IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: COR 2014 5696

FINDING INTO DEATH WITHOUT INQUEST

Form 38 Rule 60(2)
Section 67 of the Coroners Act 2008

Findings of:	Caitlin English, Coroner
Deceased:	Shane Kyle Tatti
Date of birth:	13 July 1987
Date of death:	8 November 2014
Cause of death:	I(a) Complications of snake bite
Place of death:	Austin Hospital 145 Studley Road, Heidelberg, Victoria

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I, CAITLIN ENGLISH, Coroner having investigated the death of Shane Kyle Tatti without holding an inquest:

find that the identity of the deceased was Shane Kyle Tatti

born on 13 July 1987

and the death occurred on 8 November 2014

at Austin Hospital

from:

I(a) Complications of snake bite

Pursuant to section 67(1) of the **Coroners Act 2008**, there is a public interest to be served in making findings with respect to **the following circumstances**:

1. Mr Tatti was 27 years of age at the time of his death. He resided at 42 Forest Road, Orbost, Victoria.

2. On 6 November 2014, whilst working as a gardener removing weeds on the banks of the Snowy River, he was bitten by a tiger snake.

3. He died from complications of snake bite at the Austin Hospital on 8 November 2014.

The purpose of a coronial investigation

4. Mr Tatti's death was reported to the Coroner as it appeared to be unexpected or the result of an accident, and so fell within the definition of a reportable death in section 4 of the *Coroners Act 2008.*

5. The role of a coroner is to independently investigate reportable deaths to establish, if possible, identity, medical cause of death and surrounding circumstances. Surrounding circumstances are limited to events which are sufficiently proximate and causally related to the death. The purpose of a coronial investigation is to establish the facts, not to cast blame or determine criminal or civil liability.

6. The coronial brief includes statements obtained from Mr Tatti's employer and work colleagues and treating medical staff at the Orbost, Bairnsdale and Austin Hospitals. Coroner's Investigator Detective Senior Constable Darcy Neal advised he based the coronial brief on the Work Safe investigation and he did not prepare an investigator's statement.

7. As part of the investigation I requested the Coroners Prevention Unit to review Mr Tatti's medical care. Following that review I obtained expert opinions from snakebite experts Dr Julian White, Associate Professor Mark Little and Professor Geoff Isbister.

8. I investigated the medical management of Mr Tatti's snake bite and the debate surrounding the guidelines for administering antivenom. I have also noted the results of the WorkSafe investigation whereby an Improvement Notice was served on Mr Tatti's workplace resulting in the introduction of new safety measures, which have now been implemented.

9. I have also had regard to correspondence from Mrs Susan Tatti, Mr Tatti's mother, dated 28 April 2017. Mrs Tatti has raised a series of questions about the type of snake, the amount of venom and antivenom, Mr Tatti's working conditions, Mr Tatti's immediate first aid treatment following the snake bite, his transfer and treatment at Orbost Regional Health, his transfer and treatment at Bairnsdale Reginal Health and transfer and treatment to the Austin Hospital. Many of her questions are answered in this finding and many of her concerns relate to the main issue under consideration, namely the appropriateness of the amount of antivenom administered to Mr Tatti.

10. I have based this finding on the evidence contained in the coronial brief. In the coronial jurisdiction facts must be established on the balance of probabilities.[1]

IDENTITY

11. On 8 November 2014, Susan Tatti visually identified her son, Shane Tatti, born 13 July 1987.

12. Identity is not in dispute and requires no further investigation.

Background

13. As part of a Federal Government initiative, East Gippsland Catchment Management Authority (EGCMA) was funded to revegetate and restore the flow of the Snowy River. Following a process seeking expressions of interest, EGCMA contracted with Snowy River Riparian Pty Ltd (SRR) for weed control and planting in the East Gippsland area.

14. Mr Tatti was employed as a labourer with a work hire company, GAB Consultants Pty Ltd. Mr Tatti began working for SRR in April 2013. His duties involved weed management and planting, which often involved working along local river banks.

[1] This is subject to the principles enunciated in *Briginshaw v Briginshaw* (1938) 60 CLR 336. The effect of this and similar authorities is that coroners should not make adverse findings against, or comments about, individuals unless the evidence provides a comfortable level of satisfaction as to those matters taking into account the consequences of such findings or comments.

CIRCUMSTANCES IN WHICH THE DEATH OCCURRED

Snakebite incident

15. On 6 November 2014 at approximately 6.45 am Mr Tatti attended a toolbox meeting at the SRR depot. The team of five was tasked for weed eradication at Nixons Lane on the Snowy River.

16. At approximately 11.00am, Mr Tatti was working in an area heavily infested with wild radish weed. As the foliage of the weed forms a matt, it can be lifted up.

17. As Mr Tatti lifted a layer of the weed he was bitten by a snake. The snake attached itself to the outside of his right wrist.

18. The snake was identified as a 1.5-metre tiger snake. The snake was reported to vigorously bite his arm and was not detached easily.

19. Mr Tatti was carried by a co-worker to the fence line and First Aid, by way of a bandage, was applied. His arm was immobilised and he was carried to the car and transported to the Orbost Hospital, arriving at 11.45am in the Emergency Department. Upon arrival, the admitting nurse described Mr Tatti as sweating, anxious and vomiting. There was documentation of a pre-hospital 'compression bandage in situ' in the Orbost Hospital medical record, and 'firm bandaging in situ from hand to elbow' in the nursing record. It was noted in the nursing record that this was left in place and reinforced to the armpit by the ambulance officer.[2]

20. The symptoms and signs experienced by Mr Tatti indicating envenoming included localised swelling and bruising, along with systemic effects of sweating, headache, nausea, vomiting and limb weakness.[3]

Clinical management

21. Mr Tatti was clinically assessed by Dr Yedlapalli who documented blood pressure, respirations and central nervous system observations to be within normal parameters.

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[2] A pressure bandage with immobilisation is the recommended first aid for suspected or definite snakebite. The bandage needs to be broad (15 cm) and preferably elasticised, rather than the previously recommended crepe bandage. The bandage is applied first over the bite and then to cover the whole limb at a pressure similar to that used for a sprained ankle. Immobilisation is essential; the limb and whole patient must remain immobilised from the time of the bite.

[3] The systemic envenoming includes venom-induced consumption coagulopathy, sudden neurotoxicity thrombotic microangiopathy and renal impairment.

Following a phone consultation with a toxicologist at the Poisons Centre[4], one vial of tiger snake antivenom was administered intravenously (IV) at 12.02pm, just after 10mg of IV metoclopramide[5], and prior to the intra muscular administration of 25mg promethazine.[6] The course of the antivenom finished at 12.50pm. No initial blood tests appear to have been taken at Orbost Hospital.

22. Mr Tatti was subsequently transferred to Bairnsdale Hospital at approximately 12.35pm by road ambulance. Blood tests were performed at Bairnsdale Hospital. Following a conference call between Adult Retrieval Victoria and a toxicologist the decision was made to transfer Mr Tatti to Austin Health where he arrived at 4.20pm.

23. On arrival, Mr Tatti's blood results from Bairnsdale Hospital were noted to be markedly abnormal with a CK greater than 300,[7] International Normalised Ratio (INR) greater than 10,[8] Activated Partial Thromboplastin Time (APTT) greater than 120[9] and D Dimer greater than 35.[10] There is a note that fibrinogen was not tested at Bairnsdale Hospital, and the toxicologist consulted requested a Computerised Tomography (CT) scan of Mr Tatti's brain.[11]

24. Mr Tatti had a complicated clinical course at the Austin Hospital. Mr Tatti deteriorated with worsening paralysis as evidenced by diplopia[12] and failure of adduction of the left eye, dyspnoea,[13] and trismus.[14]

25. On 7 November 2014, the day following Mr Tatti's transfer to the Austin Hospital, he had evidence of worsening rhabdomyolysis,[15] with rapidly rising CK levels,[16] renal failure and hyperkalaemia,[17] and refractory shock.[18]

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[4] In accordance to the Victorian Department of Health. 2014 Clinical Guideline. 'Management of snake bite in emergency departments (ED) in Victoria'.
[5] An antiemetic administered to treat nausea and vomiting.
[6] Promethazine (Phenergan) is a neuroleptic and first-generation antihistamine.
[7] CK is a measure of skeletal muscle damage. The normal range is <161.
[8] The INR measures the clotting tendency of blood.
[9] The normal values of APTT differ from lab to lab. Generally, the time taken for blood coagulation ranges between 25 and 39 seconds.
[10] D-dimer is a fibrin degradation product (or FDP), a small protein fragment present in the blood after a blood clot is degraded by fibrinolysis.
[11] According to the 2014 Victorian DoH clinical guideline, the initial blood tests are to include coagulation screen (INR, APPT, fibrinogen), FB, CK, EUC, LDH and LFTs.
[12] Double vision.
[13] Shortness in breath.
[14] Trismus, or lockjaw, refers to reduced opening of the mouth.
[15] Rhabdomyolysis is the breakdown of muscle tissue that leads to the release of muscle fibre contents into the blood.
[16] CK is a measure of skeletal muscle damage. The normal range is <161. Mr Tatti's peak CK level was over 500,000.
[17] Abnormally high levels of potassium in the blood.
[18] Irreversible shock, despite appropriate treatment.

26. The intensive care medical team consulted with a consultant toxicologist on the evening of 7 November 2014. The doctors outlined concerns regarding an apparent inadequate dosage of antivenom, given Mr Tatti's worsening clinical features. Consultant Dr Sam Radford obtained advice from the toxicologist Dr John Kerr that Mr Tatti's deterioration was consistent with late complications of appropriately treated tiger snakebite and that *'..there was unlikely to be any benefit from further anti-venom administration.'*[19]

27. However, Mr Tatti continued to rapidly deteriorate. A fasciotomy[20] was performed on both forearms on the evening of 7 November and revealed necrotic muscle.

28. Dr Radford stated he discussed Mr Tatti's condition again with Dr Kerr at 3.00am on 8 November 2014. Dr Radford stated Dr Kerr:

'...outlined Mr Tatti's history and immune testing in Gippsland supported tiger snakebite as the offending cause. He reiterated that a single dose of tiger antivenom is supported in the literature as being no better than repeated doses in addressing venom related coagulation disorders, myopathy and neuropathy but acknowledged that this was an area of considerable debate. We agreed that given his already risky position with extreme likelihood of death, there was little to be lost from giving a dose of Brown snake antivenom.'[21]

29. On this basis, further antivenom (one ampoule of brown snake antivenom) was administered.

30. Worsening hyperkalaemia from muscle breakdown and renal failure, together with refractory shock resulted in Mr Tatti's death.

CAUSE OF DEATH

31. Forensic Pathologist Dr Yeliena Baber conducted an external examination at the Victorian Institute of Forensic Medicine (VIFM), on 10 November 2014 and formulated the cause of death as '*I(a) Complications of snake bite*'.

[19] Statement of Dr Samuel Radford dated 24 August 2015, Coronial Brief p 40.
[20] A fasciotomy is a surgical procedure that cuts away the fascia to relieve tension or pressure.
[21] Statement of Dr Samuel Radford dated 24 August 2015, Coronial Brief p 41.

SNAKEBITE MANAGEMENT

Coroners Prevention Unit

32. Having been alerted to differences in opinion within the clinical community about snakebite management I sought advice from the Coroners Prevention Unit (CPU)[22] and the Health and Medical Investigation Team (HMIT).[23] I asked for a review of Mr Tatti's medical management as well as the advice in the current literature for the treatment of snakebites.

33. The CPU advised I obtain expert reports to consider the medical management of Mr Tatti's death and the appropriateness of the recommended practice regarding snakebite management.

Snakebite management guidelines

34. Most snakebites will not result in envenoming and do not require antivenom,[24] however, if there is evidence of envenoming,[25] antivenom must be administered as soon as possible. Venomous snakebites in Victoria are from brown or tiger snakes.

35. In 2013 a 'clinical focus' was published in the Medical Journal of Australia containing a summary of research, 'Snakebite in Australia: a practical approach to diagnosis and treatment'[26] by Professor Geoff Isbister (an emergency physician and toxicologist) and his research group from the Australian Snakebite Project (ASP). With respect to the amount of antivenom to be administered, it stated:

    '*One vial of the relevant antivenom is sufficient to bind all circulating venom. However, recovery may be delayed as many clinical and laboratory effects of venom are not immediately reversible.*'[27]

36. The section headed 'Antivenom treatment' states one vial of antivenom is all that is needed for children and adults for all snake types: '*The use of more than one vial or repeated doses is no longer recommended.*'[28]

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[22] The Coroners Prevention Unit (CPU) is a specialist service created to strengthen their prevention role and provide them with assistance on issues pertaining to public health and safety.

[23] The Health and Medical Investigation Team (HMIT) is part of the Coroners Prevention Unit, which assists in the investigation and development of recommendations surrounding deaths occurring during the provision of healthcare. HMIT also assists in identifying factors that may help improve patient safety and risk management.

[24] Isbister G, Brown S, Page C et al. 'Snakebite in Australia: a practical approach to treatment'. Medical Journal of Australia 2013; 199 (11): 763-768.

[25] Envenoming includes venom-induced consumption coagulapathy, sudden neuro toxicity thrombotic microangiopathy and renal impairment.

[26] Isbister G, Brown S, Page C et al. 'Snakebite in Australia: a practical approach to treatment'. Medical Journal of Australia 2013; 199 (11): 763-768.

[27] Ibid.

[28] Ibid.

37. The article in the Medical Journal of Australia [29] suggests the use of one vial of the relevant antivenom is recommended practice regarding diagnosis and treatment of snakebite, although the 2013 Victorian clinical guidelines for management of snakebite in emergency departments do not specifically adopt that wording.

Debate regarding the guidelines

38. In separate correspondence sent to the Coroners Court, Professor Julian White, Head of Toxinology at Adelaide Women's and Children's Hospital[30] and Mr Peter Mirtschin,[31] an independent researcher at private company, Venom Science Pty Ltd, expressed their particular interest in the circumstances of Mr Tatti's death.

39. Dr Sam Radford, Intensive Care Specialist at the Austin Hospital who cared for Mr Tatti, also wrote to the court [32] expressing his concerns and asking:

'Given the guideline of a single dose of antivenom for a single bite has failed this gentleman, can adherence to this guideline be supported? Can the coroner please advise whether practice change is or may be necessary, especially or responders early in the chain of survival such as GP's and peripheral hospitals?'

40. Professor White referred to different opinions in Australian emergency medicine and toxicology circles concerning the recommendation that one ampoule of antivenom be administered. Mr Mirtschin raised a number of issues involved in treatment of snakebite for the extremely difficult cases of high venom yield and that he would have recommended 6+ vials of tiger snake antivenom, '*as an ideal start.*' He wanted to comment on recommendations for the future management of such cases.

41. Professor White stated that there are circumstances in which multiple ampoules should be administered. He noted that the antivenom producer CSL (now Seqirus)[33] recommends two ampoules of tiger snake antivenom as the initial dose and that in two reported series of Australian snakebite cases (23 cases in Western Australia over 16 years including one death, and a national series of 56 cases with no deaths) patients received more than one ampoule of

[29] The MJA is sent to all members of the Australian Medical Association.
[30] Emails dated 20 November 2014 and 4 December 2015.
[31] Letter dated 29 December 2104.
[32] Email dated 11 November 2014.
[33] 2013: A Clinician's Guide to Australian Venomous Bites and Stings.

tiger snake antivenom on average, with four ampoules in the WA series, and two ampoules in the national series.

Expert reports

42. The evidence supports Mr Tatti was vigorously bitten by the tiger snake which could not be detached easily from his arm, suggestive that he received an increased venom load.

43. Death from snakebite in Australia should be rare, particularly with early access to specific antivenom therapy. As noted above, two Australian studies reported one death in 23 cases (Western Australia) and 56 cases with no fatalities (national data).

44. In addition to Mr Tatti's death, another death occurred in Victoria two months later in February 2015, also from a tiger snakebite.[34]

45. I decided to obtain expert reports as recommended by CPU.

46. Associate Professor Mark Little and Professor Julian White were asked to provide expert opinions on the deaths of Mr Tatti and the other death, noting any areas of similarity and common issues between the two. Professor Isbister, whose work supports the administration of one ampoule of antivenom an is the author (with others) of the 'clinical focus' which was published in the MJA containing a summary of research, 'Snakebite in Australia: a practical approach to diagnosis and treatment,'[35] was asked to respond to the two expert reports.

- *Associate Professor Mark Little*

47. In respect of Mr Tatti's medical management, Associate Professor Little stated:

'I have no concerns in regards to the standard of care provided to Mr Tatti, as this was consistent with national guidelines for the management of snake bite in Australia.'[36]

48. Considering Mr Tatti's prompt medical treatment and administration of the antivenom, Associate Professor Little considered four separate scenarios as to why Mr Tatti still had active venom present despite the antivenom being administered.

49. The scenario he ultimately accepted was the administration of an inadequate dose of antivenom.

50. He concluded:

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[34] See the Finding without Inquest into the Death of Joy Zerafa (COR 2015 0048).
[35] Isbister G, Brown S, Page C et al. 'Snakebite in Australia: a practical approach to treatment'. Medical Journal of Australia 2013; 199 (11): 763-768.
[36] Report by Associate Professor Mark Little dated 9 January 2016 p 4.

'The concerning issue about this case is that despite very early appropriate antivenom, Mr Tatti continued to demonstrate ongoing evidence of envenoming with progressive rhabdomyolysis, that resulted in his death. If we accept my arguments, excluding the other reasons for not enough antivenom being administered, this case may be an outlier to the evidence reported by the ASP [Australian Snakebite Project] studies. In treating an envenomed patient we need to successfully treat the 'outlier' case, not the 'median' case. Whilst it is likely that for many patients envenomed by a snake in Australia, one ampoule may be enough, this case would suggest that a higher initial dose (possibly two ampoules) might be required for tiger snake envenomings.'[37]

51. He stated that in light of Mr Tatti's death, he believed the recommendation that one ampoule of antivenom be administered based on Professor Isbister's research needed refinement.

- *Professor Julian White*

52. Professor White stated:

'The decision to give just 1 vial of CSL Tiger Snake Antivenom (the correct choice of antivenom) based on phone advice to the doctor in Orbost, was clinically unwise and an opportunity to give an adequate neutralising dose (at least 2 vials) at such an early stage was lost.'[38]

53. Professor White was also of the view that the later repeated decisions not to give more antivenom were clinically unwise and may have missed opportunities to counter the level of envenoming. He stated it was not possible to know whether higher doses of antivenom would have altered Mr Tatti's course, but that higher doses should have been given as the clinical picture of severe envenoming emerged.

54. In conclusion, Professor White stated:

'Victorian State guidelines for snakebite indicating use of a single vial of antivenom are, in my opinion, clinically unwise, dangerous, and not consistent with published national recommendations endorsed by the antivenom producer. Guidelines published in the Medical Journal of Australia, recommending just one vial of antivenom are, in my opinion, similarly clinically unwise, dangerous and should be disavowed.' [39]

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[37] Report by Associate Professor Mark Little dated 9 January 2016 p 10.
[38] Report by Professor Julian White dated 5 February 2016 p 4.
[39] Ibid.

55. With respect to Mr Tatti's medical management, Professor White questioned the decision to perform fasciotomies.

- *Professor Geoffrey Isbister*

56. Responding to the expert reports, Professor Isbister disagreed with Professor White's criticism of Mr Tatti's medical management and preferred Associate Professor Little's position that the management was reasonable.

57. He clarified that the main issue for the coronial investigation was whether the guideline in the Medical Journal of Australia recommending one vial of antivenom and the use of one vial of antivenom in this case has been a factor in the patient's death.

58. Professor Isbister acknowledged that blood tests on Mr Tatti did demonstrate some remaining free venom after antivenom had been administered. He suggested that the one vial of antivenom may therefore not have been sufficient to bind all venom but the remaining amount of free venom was very low and therefore unlikely to have accounted for the severe deterioration observed in Mr Tatti's case. He argued a more likely explanation was that the massive envenoming in this case resulted in a very rapid initial movement of toxins into the blood stream and then to the muscle to cause injury, and that this damage occurred prior to the very early antivenom administration; that is, the damage was done by the initial massive dose of venom. The antivenom infusion was commenced 62 minutes after the bite, with the total dose administered over the following 50 minutes.

59. Professor Isbister stated there is little evidence that antivenom actually prevents the development of muscle damage and that it is therefore not necessarily the case that the muscle damage is due to insufficient antivenom, but more likely due the initial large venom load. Therefore, the antivenom does not prevent or reverse the damage that is initiated prior to the administration of antivenom, it just prevents further binding of venom to its targets and further damage.

60. Professor Isbister stated that analysis of the Australian Snakebite Project (ASP) data has shown that one vial is sufficient in the vast majority of cases and potentially all cases. He also stated that it is important to continue to carefully monitor the effect of lower dose antivenom and that there are current studies underway.

61. Professor Isbister explained that larger antivenom doses carry a risk of allergic reactions in one in five patients and severe or life-threatening anaphylaxis in three out of 100 cases and noted a cost issue, with antivenom costing between $200 and $2000 per vial.

62. By way of background, Professor Isbister explained that in the 1980's and 1990's the recommended dose of antivenom was increased because of what he described as a flawed belief that antivenom could reverse an irreversible process. In the early 2000's the ASP provided evidence to disprove the concept that antivenom could reverse the coagulation disturbance that occurs in envenoming.

63. Professor Isbister noted, that as discussed by Associate Professor Mark Little, there could be a number of reasons for Mr Tatti's death and there is in fact no strong evidence favouring any specific cause. He stated Mr Tatti's case may represent the extreme case where one vial is insufficient when massive doses of venom are injected or it may be that the intravenous cannula tissued,[40] therefore not all the antivenom was administered intravenously. However, he does not think there is sufficient evidence to change the initial dose in every case of tiger snake envenoming.

64. He stated:

'We certainly need to consider that we may need to give larger doses where we think there is more severe envenoming. Unfortunately, we are currently unable to determine in which cases there is a massive venom load. I would support Associate Professor Mark Little's opinion that we need to keep researching this and we need to record cases such as this and modify guidelines when there is sufficient evidence.'[41]

65. He concluded Mr Tatti's death was:

'...tragic and demonstrates the complexities and the often apparent unpredictable nature of severe snake envenoming. The patient was given one vial of antivenom early and then developed myotoxicity [42] *and died from the complications of myotoxicity. However, as a single case it is impossible to assign causation of the death to only a single vial being administered.'*[43]

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[40] Resulting in the inadvertent administration of IV fluids in to surrounding tissue rather than in the vascular system.
[41] Report by Professor Geoffrey Isbister dated 18 May 2016 p 20.
[42] Myotoxins are a type of neurotoxin which binds to muscle fibres causing progressive destruction of the muscle cells releasing breakdown products.
[43] Report by Professor Geoffrey Isbister dated 18 May 2016 p 27

Referral of expert reports to Department of Health & Human Services[44]

66. The expert statements reflect an ongoing debate regarding the amount of antivenom that should be administered to treat snakebite, particularly in cases where there is evidence of high envenoming.

67. In view of the divergence in opinion it was apparent the debate needed resolution so that clinicians treating and advising on snakebite management had access to evidence-based research and advice.

68. In order to facilitate this, I sent by cover of letter dated 20 September 2016, the three expert reports to the Department of Health and Human Services (DHHS).

69. I advised DHHS that whilst investigating two deaths from snakebite, I was provided with conflicting evidence from experts regarding the appropriateness of the recommended practice in the MJA, namely that a single dose of antivenom should be administered to treat snakebite.

70. I asked DHHS to consider the three reports with a view to ascertaining whether the 2013 Guideline for the management of snakebite in emergency departments in Victoria should be reviewed.

71. DHHS agreed to review the Guidelines. The response from Safer Care Victoria dated 30 June 2017 indicated that the 2013 'Management of snakebite in emergency departments in Victoria' clinical pathway had been revised by an expert reference group and endorsed by the Emergency Care Clinical Network Steering Committee (ECCN).

72. The updated 2017 Guidelines are largely the same as the 2013 Guidelines. They emphasise the importance of early discussions with a clinical toxicologist at the Poisons Information Centre.

73. The 2017 Guidelines refer to the ECCN convening an expert reference group of clinical toxicologists and experts in management of snakebite to update the 2013 Snakebite Clinical Pathway. I note the expert reference group includes Professor Geoff Isbister.

74. With respect to the amount of antivenom to be administered, the Snakebite Clinical Pathway acute management implies one vial is to be administered as it refers to diluting in 100-500 ml of isotonic saline and administering over 15-30 minutes.

[44] Formerly The Department of Health.

75. The 2013 and 2017 Guidelines both note that in case of envenomation *and* delay in contacting a clinical toxicologist, to administer one vial of tiger snake antivenom and one vial of brown snake antivenom.

WorkSafe Victoria Investigation

76. WorkSafe Victoria investigated GAB Consultants Pty Ltd, Snowy River Riparian (SRR) and East Gippsland Management Authority (EGMA).

77. WorkSafe Victoria was satisfied GAB Consultants (the labour hire agency that paid Mr Tatti) had breached the Occupational Health and Safety Act 2004 by failing to provide for its employees' safe systems of work, and issued a formal Caution Notice.

78. Following Mr Tatti's death, on 17 November 2014 inspectors from Work Safe attended SRR.

79. WorkSafe Victoria found that SSR did not have a Safe Work Method Statement (SWMS) for hand weeding in snake infested areas. As a result, on 17 November 2014 Work Safe inspectors issued an Improvement Notice.

80. Following Mr Tatti being bitten, SRR and EGMA ceased all work in relation to the Snowy River project until a newly developed SWMS specifically for hand weeding was developed which included personal protective equipment and personal protective clothing.

81. The coronial brief includes statements from the WorkSafe Victoria investigation, from Mr Tatti's co-workers.

82. A co-worker, Patrick Derbeyshire stated:

'With the hand weeding, there was no training about poking around in the weeds with a stick or something to make sure there were no snakes, and no one ever taught us not to put our hands into weeds where you couldn't see properly...The training that I got in relation to working in areas with snakes didn't exist.' [45]

83. Co-worker Luke Lawless noted when he started working with SRR he was provided with washable rubber gloves, gumboots and sunhats. '*I was not provided with any other equipment or safety items.*'[46]

84. On 17 December 2014 WorkSafe inspectors again attended SRR and found the Improvement Notice was complied with. SRR provided a copy of the document, 'Weeding – safe work

[45] Statement of Patrick Derbeyshire dated 12 June 2015, Coronial Brief p 14.
[46] Statement of Luke Lawless dated 27 May 2015, Coronial Brief p 1.

procedure'[47] which tied in with EGCMA OHS standard for safe weeding.[48] A newly developed SWMS, specifically for hand weeding, incorporated the highest level of acceptable Personal Protective Equipment and Personal Protective Clothing.

85. As a result of the consultation and review, all employees of SRR, GAB Consulting and EGCMA[49] are now provided with additional personal protection equipment (long boots, custom made leg chaps, arm gaiters/long gloves), long handled tools and direction regarding the approach to working in snake prone areas.

86. Mr Lawless stated:

'Since this incident things have changed dramatically as far as safety goes mainly in relation to snakes. Mostly in regards to surveying the site where we go out to work. We used to just go out to a site and start our work. Now we will walk through the area, check out any weed infested areas and if we think an area is a hazard for snakes we will leave that area alone.

We have now been supplied with chaps, which are long canvas pants. These are quite thick and would most likely prevent a snake bite. We also have longer gloves which cover up above the wrist area. We also have longer handled tools to prevent us from having our hands close to the ground. I feel safer working with these items.' [50]

Conclusion

87. The immediate response to Mr Tatti's snakebite was appropriate and timely. His colleagues immediately administered first aid and he was quickly driven to Orbost Hospital. He was then transported for further treatment to Bairnsdale Hospital and then Austin Health. Mr Tatti's colleagues are to be commended for their swift and appropriate response.

88. I accept the expert opinions of Associate Professor Little and Professor Isbister that the standard of medical care provided was reasonable and consistent with the national guidelines for the management of snakebite in Australia. However, with respect to the dose of antivenom administered, both Associate Professor Little and Professor White raise questions regarding the dose of antivenom recommended in Professor Isbister's research published in the MJA.

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[47] Coronial Brief pp 143-146.
[48] Coronial Brief pp 136-142
[49] Including Moogji Aboriginal Council, which, although not an employer of Mr Tatti, conducted similar work to SRR such as the hand removal of weeds around the Snowy River.
[50] Statement of Luke Lawless dated 27 May 2015, Coronial Brief p 4.

89. Professor Isbister stated that Mr Tatti's case may represent the extreme case where one vial is insufficient when massive doses of venom are injected, or it may be that the intravenous cannula tissued, but concluded the cause of Mr Tatti's deterioration could not be assigned to the administration of just a single dose of antivenom. However, Professors Little and White concluded that the dose of antivenom was, in this case, insufficient.

90. The WorkSafe Improvement Notice issued to SSR indicates that SSR did not have a Safe Work Method Statement for hand weeding in snake infested areas. WorkSafe found the Improvement Notice had been complied with. The Safe Work Method Statement developed in response includes proper safety work processes, clothing and equipment which has now been implemented.

Comments pursuant to section 67(3) Coroners Act 2008

91. Deaths from snakebite in Australia are rare and two Victorian deaths in close succession are a cause for particular concern. In the course of my investigation I was provided with conflicting evidence from experts regarding the appropriateness of suggested recommended practice regarding diagnosis and treatment of snakebite in Australia.

92. In light of these differing opinions, I sent the expert reports obtained during the investigation to the DHHS and was advised of their intention to review the 2013 'Management of snake bite in emergency departments in Victoria clinical guidelines.'

93. When provided with the reviewed and updated 2017 Guidelines by DHHS there was no acknowledgement of the divergence of views in the clinical community as outlined in the expert reports, or how or, indeed if, they had been reconciled. I note there is no reference in the 2017 Guidelines to the number of ampoules of antivenom to be administered. I note the emphasis in the Guidelines is to contact a clinical toxicologist at the Poison Information Centre for advice, which will presumably include advice about the type and number of ampoules of antivenom to be administered.

94. There is no suggestion or acknowledgement that there could be circumstances, such as severe envenoming, when more than one ampoule of antivenom should be administered.

95. I conclude by noting Associate Professor Mark Little's comment that '*...in treating an envenomed patient we need to successfully treat the 'outlier' case, not the 'median' case. Whilst it is likely that for many patients envenomed by a snake in Australia, one ampoule may*

be enough, this case would suggest a higher initial dose (possibly two ampoules) might be required, for tiger snake envenomings.'

96. Unfortunately, the coronial investigation has not resolved this concern. Associate Professor Little's recommendations enable toxicologists to provide advice, and clinicians to deliver care, in accordance with both the evidence-based guidelines and their experience and allow administration of higher doses of antivenom in extreme cases. This use of the '*gestalt*,' namely clinician experience, in the extreme (or outlier) case, is an appealing position.

97. I support Associate Professor Little's comment that, in light of Mr Tatti's death, the current recommendation to administer one ampoule of antivenom needs refinement.

98. I note Professor Isbister' s comment '*We certainly need to consider that we may need to give larger doses where we think there is more severe envenoming...we need to keep researching this and we need to record cases such as this and modify guidelines when there is sufficient evidence.*'

99. I support Professor White's suggestion recommending national, multi-centre, independent research to substantiate the appropriateness of single ampoule antivenom dosing for snake envenoming.

100. I support the suggestion by Associate Professor Mark Little that the clinical details of this case and the other death from tiger snake envenomation be published in the medical literature (subject to family consent) so that clinicians are aware of the details surrounding these deaths.

Recommendations pursuant to section 72(2) Coroners Act 2008

1. In the course of this coronial investigation, I requested DHHS review the 2013 clinical guidelines, which it agreed to do so, and the 2017 clinical guidelines are largely unchanged.

   I recommend DHHS again review the 2017 'Management of snake bite in emergency departments in Victoria clinical guidelines,' in light of this Finding.

2. I recommend that the Australasian College for Emergency Medicine (ACEM) circulate this Finding to ACEM fellows to highlight the evidence, guidelines and potential issues in the management of snake bite.

I express my sincere condolences to Mr Tatti's family for their tragic loss.

Pursuant to section 73 (1A) Coroners Act 2008 I direct this Finding be published on the Internet.

I direct that a copy of this Finding be provided to the following:

Mrs Susan Tatti

Dr Simon Judkins, President, Australasian College for Emergency Medicine

The Secretary, Department of Health and Human Services

Ms Tanya Murphy, WorkSafe Victoria

Mrs Maria Patramanis, Comminsure

Mr Bruce Crosthwaite, Thomson Geer

Mrs Pauline Chapman, Austin Health

Mrs Juliette Wenn, Bairnsdale Regional Health Service

Professor Julian White, Women & Children's Hospital, Adelaide, SA

Professor Geoff Isbister, University of Newcastle, NSW

Associate Professor Mark Little, Cairns Hospital, QLD

Mr Peter Mirtschin, Venom Science Pty Ltd

Dr Sam Radford, Austin Health

Signature:

CAITLIN ENGLISH
CORONER
Date: 21 August 2018