



CORONERS COURT
OF NEW SOUTH WALES

Inquest:	Inquest into the death of Troy Almond
Hearing dates:	19 - 20 and 22 - 23 November 2018
Date of findings:	3 December 2018
Place of findings:	Nowra Local Court
Findings of:	Deputy State Coroner, Magistrate Teresa O'Sullivan
Catchwords:	CORONIAL LAW – Cause and manner of death Septicaemia due to Streptococcal (Beta Haemolytic Group A) infection Paediatric Sepsis Pathway Standard Paediatric Observation Chart (“SPOC”) Between the Flags (BTF)
File number:	2016/89802

<p>Representation:</p>	<p>Ms L Whalan SC, Counsel Assisting, instructed by Ms K Lockery, Crown Solicitor’s Office</p> <p>Ms G Furness SC, instructed by Mr L Sara of Hicksons Lawyers, for the Illawarra Shoalhaven Local Health District</p> <p>Dr P Dwyer, instructed by L Antonini of Avant Law, for Dr B Tajvidi</p> <p>Mr R O’Keefe, instructed by Ms J Mahony of Stacks Goudkamp, for Mr D Almond and Mrs K Macklin</p> <p>Ms K Doust of the NSW Nurses and Midwives Association, for Registered Nurses P Mason and S Avis</p>
<p>Findings:</p>	<p>Identity of deceased: The deceased person was Troy Almond</p> <p>Date of death: Troy died on 22 March 2016</p> <p>Place of death: Troy died at the Shoalhaven District Memorial Hospital, Scenic Drive, Nowra NSW 2541.</p> <p>Manner of death: Troy died due to a failure by the treating specialist in the Emergency Department of the Shoalhaven District Memorial Hospital on 21 March 2016 to recognise signs of toxicity caused by possible sepsis, to investigate the possibility of sepsis, and administer antibiotics.</p> <p>Cause of death: The medical cause of the death was Septicaemia due to Streptococcal (Beta Haemolytic Group A) infection.</p>

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The Coroners Act 2009 (NSW) in s. 81(1) 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 Troy Almond.

INTRODUCTION

1. Troy Almond was the much loved son of Kim Macklin and Daniel Almond. He was described by his parents as almost always happy and smiling, being full of energy and always chasing around with his brothers. Troy's parents spoke eloquently at the inquest of their memories of Troy and of the profound loss they have experienced.
2. The role of a Coroner, as set out in s.81 of the *Coroners Act 2009 (NSW)* ("the Act"), is to make findings as to the identity of the person who died, when and where they died, and the manner and cause of their death. The manner of a person's death means the circumstances surrounding their death and the events leading up to it. Pursuant to s.82 of the Act, a Coroner also has the power to make recommendations concerning any public health or safety issues arising out of the death in question.
3. In Troy's case, the coronial investigation gathered sufficient evidence to answer the questions about Troy's identity, where and when he died, and the medical cause of his death. The inquest was primarily focused on the manner of Troy's death. It is important for Troy's family to know and understand how and why he died and whether different decisions about his treatment should have been made when he presented to Shoalhaven District Memorial Hospital ("the Hospital") on 21 March 2016. The inquest also involved the consideration of any recommendations that may prevent future deaths.
4. In preparing of my findings, I have been assisted by the oral submissions of Counsel Assisting, Ms Lesley Whalan, SC and the oral submissions made on behalf of Dr Tajvidi, Nurses Mason and Avis, the Illawarra Shoalhaven Local Health District ("ISLHD") and Troy's family. Additionally, Mr O'Keefe on behalf of Troy's family provided written submissions dated 23 November 2018.

THE FACTUAL EVIDENCE

Background

5. Troy Daniel Almond was born on 9 October 2014 at the Hospital to Kim Ann Macklin and Daniel Almond. Troy was born at 40 weeks, plus 6 days of gestation. There were no abnormalities and no complications during the immediate neonatal period. Troy was discharged the following day.¹
6. Troy remained a healthy baby boy. There were no underlying or background health issues concerning Troy. He was well cared for and belonged to a loving family, created by his two parents and two brothers, with whom he lived.²
7. According to Dr Simes, Troy's general practitioner, Troy presented to his practice only for the occasional minor illnesses of childhood, such as a respiratory tract infection and for vaccinations.³
8. Troy had been well up until 21 March 2016.⁴ On that day, at about 12.30am , Ms Macklin observed Troy to be restless, refusing to breastfeed and running a temperature. At about 1.00am, Ms Macklin gave Troy paracetamol, shortly after which he vomited. At about 4.00am, Ms Macklin gave Troy more paracetamol, but he once again vomited.⁵
9. At about 6:00am, Ms Macklin gave Troy Nurofen, which was apparently effective in settling him until about 10.00am.⁶ Ms Macklin kept Troy hydrated with water and breastmilk.⁷ Ms Macklin took her other two children to school and pre-school

¹ Exhibit 1, Vol 1, Tab 19

² Exhibit 1, Vol 1, Tab 6 at [8]

³ Exhibit 1, Vol 1, Tab 15, pgs. 1-2

⁴ Exhibit 1, Vol 1, Tab 5, pgs. 1-2

⁵ Exhibit 1, Vol 1, Tab 6 at [20]-[22]

⁶ Exhibit 1, Vol 1, Tab 6, at [23]

⁷ Exhibit 1, Vol 1, Tab 5, pg. 2

and then drove to the Hospital with Troy.⁸ At that time, Ms Macklin was employed by the Hospital as Registered Nurse (“RN”).⁹

Presentation to Shoalhaven District Memorial Hospital, Emergency Department on 21 March 2016

10. Troy was triaged at 10:15am on 21 March 2016 by RN Pamela Mason. She took Troy’s history, made observations and recorded these in the Emergency Department Triage Record. She contemporaneously recorded that Troy had presented: *“lethargic, pale and febrile, restless overnight. not tolerating food but been drinking water and breast milk. Wet nappies. vomited post paracetamol 01.00. Shaky limbs and mucosy [sic] vomit at triage”*.¹⁰

11. RN Mason recorded that Troy had an elevated peripheral pulse rate of 173 beats per minute (“bpm”) and an elevated temperature, recorded at 38.9°C. Troy’s other observations of vital signs that she recorded were normal. RN Mason recorded each of these observations in the electronic medical record.¹¹

12. RN Mason said that she also tested Troy’s capillary refill, and found this to be brisk, although this was not recorded. She did not take Troy’s blood pressure. RN Mason allocated Troy a triage category of 3. Troy was then transferred to the Paediatric Bay.¹²

13. As the paediatric RN shift had not commenced by the time RN Mason completed her triage assessment, RN Mason handed over Troy’s care to the RN in Charge and to Dr Babak Tajvidi, the Emergency Department Staff Specialist.¹³

⁸ Exhibit 5, Annexure ‘A’, at [5]

⁹ Exhibit 1, Vol 1, Tab 6 at [9]

¹⁰ Exhibit 1, Vol 2, Tab 20, pg. 3

¹¹ Exhibit 1, Vol 2, Tab 20, pg. 3

¹² Exhibit 1, Vol 1, Tab 10, at [13]-[16]; Exhibit 1, Vol 2, Tab 20, pg. 3; Evidence of RN Mason on 19 September 2016;

¹³ Exhibit 1, Vol 1, Tab 10 at [17]-[18]

14. According to the medication chart, Troy was given an oral dose of Panadol at 10:25am.¹⁴ RN Mason gave evidence that this was given to Troy's mother to give to him after she had finished breastfeeding.¹⁵
15. RN Shaun Avis was the RN allocated to the Paediatric Bay on 21 March 2016. Between 10.50am and 11.00am, he took Troy's history and examined him.¹⁶ At 11:04am, RN Avis observed and recorded Troy's vital signs, including: a heart rate of 168bpm; mild respiratory distress; a respiratory rate of 36 breaths per minute; and temperature of 37.8°C.¹⁷ He recorded these vital signs in the electronic medical record using iView.¹⁸
16. RN Avis also made an entry in Troy's electronic progress notes. RN Avis recorded Troy's history of vomiting, lethargy and fever and the time of the onset of symptoms. He noted that Troy vomited during his assessment, had some tachypnoea, was warm to touch, looked a little pale, had good capillary refill, and was engaging and not at that time lethargic. He also noted that Troy was crying appropriately, had no rashes or injuries, and had normal wet nappies. He noted that Troy was febrile with a temperature of 37.8°C. RN Avis further noted that Troy had been given paracetamol at triage, but had vomited soon after.¹⁹
17. RN Avis gave evidence that Dr Tajvidi's first assessment of Troy occurred at about the same time as his own assessment of Troy.²⁰ Dr Tajvidi gave evidence that his first assessment of Troy took place just after 11.00am, but his record of the assessment was written some time later.²¹ The progress notes support the recollections of both RN Avis and Dr Tajvidi in relation to the time of Troy's assessments.

¹⁴ Exhibit 1, Vol 2, Tab 20, pg. 13

¹⁵ Evidence of RN Mason on 19 September 2018

¹⁶ Exhibit 1, Vol 1, Tab 11 at [2] and [9]; Evidence of RN Avis on 19 September 2018

¹⁷ Exhibit 1, Vol 2, Tab 20, pg. 10

¹⁸ Evidence of RN Avis on 19 September 2018

¹⁹ Exhibit 1, Vol 2, Tab 20, pg. 6

²⁰ Evidence of RN Avis on 19 September 2018

²¹ Exhibit 1, Vol 1, Tab 11A at [8]; Evidence of Dr Tajvidi on 20 September 2018

18. When Dr Tajvidi examined Troy, Troy had a temperature of 38.9°C, a heart rate of 170bpm, a respiratory rate of 35, but normal 'working of breath' and oxygen saturation measured at 97%.²²
19. Following his physical examination of Troy, in which Dr Tajvidi noted that there was no rash present and that the physical examination was otherwise normal apart from some pharyngeal redness, Dr Tajvidi formed the impression that Troy most likely had a viral illness.²³ Dr Tajvidi agreed in oral evidence that the impression he should have formed and recorded was that Troy had a viral or bacterial illness.²⁴
20. The medication chart indicates that the smaller doses of Panadol and Nurofen ordered by Dr Tajvidi were given at 11.30am, indicating that Dr Tajvidi had reviewed Troy at least by that time.²⁵
21. At 12.16pm, RN Avis repeated Troy's observations and recorded them in the electronic medical record using iView.²⁶ RN Avis recorded a heart rate of 170bpm; mild respiratory distress; a respiratory rate of 38 breaths per minute; and a temperature of 39.7°C.²⁷
22. In a progress note made at 12:17pm, RN Avis recorded that Troy's fever had increased to 39.8°C and that his respiratory rate and heart rate had also increased. RN Avis informed Dr Tajvidi of these observations.²⁸
23. Dr Tajvidi's instructions to RN Avis were that Dr Tajvidi was happy for Troy to be monitored for a bit longer until the Nurofen and paracetamol had taken effect.²⁹

²² Exhibit 1, Vol 2, Tab 20, pg. 4

²³ Exhibit 1, Vol 2, Tab 20, pg. 5

²⁴ Evidence of Dr Tajvidi on 20 September 2018

²⁵ Exhibit 1, Vol 2, Tab 20, pg. 13

²⁶ Evidence of RN Avis on 19 September 2018

²⁷ Exhibit 1, Vol 2, Tab 20, pg. 9

²⁸ Exhibit 1, Vol 2, Tab 20, pg. 6

²⁹ Exhibit 1, Vol 2, Tab 20, pg. 6

24. At 12:30pm, RN Avis applied topical anaesthetic to Troy's hands, in the form of EMLA patches, for the insertion of a cannula. The cannula was necessary for taking blood samples for the purpose of analysis. RN Avis gave evidence that he had already applied the EMLA patches to Troy's hands when Dr Tajvidi instructed him to do so. At 1:06pm, RN Avis recorded that "*EDMO [Emergency Department Medical Officer] wants to do bloods*".³⁰ This confirms that the insertion of a cannula and taking blood samples for testing was the intended plan of management at 1.06pm.
25. At about 12:57pm, RN Avis observed and recorded further observations of Troy's vital signs. Troy's heart rate at that time was 170bpm, the same level as it was at 12.16pm. Troy's respirations were 36 breaths per minute with mild work of breath. Troy's temperature was 39.8°C, which was also the same as his temperature recorded at 12.16pm.³¹
26. By 1.30pm, the evidence indicates that Troy showed some improvement in symptoms. RN Avis recorded, "*Looks well now. Talking engaging*".³² Troy's temperature had reduced to 37°C and his heart rate had reduced to 158bpm, although at that level Troy still had tachycardia.³³
27. At 1:33pm those caring for Troy noticed that he developed a rash on his chest and back. RN Avis recorded that the rash was non-blanching,³⁴ but said in the statement he provided to the Coroner dated 10 January 2018, that his progress note was incorrect and that he recalls that the rash was blanching.³⁵ Dr Tajvidi also gave evidence that the rash was blanching and maculopapular in appearance.³⁶

³⁰ Exhibit 1, Vol 2, Tab 20, pg. 5; Evidence of RN Avis on 19 September 2018

³¹ Exhibit 1 Vol 2, Tab 20, pgs. 9-10

³² Exhibit 1, Vol 2, Tab 20, pg. 5

³³ Exhibit 1, Vol 2, Tab 20, pgs. 9-10

³⁴ Exhibit 1, Vol 2, Tab 20, pg. 5

³⁵ Exhibit 1, Vol 1, Tab 11 at [18]; Evidence of RN Avis on 19 September 2018

³⁶ Evidence of Dr Tajvidi on 20 September 2018

28. The observations of Troy's vital signs made at 1.29pm were the last set of observations recorded.³⁷ RN Avis' progress note regarding Troy's rash was the last entry RN Avis made in the electronic medical record regarding Troy's care.³⁸
29. Dr Tajvidi examined Troy for the second and final time at about 2.00pm that day. Dr Tajvidi did not repeat Troy's vital signs at the time of the examination. He based his assessment on the vital signs observed and recorded at 1.29pm.³⁹
30. Dr Tajvidi agreed in oral evidence that he should not have done so and that relying on observations for Troy taken over an hour before discharge was not satisfactory. Dr Tajvidi then elaborated that Troy's vital signs should have been taken after his examination of Troy at about 2.00pm, and prior to discharge, regardless of whether he had assessed Troy as having improved. Dr Tajvidi accepted that, regardless of whether the vital signs had shown further improvement or further deterioration, Troy should still have been investigated for the possibility of a bacterial infection and that he should have ordered blood tests.⁴⁰
31. At 2:20pm, Ms Macklin sent Troy's father, Mr Almond, a text message indicating that she was waiting for Dr Tajvidi to return to see Troy and to find out whether blood tests would be done.⁴¹ The time of the text message indicates that Dr Tajvidi's decision to discharge Troy, without blood tests, was communicated after this time and not at the time of the examination.
32. Dr Tajvidi's diagnosis was that Troy was suffering from a viral illness. Dr Tajvidi considered that Troy probably had Fifth Disease, based upon as he saw it, the initial presentation of high grade fevers and a delayed appearance of rash.⁴² Dr Tajvidi discharged Troy without proceeding to do blood tests to investigate the

³⁷ Evidence of RN Avis on 19 September 2018

³⁸ Exhibit 1, Vol 2, Tab 20, pg. 5

³⁹ Evidence of Dr Tajvidi on 20 September 2018; Evidence of RN Avis on 19 September 2018

⁴⁰ Evidence of Dr Tajvidi on 20 September 2018

⁴¹ Exhibit 5, B18

⁴² Exhibit 1, Vol 2, Tab 20, pg. 4

possibility of a bacterial infection. The actual time of discharge is not recorded, however the Hospital records indicate that Troy departed at 2.34 pm.⁴³

33. Ms Macklin provided a statement dated 16 November 2018, which was tendered as Exhibit 5 during the inquest. In her statement, Ms Macklin states that after 1.10pm Troy brightened up and smiled at her around this time.⁴⁴ She further states that Dr Tajvidi reviewed Troy at about 2:00pm, but that within minutes of that review, Troy became lethargic and fell asleep.⁴⁵

34. Ms Macklin states that she had conversations with both RN Avis⁴⁶ and Dr Tajvidi⁴⁷ about Troy's temperature and heart rate after the 2:00pm review. She states that RN Avis was also concerned about Troy's condition and said that he would inform the doctor. Ms Macklin further stated that she had a conversation with Dr Tajvidi as she was leaving the Hospital, and that Dr Tajvidi reassured her that Troy's symptoms were normal given the diagnosis and that his heart rate was elevated because of the increasing temperature.⁴⁸

35. The accounts of RN Avis and Dr Tajvidi on the one hand, and Ms Macklin on the other, differ in relation to Troy's clinical appearance, the degree of any improvement in symptoms and whether there was further deterioration after a period of apparent improvement. It is not necessary, and probably not possible, to resolve the conflicting accounts to a point where I can be satisfied to the standard necessary to make findings of what exactly occurred with respect to each of the matters upon which the accounts differ. I am satisfied that the questions that arose in this inquiry, being whether or not the possibility of bacterial infection should have been investigated by taking blood samples, and whether or not Troy should have been discharged without them, are capable of being answered on the basis of facts that are not disputed.

⁴³ Exhibit 1, Vol. 2, Tab 20, pg. 2

⁴⁴ Exhibit 5 at [37]

⁴⁵ Exhibit 5 at [48]

⁴⁶ Exhibit 5 at [50]

⁴⁷ Exhibit 5 at [58]-[62]

⁴⁸ Exhibit 5 at [59]

36. I am satisfied that all the witnesses agree that there was some improvement in Troy's vital signs and clinical appearance shortly after 1.00pm, although accounts differ about the degree of the improvement and Troy's level of activity from that time. There is also a difference in witness accounts about whether or not Troy's vital signs and his clinical appearance later worsened.
37. There is also a difference in the evidence by RN Avis and Dr Tajvidi, on the one hand, and Ms Macklin, on the other, about her level of her concern about Troy's condition. Ms Macklin states that she never expressed a wish to take Troy home.⁴⁹ RN Avis states that Ms Macklin had no questions or concerns about Troy at the time of discharge.⁵⁰ I do not find that Ms Macklin was unconcerned about Troy at the time of discharge. Accepting a specialist's advice about diagnosis and that Troy was fit for discharge is not the same thing as being unconcerned.

Events of Tuesday 22 March 2016

38. On the morning of Tuesday 22 March 2016, Troy awoke and was still unwell. He became increasingly unwell that morning with diarrhoea and vomiting.⁵¹
39. Troy's condition deteriorated further and his parents called an ambulance.⁵² Ms Macklin commenced cardiopulmonary resuscitation, which was continued by the paramedics.⁵³
40. Troy was taken to the Hospital, where resuscitation efforts were continued by Dr Glen Browning and Dr Peter Thompson.⁵⁴ Tragically, the resuscitation effort was unsuccessful. Troy's death was pronounced by Dr Thompson⁵⁵ and formally recorded at 12.50pm on 22 March 2016.⁵⁶ The cause of Troy's death at that time was unknown.

⁴⁹ Exhibit 5, at [32]

⁵⁰ Exhibit 1, Vol. 1, Tab 11 at [22]

⁵¹ Exhibit 1, Vol. 1, Tab 6 at [36]-[38]

⁵² Exhibit 1, Vol. 1, Tab 6 at [38]-[40]

⁵³ Exhibit 1, Vol. 1, Tab 5 at [4]

⁵⁴ Exhibit 1, Vol. 1, Tab 12; Exhibit 1, Vol. 2, Tab 21

⁵⁵ Exhibit 1, Vol. 1, Tab 13

⁵⁶ Exhibit 1, Vol. 1, Tab 2

THE EXPERT EVIDENCE

Autopsy Examination

41. On 24 March 2016, Dr Allan Cala, Forensic Pathologist, conducted a post mortem examination, which included pathology testing.⁵⁷ On the basis of those findings, Dr Cala concluded that the direct cause of Troy's death was Septicaemia due to Streptococcal (Beta Haemolytic Group A) infection. There were no other significant conditions contributing to death, unrelated to the disease present.⁵⁸

Opinions of Expert Emergency Department Physicians

42. Three emergency department physicians were called to give expert evidence in the proceedings: Associate Professor John Raftos, Dr Michael Golding and Professor Ann-Maree Kelly. Each expert provided an initial report and a supplementary report.⁵⁹ The experts gave oral evidence concurrently at the inquest.

43. The expert witnesses all agreed that Troy was showing signs of toxicity at the time of his initial presentation, being 10:15am.⁶⁰ They also agreed that following Dr Tajvidi's first examination just after 11:00am, Troy ought to have had a cannula inserted and blood samples taken for investigation.⁶¹ I accept this evidence.

44. Associate Professor Raftos and Professor Kelly were both of the view that, despite the improvement in Troy's temperature and heart rate by the time of the observations recorded at 1:29pm and progress note recorded at 1:31pm, blood tests for inflammatory markers should still have been performed. In forming this

⁵⁷ Exhibit 1, Vol. 1, Tab 4, pg. 2

⁵⁹ Exhibit 1, Vol. 1, Tabs 17-18B

⁶⁰ Concurrent Evidence of Emergency Experts on 22 September 2018; Exhibit 1, Vol. 1, Tab 18 at pg. 8; Exhibit 1, Vol. 1, Tab 18B at pg. 4

⁶¹ Concurrent Evidence of Emergency Experts, 22 September 2018; Exhibit 1, Vol. 1, Tab 17 at pgs. 9-11; Exhibit 1, Vol. 1, Tab 18 at pgs. 8-11

view, Associate Professor Raftos placed weight on Troy's elevated heart rate and commented that heart rate is the most sensitive indicator. Professor Kelly expressed the opinion that one set of improved vital signs was an insufficient basis to alter the original management plan for Troy, which was to do blood tests. Both Associate Professor Raftos and Professor Kelly warned against placing too much emphasis on the appearance of a child, noting that antipyretic drugs can make a child look well, calm their vital signs and mask symptoms.⁶²

45. Dr Golding considered that in light of Troy's clinical improvement observed and noted at around 1:31pm, it was reasonable for Dr Tajvidi not to do blood tests and to discharge Troy. Dr Golding also considered it reasonable for Dr Tajvidi to assess Troy's illness as probably viral because statistically in most cases the diagnosis is viral, not bacterial in nature.⁶³

46. Dr Golding's views on whether Dr Tajvidi should have proceeded with the initial plan to do blood tests are at odds with Dr Tajvidi's own assessment, albeit reached retrospectively. Dr Tajvidi says that he should have proceeded to do blood tests to investigate Troy's illness. Dr Tajvidi conceded that he attached too much significance to Troy's clinical improvement and should not have done so.⁶⁴

47. Whilst I accept that viral infections are vastly more common than bacterial infections, I prefer the evidence of Associate Professor Raftos and Professor Kelly in this regard over Dr Golding's view that bacterial infection as a cause for Troy's signs and symptoms did not need to be investigated further once Troy showed signs of clinical improvement, even if he did look well.

48. Based on Dr Tajvidi's own assessment of what he should have done and the expert opinions of Associate Professor Raftos and Professor Kelly, I find that Troy should have received blood tests following Dr Tajvidi's review at 11.00am

⁶² Concurrent Evidence of Emergency Experts on 22 September 2018

⁶³ Concurrent Evidence of Emergency Experts on 22 September 2018; Exhibit 1, Vol. 1, Tab 18B at pg. 5

⁶⁴ Evidence of Dr Tajvidi on 20 September 2018; Exhibit 1, Vol. 1, Tab 11A at [24]

and that the need for blood tests continued throughout Troy's stay in the Emergency Department.⁶⁵

49. I accept the evidence of Associate Professor Raftos and Professor Kelly that Troy should not have been discharged without blood tests being performed, regardless of some improvement in vital signs and clinical appearance.⁶⁶ In this regard, I note that each of the experts agreed that the presence of a serious bacterial infection could not be ruled out in any other way apart from further investigation, in which taking blood samples was the first step.

50. Dr Golding emphasised the risks associated with doing blood tests. However, I accept the evidence of Associate Professor Raftos and Professor Kelly that it is necessary to carry out blood tests in all children where viral infection and bacterial infection forms the differential diagnosis and that doing so properly reflects community standards.⁶⁷

51. A key document considered in the course of the inquest was the Paediatric Sepsis Pathway developed by the NSW Government's Clinical Excellence Commission. The Paediatric Sepsis Pathway asks clinicians to consider, "*high level parental concern*" when assessing a child's risk factors for sepsis.⁶⁸ The Paediatric Sepsis Pathway then directs clinicians to observations of vital signs falling into the red zones and yellow zones of a standard observation chart. On presentation, Troy's heart rate was in the red zone and his temperature in the yellow zone. His heart rate was either on the borderline of the red zone or in the yellow zone throughout the time he spent in the Emergency Department. Troy's heart rate remained in the yellow zone on the last recorded observations prior to discharge.

⁶⁵ Evidence of Associate Professor Raftos and Professor Kelly on 20 September 2018; Exhibit 1, Vol. 1, Tab 17 at pgs. 9-11; Exhibit 1, Vol. 1, Tab 18 at pgs. 8-11

⁶⁶ Evidence of Dr Tajvidi on 20 September 2018; Evidence of Associate Professor Raftos and Professor Kelly on 22 September 2018; Exhibit 1, Vol. 1, Tab 17 at pgs. 9-11; Exhibit 1, Vol. 1, Tab 18 at pgs. 8-11

⁶⁷ Concurrent Evidence of Emergency Experts on 22 September 2018; Exhibit 1, Vol. 1, Tab 18 at pg.10; Exhibit 1, Vol. 1, Tab 17 at pg. 10

⁶⁸ Exhibit 1, Vol. 2, Tab 28

52. Noting the Paediatric Sepsis Pathway, the Emergency Department expert witnesses were asked to consider what bearing parental concern should have on whether or not blood tests should be performed to investigate the presence of bacterial illness. Both Associate Professor Raftos and Professor Kelly agreed that blood tests were mandated following Dr Tajvidi's review even if there was no perceived parental concern. Dr Golding agreed, but preferred the word "indicated" to "mandated".⁶⁹

53. Professor Kelly gave evidence that the absence of parental concern should not be enough to sway a clinician away from proceeding with blood tests where there is a possibility of bacterial infection. Associate Professor Raftos agreed with this view.⁷⁰

54. When commenting on the role of parental concern in the management of a child more generally, Dr Golding gave evidence that parental concern is an important influence which can operate both ways. He indicated that high parental concern may cause a clinician to admit a child that otherwise looks well, whilst if there is an absence of parental concern and the child looks well, there is a concordance. Dr Golding emphasised the need to look at all aspects of the child's presentation together.

55. In Troy's case, I accept the evidence of Associate Professor Raftos and Professor Kelly and do not consider that the perception of parental concern, either present or absent, ought to have influenced the decision-making with respect to proceeding to blood tests given Troy's signs of toxicity and persistent tachycardia.

⁶⁹ Concurrent Evidence of Emergency Experts on 22 September 2018; Exhibit 1, Vol. 1, Tab 17A at pg. 3; Exhibit 1, Vol. 1, Tab 18A at pgs. 4-5

⁷⁰ Concurrent Evidence of Emergency Experts, 22 September 2018; Exhibit 1, Vol. 1, Tab 17A at pg. 3

Opinions of Expert in Paediatric Infectious Diseases & Microbiology

56. The expert report prepared by Professor Alison Kesson dated 25 September 2018 was tendered as part of the brief of evidence at the commencement of this inquest.⁷¹ Professor Kesson is an expert in paediatric infectious diseases, microbiology and virology. She practises at The Children's Hospital at Westmead. None of the parties sought to challenge her opinions and she was not required to attend for cross examination. I have given significant weight to Professor Kesson's opinions, given her expertise in the fields of medicine which are relevant to the matters arising in this inquest.

57. According to Professor Kesson, Troy's bacterial infection was probably contracted from the colonising *Streptococcus pyogenes* in his nose and throat.⁷² Professor Kesson stated that the cause of this is rarely known. *Streptococcus pyogenes* infections are not known to be associated with any recognised congenital or acquired immune deficiencies and there is no vaccine available for protection against infection from this microorganism.⁷³

58. Professor Kesson stated that she would expect the full blood count for Troy to have shown an increased white blood cell count, predominately neutrophils (a sub set of white blood cells which kill bacteria). She would expect the erythrocyte sedimentation rate ("ESR") and C-reactive protein ("CRP") and Procalcitonin to have been significantly elevated.⁷⁴ Professor Kesson has particular expertise on this question and I accept her evidence.

59. I accept the opinions of Professor Kesson that Troy's bacterial infection was treatable, with early detection and early administration of antibiotic therapy to which the microorganism was sensitive. She states, in her report, that

⁷¹ Exhibit 1, Vol 1, Tab 16

⁷² Exhibit 1, Vol. 1, Tab 16, pg. 3

⁷³ Exhibit 1, Vol. 1, Tab 16, pg. 3

⁷⁴ Exhibit 1, Vol. 1, Tab 16, pg. 4

Streptococcus pyogenes is always sensitive to penicillin and is sensitive to a number of other types of antibiotic medication.⁷⁵

60. Professor Kesson concludes in her report that, on the balance of probabilities, if Troy had had blood tests, which would probably have indicated serious bacterial infection, and had this been acted on with antibiotic therapy, his death would have been prevented.⁷⁶ I accept Professor Kesson's conclusions.

POLICIES AND PROTOCOLS

61. The existence of policies in the area of detecting and responding to suspected bacterial illness in NSW public hospitals, and specifically at the Hospital, received attention in the course of this inquest.

Between the Flags

62. In 2013, NSW Health published a Policy Directive entitled, ***Recognition and Management of Patients who are Clinically Deteriorating*** ("Recognition and Management Policy").⁷⁷ The Recognition and Management Policy is and was intended to be a directive, meaning that its use is not voluntary but mandatory. Once introduced, the policy applied to every public hospital in NSW. The Recognition and Management Policy carries additional requirements for mandatory education of hospital staff and compliance audits. It has been revised since its initial introduction, but the key principles remain the same and it remains active.

63. The Recognition and Management Policy requires a "Between the Flags" ("BTF") approach to patient clinical assessment which requires a colour coded chart being used to track and record the observations of the patient's vital signs.⁷⁸ For paediatric patients such as Troy, the form required is known as the Standard Paediatric Observation Chart ("SPOC") for infants who are aged 1 to 4 years.

⁷⁵ Exhibit 1, Vol. 1, Tab 16, pg. 3

⁷⁶ Exhibit 1, Vol. 1, Tab 16, pg. 4

⁷⁷ Exhibit 1, Vol. 2, Tab 24, Annexure 8.

⁷⁸ Exhibit 1, Vol. 2, Tab 24, Annexure 8, pg. 7

64. The colour coded chart establishes a set of parameters for recognising a patient whose condition might be worsening based on where that patient's vital signs fall on the chart and identifies the action to be taken to provide the required clinical response. .
65. At the time of Troy's presentation to the Emergency Department at the Hospital, a BTF chart was available and staff in that department had access to it, in electronic form, via the FirstNet computer system.⁷⁹
66. At the time of Troy's presentation, the SPOC was not used in paper form at all for monitoring patients in the Emergency Department. A paper version of the SPOC was, however, commenced for a paediatric patient being admitted from the Emergency Department to the paediatric ward.⁸⁰ If admission to the paediatric ward were required, the paediatric nurse would enter the last set of observations⁸¹ on the paper SPOC, which would accompany the patient's transfer to the paediatric ward.
67. A BTF approach was not used by RN Avis for electronically recording or monitoring Troy's observations. Both RN Mason⁸², at the time of the triage assessment, and RN Avis⁸³ over the period that Troy was being observed in the Emergency Department recorded Troy's observations in the iView field of the FirstNet computer system used in the Emergency Department at that time. The iView field did not provide any colour coded alerts, other than an exclamation mark which would come up if the vital sign was very high.⁸⁴

⁷⁹ Exhibit 8 at [7]

⁸⁰ Exhibit 8 at [6]

⁸¹ Exhibit 8 at [6]; Evidence of RN Avis on 19 September 2018

⁸² Evidence of RN Mason on 19 September 2018; Exhibit 1, Vol. 1, Tab 10 at [12]

⁸³ Evidence of RN Avis on 19 September 2018

⁸⁴ Evidence of RN Avis on 19 September 2018

68. Dr Tajvidi gave evidence that it was his practice to use iView, as it gave him quick access to vital signs.⁸⁵ He confirmed that the vital signs were entered into the system without being directed to the relevant BTF observation chart.⁸⁶
69. Dr Tajvidi's description of not being directed to the BTF chart accords with the evidence of Mr Bradley Scotcher, Acting Director of Nursing & Midwifery at the Hospital, in his supplementary statement. Mr Scotcher's statement indicates that, in order to view Troy's observations on a BTF observation chart, at that time, it was necessary to open another screen by selecting the colour coded BTF chart.⁸⁷ Troy's observations were automatically populated on the electronic BTF chart from the data entered by RN Avis in iView.
70. As RN Avis did not enter Troy's observations directly into a colour coded chart that depicted the BTF approach, with red zones and yellow zones, he was therefore not tracking Troy's observations in accordance with the BTF mandatory policy.
71. The Hospital ceased training staff in iView in 2013.⁸⁸ Mr Scotcher's statement confirms that from December 2013, the BTF approach was in place at the Hospital and staff were required to use BTF charts for patient observations. RN Avis gave evidence that when he commenced employment in the Hospital's Emergency Department in 2014, he used iView as it was easier to use for entering patient observations.⁸⁹ There is no evidence that other paediatric nurses also used iView only.
72. Mr Scotcher states that from recent discussions with Emergency Department managers, he learned that as at 21 March 2016, "*some emergency department staff used iView rather than BTF because of a belief that it was easier to use..... and they were more familiar with iView*".⁹⁰ There is no evidence that the practice

⁸⁵ Evidence of Dr Tajvidi on 20 September 2018

⁸⁶ Evidence of Dr Tajvidi on 20 September 2018

⁸⁷ Exhibit 8 at [8]

⁸⁸ Exhibit 8 at [9]

⁹⁰ Exhibit 8 at [10]

extended beyond some staff. It is concerning that RN Avis, when he commenced at the Hospital's Emergency Department in the 2014, was shown the iView method of recording observations and that he used that method in March 2016, at least two years after the BTF mandatory policy had been introduced.

73. Whilst I find that the reliance on iView and the manner in which RN Avis recorded and monitored Troy's observations was not compliant with BTF mandatory policy, and that it was the Hospital's responsibility to ensure that the mandatory policy was being followed, I am satisfied that this problem has since been addressed. The Hospital has now removed access to iView for the electronic recording of patient observations.⁹¹ This occurred in February 2018. RN Avis described an aspect of what occurs now in the Emergency Department when a patient's vital signs are recorded and do not fall between the flags. He indicated that if the observations are in the red zone of abnormality, the computer will show a red zone and require that a time be entered for patient review.⁹²

The Paediatric Sepsis Pathway

74. The Paediatric Sepsis Pathway, which has been referred to above, was first published in December 2013. The document current at the time of Troy's presentation to the Hospital was the May 2015 version.⁹³ It has been updated since that time.⁹⁴ The stated purpose of the Paediatric Sepsis Pathway document is to describe the standard and principles of the BTF system for improving the recognition, response to and management of patients who are clinically deteriorating. The Sepsis Pathway is a document that supports the Recognition and Management Policy. There is no evidence that the document is, or was, mandatory, however it is a highly and widely endorsed document.

75. RN Avis gave evidence that the various sepsis pathways developed by the Clinical Excellence Commission are available and accessible in both the triage area and the main area of Emergency Department of the Hospital.⁹⁵

⁹¹ Exhibit 8 at [11]

⁹² Evidence of RN Avis on 19 September 2018

⁹³ Exhibit 1, Vol. 2, Tab 28

⁹⁴ Exhibit 1, Vol. 2, Tab 24, Annexure 2D

⁹⁵ Evidence of RN Avis on 20 November 2018

RECOMMENDATIONS

76. Counsel for the Almond family invited me to make a recommendation that “*the SDMH consider implementing an orientation program for all new staff commencing work within the Emergency Department that identifies all between the flags and sepsis guidelines that are utilised within the Emergency Department and which involves a demonstration of the documents and/or computer software used within the ED to implement those guidelines*”.

77. Ms Furness, SC submitted on behalf of the ISLHD that some steps have been taken in this regard. The statements of Mr Ian Power, General Manager of the Shoalhaven Hospital Group (at the time the statement was made) and Mr Bradley Scotcher, Acting Director of Nursing & Midwifery at the Hospital, indicate that investigations of the management Troy received on 21 March 2016 have been undertaken, further inquiries have been made and changes implemented following Troy’s death. Changes have been made to the systems, including the computer systems used, at the Hospital. The statements of Mr Power and Mr Scotcher provide relevant information of staff education and training that has occurred, and is continuing at the Hospital, with respect to BTF and sepsis policies.

78. In light of the steps taken by the Hospital to date, I am of the view that I do not need to formally make the recommendation sought by the Almond family, however, I do encourage the Hospital to continue to review and update their staff orientation and training with respect to BTF and sepsis policies as appropriate.

FINDINGS REQUIRED BY S.81(1) OF THE CORONERS ACT 2009

79. Having considered 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 of the Deceased

The deceased person was Troy Almond.

Date of Death

Troy died on 22 March 2016.

Place of Death

Troy died at the Shoalhaven District Memorial Hospital, Scenic Drive, Nowra NSW 2541.

Cause of Death

Troy died as a result of Septicaemia due to Streptococcal (Beta Haemolytic Group A) infection.

Manner of death

Troy died due to a failure by the treating specialist in the Emergency Department at the Shoalhaven District Memorial Hospital on 21 March 2016 to recognise signs of toxicity caused by possible sepsis, to investigate the possibility of sepsis, and to administer antibiotics.

CONCLUSION

80.I would like to thank my counsel assisting, Ms Lesley Whalen SC and her instructing solicitor, Ms Kate Lockery from the Crown Solicitor's Office for the enormous amount of assistance they provided to me.

81.I would also like to express my gratitude to Troy's parents, Kim and Daniel who attended this inquest every day. Their dignity and patience throughout the coronial process was admirable. I know that there are no words to comfort them. The best that I can do is to acknowledge the enormity of their loss and their love for their beautiful son, Troy.

I close this inquest.

Teresa O'Sullivan
Deputy State Coroner

DATED: 3 DECEMBER 2018