CORONERS COURT
OF NEW SOUTH WALES

Inquest:	Inquest into the death of Carey Alexander
Hearing dates:	4 - 6 September 2017 17 November 2017
Date of findings:	1 December 2017
Place of findings:	NSW Coroner Court - Glebe
Findings of:	Magistrate Elizabeth Ryan, Deputy State Coroner
Catchwords:	CORONIAL LAW – death of thirteen year old boy - borderline myocarditis – should myocarditis have been diagnosed earlier - was treatment in Emergency Department adequate - was discharge from hospital appropriate – would earlier intervention have altered fatal outcome – findings and recommendations.
File number:	2014/235298
Representation:	Counsel Assisting the Coroner: Ms M Gerace, i/b Office of the General Counsel, NSW Dept of Justice. The Alexander family: Mr D Evenden Solicitor Advocate, i/b Legal Aid Commission. Sydney Local Health District: Ms L Boyd Solicitor Advocate, i/b Crown Solicitor's Office. Dr Ian Ly: Mr T Saunders of Counsel, i/b Meridian Lawyers. Dr Gang Cheng: Ms R Mathur of Counsel, i/b Avant Lawyers. Dr Stephen Jacobe: Browns Legal & Consulting.

Findings:	The person who died was Carey Alexander. Carey Alexander died on 10 August 2014 at the Children's Hospital Westmead. The cause of his death was borderline myocarditis. The manner of his death was natural causes.
Recommendations:	To the Sydney Local Health District: Recommendation 1: That Concord Repatriation General Hospital implement the REACH program in its Emergency Department. Recommendation 2: That Concord Repatriation General Hospital consider a review of the approach of nursing and medical staff in its Emergency Department to paediatric patients, with the view of ensuring that staff explore and encourage the expression of parent and carer concerns as part of a family centred approach to the care of paediatric patients.

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Section 81(1) of the Coroners Act 2009 (NSW) [the Act] requires that when an inquest is held the Coroner must record in writing his or her findings as to various aspects of the death.

These are the findings of an inquest into the death of Carey Alexander.

Introduction

1. Carey Alexander was thirteen years old when he died at the Children's Hospital Westmead on 10 August 2014. The cause of his death was uncertain at the time but it has since been identified as borderline myocarditis, most likely due to influenza A virus infection.

2. Carey was born on 18 October 2000. He lived with his parents, brother and sister in the inner west Sydney suburb of Croydon Park. Carey was in Year 8 at Dulwich Hill High School. He was a healthy and active boy with no medical conditions.

3. Carey's death came as a terrible shock to his parents Karen and Phillip, and to his brother Gene and sister Kinsey. They loved him dearly and his sudden death has left them devastated and grieving. On behalf of their family, at the close of the inquest Gene and Kinsey made a very moving statement about their life with Carey, and how deeply they and their parents miss him.

4. Carey loved skateboarding and rap music, and he had won junior championships in the sport of kart racing. His brother and sister lovingly described him as an entrepreneur with a vibrant personality who liked to make things happen. They spoke of how he designed and sold T-shirts, socks and skateboards, and how his energy and creativity brightened up everyone's day. It was obvious that the loss of this busy, talented and loving boy has brought profound grief and sadness to his family.

5. The focus of this inquest is on Carey's medical condition and the treatment he received at Concord Hospital on the night before he died. Carey's family has attended each day of this inquest and for them, understanding how he died is important in determining if anything could have been done differently.

The Inquest

6. An inquest is different to other types of hearings. It is neither criminal nor civil in nature. It does not determine whether a person is guilty of an offence and does not make determinations and orders that are binding on parties.

7. A Coroner is required to confirm that a particular death occurred and make findings as to the identity of the person who died, the date and place of death, and the cause and manner of the death. In addition under section 82 of the

Act a Coroner may make recommendations that are necessary or desirable in relation to any matter connected with the death, including health and safety.

The time, place and cause of Carey's death

8. The time and place of Carey's death are not in issue. Carey died at 2.45pm on 10 August 2014, at the Children's Hospital Westmead.

9. The most likely cause of Carey's death was identified as borderline myocarditis, in a post mortem report of pathologist Professor Johan Duflou.

10. Myocarditis is an inflammatory disease of the muscular tissue of the heart, often caused by viral infections. In acute cases it causes death by severely damaging heart muscle cells to such an extent that the heart is either unable to pump blood to the other parts of the body, or is made to beat in an irregular fashion leading to sudden heart fibrillation. In cases such as Carey's the progress of myocarditis can be very rapid, leading to irreversible damage to the heart.

11. Most of the medical experts who assisted this inquest agreed with Professor Duflou that in Carey's case myocarditis could not be unequivocally diagnosed. This was because at the time of his death there was little evidence of the inflammation of the heart muscle tissue which almost always accompanies this disease.

12. Nevertheless there were sufficient features which fulfilled the criteria for 'borderline myocarditis'. Professor Duflou described this condition as one in which damage to the heart muscle cells as a result of inflammation was not obvious under microscope.

13. The features which fulfilled a diagnosis of borderline myocarditis included the presence in Carey's body of specific viruses known to be a common cause of myocarditis, and the mottled appearance of his heart muscle typically seen in myocarditis. In addition Professor Duflou noted symptoms consistent with myocarditis which Carey had displayed in the hours leading up to his death. These included abdominal pain, a fainting episode and the very rapid progression of the disease after his discharge from Concord Hospital.

14. Given the above evidence I am able to find on the balance of probabilities that the cause of Carey's death is borderline myocarditis.

Issues surrounding the manner of Carey's death

15. This inquest has focused on providing a greater understanding of the manner of Carey's death, and whether anything might reasonably have been done to prevent it.

16. During the inquest it became apparent there was no basis for criticism of the treatment provided to Carey by his GP Dr Ian Ly, or of the care and treatment Carey received at Children's Hospital Westmead.

17. Rather, most of the evidence concerned decisions made by staff at Concord Hospital on the night of 9 August 2014, when Carey's parents brought him into the Emergency Department.

18. As the evidence unfolded over the four days of the inquest, the issues which emerged were these:

- Were the examinations and assessments performed by Concord Repatriation General Hospital [Concord Hospital] in relation to Carey adequate?

- Did the nursing and medical staff at Concord Hospital fail to appreciate the seriousness of Carey's illness?

- Was the decision to discharge Carey from Concord Hospital on the morning of 10 August 2014 appropriate?

- Would a decision not to discharge him have altered the tragic outcome for Carey?

Background

19. On the evening of Wednesday 6 August 2014 Carey was unwell with fatigue and a sore throat. He didn't go to school the next day as his throat still hurt and he had a sore abdomen. That evening his mother Karen noticed he had a high temperature and wanted only to lie down on the couch.

20. On Friday afternoon Karen took Carey to see their GP Dr Ian Ly. Carey told Dr Ly he had a sore throat, felt '*sore all over*', was feeling hot and cold and had had a dry cough for a few days. Dr Ly checked Carey's throat and chest and felt his glands. He noted Carey had a mild red throat but that his temperature was not in the febrile range nor was he in any respiratory distress. Dr Ly told Carey and his mother it was most likely Carey was suffering from an upper respiratory tract virus, and that he should rest, drink fluids and use paracetamol to help with any fever or muscular pain.

21. The next day, which was Saturday, Carey's condition worsened in the afternoon and Karen noticed his eyes looked swollen. She felt alarmed and decided to take him to Campsie Medical Centre as Dr Ly's surgery had closed. Carey was extremely lethargic and needed to hold on to Karen as he walked out to the car.

22. At the Medical Centre Carey seemed unable to sit up in his chair. The waiting queue was long so Karen decided to take him to Concord Hospital instead. Again Carey needed to hold on to his mother in order to walk out to the car, and likewise for the walk from Concord Hospital's main entrance to its Emergency Department.

In Concord Hospital's triage area

23. Carey and his mother arrived at Concord Hospital's triage area just before 7pm that night. Triage nurse Rose Vukoja thought Carey looked lethargic, unwell and dehydrated. Carey's mother provided a history of Carey's illness which Registered Nurse Vukoja recorded as follows:

'*flu like symptoms 2/7, fever, lethargy, decreased appetite, productive cough, complaining of headache, dizziness, right foot pain, child drowsy but rousable, lethargic'.*

24. In relation to the right foot pain, Carey told RN Vukoja he had a stabbing pain in the big toe of his right foot '*like pins and needles'*.

25. RN Vukoja considered that Carey's temperature, heart rate and oxygen saturation levels were normal, although she noted his heart rate was slightly tachycardic. Tachycardia describes a fast or irregular heart rhythm, usually of more than 100 beats per minute, while the person is at rest.

26. RN Vukoja assessed Carey as Category 3, meaning he should see a doctor or nurse within 30 minutes. This decision was substantially based on the degree of Carey's lethargy. In her evidence to the inquest RN Vukoja described him as needing to be roused in order to respond to her questions. Given his lethargy and difficulty sitting up she arranged a bed for Carey in the Emergency Department, and he was taken there by wheel chair.

In the Emergency Department

27. It was busy in the Emergency Department that Saturday night, with 40 to 50 patients attending during each ten-hour shift.

28. Karen thought Carey seemed better once he was lying down in the Emergency Department bed.

29. At 7.20pm Registered Nurse James Jantzen spoke to Carey and his parents, obtaining and recording a history of his current illness. It was similar to the one recorded by RN Vukoja, and included Carey's two-day history of lethargy and dizziness.

30. RN Janzten checked Carey's vital signs and conducted a basic test for blood circulation known as 'capillary refill'. He recorded all of Carey's results as within the normal range except for his elevated heart rate.

31. Carey's vital signs were checked a further six times throughout his six and a half hour stay in the Emergency Department. On each occasion the observations were conducted while he was lying down.

32. Sometime between 8.20pm and 9pm Carey was examined by ED Registrar Dr Puminda Amaratunga. Dr Amaratunga was working an evening shift which he completed between 10pm and 10.30pm.

33. After examining Carey Dr Amaratunga ordered blood tests and a chest x-ray. He considered Carey's blood test results were within normal range, although he agreed Carey's potassium level was slightly elevated and there was low sodium and bicarbonate. He did not think these features were indicative of anything in particular.

Carey's collapse

34. Shortly after Dr Amaratunga's examination Carey was asked to provide a urine sample. It was by now about 9pm. Carey's father Phillip helped him out of his bed and supported him for the ten metre walk to the bathroom by placing his hands under Carey's arm. When they got to the bathroom Carey told his father he would be alright by himself, so Phillip shut the toilet door and waited outside.

35. Almost immediately Phillip heard a loud noise and together with nursing staff he ran to open the toilet door. Phillip described seeing Carey unconscious on the floor.

36. RN Amanda Jacobs also heard the sound of Carey's collapse. When she opened the toilet door she found Carey had '*fallen against a plastic garbage bin, drowsy'.* In her evidence to the inquest RN Jacobs described Carey as having '*loss of consciousness for approximately 30 seconds to one minute'*. She assisted Phillip to lie Carey on the floor where he remained in a

supported position for about three minutes. Carey told her he had felt dizzy just prior to collapsing.

37. Carey's bed was wheeled close to the bathroom and according to RN Jacobs he was able to get up and make the 1.5 metre walk to his bed '*with minimal assistance'*. She explained this meant with the assistance of a supportive arm under his arm or on his back.

38. Very shortly after Carey suffered his collapse he was re-examined by Dr Amaratunga. Dr Amaratunga ordered an electrocardiogram [ECG] to investigate whether the collapse might have been caused by a heart malfunction. An ECG is used to check for heart conditions by showing the heart's electrical activity. Carey's ECG was performed while he remained lying in his bed.

39. Carey's ECG did not show any abnormal features other than mild tachycardia, with a heart rate of 110 beats per minute. This, Dr Amaratunga reasoned, was probably the result of Carey's dehydration. He therefore directed that Carey receive two litres of saline to be delivered intravenously. Carey commenced receiving the first litre at 9.13pm and the second at 10.05pm.

40. Dr Amaratunga recorded Carey's fainting episode as follows: '*Patient had ?syncopal episode in toilet – did not hit head – found leaning against wall.*' Dr Amaratunga explained he had used a question mark because he himself had not witnessed the collapse. At the time he had assumed it was the result of Carey's dehydration, and sought to resolve the problem by means of rehydration.

Carey's Case History and Discharge records

41. During his shift Dr Amaratunga prepared an electronic record in relation to Carey headed 'ED Case History Notes'. In it Dr Amaratunga recorded that Carey was 'safe for discharge'. Just before completing his shift Dr Amaratunga copied the contents of this document across to a new record, headed 'ED Discharge Referral template'. This was designed to assist medical staff on the incoming shift.

42. In his evidence to the inquest Dr Amaratunga said he wrote that Carey was 'safe for discharge' because he believed Carey had flu like symptoms and was likely to be suitable for discharge provided he responded to his IV fluids and medications of paracetamol and Maxalon. He based this assessment on his physical examinations of Carey and the results of his blood tests, x-ray, ECG and vital observations up until 10pm. He agreed his document could

have given the impression to others relying upon it that he thought Carey was in fact safe for discharge.

43. Dr Amaratunga's document also included a presenting history which he had earlier obtained from Carey and his parents. However, unlike the presenting histories recorded earlier by RN's Vukoja and Jantzen, Dr Amaratunga's history omitted any reference to Carey having been dizzy and lethargic for the previous two days. In his evidence he said this was because he considered lethargy to have minimal clinical significance due to its vagueness.

44. The effect of omitting this information was that Carey's symptoms and history of lethargy and dizziness effectively disappeared from records whose purpose was to assist later medical staff to make decisions about his suitability for discharge.

45. In addition Dr Amaratunga's records did not contain any reference to Carey needing assistance to walk into the hospital that evening, or into the ED from triage. Dr Amaratunga said this information was not made known to him, and there is no reason to disbelieve him about this. Certainly Carey's hospital records contain no reference to him being unable to walk, either on entering or leaving the hospital or during his stay. Dr Amaratunga said that had he been aware of this information he would have invested Carey's history of lethargy, and his collapse in the bathroom, with a greater level of clinical significance.

Carey's treatment from 10.30pm to 2.20am

46. Carey's discharge from Concord Hospital ED was signed at 2.20am by Dr Gang Cheng, who was working night shift. That night Dr Cheng was the Team Leader in the ED, responsible for his own patients as well as supervising the work of other clinical staff including the two junior doctors on duty.

47. On his arrival that night Dr Cheng received a verbal handover of his patients including Carey. He could not recall if the doctor handing over to him was Dr Amaratunga or another doctor on duty that night, Dr Kirthy Jambagi. He said his understanding was that Carey was considered suitable for discharge provided his condition remained stable.

48. During the course of the night Dr Cheng read Dr Amaratunga's draft ED Discharge Referral record. He also noted that Carey's vital signs had remained largely unchanged and that his x-ray and ECG had not shown abnormal results. On this basis he believed he could confirm that Carey was

safe for discharge. At no stage did he conduct his own physical examination of Carey.

49. Dr Cheng agreed this approach involved substantial reliance on Dr Amaratunga's medical examinations of Carey, which had taken place some five hours earlier. As Carey's vital signs had remained unchanged since that time, Dr Cheng did not consider there was any warrant either to personally review Carey or to deviate from the '*aiming for discharge'* pathway Dr Amaratunga had set five hours earlier.

50. In his evidence Dr Cheng noted the heavy workload with which the ED was dealing that night. He said his staff knew he would make himself immediately available to review any patient, including Carey, if there were concerns about their condition. No one raised any concerns about Carey. In those circumstances, Dr Cheng felt that while a personal examination of Carey prior to discharge may have constituted best practice, in reality the work load within ED made it unlikely to happen.

51. Dr Cheng had a brief conversation with Carey's mother in which he asked her if she was able to take Carey home, to which she replied that she was. His observation in his statement for the coronial investigation that Carey '*felt better than when having the syncope'* was based only on what the handover doctor had told him around 10.30pm, and not upon any enquiries he had made of Carey or his parents.

52. Like Dr Amaratunga, Dr Cheng stated he was not made aware that Carey had been unable to walk unassisted into hospital. Nor was he made aware that on discharge Carey required a wheel chair. Had he known, he said he would have seen a need to re-assess the decision to discharge Carey. In his opinion it was not common for a thirteen year old with a viral illness to be unable to walk.

Carey's discharge from hospital

53. When Karen Alexander learned of the plan to discharge Carey she told nursing staff he was restless and had neck pain. Then she told the nurse who was removing Carey's drip that he was unable to walk, and asked how they could get him to the car, whereupon she was told there was a wheel chair '*around the corner*.' Karen got the wheel chair and wheeled Carey out to the car, then she and Phillip lifted him in and took him home.

54. In her statement for the coronial investigation Karen said Carey's condition seemed to be of less concern to staff in the ED than to those in the triage area. She said that on a number of occasions throughout the night she drew

the attention of ED staff to features that worried her about Carey's condition. These included that Carey had a sore neck, sore toes, and puffy eyes. After Carey's collapse she noticed his hands didn't look normal: they were blotchy and his knuckles were red. She told nurses about it, but they didn't appear to take any notice. She also told nurses Carey hadn't been passing urine even though she had given him water at home.

55. Karen noted in particular that all medical examinations of Carey in the ED took place while he was lying down, and not while he was struggling to stand up as he had been in the triage area.

56. Carey's discharge from Concord Hospital took place while he was under the nursing care of RN Marc Vallance. RN Vallance was unable to recall, more than three years later, whether he had had any discussions with Carey's family about his condition. In particular he could not remember if Karen had expressed concern to him about getting Carey home given that he was unable to walk. Similarly he could not recall if she had drawn his attention to Carey's blotchy hands, neck pain or restlessness.

57. It should be noted that RN Vallance made no clinical notes whatsoever of Carey's discharge. Further, at times throughout his night shift he either failed to test some of Carey's vital signs, or failed to record the result. There is no evidence that the information missing from Carey's Observation Chart played any causative or contributory role in his death. In my view however given these omissions in record-keeping, it should not be assumed that the absence of a clinical record of the matters which concerned Karen Alexander compels the conclusion that she did not bring them to the attention of staff.

At home

58. When Carey and his parents arrived home from Concord Hospital in the early hours of 10 August Carey was too weak to walk from the car, so Karen and Phillip carried him into the house and helped him get ready for bed. Karen lay down next to Carey in his bed and noted he felt warm with a temperature. After a while Carey told her he felt too hot with her next to him, so she returned to her bed and slept for a few hours.

59. When Karen awoke at 7 o'clock the next morning Carey was lying on the couch in the kitchen. She was very alarmed to see his hands were a purple-red colour. On the advice of a GP friend she and Phillip decided to take him straight to Children's Hospital Westmead. During the trip Karen sat in the back seat with Carey and told him not to worry.

At Children's Hospital Westmead

60. When Carey arrived at the Emergency Department of Children's Hospital Westmead at 9.52am it was immediately evident he was seriously ill. The triage assessment notes described him as '*slumped in wheel chair … pupils reactive but sluggish … pale to touch, peripherally cold … in shock'*.

61. Carey was treated with oxygen and IV fluids, and arrangements were made for him to be admitted to the Intensive Care Unit. An ultrasound scan showed excessive fluid had collected in the sac surrounding Carey's heart, which was contracting poorly. The paediatric cardiology team was immediately called to perform a cardiac ultrasound, or echocardiogram. At about 11am however, and before the echocardiogram could be performed, Carey suffered a cardiac arrest. Emergency resuscitation efforts commenced at once.

62. Because of the resuscitation efforts the resulting echocardiogram was a limited one. However it was sufficient to reveal severe cardiac dysfunction and a very poorly contracting heart. It was decided that Carey needed urgent surgical intervention to have any chance of survival. At about 12.30pm and while CPR efforts continued, Carey was taken to the operating theatre and was placed on mechanical cardiopulmonary life support. Still Carey's heart and circulation did not respond.

63. At around 2pm the senior clinicians treating Carey reached the conclusion that his cardiac arrest was irreversible, and that further treatment would be futile. He was taken to the Paediatric Intensive Care Unit and his family gathered around him. He died at 2.45pm.

Analysis of the issues

64. I now turn to the issues which arise for consideration in this inquest.

65. To assist its determination of the issues the Court received expert evidence from the relevant medical specialties of cardiology, paediatrics and emergency medicine, in addition to the evidence of pathologist Professor Duflou referred to above. The expert medical witnesses were:

- Professor Anne Keogh, senior heart transplant cardiologist.
- Professor James Wilkinson, senior paediatric cardiologist.
- Dr Ken MacLean, paediatrician and clinical geneticist.
- Dr Mark Lee, consultant in emergency and paediatric medicine.

- Dr John Vinen, emergency physician.

In addition evidence was given by Dr Andrew Dwyer, staff specialist emergency physician at Concord Hospital.

Were the assessments performed by Concord Hospital adequate? Did the nursing and medical staff fail to appreciate the seriousness of Carey's illness?

66. Due to the overlap of evidence it is sensible to deal with issues 1 and 2 in combination.

67. There was not complete consensus in answer to these two questions. Nevertheless the weight of the expert evidence was that on the night of 9 August, nursing and medical staff missed opportunities to identify that Carey was suffering a serious illness.

68. It needs first to be stated that no witness was critical of staff at Concord Hospital for failing to diagnose Carey's condition of borderline myocarditis. Cardiologists Professor Keogh and Professor Wilkinson told the Court that clear indications of Carey's myocarditis probably did not emerge before the early hours of 10 August. In their view, while Carey was at Concord Hospital there was no direct evidence to warrant further cardiac investigation. The results of his x-ray and ECG were largely unremarkable, indicating the damage to his heart muscle was still at an early stage. Nor did Carey's persistent tachycardia necessarily indicate heart dysfunction, as this feature may be present for a range of reasons. I can therefore be satisfied that the failure to diagnose Carey's myocarditis was not due to any deficiency on the part of Concord Hospital's staff or its systems.

69. Secondly I acknowledge the submission of Ms Mathur, counsel for Dr Cheng, that medical diagnosis and treatment is a human activity, that reasonable minds can differ on the most appropriate clinical course to be taken, and that mistakes do occur. Furthermore, that Emergency Department decisions made that night in relation to Carey took place in the context of a busy weekend night at the height of the flu season, with a high turnover of patients and a relatively inexperienced Team Leader, Dr Cheng.

70. It is also important when analysing the events of 9 August to be mindful of the risk of hindsight bias. This is the phenomenon of seeing an event after it has occurred as having been predictable. Coroners must keep in mind that they are judging the actions of others with the clarity of hindsight, and in very different conditions to those experienced by the people at the centre of the

event. With the benefit of additional information and time for reflection, it is relatively easy to judge the quality of decisions made by others who had to operate without those advantages.

71. Nevertheless all the expert witnesses identified missed opportunities that night for clinicians at Concord Hospital to recognise that Carey was seriously ill, and to identify the need for further assessments. These may in turn have led to different decisions being made. They are addressed below.

<u>Failure to conduct a postural blood pressure assessment</u>

72. A postural blood pressure assessment involves repeat measuring of a patient's blood pressure and pulse rate from lying, sitting and standing positions. It is designed to detect postural hypotension as a sign of a more significant condition which could be compromising a patient's cardiac output.

73. Doctors Dwyer, Vinen, MacLean and Lee were all of the opinion that after Carey's syncopal event, and in view of the presenting history of dizziness, it would have been appropriate to conduct a postural blood pressure assessment. In retrospect Dr Amaratunga too acknowledged that this assessment ought to have been carried out after Carey's collapse. In Dr Dwyer's opinion the postural assessment should also have been conducted after administration of the first litre of saline, to assess whether dehydration was the underlying cause of Carey's dizziness and loss of consciousness.

74. Paediatrician Dr MacLean commented further that all Carey's assessments and examinations were performed while he was supine, a circumstance which may have masked what in his opinion were the most concerning features of Carey's presentation: his lethargy and his need for assistance with mobility.

75. The failure to conduct a postural blood pressure assessment therefore represented a missed opportunity to identify that Carey's dizziness, lethargy and loss of consciousness may have been symptoms of a more serious underlying illness.

<u>Failure to document and communicate signs and symptoms</u>

76. Secondly all experts commented on one or both of the following features: the failure to record Carey's history of lethargy and dizziness, and the failure to communicate to medical staff his inability to walk unassisted.

77. Lethargy is a non-specific symptom that is consistent with many common conditions, including the working diagnosis here of a flu-like illness. It was for this reason that Dr Amaratunga did not consider Carey's two-day history of

lethargy, which had been communicated at triage, to be significant enough to be recorded in his Case History notes. This contrasts with the earlier response of triage nurse RN Vukoja, for whom Carey's lethargy and drowsiness were significant factors in her decision to assess him as a Category 3 patient and to assign him a bed in the ED.

78. In the opinion of paediatrician Dr MacLean, the symptom of persistent lethargy has a high degree of significance in the treatment of adolescents. In his opinion, with which Professors Keogh and Wilkinson agreed, Carey's lethargy in combination with other signs presented a cumulative picture of serious illness.

79. It is within this context that one considers Carey's related symptom of being unable to walk without assistance. Carey was too weak to enter Concord Hospital without his mother's support. Six and a half hours later he required a wheelchair to leave the ED because he was still too weak to walk by himself. These features were not recorded in Carey's clinical notes, and the medical officers on duty that night, Dr Amaratunga and Dr Cheng, were not made aware of them.

80. Without exception the medical witnesses were of the view that Carey's ongoing difficulty with walking flagged the possibility of a serious underlying illness. In the opinion of emergency physician Dr Vinen, an otherwise healthy thirteen year old patient diagnosed with a flu-like illness should not ordinarily require a wheelchair. For Dr MacLean this sign was a marker of seriously impaired functioning. For Dr Lee, who was less critical than the other witnesses of the clinical decisions made that night, Carey's inability to walk on discharge needed to be brought to the attention of medical staff. If known it would, he said, have properly led to further investigations of the reason.

81. The medical officers involved in the discharge decision, Dr Cheng and Dr Amaratunga, also considered this information to be very relevant. Dr Cheng commented that if known it would have prompted a re-assessment of Carey's suitability for discharge. According to Dr Amaratunga, had he known that Carey could not walk without assistance he would have invested his lethargy and his collapse with a higher degree of clinical significance.

82. The failure to document Carey's history of lethargy, together with the medical officers' lack of awareness of his mobility difficulties, resulted in an inaccurate picture of his clinical status – one which, in the words of Dr MacLean, placed too much reliance on the metric parameters of Carey's diagnostic tests and 'between the flags' vital signs. As noted by Dr MacLean, Carey's severe lethargy and inability to walk unassisted were 'the major early clues' to the severity of his illness.

Insufficient engagement with parents' concerns

83. The concerns expressed by Carey's parents offered a further opportunity for Concord Hospital staff to recognise that Carey was more seriously ill than was thought.

84. In her review of the case Professor Keogh identified an insufficient emphasis on parental concerns. Professor Keogh was referring to evidence that throughout the night Karen Alexander brought to the attention of clinical staff various features which worried her. Some of these, such as her observation of Carey's blotchy skin, raised the possibility of impaired peripheral circulation.

85. Perhaps most significantly, as noted by paediatrician Dr MacLean, there was '*no acknowledgement as to the simple gravity of [these concerns]: that Carey was unable to walk to the car after being treated in hospital for 4-5 hours'*. This information, acknowledged by all to be highly relevant to the discharge decision, was communicated to nursing staff by Carey's mother but not relayed to medical staff. The overwhelming evidence is that as a result a very significant opportunity was missed to recognise that Carey was in fact seriously ill.

86. Paediatric experts Dr Lee and Dr MacLean agreed that parental engagement is a vital aspect of paediatric medicine. In particular when assessing whether a child was well enough to be discharged it was important to have a discussion with parents about whether in their view their child was significantly better than on arrival. In Dr Lee's opinion it was not sufficient for Dr Cheng merely to have asked Carey's mother if she was able to take him home. Karen and Phillip needed to be asked if they were happy with this course of action. I accept the assessment of Dr MacLean that in this respect the standard of care fell below what was required.

Was the decision to discharge Carey appropriate?

87. The weight of the expert evidence is that Carey's signs and symptoms precluded safe discharge. All expert witnesses with the exception of Dr Lee were of the view that Carey's symptoms pointed to the need for him to remain in hospital for further observation.

88. Professors Keogh and Wilkinson identified six features which in their opinion compelled this conclusion. These were Carey's collapse, persistent lethargy, lack of independent mobility, low urine output, signs of poor peripheral circulation, and abnormal blood results indicating an acidolic circulation.

89. Not all expert witnesses characterised the latter three as signs which flagged the possibility of a more serious underlying condition. However all except for Dr Lee agreed that the other symptoms necessitated a decision to keep Carey in hospital to monitor his condition.

90. In his evidence to the inquest Dr Lee said he had considered the medical evidence many times, and could not honestly assert he would not have made a similar decision to discharge Carey. In his opinion the symptoms and signs recorded in Carey's medical notes when considered in totality supported the diagnosis of a flu-like illness, and a diagnosis of low cardiac output was not apparent.

91. Counsel for Dr Cheng urged the Court to give significant weight to Dr Lee's opinion, having regard to the relevance of his specialities of paediatrics and emergency medicine. She submitted that on this basis the Court would be cautious to find error in the Hospital's decision to discharge Carey that night.

92. However two additional factors need to be considered when weighing Ms Mathur's submission that on this point, Dr Lee's opinion should be accorded greater weight than that of the other expert witnesses.

93. First as Dr Lee acknowledged, his opinion that the decision to discharge Carey was reasonable did not take account of the evidence of Carey's impaired mobility. Had Carey's doctors been aware of this feature, he said, it would have compelled further medical investigation. Whether discharge was appropriate would have depended on whether those investigations satisfactorily explained his mobility difficulties.

94. Secondly each of the expert medical witnesses who assisted this inquest has substantial qualifications and experience in one or more of the specialities relevant to the case. Professor Wilkinson for example is a paediatric cardiologist. Dr MacLean is a paediatrician with extensive experience in emergency medicine. Furthermore the expert witnesses each brought an independent mind to the issues, evidenced by the fact they did not concur on all points, as for example whether Carey's blood test results were indicative of a more serious illness. On the basis of their qualifications, experience and objectivity the Court would invest with a high degree of reliability the opinion held by each with the exception of Dr Lee, that the clinical evidence precluded safe discharge for Carey.

95. The fact that Carey was too weak to walk unassisted and the degree of his lethargy should have been available for consideration and would have been, were it not for the omissions in record-keeping and communication identified

above. Given the weight of the above evidence, I find that the decision to discharge Carey that night was not appropriate.

Would a decision not to discharge Carey have altered the outcome?

96. Whether Carey's tragic death could have been prevented is a question which many people - those who treated Carey that night, those who have worked on this inquest, and above all, Carey's family - have asked themselves.

97. The cardiologists Professor Keogh and Professor Wilkinson were asked what the outcome for Carey might have been had he not been discharged from Concord Hospital that night.

98. They agreed that a decision to keep Carey in hospital would have improved his chances of recovery. As the night progressed signs of serious illness would have become increasingly apparent, such as falling blood pressure and increasing peripheral coldness. A transfer to the Intensive Care Unit or a request to transfer to a specialist paediatric hospital would likely have resulted. It is probable therefore that if kept in hospital that night Carey's decline would have been more readily observed and have received an earlier response.

99. However neither Professor Keogh nor Professor Wilkinson was willing to say that a decision to keep Carey in hospital would have prevented his death from occurring. Professor Keogh commented that for patients diagnosed with borderline myocarditis the outcome is far less favourable than for those with classical myocarditis. Furthermore Carey's virus was an extremely aggressive one and caused his condition to deteriorate dramatically between 2.30am and 7am. Remaining in hospital that night might not have been enough to prevent the damage to his heart muscle becoming irreversible and his circulation unsupportable, even with mechanical life support.

100. Dr MacLean and Dr Dwyer provided the further evidence that in the early hours of 10 August it was by no means assured that a paediatric hospital would have accepted a transfer of Carey, given that at that stage his illness was still non-specific.

101. The evidence therefore is that while a decision not to discharge Carey would have improved his chances of survival, there is no assurance it would have prevented his death.

Apology

102. At the close of evidence an apology was made to Carey's family by the Sydney Local Health District, through their representative Ms Boyd. Concord Hospital falls within the administration of the Sydney Local Health District.

103. Ms Boyd acknowledged the evidence that it was known to some staff at Concord Hospital that Carey was too weak to walk when he was discharged. On behalf of her client she stated that staff at Concord Hospital ought not to have discharged Carey that night. On their behalf she apologised unreservedly for that decision, acknowledging that it had contributed to the enormous and ongoing grief his family suffered as a result of his loss.

Recommendations proposed

104. Pursuant to section 82 of the Act a Coroner may make recommendations that are necessary or desirable in relation to any matter connected with a death, including health and safety.

105. Carey's family has proposed two recommendations for the Court to consider, in the hope these will reduce the risk that other patients in Carey's situation will be discharged inappropriately.

Amendment of the Paediatric Observation Chart

106. The first proposal is that the Paediatric Emergency Department Observation Chart be amended to include measuring for the presence and degree of a patient's lethargy. The evidence was clear that Carey's persistent lethargy was an important marker of the severity of his illness, but it was not properly recorded or recognised by nursing and medical staff. The family's proposal is that the Paediatric Observation Chart be amended to require assessment of lethargy within categories of mild, moderate and severe.

107. At the inquest Dr MacLean, when asked his opinion about such a proposal, stated that it could be a useful measure. However none of the other witnesses was asked about the value of this proposal. Nor in his statement prepared for the coronial investigation did Dr Vinen include it in his list of recommendations that might prevent similar deaths from occurring. The proposal is not supported by the Sydney Local Health District.

108. In Carey's case there can be no doubt about the significance of lethargy as an important marker of his true clinical status. Nevertheless I am reluctant to make this recommendation in circumstances where the Court has minimal evidence about the feasibility of the change sought, and the degree to which

it is likely to address the problem. For these reasons I respectfully decline to make this recommendation.

Review of training needs regarding paediatric patients

109. The second recommendation of Carey's family is that Concord Hospital consider conducting a review of the training needs of its clinical staff in the Emergency Department for the treatment of paediatric patients.

110. This recommendation is also not supported by the Sydney Local Health District. However a similar albeit more limited proposal is made by the Sydney Children's Hospital Network [SCHN], which administers the Children's Hospital Westmead. The SCHN provided the inquest with its comments upon the recommendations sought.

111. Recognising the very significant role parents and carers play in the treatment of children, the SCHN noted that in an adult facility such as Concord Hospital the organisational culture to support this role may not be well developed. The SCHN therefore urged Concord Hospital to ensure that a family-centred approach to its care of paediatric patients be taken. This would require clinicians to think about the care of children from the family's point of view. It would involve exploring and encouraging parent and carer concerns about their child.

112. In my view the evidence does not support a need for review of the training of ED staff generally in their care of paediatric patients. However it does support a need for the Hospital to review the approach of its ED nursing and medical staff to the role of parents and carers in the treatment of children.

113. The evidence established that concerns expressed by Carey's mother were not documented or communicated to medical staff. Furthermore, medical staff did not take adequate steps to engage Carey's parents in the decision whether it was safe for him to be discharged home. For these reasons I see the need for Concord Hospital to do more to facilitate a family-centred approach to the care of paediatric patients in its Emergency Department. Specifically there is a need for staff to better understand the need to explore and encourage parents and carers to express any concerns about their children's care.

114. It may be argued that Concord Hospital is already taking such steps, with the planned implementation of the new REACH system. This is a program developed by the Clinical Excellence Commission to enable patients and families to raise any concerns that a patient's condition has deteriorated

while in hospital. Parents will be able to escalate their concerns about their child if they feel these are not receiving a response.

115. The Court heard evidence of a plan to introduce the REACH system into Concord Hospital's ED in December 2017. This is a welcome development, as it represents one of the ways in which families can play a complementary role with clinicians in monitoring the condition of their family members.

116. However I accept the SCHN's implicit submission that more than this is required if adult facilities are to develop a culture which understands the clinical value of parental input. This may involve staff actively soliciting a parent's opinion about the child's suitability for discharge, an opportunity which was so plainly missed on the night of 9 August. Having carefully considered the submissions and responses, in my view the evidence supports the need for a recommendation along the lines proposed by the SCHN. Details of the recommendations which I make appear below.

117. It should be mentioned that since Carey died a new unit within Concord Hospital's ED has opened. The new unit enables patients to be kept in hospital for observation for periods of up to 24 hours. It is unknown whether the existence of this facility in August 2014 might have prevented Carey's death. Nevertheless it is a welcome reform and will surely provide more flexible care options for patients whose clinical status is uncertain.

118. Also as a result of its review following Carey's death, Concord Hospital has introduced a change to its discharge procedures. New documents now require that before a child can be signed as 'safe for transfer home', the clinician must enter on the discharge form the last-recorded observations for the child. These must have been taken within thirty minutes of the time for discharge. This too is a welcome reform, although it is doubtful it would have led to a different decision in Carey's case given the largely unremarkable nature of those observations.

119. As a final matter, I want to emphasise that Carey's parents took every possible care of him and did everything that loving and conscientious parents could do. They relied on the expertise of Concord clinicians that he was safe to be discharged, as they were entitled to do. I hope they have long ago accepted that there was nothing more they could have done to save the life of their much loved son.

120. The Coronial team and the staff at the NSW Coroner's Court hope that Carey's parents, brother and sister will accept our sincere sympathy for the loss of a son and brother who was so loved and is so much missed.

Findings required by s81(1)

As a result of considering all of the documentary evidence and the oral evidence heard at the inquest, I am able to confirm that the death occurred and make the following findings in relation to it.

Identity

The person who died is Carey Alexander

Date of death

Carey Alexander died on 10 August 2014.

Place of death

Carey Alexander died at Children's Hospital, Westmead.

Cause of death

Carey's death was caused by borderline myocarditis.

Manner of death

The manner of Carey's death was natural causes.

Recommendations pursuant to s82

To the Sydney Local Health District:

Recommendation 1: That Concord Repatriation General Hospital implement the REACH program in its Emergency Department.

Recommendation 2: That Concord Repatriation General Hospital consider a review of the approach of nursing and medical staff in its Emergency Department to paediatric patients, with the view of ensuring that staff explore and encourage the expression of parent and carer concerns as part of a family centred approach to the care of paediatric patients.

I close this inquest.

Magistrate E Ryan

Deputy State Coroner

Glebe

Date