

**CORONERS COURT  
OF NEW SOUTH WALES**

<b>Inquest</b>	<b>Inquest into the death of Brent Justin Crough</b>
<b>Hearing dates:</b>	9-13 November 2020
<b>Date of findings:</b>	7 May 2021
<b>Place of findings:</b>	Local Court of NSW, Tamworth
<b>Findings of:</b>	Magistrate Julie Soars, Coroner
<b>Catchwords:</b>	CORONIAL LAW – brown snakebite envenoming, manner of death, care and treatment
<b>Non-publication order:</b>	<b>Annexure A</b> contains details of the non-publication orders made
<b>File number:</b>	2018/10493
<b>Representation:</b>	Sergeant C Xanthos, Advocate Assisting the Coroner

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**Findings:**

The findings that I make under section 81(1)  
of the *Coroners Act 2009 (NSW)* are:

***Identity***

The person who died was Brent Justin  
Crough.

***Date of death***

Brent Justin Crough died on 10 January  
2018 at 23:17.

***Place of death***

Brent Justin Crough died at Tamworth Base  
Hospital, Tamworth NSW 2340.

***Cause of death***

The cause of Brent Justin Crough's death  
was Complications of Brown Snake Bite.

***Manner of death***

Misadventure due to picking up an Eastern  
brown snake whilst separating the snake  
from a dog

**Recommendations:** See section D of these findings

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## Introduction

1. When an inquest is held section 81(1) of the *Coroners Act 2009* (NSW) (the **Coroners Act**) requires that the findings of the Coroner be recorded in writing. These are the findings of an inquest into the death of Brent Justin Crough (**Brent**).
2. These findings will address the following:

**Section A** contains information in relation to the nature of the coronial proceedings, the scope of these proceedings and other introductory matters;

**Section B** sets out factual background and context for this inquest and my findings;

**Section C** sets out the findings and recommendations I have made;

**Section D** contains a summary of the formal findings and recommendations made in this inquest pursuant to ss 81 and 82 of the *Coroners Act*, as well as some closing remarks.

3. Before turning to the findings that I am required to make, I would like to thank Sergeant Tina Xanthos, Advocate Assisting the Coroner in this matter, for her assistance and comprehensive written submissions, and Tamworth Police for their assistance with the investigations that led to this inquest.

### **SECTION A: the nature of the coronial proceedings, scope of the proceedings and other introductory matters**

#### ***Nature of the coronial proceedings***

4. All violent and unnatural deaths must be reported to a Coroner. A Coroner has an obligation to make findings about the identity of the person who died, when and where they died, and what the cause and the manner of their death was. The manner of a person's death means the circumstances in which that person died.

5. This was an inquest held at the direction of a Coroner based in Tamworth that focussed on the manner of death of Brent, including care and treatment concerns raised by Brent's family.

### ***Procedural matters***

6. This inquest was held at the Local Court at Tamworth from 9 to 13 November 2020. The commencement of the inquest was delayed because of the impact of the COVID 19 pandemic and an earlier inquest hearing date in 2020 was vacated because of the pandemic.
7. The Inquest heard evidence from 14 witnesses in addition to the brief of evidence which comprised a total of 28 items that included witness statements, medical documents, and expert reports.
8. Written submissions were served by each of the parties with the last submissions filed on 8 February 2021.
9. A non-publication order was made in these proceedings which is **Annexure A**.

### ***The scope of these proceedings***

10. Before setting out the findings from the inquest, it is appropriate at this time to briefly say something about what is known about Brent. Brent was a young man of 24 years of age as at the date of his death, in prior good health and with no known medical conditions. Brent was at home with his mother in a residential suburb of Tamworth on 10 January 2018 and was bitten by an Eastern brown snake on his right pointer finger when trying to separate the snake from his dog. His dog was also bitten by the snake but as it turned out, did not die. Brent was transported to hospital by his mother in her own car over a short distance and presented to the Emergency Department of Tamworth Base Hospital at 21.52. Brent and his mother took the snake in a large jar with them to hospital.
11. Antivenom, including polyvalent antivenom was available at Tamworth Base Hospital but was not administered immediately Brent presented, rather Brent was observed by the treating doctor and nurses in accordance with NSW Health Department Guidelines which cover snakebite. The treating doctor and nurses had formed the view that Brent was not showing any clinical signs of envenomation at that time and blood was taken for urgent blood tests. At about 22.17 Brent collapsed, was revived briefly and then suffered a

cardiac arrest and became unconscious. No pressure immobilising bandage was applied to Brent's finger or arm at any time prior to his collapse. Shortly after his collapse antivenom was administered and CPR was applied over an extended period of time, but tragically Brent was unable to be revived despite strenuous efforts.

12. Brent's mother's evidence was that shortly after Brent's death was confirmed at 23:17, a hospital staff member said to her "*Brent did not present as a snake bite victim.*" This was one of the reasons why the Crough family requested an inquest into Brent's death and the care and treatment he received. Who had said this to Mrs Crough and what was meant by it was one of the factual matters explored at this inquest and the outcome of that investigation is further addressed below. In addition Brent's family was also concerned to know whether antivenom could have and should have been administered earlier to Brent and, if so, would that have made a difference to the outcome for Brent.
13. The focus of the inquest was therefore Brent's manner of death and any care and treatment concerns arising, together with a consideration of the adequacy of the applicable treatment Guidelines in the context of Eastern brown snakes only. Due to the constraints of the *Coroners Act* requiring the focus of the inquest to be on the snake relevant to Brent's death only, there being no issue that he was bitten by an Eastern brown snake.
14. The areas of interest in the inquest, by reference to the Issues List circulated by Advocate Assisting to the interested parties, were:
  - a. **Issue 1** - Was the care and treatment provided to Brent upon admission to Tamworth Hospital on 10 January 2018 appropriate and adequate?
  - b. **Issue 2** - Were all preventative measures put in place to give Brent the best possible opportunity to survive the snake bite sustained to him?
  - c. **Issue 3** - Are the current NSW Health Clinical Management Guidelines used to address the treatment following a patient that has sustained a snake bite appropriate?

- d. **Issue 4** - Are there any public health and safety issues raised by this case that require recommendations for remedial action to address systemic shortcomings?

## **SECTION B: factual background and context**

### ***Eastern Brown snakes – amongst the most deadly snakes on the planet***

15. The Eastern brown snake (genus *Pseudonaja spp*) is one of the most dangerous and potentially deadly venomous snakes in Australia.<sup>1</sup> It causes the most serious evenomings and the most deaths in Australia and is one of the most difficult snakebites to treat.<sup>2</sup>
16. Eastern brown snakes are found along the eastern seaboard of Australia and throughout NSW<sup>3</sup>, including in Tamworth in the New England region of NSW where Brent's brown snakebite occurred. Professor Julian White's evidence at the inquest was that:

*It does appear that of all of Australia's dangerous snakes the brown snake genus has adapted best to human encroachment and urbanisation and they seem to do quite well in urban areas....So brown snakes are the...group of snakes that you would most likely [expect] in an urban area such as Tamworth.<sup>4</sup>*

17. As the Local Court Magistrate for Tamworth and a permanent resident of Tamworth I can say from my own personal experience, and from speaking to other staff of the court and Tamworth residents, that brown snakes are frequently encountered in the New England region of NSW. In particular that just about everyone I have spoken to in Tamworth reports having sighted a suspected brown snake, including in urban residential areas of Tamworth. Brown snakes can be found in residential backyards (as was the case for Brent) as well as being found in the bush or farming and agricultural areas around Tamworth.

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<sup>1</sup> Professor Isbister, (Transcript 12/11/20, 21:20-40)

<sup>2</sup> Professor Isbister, (Transcript 12/11/20, 21:30-35)

<sup>3</sup> See the map at p32 of the Guidelines

<sup>4</sup> Professor White, (Transcript 12/11/20, 65: 40-50)



18. It is no exaggeration then for me to say that people in Tamworth pretty much live “cheek by jowl” with the dangerous, and potential deadly, Eastern brown snakes.
19. The results of the Australian Snakebite Project (**Australian Snakebite Project**), a 10 year study between 2005-2015 in respect of 1548 patients with suspected snakebites that Professor Isbister was involved with and which was referred to at the inquest, found that brown snakes were the snake type most frequently involved in snakebite in Australia and that of the 23 deaths studied, 17 of them were attributed to brown snakes. The Australian Snakebite Project found that about two snakebite deaths occurred annually, which was low for the Australian population size, but that the fatality rate among envenomed patients was relatively high.<sup>5</sup>
20. Hence the risk of seeing or interacting with a brown snake is one of the real risks of living in the Tamworth area, although the risk of an envenomed brown snake bite, may be statistically unlikely.
21. The principal effect of envenoming by brown snakes is defibrination coagulopathy or venom induced consumption coagulopathy (**VICC**), a process whereby the action of the venom in the blood consumes all of the clotting factors in the blood, leading ultimately to a loss of blood pressure and a sudden collapse. Non-specific symptoms may include headache, nausea, vomiting, abdominal pain.<sup>6</sup> Brown snake envenoming is commonly associated with minimal/trivial local effects, with minimal or no pain or swelling.<sup>7</sup> Professor Julian White’s evidence was that a few patients also develop an early “collapse”, a loss of consciousness which is usually transient with spontaneous recovery, but in a minority of such cases, there is a cardiac arrest. This usually occurs within the first hour post-bite and mostly pre hospital. In Professor White’s view, these uncommon to rare cases usually affect less than 6 patients per year.
22. The experts agreed that a person bitten by a brown snake may **not** show any clinical symptoms of envenomation prior to a sudden early collapse and cardiac arrest. Sudden

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<sup>5</sup> <https://www.mja.com.au/journal/2017/207/3/australian-snakebite-project-2005-2015-asp-20>

<sup>6</sup> See Professor Julian White’s written report (Ex 1 tab 6) at p3

<sup>7</sup> See Professor Julian White’s written report (Ex 1 tab 6) at p4

collapse, as was shown in the case of Brent, may be the first conclusive observable clinical sign of envenomation by a brown snake bite (although sudden collapse can occur with other snake types as well and is not unique to brown snake bite.<sup>8</sup>

23. I find that the risk of sudden collapse of envenomed brown snakebite victims makes the management in a hospital setting of patients with suspected brown snake bites difficult and high risk.
24. Professor Isbister confirmed in evidence that he had been in frequent contact with Dr Ryan the Director of Emergency at Tamworth Base Hospital over the years in respect of snake bite patients, including brown snake bite, and that Dr Ryan was a co-author of the Australian Snakebite Project.<sup>9</sup>
25. The evidence at the inquest was that a number of reported snake bites can turn out to not be a snake bite at all (the term “stick bite” is used for a scratch received which the person thinks may be a snake bite but may be the result of walking into a stick or twig). Even when there is a confirmed snake bite, it may not be an envenomed snake bite containing venom, but rather a “dry” bite not containing venom, the bite being more of a warning. Also the brown snake may have already bitten another person or animal and exhausted its supply of venom before biting the patient, also giving rise to the possibility of a “dry” bite.
26. Research into brown snakes and approaches to the treatment of brown snakebite is potentially more complicated because guidelines for treatment are developed by health departments on a state and territory basis, rather than on a national basis, although there are bodies independent of these health departments that are preparing national guidelines, such as the Australian Therapeutic Guidelines referred to by Professor Isbister.

***The applicable NSW Health Snakebite and Spiderbite Guidelines***

27. Each state and territory of Australia has developed its own set of guidelines for the treatment of snakebite.

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<sup>8</sup> See Professor Julian White’s written report (Ex 1 tab 6) at p3

<sup>9</sup> Professor Isbister, Transcript 12/11/20, 24:20

28. The applicable NSW Health Guidelines at the time Brent was bitten by a the brown snake were the *Snakebite and Spiderbite Clinical Management Guidelines 2013 - Third Edition* published 17 March 2014 (**Guidelines**)<sup>10</sup> and which are publically available. These cover all types of snake and spider bite patients and are not specific to brown snakes. On their face the Guidelines say they were due to be reviewed in 2019, which fell within the COVID pandemic period. Professor Isbister indicated in his evidence that he has been involved in the consultation process regarding the fourth edition for the last 18 months. NSW Health in its written submissions confirmed that draft revised Guidelines are being prepared. It does not appear that this review has been completed and this may be because the relevant persons involved are awaiting the outcome of this inquest.

***Brent's initial presentation on 10 January 2018 to Tamworth Base Hospital***

29. The circumstances that brought Brent to Tamworth Base Hospital on 10 January 2018 were largely uncontested.

30. The triage notes recorded by RN Coggan indicated Brent and his mother presented at the ED of Tamworth Hospital at 21:52 on 10 January 2018. In evidence, RN Coggan confirmed that the ED was not 'greatly busy' on the evening of 10 January. She recorded in the admission document that Brent had been bitten by a snake. She noted Brent had a 'pinprick hole' that was not bleeding to his right index finger which was not bandaged at the time.

31. Brent described going into his backyard and observing his dog fighting with a snake. Mrs Crough in her evidence described that Brent could not get his dog, so in order to separate the dog from the snake, Brent grabbed hold of the snake and that is when he was bitten. Brent kept hold of the snake and went inside and woke his mother up. Mrs Crough grabbed a glass jar and placed the snake in it and drove Brent to hospital. Mrs Crough was first aid trained but decided against calling '000' as she just wanted to get Brent immediately to hospital. The drive to the hospital from the Crough's residence takes approximately 10-15 minutes. It is understandable why Mrs Crough would have considered that by transporting her son to hospital as opposed to waiting on an ambulance would have been a quicker option.

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<sup>10</sup> [https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/GL2014\\_005.pdf](https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/GL2014_005.pdf)

32. At the commencement of the inquest, the exact time Brent was bitten by the snake was uncertain. Unfortunately, the evidence heard during the inquest did not resolve that issue. Brent estimated to RN Coggan he was bitten approximately 40 minutes prior to arrival at ED. This would suggest approximately 21:12hrs. For reasons unknown RN Coggan recorded 21:30pm. RN Coggan triaged Brent as a category 2 patient in accordance with the Australian Triage Scale. A category 2 patient requires a patient to be seen by a doctor within ten minutes of triage. At the time Brent was not displaying any signs of illness or envenomation, other than a confirmed bite site. The decision to triage him as a category 2 was not challenged by any of the experts. RN Coggan called the in-charge nurse RN Thorpe confirming Brent was allocated to Bed 17. He was escorted by RN Harris in a wheelchair to bed 17 in the Acute Care of the ED. Dr Bates was the doctor-in-charge of the Acute Care Department. Whilst being transferred to the Acute section, Dr Bates recalled seeing Brent and described him as being in "good spirits." Brent was seen by Dr Bates almost immediately.
33. Dr Bates' evidence was that she believed the snake to be a juvenile brown snake from her experience in treating previous patients who had attended Emergency all of whom who had been bitten by the same species of snake. However, Brent was the first patient to show signs of envenomation and where she had to order the administration of antivenom. In evidence she stated her initial assessment of Brent was as being a high risk of envenomation based on her observation of the visible puncture mark and the history provided to her of Brent receiving the bite approximately 20 minutes before arrival, which she recorded in her notes as being approximately 21:35 hours.
34. Dr Bates described her examination and treatment of Brent was to identify any systemic symptoms of envenomation such as vomiting and diarrhoea. She relied on the nursing staff to continue cardiac monitoring and to advise her of any clinical deterioration which would suggest he may have been experiencing signs of systemic envenomation. Even when Dr Bates returned to her workstation adjacent to Brent's bed, she states that she remained vigilant to Brent's condition at all times. She was asked whether she considered calling a clinical toxicologist. Dr Bates stated that she would only call if she had specific questions. Dr Bates had no uncertainty about Brent's condition.
35. Mrs Crough was asked to remain at the triage desk to complete paperwork for Brent. During this time, RN Coggan made enquiries about the dog's condition where Mrs

Crough said she assumed the dog had died from the bite. It is not until Mrs Crough returned home; she discovered the dog did not sustain any fatal injuries.

36. At bed 17, Brent was placed into the nursing care of RN Procter. Brent was placed on continuous cardiac monitoring for his heart rate, rhythm, blood pressure and oxygen saturation by machines. When he was first attached to the monitor, his heart rate was 122bpm which activated the cardiac monitor to alarm. It remains unclear how long the alarm sounded for, however exhibit 6 confirmed that the snapshot of Brent's ECG taken at 9:05:04pm (or 10:05:04pm taking daylight saving into consideration) showed Brent's heart rate had dropped to 110 – within the accepted parameters. The evidence from Dr Bates was that his heart rate continued to decrease.
37. RN Procter had never cared for a patient that had presented with a snake bite. To assist her, the Department's "Snake Bite Folder" was provided to her containing three items; the third edition of the Snakebite and Spiderbite Clinical Management Guidelines, the proforma Snakebite Observation Chart and the Snakebite Clinical Pathway documents for completion. RN Procter confirmed that she had never seen or read these documents before caring for Brent.
38. At 22:01, RN Procter performed the first set of observations using the Standard Adult General Observations (SAGO) chart. These observations were performed whilst Dr Bates was preparing the cannula and collecting Brent's blood samples. At 22:10, RN Procter completed the snakebite observation chart. In respect of this chart, the evidence established certain facts:
  - a. The top right part of the form nominating the date and time of bite as 21:15 was completed by an unknown person. RN Procter nominated Dr Bates as filling it out after Brent's death, but Dr Bates refuted this. The recording of 21:15 presents the court with another estimated time of Brent's bite from an unknown source.
  - b. The observations under the GENERAL heading were the figures taken by RN Procter at 22:01 from the SAGO chart and merely transferred to the snakebite chart. The chronology of events suggests that Dr Bates had returned to her desk at this time to send off Brent's blood samples to the laboratory. Therefore, Dr Bates was not at Brent's bedside when these observations were recorded. Brent's heart rate was 122 at 22:01 and had dropped at 22:05 to 110, but it remains unknown what Brent's pulse rate, blood pressure

or temperature was at 22:10. Dr Bates confirmed that she remained vigilant, 'not passive' in observing signs for any abnormalities in Brent's condition.

- c. RN Procter recorded under "SPECIFIC", a 'Y' next to local bite site pain and bite site swelling. When Brent first arrived at bed 17, Dr Bates confirmed that she noticed Brent's right index finger was swollen compared to his other finger. This was not new information at 22:10, however during these observations Brent now complained to RN Procter that the bite site was "stinging." This was new information that was recorded on the observation chart, but not communicated to Dr. Bates. Despite this development in local symptoms, both Professors Isbister and White confirmed that this would not have changed their respective views that at this time there were no clinical signs of envenomation.

39. Between 22:10 and 22:17, RN Procter remained at Brent's bedside where she continued to observe and talk to him. Mrs Crough had arrived by this time and recalls a conversation taking place between them. RN Procter described Brent as quiet unless he was spoken to. Dr Bates maintains that she was at her desk preparing and sending off Brent's bloods through the pneumatic tube. After sending off the blood samples, Dr Bates cannot recall her exact movements but maintains that she remained at her desk, approximately 3.5 metres from Brent's bed giving her a direct line of sight to Brent's monitors. There was nothing to suggest that Brent was unwell or showing systemic or clinical signs of envenomation prior to 22:17.

### ***Brent's cardiac arrest***

40. Before his deterioration and his development of significant clinical symptoms of envenomation at 22:17, the last recorded observations of Brent's condition were at 22:10 on the Snakebite Observation Chart. In these seven minutes, there are no written progress or clinical notes that were made contemporaneously. The Snakebite Clinical Pathway attached as Appendix 7 of the guidelines remained blank and incomplete.

41. At approximately 22:17, Brent complained of feeling light-headed and dizzy. RN Procter alerted Dr Bates of Brent's deterioration who attended Brent's bedside immediately. She observed his colour had changed, and he didn't look good. After laying Brent's bed flat, he became unresponsive to questions. He woke up briefly to communicate that he felt numb and couldn't feel his legs before becoming unconscious and unresponsive. A set of observations were recorded on the SAGO chart at 22:20.

These observations were not adopted by signature and at the end of the inquest, the identity of the person that completed these observations remains unknown.

42. CPR commenced at 22:23 and the first push of brown snake antivenom was also administered then. It was given undiluted directly into the cannula as opposed to diluted over a 15-20 minute period. Both Professors Isbister and White do not criticise this decision. At 22:24, RN Thorpe states that she recorded Brent's observations on the SAGO chart, but mysteriously, the time of these observations is crossed out with "22:30" written underneath. RN Thorpe does not know why or who made this amendment and again the identity of the person who made this change remains unknown.
43. A second vial was administered at 22:25 after Brent failed to respond. CPR continued as Brent was transferred into the resuscitation bay at 22:30. Not long after this, Dr Naidu came to assist with Brent's CPR. Dr Naidu had been working in the separate Early Treatment Zone of the ED that evening. This area is separate to the Acute Care where Brent was being treated. She arrived to assist with CPR after the second vial of antivenom had been administered and within 30 seconds of arriving, she recommended that the on-call toxicologist be called.
44. Dr. Naidu was asked in evidence about her experience with snake bite patients. She was able to describe in detail that in 2013, a patient had presented with a suspected snake bite and a pressure bandage on the right upper limb. The patient thought he had been bitten by a Stephen's Bandit Snake. The patient's blood was collected, and a toxicologist was called for advice. The toxicologist cautioned Dr Naidu when removing the bandage to beware of symptoms of envenomation. The blood test returned no coagulation and the patient had not displayed any symptoms of envenomation. The bandage was removed and not long after, the patient became unwell and symptomatic. Antivenom was administered, and the patient responded positively. It could be said this experience is what prompted Dr Naidu to recommend that the toxicologist be called for advice regarding Brent's treatment. The advice from the on call toxicologist resulted in polyvalent antivenom to be administered at 22:36.
45. Dr. Nicholas Ryan was also called during CPR. He is the Director of Emergency at Tamworth Base Hospital. As a practising emergency physician for 42 years, he has treated many snake bite patients, including some who had been envenomed and one who went into cardiac arrest. He was not on duty this evening but attended to assist.

During CPR, Dr Ryan directed that a PBI be applied to Brent. There was “no science behind” his decision Dr Ryan said in his evidence, other than all other forms of treatment had been used and there was “nothing to lose.”

46. As noted above, after Brent’s death was confirmed at 23:17, a staff member stated to Mrs Crough, “*Brent did not present as a snake bite victim.*” This was a contributing factor to the reasons why the Crough family requested an inquest into Brent’s death and the care and treatment he received. The inquest was unable to establish who said those words to Mrs Crough. None of the treating nurses or doctors who gave evidence before the inquest said that they had said these words. It would appear that whoever said these words was likely not directly involved with Brent’s treatment on 10 January 2018. As noted above, the evidence does not establish that Brent was treated contrary to the Guidelines or other than as a snake bite victim, although as the evidence established, he was not considered to have an envenomed brown snake bite until his collapse.

#### ***Brent’s blood samples***

47. Dr. Bates recorded on the Emergency Department Green Form that she collected the bloods from Brent at 22:00 and requested a Full blood count, EUC (Electrolytes, Urea, Creatinine), CK (Creatine Kinase), COAGS, D-Dimer. Again, in accordance with the Guidelines, these tests are the relevant tests for a patient that presents with a snake bite. In the Clinical notes, Dr Bates recorded the words “Snake Bite”. In the top right hand corner of the form, Dr Bates had the opportunity to mark the form as either “Critically Urgent” or “Urgent”. Dr Bates declined to tick either of these boxes or to use the opportunity to phone the laboratory in advance. In her evidence she stated that writing the words “Snake Bite” and the fact that the form came from the ED (being green in colour) would be sufficient in alerting the laboratory technician that this was a request that required immediate attention. All witnesses gave evidence that results for blood tests can take between 35 – 60 minutes. Dr Clausen stated that the Australian Health Care Standards are the “benchmark standards” and estimate 40 – 50 minutes to complete testing.
48. Dr Bates used the pneumatic tube to send the Brent’s blood samples to the laboratory. Mr Clausen assisted the court in detailing how the pneumatic system worked and even prior to the inquest, had walked from the ED to the laboratory to calculate an estimate time as to whether transport of bloods by foot would have been quicker than the tube



system. I accept Mr Clausen's evidence that the pneumatic tube system is a more efficient form of transportation and was appropriately used by Dr Bates on 10 January 2018.

49. Dr. Bates placed the blood samples in the canister and then in the pneumatic tube at 22:13:01 and the cannister left at 22:13:08. There is a 13 minute timeline from the time Dr Bates says the blood samples were collected to the time the canister was placed in the pneumatic tube. Dr Bates recounts that the bloods were collected at about 22:00, but not exactly as she nominated the time by "rounding" it. Dr Bates maintains that she acted "very promptly" however the preparation of the cannula takes "a couple of minutes" as does recording the details on the vials which their practice requires to be written by hand. The evidence does not suggest there was an unnecessary or intentional delay during this time.
50. Mr Ralston and Mr Clausen both said that the arrival of the canister in the laboratory does not alert the staff by an alarm but does make a significant noise that is easily heard. Mr Ralston recalls collecting the samples from the tube submitting the information on the AUSLAB that includes the "bundy stamp" at 22:19.
51. Mr Ralston was the only employee working in the laboratory on the evening of the 10 January 2018. He described that the 10 January 2018 was not busy, and Mr Ralston was able to prioritise Brent's blood tests. There was no delay in Mr Ralston's testing of Brent's blood and when a clot was discovered in the citrate tube, Mr Ralston promptly alerted the staff in the ED of the results by phone.

### ***First aid***

52. The example used by Dr Naidu demonstrates the advantages of a properly applied PBI. Dr. Ryan acknowledged that a patient who presents with a snake bite and an appropriately applied PBI will alter his risk assessment. Dr. Bates declined to apply a PBI despite being prompted to do so by nurses. It is readily accepted in the Guidelines that once a patient presents in a hospital setting, the application of a PBI serves no purpose.
53. Professors Isbister and White still encourage the use of a PBI and advocate that it plays a role in the community, particularly where there may be a delay in securing medical

attention. I find that the use of PBIs still play a large role in the first aid treatment of snake bites and should be encouraged.

54. Venom Detection Kits were previously used to identify what type of snake had bitten a patient. It was particularly useful in the past where many ampoules of antivenom were administered. The process involved a swab of the bite but often returned false results and as a consequence where antivenom would be administered unnecessarily. With the research collected from the Australian Snakebite Project it is now confirmed that only 1 vial of antivenom is required abandoning the necessity of VDKs. The use of VDKs is no longer encouraged and it is not proposed that this change.
55. Mrs Crough made the decision to decline calling '000'. This is not a decision that is criticised, and it is understandable that she would consider driving Brent to the hospital would have been the quickest solution in obtaining medical assistance for Brent. If an election to call '000' was made, this may have provided advice over the phone on choices regarding first aid, such as the application of PBI. Professor Isbister described the testing of PBI on monkeys where they were completely restrained leaving them inactive. Professor White was of the view that a PBI further assists in keeping a patient less active after sustaining a bite thereby improving its effectiveness.

***The administration of antivenom earlier?***

56. One of the issues explored at this inquest was whether antivenom could have and should have been administered earlier to Brent. In addition his family was interested in whether the earlier administration of antivenom would have made a difference to the outcome for Brent.
57. The NSW Guidelines are clear in determining that antivenom should not be administered unless there are clinical symptoms of envenomation. To administer antivenom earlier would be an unnecessary risk that could result in adverse reactions in patients. Dr Ryan recalled one patient who suffered anaphylaxis after being administered the antivenom resulting in a rash and hypotension. However, as the patient was allergic to horses and with horse serum being the main ingredient of antivenom, this was not an unexpected incident.

58. In respect of a patient who has been bitten by a brown snake; collapse will usually occur within the first one to two hours. This was the case with Brent. With the benefit of hindsight, that raises the question, could it be said that antivenom should have been administered earlier? This is certainly the position the family holds, and it is a reasonable question to ask in the circumstances. However, the application of the Guidelines as created by the experts needs and should be considered in all the circumstances. Needless to say, they are Guidelines only and I find that each presentation needs to be considered based on the individual clinical symptoms at the time of presentation, the medical history of the patient and reliant upon the appropriate clinical judgement of the medical practitioner at the time.
59. Dr Ryan agreed that it was a mistake to solely wait for blood test results and coagulation assays to determine if someone is suffering from envenomation. The role of the medical practitioner is to look for clinical signs of envenomation in advance of receiving blood test results as well. Page 17 of the Guidelines outlines both absolute and relative indications of symptoms where antivenom should be considered.
60. RN Procter observed that Brent was “a bit tachy” and “a bit clammy” meaning he was tachycardic (high heart rate) and diaphoretic (sweaty) upon presentation. His heart rate was at 122 but, it must be conceded that at 22:05, his heart rate had decreased to 110. His heart rate at 22:10 is unknown, however there is no evidence to suggest that the heart rate monitor’s alarm was activated at that time to indicate the rate had increased into the yellow zone. Dr Bates considered that she had no difficulty in inserting the cannula and did not consider Brent’s sweating to be so profuse that would warrant concern. No other witness considered Brent to be diaphoretic, therefore the evidence cannot be taken any further to suggest that this may have been a symptom of envenomation.
61. The only clear symptom that Brent developed from the time he presented to hospital at 21:52 to 22:17 was swelling and “stinging” to the bite site. These are possible local symptoms as highlighted in the Guidelines. However, when these symptoms were put before the experts, they conceded that these symptoms along would not have caused a medical practitioner to come to a diagnosis that Brent was showing signs of envenomation. In fact, the experts confirmed that most bites by a brown snake are painless. Until 22:17, Brent showed no systemic or clinical symptoms of envenomation

and therefore, it must be accepted that the circumstances at the time did not warrant the administering of antivenom.

### ***The experts***

62. Professor Isbister and Professor White both appeared via AVL and gave evidence and were examined by all parties. Professor Isbister had not provided a formal report for the purposes of the inquest, however, was approached by the Hunter New England Local Health District (**HNELHD**) about Brent's case shortly after his death and asked to provide an opinion on his care and treatment. At the time, Professor Isbister had only been provided with the medical notes, however he also spoke to Dr Ryan and had been contacted by other legal representatives so was well informed about the circumstances around Brent's death.
63. Professor Isbister was also on the expert panel which wrote the 2013 Guidelines and is the author of the Australian Therapeutic Guidelines. He advised the court that the Australian Therapeutic Guidelines were released in August 2020, however the release of an update to the NSW 2013 Guidelines have been delayed for reasons unknown to him. Since the 2013 NSW Guidelines, Professor Isbister has published ten papers in the field of snakebites.
64. As a clinical toxicologist, he also heads the research for the Australian Snakebite Project, a project founded in 2002 in which Tamworth Base Hospital is an involved participant, sending the bloods of patients that have presented with suspected snake bites to be analysed for the project's research. Since its inception, they have received approximately 3,000 samples where 100-150 were envenomed blood.
65. Professor Isbister stressed that a toxicologist is available 24 hours a day and as part of that team, he gets called almost every night. The Australian Therapeutic Guidelines opening line states that a clinical toxicologist or poisons information centre should be contacted if envenoming is suspected. In examination, Professor Isbister conceded that the flowchart depicted in Figure 11.7 of the Guidelines should be amended seeking that advice from a clinical toxicologist should be higher up in the chain of steps. He further conceded that the NSW Guidelines should be brought in line with the Australian Therapeutic Guidelines.

66. Professor Isbister recommended that the risk assessment to be applied when determining whether or not to give antivenom factors based on the following: whether the snake was seen; if the snake was seen to bite the patient; subsequent symptoms; and the timing since the bite. When balancing the risk of whether or not to give antivenom, he estimates that 1 out of 4-5 patients will have an allergic reaction. Out of those, 2-3% will have a severe anaphylaxis or hypotensive reaction that may be life threatening.
67. Professor Isbister stated that Brent's case was exceedingly rare and that the Australian Snakebite Project had never seen a case before of a cardiac arrest in hospital from envenomation, but rather they were outside the hospital setting. Professor Isbister having reviewed hospital records, said Brent did not display any symptoms that would suggest he was envenomed prior to collapse. He did, however, say in accordance with the Australian Therapeutic Guidelines that he encouraged medical practitioners to call the experts very early, particularly where there had been a definite bite. Options could therefore be discussed. He opined that the closer a patient gets to the snake, the more likely that the patient has been envenomed. These are facts that can only be assessed by an expert on call toxicologist.
68. Professor White provided a very detailed report and his opinion did not divert from this report under oral questioning. He has been treating cases of envenomation since 1976 and is the author of the first version of the NSW Snakebite Guidelines. Professor White in his written report<sup>11</sup> and in his oral evidence at hearing was of the view that the symptoms and signs documented for Brent were not clear evidence that a collapse was imminent.
69. The experts all agreed that it should not be standard practice to give antivenom to patients that present with a snake bite unless there is first clear clinical indication of envenomation due to the risks involved. In Brent's case, there was no precursor before his collapse to suggest he was envenomed. None of the experts criticised the decision made by Dr Bates not to administer the antivenom before 22:23 on 10 January 2018.

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<sup>11</sup> See Professor Julian White's written report (Ex 1 tab 6) at pp3-4

## Section C Findings by reference to the Issues list

### General comments

70. One of the questions that Brent's family sought to be answered by the inquest was a simple one. Why was antivenom not administered earlier to give Brent a greater possibility of survival? The answer to this question was not a simple one, and the experts said that the situation may not have been any different if it had been administered earlier, due in part to the different responses that patients have to antivenom and the impact of possible high concentration of venom in the blood.<sup>12</sup>
71. However expressed in its simplest form the answer to that question appears to have been that antivenom was not administered earlier to Brent because in the view of treating medical practitioners it was not clinically indicated according to the applicable Guidelines that it should have been administered any earlier.
72. The evidence of Professor Isbister at the inquest based on the ASP research was that of all patients with brown snakebite envenoming about one third suffer a sudden collapse.<sup>13</sup> More than half of this one third recover without any treatment. Of the other half of the one third, half of them survive usually because someone does CPR on them (the others usually do not survive because no CPR is done). The first indication of severe envenoming can be cardiac arrest and potential death. The effect of envenoming in brown snakes is very rapid so you really need to give it so early to prevent this occurring. Once the patient has had the cardiac arrest that means that coagulopathy has developed. He was of the view that you are not going to prevent that and you are unlikely to prevent the cardiac arrest.<sup>14</sup>
73. Professor Isbister acknowledged in his oral evidence at the inquest that *"the problem with brown snakes is if you are in the 50% that gets systemic symptoms fantastic. It's going to make you give antivenom but more importantly with brown snake is that we cannot exclude and ...that's where the issue is, we can rule it in but can't rule it out and*

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<sup>12</sup> Professor Isbister, Transcript 12/11/20 ,25:0-10

<sup>13</sup> Professor Isbister, Transcript 12/11/20, 24:20

<sup>14</sup> Professor Isbister, Transcript 12/11/20 p23:0-10

*that's why it becomes – we have to keep waiting until we've got something that rules it in".<sup>15</sup>*

74. The Guidelines which apply to brown snake bite management, are according to the expert evidence given at the inquest, appropriate and effective for those patients who have not actually been bitten by a brown snake, or who have been bitten but have not been injected with any venom from a brown snake – that is had dry bites (non envenomed bites) or stick bites (no bite at all) in respect of protecting them from the risks associated with the unnecessary administration of antivenom (anaphylaxis and possible death),
75. I find based on the expert evidence given at the inquest that for the envenomed brown snake bite patients who are at the highest risk of a sudden collapse, cardiac arrest and death and who are in the group that do not show any observable unequivocal clinical signs of envenomation (such as Brent), there is potentially a gap or lacuna in the Guidelines when it comes to treating them. In respect of such patients, the Guidelines do not adequately provide for appropriate preventative treatment.
76. This gap or lacuna arises because for such patients, the current Guidelines expose them to the risk of a sudden collapse and death for quite a lengthy period of time while awaiting blood test results and further treatment. While according to the Guidelines, treating medical practitioners are to observe such patients carefully for any clinical signs of envenomation and await blood test results, the blood test results will take at least 35-60 minutes to be returned, and even when the results are returned may be inconclusive or incomplete. This was the case in respect of Brent's blood test results which were unable to be completed by the technician and which the two experts involved in the inquest may have interpreted differently.<sup>16</sup>
77. There is some irony to my finding that the Guidelines do not effectively identify and treat those patients who have actually been bitten by a brown snake and who are the envenomed and in the group that do not show any observable unequivocal clinical signs

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<sup>15</sup> Professor Isbister, Transcript 12/11/20,41:15-20

<sup>16</sup> Professor Isbister saying that the report of "clotted coags" was a sign of envenomation of itself, and Professor White being of a different view because the clotting could have had other causes. [add refs]

of envenomation (such as Brent), and who are at the highest risk of a sudden collapse, cardiac arrest and death.

78. One can understand why on the facts of this case Brent's family may feel that the current Guidelines failed Brent as they failed to prevent his sudden collapse, cardiac arrest and death or provide for the earlier administration of antivenom which may have prevented Brent's death, although this could not be stated with certainty based on the expert evidence before me. There is no doubt Brent did not have the opportunity to see if the early administration of antivenom prior to his collapse may have changed the outcome.

79. My finding is also consistent with the ultimate findings of the Australian Snakebite Project 2005-2015 and its review of snakebite deaths were that: "*[R]esearch and clinical practice should focus on improving early diagnosis, enabling earlier administration of antivenom*". It appears that notwithstanding that antivenom has been available for decades and consistent with the Australian Snakebite Project findings, patients with envenomed snakebites are still dying, including in the hospital setting as is shown by Brent's case.

80. It was said by the experts that Brent's case was unusual, arguably rare, exceptional<sup>17</sup>, particularly for there to be a collapse, cardiac arrest and death in a hospital setting.

81. I am of the view that another case similar to Brent's could occur in Tamworth or the New England region at any time in a hospital setting. This is, of course, of some concern given the gap or lacuna in the Guidelines that I have identified. I have come to this view taking into account the frequency of brown snake sightings in Tamworth, the fact that many of the population of Tamworth of in excess of 60,000 people live within a 20-30 minute distance from Tamworth Base Hospital, the evidence of Professor White as to the ability of brown snakes to live alongside humans notwithstanding urban development and the evidence of Professor Isbister that he is in regular contact with doctors from the ED of Tamworth Base Hospital in respect of snake bite cases,

82. The experts in their evidence at the inquest were concerned that antivenom not be administered to every patient said to have had a brown snakebite because 1 in 20 would

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<sup>17</sup> See for example Professor Julian White's written report (Ex 1 tab 6) at p3



not develop envenoming and there were risks of the patient suffering an allergic reaction, with a risk of anaphylaxis and even a small risk of death arising from the use of antivenom.

83. I accept the experts' view that the Guidelines should not provide for the administration of antivenom in every case of a suspected brown snakebite for the reasons that they gave.<sup>18</sup>

84. What can be done? Advocate Assisting the Coroner made a number of recommendations as to changes to the Guidelines to possibly address this gap and try to prevent this situation ever occurring again.

85. It is accepted that the gap or lacuna in the Guidelines may be difficult to address, particularly due to the limitations of the current state of medical knowledge, the apparent lack of any effective bedside test for venom, and the lack of research funding and lack of availability of early diagnosis tools for brown snake envenoming. It is important however that its existence be acknowledged and that the risks to patients affected is properly considered. I find therefore that attempts should be made to continually improve and revise the Guidelines to better address the gap that I have identified. Otherwise the Guidelines may be seen to fail the very patients that most would assume they are intended to assist – that is envenomed brown snakebite patients who need urgent medical treatment and the early administration of antivenom to maximise their chances of survival.

86. The experts agreed that most doctors will manage very few patients with envenoming during their careers and cannot be expected to be experts in managing snakebite patients. It will be part of my recommendations that it should therefore be a matter of routine or recommended as part of the Guidelines to discuss the patient with a medical

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<sup>18</sup> Professor White in particular was against any recommendation that the Guidelines be changed to recommend for example that all patients presenting with a bite by a brown snake should receive early antivenom. Not just because the cost of treating this patient group would rise, but also the attendant risks, including death (from anaphylaxis) or long term disability from adverse reactions to antivenom (from serum sickness). Further his view that it was quite uncertain that such a policy change would have prevented the tragic outcome in Brent's case (Professor Julian White's written report (Ex 1 tab 6) at p3)

expert in toxicology (or toxinology according to Professor White), so that the treating doctor has access to the latest information on care of such patients.<sup>19</sup>

87. I accept the general thrust of Advocate Assisting's submissions that a more nuanced approach should be considered in the Guidelines which emphasises that for envenomed brown snakebite patients that a sudden collapse and cardiac arrest may be the first sign of envenomation, and by that time the effectiveness of the administration of antivenom may be compromised. That reminds the treating doctor of their discretion to administer antivenom before the results of blood tests are known and based on their assessment of the risk of envenomation and sudden collapse against the background of the case, in which they are encouraged to seek the input of an expert toxicologist or toxinologist on this risk assessment and in which they are, to the extent possible in a clinical setting, keeping the patient informed of the proposed treatment approach, the risk of sudden collapse and the systemic signs of envenomation to be on the lookout for, involving the patient in the risk assessment in respect of the administration of antivenom.

88. Professor White was of the view that brown snake bite should not be managed differently to other snake bites as all snakebite patients are at risk of potentially catastrophic envenoming and in many cases the identity of the snake involved is not certain<sup>20</sup>  
Professor White stated:<sup>21</sup>

*..unfortunately a few deaths from snakebite were likely in Australia, despite best practice medical care, simply because of the uncommon to rare effects of envenoming, specifically the sudden, often unheralded, cardiac arrest that most often occurred pre-hospital..."*

89. Given, however, brown snake bites are the most common and deadly according to the Australian Snakebite Project 2005-2015, in my view it is justified for the experts to

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<sup>19</sup> Professor Julian White's written report (Ex 1 tab 6) at p8

<sup>20</sup> Professor Julian White's written report (Ex 1 tab 6) at p5

<sup>21</sup> Professor Julian White's written report (Ex 1 tab 6) at p13

consider singling out brown snakes in the Guidelines by way of an appendix and I propose to make findings in that regard.

90. My findings in this Inquest are set out below by reference to the Issues List.

***Findings - Issue 1 - Was the care and treatment provided to Brent upon admission to Tamworth Hospital on 10 January 2018 appropriate and adequate?***

91. This inquest considered in detail the adequacy of the observations of Brent by medical staff and of the medical treatment of Brent upon his presentation to the Emergency Department of Tamworth hospital. In particular it considered whether the nursing staff and doctors had missed any clinical signs of envenomation prior to his collapse.

92. The unanimous conclusion of the experts was that Brent's care and treatment had been within accepted parameters and no care and treatment concerns were identified. Further, and in particular that: (1) treating nurses and doctors had not missed any early clinical signs of envenomation prior to Brent's sudden collapse; (2) the medical practitioner's decision not to apply a PBI when Brent was being treated at Tamworth Base hospital had not detrimentally impacted Brent<sup>22</sup> (although applying a PBI was recommended in a hospital setting); (3) the earlier administration of antivenom to Brent was not indicated by the Guidelines as being needed at any point prior to the time it was administered; and (4) the Guidelines were followed at all times by treating medical staff.

93. I am comfortably satisfied that there are no care and treatment concerns given the evidence that the Guidelines were followed. The evidence presented at the inquest confirms that from the time that Brent presented in the ED, he was promptly triaged and seen by Dr Bates. The first hour after the bite is considered to be the most crucial, however the inquest was unable to confirm with any further specificity the time Brent was bitten. I find that the bite is likely to have occurred sometime between 21:12 and 21:35

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<sup>22</sup> Professor White said that probably if appropriate PBI first aid had been applied it might have slowed the onset of envenoming and thereby provided more time for in-hospital assessment and treatment (Professor Julian White's written report (Ex 1 tab 6) at p13) although Professor Isbister said not applying a PBI at triage or at all during presentation at ED was unlikely to have changed the outcome as it needs to be placed on immediately and the patient to have been immobile from the time of the bite (Exhibit 1:tab 4). Professor Isbister did recommend a PBI be put on in a hospital setting more in terms of consistency of first aid.

and considering Brent's collapse was at 22:17, on the evidence before me this is a reasonable assumption to make. I find that the inability to specify a precise bite time would not have altered the treatment Brent received at the hospital. Dr Bates' evidence was that she always considered Brent as a high risk patient when he arrived. Even in hindsight, she did not say that she would have made different decisions to those she made on 10 January 2018. The opinions of Professors Isbister and White confirm they agree with Dr Bates' assessment.

***Findings - Issue 2 - Were all preventative measure put in place to give Brent the best possible opportunity to survive the snake bite sustained to him?***

94. My findings on issue 2 overlap with my findings on issue 1.

95. I note the experts' comments that a PBI bandage should have been applied for consistency in first aid even in a hospital setting. I also note the experts' views that this would not have likely changed the outcome for Brent.

96. All clinical notes recorded by staff were completed retrospectively. The evidence was not able to elicit specific conversations that took place between Brent and the staff, particularly from the time that he arrived at bed 17. Furthermore, there was information that the inquest discovered regarding Brent's condition that was not provided to the medical staff. For example, the information regarding the pain Brent had in his arm in the car if reported to the treating doctor may have prompted doctors to have exercised their clinical judgement earlier before his collapse in favour of administering the venom. Although Brent didn't disclose this information at the time, a detailed history and examination should have elicited that information. The experts all agreed that until there is any systemic or clinical evidence of envenomation, then antivenom should not be administered and decline to adopt the view that anti venom should be administered to all snake bite victims. However, any information that is an indication of clinical deterioration is important because blood results take time. It should be considered in any review of the Guidelines that the history and examination regarding the 'snake bite' is important information to assist medical staff in determining, in the absence of blood results, whether to exercise their discretion to give antivenom before a patient becomes unresponsive.

***Findings - Issue 3 - Are the current NSW Health Clinical Management Guidelines used to address the treatment following a patient that has sustained a snake bite appropriate?***

97. The evidence at the inquest was that the Guidelines are regularly reviewed and in the ordinary course were due for a review which appears to have been delayed by COVID and the conduct of this inquest.
98. The Guidelines are drafted by or with the input of experts and this of course needs to continue. The main finding and recommendation that I make is that the experts who are asked to review the Guidelines should be provided with a copy of these findings and asked to review the Guidelines, taking into account in particular my findings as to there being a lacuna or gap in the Guidelines in that they currently do not adequately provide for appropriate preventative treatment for envenomed Eastern brown snake bite patients who are at risk of a sudden collapse without prior clinical or systemic symptoms and prior to blood test results being known, such as in Brent's case.
99. It is my hope that medical practitioners and experts will do their best in the future when revising the Guidelines to try to revise them to address this gap or lacuna in the Guidelines. It is my hope that they consider whether in order to fill the gap it is necessary to see brown snakes as a possible separate category due to the risk of sudden collapse without prior clinical or systemic symptoms of envenoming, which sets them apart and make them more dangerous and potentially the deadliest of all Australian snakes.

**Section D Recommendations and formal findings**

***Recommendations - Are there any public health and safety issues raised by this case that require recommendations for remedial action to address systemic shortcomings?***

***Issue # 3 - Are the current NSW Health Clinical Management Guidelines used to address the treatment following a patient that has sustained a snake bite appropriate?***

100. In respect of this issue Advocate Assisting made a number of submissions as to the recommendations I should make when it came to the Guidelines (Recommendations 1.1-1.8). In this regard I note that during the course of this inquest no evidence was led as to what was happening to updating the Guidelines and the Coroner was left to infer what

was happening from the final written submissions of NSW Health and HNELHD at [1.9] that “*draft revised Guidelines are being prepared*”.

101. I have read and taken into account the written submissions of NSW Health and HNELHD in respect of these recommendations by Advocate Assisting (other parties not commenting, NSW Pathology limiting their submissions to certain issues only). In terms of Advocate Assisting’s recommendation 1.1, they particularly take issue with the suggestion that the Coroner should recommend that the Expert Review Panel reviewing the Guidelines “*should include any possible divergent ‘expert’ views within the medical community and include person who can provide guidance...*” (describing it as “fraught with danger”). The reason given is that such a recommendation would be outside of the scope of the inquest and is unclear as to who it is appropriate to include. I do not agree that such a recommendation is outside the scope of this inquest, given that adequacy of the Guidelines, which must incidentally include the review process to prepare them, was at all times an important issue in the inquest. I will however express that recommendation in terms that “*the Expert Review Panel should “consider” including any possible divergent ‘expert’ views*”, leaving it to the Panel to recommend what it thinks that this is appropriate.
102. The written submissions of NSW Health and HNELHD also take issue with the recommendation by Advocate Assisting at 1.1.3 as to the writing of the Guidelines by experts. Taking into account those submissions, I will express that recommendation somewhat differently, recommending instead close collaboration with experts and input from experts in the writing of the Guidelines.
103. In respect of Advocate Assisting’s recommendation in paragraph 1.2, I note that NSW Health and HNELHD in their written submissions support providing a copy of these findings to the Expert Review panel. They do not, however, support the further more detailed findings suggested by Advocate Assisting. In respect of the more detailed findings proposed by Advocate Assisting at 1.2.1, I assume that NSW Health and HNELHD does not support those recommendations because they do not agree that there are any changes or improvements that should be made to the Guidelines as a result of this inquest or Brent’s case. As to why NSW Health and HNELHD say that Brent’s case should not be used as a case study, the reasons given are somewhat opaque. In that regard I disagree and I refer to my general findings set out above that there is a gap or lacuna in the Guidelines for the reasons I have given which I do not set

out again here. I find that Brent's case is a clear example of what can happen to the most high risk brown snake bite patient who suffers envenomation following a brown snake bites and is at risk of sudden collapse, cardiac arrest and death and who may show no prior clinical symptoms. The recommendation is already expressed in terms of requesting the relevant persons to "consider" these matters. For these reasons I propose to make the recommendations in accordance with Advocate Assisting's paragraphs 1.2.1 to 1.2.2.

104. In respect of Advocate Assisting's recommendations in paragraph 1.3.1-1.3.4 (Patient Centred Care), I note that these findings are not supported by NSW Health and HNELHD in their written submissions, because they say that is a matter for good clinical management. In Brent's case there was no suggestion on the evidence that possible clinical symptoms to be on the look out for in relation to possible envenomation, the risk of collapse and the other matters relating to envenomation were ever discussed with Brent or his mother, notwithstanding his admission at 21.52 and his sudden collapse at 22.17, some 25 minutes later. I accept Advocate Assisting's submissions that these recommendations should be made and these matters should also be referred to the Expert Review Panel for further consideration. I do not accept that this in effect transfers the clinical decision-making process onto the shoulders of the patient or that Professor White suggested this. A proposition to this effect in cross examination was put to Professor White by counsel for NSW Health and HNELHD which contained a number of components, in the form of a rolled up question. It was not a comment that originated from or was volunteered by Professor White. Professor White's response "*Yeah, I think it would be a difficult thing to do*" may have been responding to the last part of the rolled up question, the part stating that the decision has to be made quickly.<sup>23</sup> It is not clear. The recommendation is in any event couched in terms of "*involving*" the patient in decision making not transferring the clinical decision to the patient. In any event, the same proposition was not put to Professor Isbister and the inquest did not get the benefit of his views on it. I find that the Guidelines should embrace and mandate patient centred care, information sharing and shared decision making with patients, consistently with other policies of NSW Health.

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<sup>23</sup> See the question put to Professor White and his answer, (Transcript 12/11/20, 71:15-20)

105. In respect of Advocate Assisting's recommendations in paragraph 1.4 (Separate Appendix for brown snake patients) and in paragraph 1.5 (adding a separate "information sheet" for patients in respect of brown snakes), I note that these recommendations are not supported in the written submissions of NSW Health and HNELHD. Paragraph 1.4 was not supported in summary as it was said to overcomplicate the position and not be supported by experts and of little use as it is often not known what snake bit the patient. Paragraph 1.5 was not supported repeating their submissions in opposition to the "patient centred care" recommendations and raising concerns as to causing acute anxiety in vulnerable patients. Given the gap or lacuna I have identified in my general findings above, and the fact that brown snakes have been described by the experts in this inquest as the most dangerous, deadly and amongst the most difficult to deal with. Further, I note the findings of the Australian Snakebite Project from their review 2005-2015 that most of the snakebite victims who die in Australia have been bitten by brown snakes. I accept Advocate Assisting's submissions that a separate Appendix should be considered by the Expert Review Panel. It would be particularly valuable where as happened in Brent's case, the type of snake was known to be a brown snake (Brent having brought the snake with him to hospital in a jar). I further repeat my response to NSW Health and HNELHD's opposition of the "*patient centred care*" approach suggested by Advocate Assisting and confirm I accept her submissions in this regard.
106. In respect of Advocate Assisting's recommendations in paragraph 1.6.1-1.6.2.8 (amendments to Snakebite Clinical Pathway), NSW Health and HNELHD say that while there was some support in the evidence at the inquest for this, the Expert Review Panel should consider it. That is precisely what Advocate Assisting's recommendation says. I also note that NSW Health and HNELHD do not support the recommendations at 1.6.2-1.6.2.6 (regarding key clinical signs and symptoms), for the reasons given. The Expert Review Panel is in my view best placed to consider whether these changes are appropriate in the light of the findings in Brent's case and I therefore accept Advocate Assisting's recommendations in this regard.
107. In respect of Advocate Assisting's recommendations in paragraph 1.7 (funding for availability of on-call toxicologist), NSW Health and HNELHD written submissions say in summary that there was no evidence at the inquest as to how the Poisons Information Hotline is funded and it would be inappropriate to make a recommendation as to funding to the MOH in the light of this. As the recommendation proposed by Advocate Assisting is couched in terms of a recommendation to the MOH only not direction, and given that



the Poisons Information Hotline is already listed as part of suggested resources available to be referred to in the existing Guidelines at p6, I can infer that information as to its funding etc, is already in the possession of NSW Health and HNELHD and the MOH, and can be considered by those entities against the background of them having the full information, consideration being all that is required by the recommendation. I therefore support the recommendation proposed by Advocate Assisting.

108. In respect of Advocate Assisting's recommendations in paragraph 1.8 (keeping the Guidelines updated), NSW Health and HNELHD did not make any written submissions in this regard. I assume there is no opposition by any party and I accept Advocate Assisting's recommendation in this paragraph.
109. In respect of Advocate Assisting's recommendations in paragraphs 2 and 3, I note that that NSW Health and HNELHD support these recommendations and I accept Advocate Assisting's recommendations in these paragraph.
110. In respect of Advocate Assisting's recommendations in paragraph 4 (public education campaign), I note that NSW Health and HNELHD support this recommendation and I accept Advocate Assisting's recommendation in this paragraph.
111. I have taken into account the written submissions of NSW Pathology and have made some adjustments in terms of the recommendations that relate to them in the light of those submissions.

### ***Recommendations to NSW Ministry of Health (MOH)***

1. I make the following recommendations:
  - 1.1. The MOH should consider carrying out an urgent review of the '*Snakebite and Spiderbite Clinical Management Guidelines 2013*' (**Guidelines**) (review date 17 September 2019) and in doing so, should consider the following:
    - 1.1.1. Establishing an Expert Review Panel to review the current version of the Guidelines;
    - 1.1.2. The Expert Review Panel should consider including any possible divergent 'expert' views within the medical community and include persons who can provide guidance on any suggestions as to how to bring the Guidelines in line

with the current Australian Therapeutic Guidelines if that is considered appropriate;

- 1.1.3. The writing of the Guidelines should be a task in respect of which there is close collaboration with and input from experts.
- 1.2. The MOH should consider providing the Expert Review Panel with a copy of the Coroner's findings from this Inquest and consider asking it to examine and make recommendations as to:
    - 1.2.1. Any changes or improvements that can be made to the Guidelines, noting the circumstances regarding Brent's death and the gap or lacuna in the Guidelines identified in the findings above. This case has demonstrated that, without any precursor, a sudden collapse from a brown snake bite can result in death within a hospital setting;
    - 1.2.2. The facts of whether Brent's case can be used as a case study to assist and prescribe up-to-date advice for the medical community for future incidents;
    - 1.2.3. Whether it is appropriate to expressly add into the Guidelines what appears to be implicit, being a notation that the treating doctor in the case of a likely confirmed brown snake bite has a discretion to administer antivenom in advance of the results of the recommended blood test results being available following a risk assessment having been undertaken as to the likelihood of an envenomed brown snake bite and the risk of sudden collapse; and
    - 1.2.4. Where possible, the treating doctor carrying out that risk assessment in conjunction with and after consultation with an on-call expert toxicologist or toxinologist from the Poisons Information Hotline, considering the risk of sudden collapse occurring before there are obvious signs of envenomation;
  - 1.3. The MOH should consider providing the Expert Review Panel with a copy of the Coroner's findings from this Inquest and consider asking it to examine and make recommendations as to:
    - 1.3.1. Whether in respect of a likely confirmed brown snake bite that adopting an approach of "patient centered care", the treating doctor should:
    - 1.3.2. Expressly discuss with the patient:

- 1.3.2.1. What the likely symptoms of envenomation from brown snake bite are so that the patient (and any support person with them) are on notice of and can look out for, any sign of these symptoms;
  - 1.3.2.2. The risk of sudden collapse of a patient following a brown snake bite;
  - 1.3.2.3. The possible ineffectiveness of anti-venom administered after that collapse, to be considered against the possible risk of an adverse reaction to antivenom if administered prior to confirmation of envenomation; and
  - 1.3.2.4. The outcome of the risk assessment referred to above and where appropriate and there is sufficient time to do so, involve the patient in the decision about the possible early administration of antivenom to be undertaken by the treating doctor in advance of the blood test results being known based on that risk assessment.
- 1.4. The MOH should consider providing the Expert Review Panel with a copy of the Coroner's findings from this Inquest and consider asking it to examine and make recommendations as to:
- 1.4.1. Whether it is appropriate to add into the Guidelines a separate "appendix" sheet for brown snake bite which extracts applicable information from elsewhere in the Guidelines, emphasizing the possibility of nil or minimal signs of envenomation prior to a sudden collapse and cardiac arrest; that the first sign of envenomation may be sudden collapse; recommends continuous supervision; recommends a risk assessment be undertaken by the treating doctor in conjunction where possible with the treating doctor consulting with an expert toxicologist or toxinologist from the Poisons Advice Hotline and in respect of that risk assessment, a consideration of the early administration of antivenom before the blood test results are known.
- 1.5. The MOH should consider providing the Expert Review Panel with a copy of the Coroner's findings from this Inquest and consider asking it to examine and make recommendations as to:
- 1.5.1. Whether to add into the Guidelines a separate "information sheet" for patients which includes information for patients with a suspected brown snake bite, describing the process that includes vigilant observations while blood tests are taken, and if there is a sign of envenomation then antivenom may be given.

This “information sheet” should emphasize the possibility of nil or minimal signs of envenomation prior to a sudden collapse and cardiac arrest.

- 1.6. The MOH should consider directing the Expert Review Panel to consider amending the Snakebite Clinical Pathway attached to the Guidelines in the following ways:
  - 1.6.1. To expressly state and prioritise a recommendation that the treating doctor in the case of a likely brown snake bite contact an on-call toxicologist or toxinologist as an expert resource to assist in the discussion of possible treatment options and the risk assessment referred to above;
  - 1.6.2. To include a recommendation that the risk assessment referred to above be carried out and include a detailed history and examination of whether:
    - 1.6.2.1. The snake was seen;
    - 1.6.2.2. The patient saw the snake bite the patient;
    - 1.6.2.3. What was the proximity of the snake to the patient when the bite occurred;
    - 1.6.2.4. Whether there is a visible a puncture wound;
    - 1.6.2.5. Whether any first aid, e.g. an effective PBI has been applied;
    - 1.6.2.6. Any symptoms of envenomation (however minor).
  - 1.6.3. To add simple plain English explanations for Latin terms so that nursing staff (however inexperienced) can immediately complete the chart rather than having to seek clarification of the meaning of terms (for example in this case there was evidence that a nurse treating Brent had to seek clarification of the meaning of the symptom “ptosis” from another nurse, potentially distracting her from care of Brent).; and
  - 1.6.4. In relation to the Snakebite Observation Chart to warn that if any signs of envenomation are detected that this information is reported to the treating doctor immediately.
- 1.7. The MOH should consider taking steps to ensure that adequate funding is available for an expert on call toxicologist/toxinologist to be made available to consult with treating doctors through the Poisons Information Hotline to assist any treating doctor with a suspected case of brown snake bite and possible envenomation with the

consequent risk of sudden collapse and should consider providing a quick access number for treating doctors.

- 1.8. The MOH should consider taking steps to ensure that the Guidelines are regularly reviewed to keep up with the ongoing research and advances regarding the possible availability of bedside blood testing methods to detect brown snake envenomation given the time taken to process blood test results in the ordinary course and other advances in the treatment of brown snake envenomed patients.

### ***Recommendations to MOH - NSW Health Pathology's Forensic Medicine Service***

2. That consideration be given to providing notification to the NSW State Coroner and the Head of the NSW Department of Forensic Medicine that expert clinical toxicologists and toxinologists have said in evidence in this inquest that:

- 2.1. Subject to the constraints of the *Coroners Act* and noting the need for prior consultation with and consent of families of the deceased, a full autopsy of suspected brown snake bite victims is likely to assist in advancing understanding of envenomation and the treatment of envenomed brown snake bite victims as well as providing a greater understanding of the manner of the death, including to assist in addressing the gap or lacuna in the Guidelines that I have identified, so that consideration can be given to developing an appropriate practice note or direction to this effect if one is required<sup>24</sup>; and
- 2.2. Formalisation of the currently ad hoc arrangement of providing antemortem blood specimens of brown snakebite fatalities to a research hospital for the purposes of research (taking steps to ensure that the requirements/constraints of the *Coroners Act* are satisfied and noting the need for prior consultation with and consent of SNOK of the deceased).

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<sup>24</sup> Professor White noted that without a full autopsy there was no information about the presence of external or internal pathology that might be present in an envenomed patient. *"Every fatal snakebite in Australia is a tragedy, but fortunately rare, so in my opinion every opportunity should be realised to fully learn from such cases, by undertaking a comprehensive autopsy. In my opinion this should be the default process in all fatal envenomings (White: p14)."*

### ***Recommendations to MOH - NSW Health Pathology***

3. I recommend that:

3.1. [not made]

3.2. That consideration be given to stating in an appropriate place in the instructions to lab technicians carrying out blood tests on potential brown snake bite victims, that where in the course of carrying out a blood test the result is “*clotted coags*”, that this may be a result in itself and suggest brown snake bite envenomation and should be reported as a matter of urgency to the treating doctor.

### ***Recommendations to Hunter New England Local Health District (HNELHD)***

4. I recommend that:

4.1. The HNELHD should consider conducting a public education campaign for the district regarding:

4.1.1. The dangers associated with the Eastern Brown Snake and what to do if you encounter one<sup>25</sup>; and

4.1.2. How to treat a suspected bite from an Eastern Brown Snake (emphasising the use of PBI's, calling 000 for assistance, keeping the patient immobile and to ensure medical staff are aware the patient is coming to hospital even if being transported by private car and so appropriate first aid can be administered).

4.2. The HNELHD should consider continuing training on a regular basis for all medical practitioners working within the Emergency Department or staff likely to come into contact with a brown snake bite patient, to ensure:

4.2.1. They are familiar with both the Guidelines and the Australian Therapeutic Guidelines and, by reference to Brent as a case study, in particular, of the risk of sudden collapse and cardiac arrest in a brown snake bite victim prior to blood

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<sup>25</sup> Professor White:13 – was of the view that there is a need to make the community more aware of the potentially dire outcome from snakebite, reinforcing the need for both prevention and effective first-aid if a bite occurs.

test results being available and no prior warning of envenomation or only very subtle signs of envenomation. The training should emphasise the availability of the expert advice of an on-call toxicologist from the Poisons Information Hotline and that the use of that resource may become critical to the risk assessments required to be carried out in respect of brown snake bite victims.

- 4.2.2. They are familiar with the 'Snake Observation Chart.' In particular, how to use this chart in conjunction with the Standard Adult Observation Chart to ensure that contemporaneous observations notes are maintained and distinguished by the relevant author and time of documenting information.

### ***Findings under the Coroners Act***

1. The findings that I make under section 81(1) of the Coroners Act are

#### ***Identity***

The person who died was Brent Justin Crough.

#### ***Date of death***

Brent Justin Crough died on 10 January 2018 at 23:17.

#### ***Place of death***

Brent Justin Crough died at Tamworth Base Hospital, Tamworth NSW 2340.

#### ***Cause of death***

The cause of Brent Justin Crough's death was Complications of Brown Snake Bite.

#### ***Manner of death***

Misadventure due to picking up an Eastern brown snake whilst separating the snake from a dog

2. On behalf of the coronial team I would like to offer my sincere and respectful condolences to Brent's family and friends.

3. I close this inquest.

A handwritten signature in black ink, appearing to read 'Julie Soars', written in a cursive style.

**Magistrate Julie Soars**

**Coroner**

7 May 2021

Local Court of NSW, Tamworth



**NON-PUBLICATION ORDER**

Coroners Act 2009, section 74. Form 16

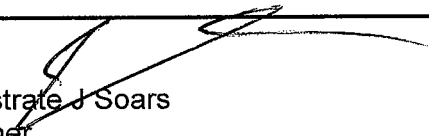


Coronial Jurisdiction  
Tamworth  
2018/00010493

✓ A ✓



D0001CLHON

<b>Proceedings</b>	Case number 2018/00010493 Inquest into the death of Brent CROUGH
<b>Date of Order</b>	Date made or given 12 November 2020
<b>Terms of Order</b>	1. That the following information contained in the brief of evidence tendered as exhibits in the proceedings not be published under section 74(1)(b) of the Coroners Act 2009 (NSW):  a. The home addresses, personal phone numbers, mobile numbers and/or email address of any person referred to in that material; and b The photographs of Mr Brent Crough contained in Confidential Exhibit 2.
<b>Signed</b>	 Magistrate J Soars Coroner
<b>Date</b>	18 November 2020