphine	40 mg	40 mg	13.3 mg
10/7/14	1645	Oral morphine	40 mg	40 mg	13.3 mg
10/7/14	2000	Slow Release Morphine	80 mg	80 mg	26.7 mg
10/7/14	2100	Oral morphine	40 mg	40 mg	13.3 mg
Total Morphine for 10/7/14				340 mg to 360 mg	113.3 mg to 120 mg
Total Morphine over 53.8 hours				535 mg to a maximum of 595 mg	178.3 mg to a maximum of 198.3

* As per the narcotic dispensing records

84. Dr Denaro also stated the management of break through pain was another aspect of concern. The patient was also given gabapentin on 10 July 2014, which medication itself has sedative properties and would have added to the sedating properties of the opiates.

85. The next factor to consider was the patient's periods of well documented hypoxaemia. It is well established that opiate medications worsen obstructive sleep apnoea. In the emergency department, after being given 10mg of IV morphine the patient oxygen saturations decreased to 79%. This is very low and required oxygen supplementation. The most likely situation is that the sedation caused by the morphine worsened his partially treated obstructive sleep apnoea

and blocked his airway. Oxygen saturations returned to thenormal after oxygen supplementation.

86. During the morning of 10 July the patient's oxygen saturations were recorded at 91% at 04:00 hours and 88% at 08:00 hours and required supplemental oxygen. At 11:30 his oxygen saturations were 93% and at 24:00 hours 90%. Dr Denaro said these levels are quite low and could be consistent with excessive sedation causing worsening obstructive sleep apnoea or aspiration.

87. Dr Denaro noted there are no notes in the medical records that indicate the treating physician noticed these periods of hypoxaemia nor the requirement for oxygen supplementation nor any indication of what might be the possible cause. The time of consultation by the treating physician on 10 July is not indicated in the chart, however the treating doctor should have been aware of the periods of low oxygen saturations that occurred in the early morning of that day. The nurse who was looking after the patient stated the patient was snoring heavily on the night of 10 July and was later snoring softly and one of the possible and likely explanations, given the toxicology results, is that the patient by then was heavily sedated by the narcotics and had a depressed respiratory drive.

88. The combination of large doses of narcotics and episodes of intermittent hypoxaemia should have alerted the clinician that the patient required very close observation, ideally not in a single room with the door closed and these concerns should have been clearly articulated to the nursing staff looking after the patient overnight.

89. Lastly, the cause of the patient's headache and its persistence must be considered. It does seem that initially the patient had symptoms suggestive of meningism and that this was an inflammatory illness. The persistence of the headache, which seemingly required large doses of opiates, might suggest alternative diagnoses need to be considered. One common cause of persistent headache in this situation is the post-lumbar puncture headache and the emergency notes do document that the patient's headache was worse after the lumbar puncture and improved lying down. Dr Denaro considered it a possibility but it should always be considered in this clinical situation and a post-lumbar puncture headache requires other management options to ameliorate the pain.

90. In summary, Dr Denaro believed the patient's opiate prescribing was excessive for an opiate naive patient and this prescribing could very well have caused this patient's demise. He believes there is some evidence to suggest the patient had partially treated obstructive sleep apnoea, which was made worse by the sedative properties of the opiates and this may have been an extra factor contributing to the patient's death. In his opinion both issues should have been recognised by the treating clinician and action taken place to prevent the final outcome.

Expert report by Dr Peter Lavercombe

91. Dr Lavercombe also provided a report at the request of the legal representatives of Dr Brockett. Dr Lavercombe is an experienced Intensive Care Specialist and General Physician.

92. Essentially the opinions of Dr Denaro and Dr Lavercombe did not differ, other than their approach to pain management is dependent upon the situation in which they were working. Dr Lavercombe works with acute pain in an ICU

setting with constant monitoring and nursing, whilst Dr Denaro deals more with chronic pain in a general ward where there is less expertise and monitoring.

93. Dr Denaro starts with low pain relief medication and works in increments conservatively until adequate analgesia is achieved. Dr Lavercombe stated this is sound medical practice particularly where the pain is, or is likely to be chronic. Dr Lavercombe stated that he deals extensively with acute pain, which is time-limited and related to a specific insult, for example, surgery, and will be decrementing over time.

94. Hence, Dr Lavercombe stated he would use large early doses through standard non-narcotic multi-modal therapy and use a Patient Controlled Analgesia device (PCA) with short acting narcotics, fentanyl or morphine, to allow the patient to determine the appropriate levels of narcotic. The PCA is programmed to deliver a safe maximum for each individual patient.

95. Dr Lavercombe stated his practice was not to switch between the various forms of oral narcotics because of the significant differences in both the bioavailability and bioequivalence.

96. Dr Lavercombe stated that he considered Dr Brockett's clinical decision regarding analgesia on 8 and most of 9 July 2014 to be reasonable, excepting the use of large doses of oral morphine. He stated that even using his practice of large early doses, this was more than he would use without close observation and continuous pulse oximetry.

97. He stated the clinical decision to commence slow-release oxycodone on the night of 9 July 2014, in combination with the larger dose of as-required medication, risked the short-acting narcotic being given before the slow-release narcotic had reached its maximum effect, thus causing an accumulation.

98. Dr Lavercombe stated that the change to slow-release morphine on the night of 10 July 2014 was problematic given the dose of slow-release oxycodone in the morning and the continuation of as-required doses of morphine. He stated there was no doubt that the doses of morphine administered were excessive, compounded by the use of combinations of short-acting narcotics and different forms of long-acting narcotic with differences in bioavailability and bioequivalence. Dr Lavercombe stated the fact that the method of analgesia is not of the conventional start-low-and-titrate-up approach is of less concern, than the total dose employed, and the various formulations used in a ward situation where monitoring is not as rigorous as in an intensive care unit.

99. Dr Lavercombe stated the oxygen saturation reading of 90% at midnight on 10 July was a significant 'trigger point', being indicative of a point where there was a significant drop in the oxyhaemoglobin disassociation curve and indicating a critical point at which inadequate amounts of oxygen were being received by the patient.

100. Dr Lavercombe agreed that the framework now being adopted by Dr Brockett is an appropriate framework for management of pain that is expected to be time-limited, particularly if combined with close observation and pulse oximetry, when significant doses of narcotics are employed. The conventional approach of starting with a low dose and titrating up remained superior for the treatment of pain that is chronic or likely to be chronic.

101. Dr Denaro also agreed the framework was fine if there was close observation and expertise.

102. Dr Denaro opined that the three factors that are likely to have resulted in the deterioration was a combination of sleep apnoea, opioid increase and introduction of gabapentin. Dr Lavercombe also considered the deterioration was a combination of factors of sleep apnoea with the slow release OxyContin, oral Ordine (morphine) and gabapentin peaking half-lives and accumulating at the same time around late evening to midnight and 1pm.

Conclusions on the issues

103. In reaching my conclusions it should be kept in mind that a coroner must not include in the findings or any comments or recommendations, statements that a person is or may be guilty of an offence or is or may be civilly liable for something. The focus is on discovering what happened, not on ascribing guilt, attributing blame or apportioning liability. The purpose is to inform the family and the public of how the deaths occurred with a view to reducing the likelihood of similar deaths.

104. If, from information obtained at an inquest or during the investigation, a coroner reasonably believes that the information may cause a disciplinary body for a person's profession or trade to inquire into or take steps in relation to the person's conduct, then the coroner may give that information to that body.

105. The impact of hindsight bias and affected bias must also be considered when analysing the evidence. Hindsight bias and affected bias can occur where after an event has occurred, particularly where the outcome is serious, there is an inclination to see the event as predictable, despite there being few objective facts to support its prediction.

106. It is also my experience that in most health care related adverse events there are usually multifactorial issues at play and a combination of system and human errors. Poor communication, poor documentation and a lack of safeguards can result in poor decisions being made. Some of those factors are evident in this case and these resulted in a number of missed opportunities to diagnose the deterioration in condition being suffered by Michael Calder.

107. This case also emphasised the importance of systems being in place to recognise and manage a deteriorating patient. It has been recognised that warning signs of clinical deterioration are not always identified or acted upon. As a result there is a specific component for Recognising and Responding to Clinical Deterioration contained in Standard 9 of *The National Safety and Quality Health Service Standards*. As the Standard states, serious adverse events are often preceded by observable physiological and clinical abnormalities and early identification of deterioration may improve outcomes and lessen the intervention required to stabilise the patient if his condition deteriorates in hospital.

108. This case also emphasised the importance of systems being in place to promote the dissemination of accurate and relevant information at clinical handovers. Handovers have long been seen to be high risk areas for patient safety and significant work has been conducted at high levels to improve handover systems.[3]As a result there is a specific component for Clinical Handover

[3] As an example see the OSSIE Guide to Clinical Handover Improvement developed by the Australian Commission on Safety and Quality in Healthcare.

contained in Standard 6 of *The National Safety and Quality Health Service Standards*. As the Standard states, clinical communication problems are a major contributing factor in 70% of hospital sentinel events. Poor or absent clinical handover can have extremely serious consequences and can result in a delay in diagnosis or treatment.

109. It is in the context of all these factors that I draw my conclusions on the issues for determination.

Cause of death

110. The cause of death, consistent with the clinical records, expert evidence and the opinion of Dr Forde, the Forensic Pathologist, is that Michael died due to opiate toxicity. Michael was found to have a morphine level in his blood well within the range considered to be potentially lethal particularly combined with the presence of oxycodone and gabapentin. These medications cause a reduced level of consciousness thus impairing Michael's ability to protect his airways, particularly with the history of obstructive sleep apnoea. This resulted in aspiration pneumonia. As well, there would have been immediate toxic effects of opiates on the central nervous system and respiration.

111. The cause of Michael's headache was not able to be established at autopsy and there is no consensus as to the cause based on the opinions of the treating physician and independent experts.

Appropriateness of the health care provided

112. The evidence gathered at the inquest and during the investigation have in my view clarified one of the aspects about Michael's clinical presentation which was confounding. It was difficult to understand how Michael could die from opiate toxicity when Michael was not exhibiting overt signs of narcotisation in that he appeared to be alert, coherent and not drowsy. It is accepted nursing staff were not necessarily on the look-out for these signs, but it is more likely than not they would have been noted if they were present.

113. There was certainly evidence of reduced oxygen saturations throughout the admission. These appear to have been generally observed by nursing staff and Michael was provided oxygen which brought them back to an acceptable level. Unfortunately, there were a number of occasions when nurses did not record Michael's pain scores and reports of pain nor his oxygen saturation levels and actions taken in response. This meant staff did not have a clear picture of the progression of his pain and oxygen saturation levels.

114. EEN Meadowfair did record his oxygen levels to be at 90% at midnight on 10 July. She did not record what action was taken, including if she provided oxygen. She said that was her practice as required under the MEWS chart guidelines, but there is no mention of her taking that action in the medical records nor was this recorded in her statement taken within hours of the death. Michael was snoring heavily at the time. She makes no reference to waking him. In my view it is more likely than not that EEN Meadowfair did not apply oxygen at that time.

115. This moment was a critical time according to the findings of the RCA and the opinions of the experts. Dr Lavercombe described it as a 'trigger point'. Dr Denaro agrees although he also believes there were earlier concerns on the morning of 10 July when oxygen saturations dropped to 88%.

116. What was significant is that it was at this time that EEN Meadowfair heard Michael snoring heavily through the closed door to his room. Two hours later he is heard to be snoring softly. Dr Denaro stated he would not expect a nurse to appreciate the significance of this change. Dr Denaro and Dr Lavercombe are both of the view that the slow release OxyContin, oral Ordine (morphine) and gabapentin were peaking at about midnight to 1pm. The totality of this evidence confirms that Michael was at this time from midnight to 2pm heavily sedated and was experiencing depressed respiratory drive. He subsequently passed away in the next short period of time.

117. What brought Michael to this point was the regime of opiate medications prescribed by Dr Brockett, which regime Dr Brockett now acknowledges was a wrong practice. Accepting there may be a difference of approach as to starting low and incrementing up or starting high and incrementing down, the consensus of the independent expert opinions was the level of opiate medications was larger than either expert would prescribe. This was also compounded by the fact Michael was on a ward and was thus not being constantly or frequently monitored. His condition was not assisted by the fact that he was most likely not provided oxygen supplementation at that critical time around midnight.

118. As well, it is evident there was dearth of communication between Dr Brockett and the nurses.[4] There is really no evidence to suggest the basis of the treatment plan was discussed by Dr Brockett with nursing staff. Dr Brockett has no clear recollection of speaking to nursing staff specifically about Michael and no nurse recalls such a conversation. Dr Brockett did not have a nurse or team leader with him on his ward rounds. He wrote brief entries in the progress notes. He acknowledges his notes could be better but it is significant he considered they were mainly for himself for reference and not for nursing staff. Dr Brockett wrote up medication orders and changes and these were appropriately attended to by nursing staff but otherwise his notes did not impart any useful information for nurses to consider about the treatment plan or that they should be on any special alert or to monitor Michael more often.

119. The reason for this is Dr Brockett did not consider Michael was particularly unwell. His vital signs observations were all within normal range other than some of the oxygen saturations. At the time Dr Brockett considered the analgesic/opioid medication regime being adopted was an appropriate one and he certainly did not expect Michael to be at risk of a life threatening event. He now realises his approach was wrong.

120. If there had been a discussion with nursing staff or clear instructions were noted in the records, this may have meant nursing staff were more alert to and aware of the signs to look for in a patient on this regime of opiate analgesia. This information could have been then handed over to oncoming staff. At the time however, nursing staff were simply administering medications that had been prescribed. They appear to have provided PRN medication utilising appropriate discretion. The independent experts agreed that it would have been beyond the expected knowledge of nursing staff to understand the complexities of the medication regime being adopted. As identified in the RCA, there could have

[4] A not uncommon situation reflecting an educational/cultural divide between medical practitioners and nurses generally which is not confined to HSNPH and which has been the subject of much comment and deliberation in the medical literature and medical/hospital authorities both within Australia and internationally.

been a more focussed assessment of the pain management provided to prompt staff to consciously consider the opioid treatment plan.

121. It is unclear if this would have made a difference, but EEN Meadowfair may have been prompted to express concerns about the low oxygen saturations and snoring she observed at midnight on 10 July 2016. She may have consulted with a more senior RN. She would no doubt have been more vigilant in recording what she did in response and more than likely to have applied oxygen supplementation. In fairness to her, she was not so informed.

122. Although Dr Brockett and Drs Denaro and Lavercombe consider they would have been expected to have been called when oxygen saturations went below 92%, that is not the instruction that guided nurses according to the MEWS tool, which also did not alert staff to conduct closer observations.[5] As well there was no specific instruction from Dr Brockett to do so.

123. The evidence does not suggest that nursing staff felt they could not contact Dr Brockett if there was a problem, as R.N.s Juan and Roach called Dr Brockett on 10 July concerning the frequency of administering Ordine. Rather the communication between Dr Brockett to nursing staff was lacking. It seems to some extent this has been improved as team leaders now carry deck phones so that they can be contacted by doctors after the ward rounds or at any other time to discuss ongoing management of a patient.

Findings required by s. 45

Identity of the deceased – Michael James Calder

How he died – Michael came into the Holy Spirit Northside Hospital for management of and treatment of headache pain. He had previously been treated for Obstructive Sleep Apnoea at the same hospital but this was not known by the treating physician. Michael received a complex regime of analgesia including subcutaneous morphine, oxycodone, Ordine (liquid morphine), MS Contin (slow release morphine), Gabapentin (neuropathic pain) along with paracetamol and ibuprofen. The medication regime adopted large doses of morphine based medication in both slow release and liquid form. During the admission there were critical moments in time when Michael's oxygen saturations were low, indicative of someone who was experiencing an impairment in ability to protect his airways. The correlation between the medications provided and the episodes of hypoxaemia was not recognised by the treating doctor or nursing staff. At some point around midnight on 10/11 July 2014 a combination of factors being that of sleep apnoea and with the accumulation of slow release OxyContin, oral Ordine (morphine) and gabapentin peaking at about the

[5] Under the new ADEC chart a similar instruction applies and would not prompt a call to a doctor on this ground alone but would prompt a call to the RN in charge.

same time, resulted in an episode of aspiration and respiratory depression to which Michael succumbed.

Place of death – Holy Spirit Northside Hospital, Rode Road Chermside

Date of death– 11 July 2014

Cause of death – 1(a) Opiate toxicity

Comments and recommendations

I have noted in my finding the RCA recommendations made and the efforts by the hospital to implement them. Drs Denaro and Lavercombe agree the improvements that have been implemented are comprehensive and address the issues which were made evident in reviewing the circumstances of Mr Calder's death.

For that reason, I do not believe it is necessary to make any further recommendations for implementation by the hospital. Counsel Assisting Ms Jarvis commented that there may be additional benefit in the Hospital taking steps to ensure the strengthened communications between nurses that has been put in place should also extend to visiting medical officers and nursing staff. I agree with that sentiment but it is a two way street and this would be dependent on the visiting medical officers also contributing to that change.

Dr Brockett has clearly reflected on his part in the circumstances of Michael's death, accepts his medication regime was wrong and has instituted a framework for future approaches to pain management. Dr Lavercombe said the framework is essentially how he approaches acute pain management. In that regard I also do not consider a further recommendation needs to be made.

There does remain the issue of referral of treating nurses and Dr Brockett to their respective disciplinary bodies. There was no submission made that I should consider a referral and after hearing the evidence I do not consider any specific referral needs to be made by me.

I am aware the circumstances of this case have been the subject of a complaint to the Office of Health Ombudsman (OHO) and our respective offices have been in communication. There has been an exchange of information in accordance with a Memorandum of Understanding between our offices. Indeed officers from OHO attended at least part of the inquest. In the normal course of events a copy of my findings will be sent to the Health Ombudsman for any further action it deems fit. That will be the course of action I take.

I close the inquest.

John Lock
Deputy State Coroner
Brisbane
2 September 2016