CORONERS COURT

OF NEW SOUTH WALES

Inquest:	Jeremy WEBB
Hearing dates:	17-19 November 2025
Date of findings:	February 2026
Place of findings:	NSW State Coroner's Court, Lidcombe
Findings of:	Deputy State Coroner Carmel Forbes
Catchwords:	Mammalian Meat Allergy after tick bite-awareness in hospitals and in the community-cause of death-severe allergic reaction-anaphylaxis-asthma
File number:	2022/171534
Representation:	Ms J Davidson and Ms B Kennedy, Counsel Assisting, instructed by Ms H Fordham (Crown Solicitor's Office) Mr R Stitt for the Webb family Ms L McFee for Dr Preena Uppal, instructed by Ms K Hickey (Barry Nilsson) Ms T Berberian for Central Coast Local Health District, instructed by Mr N Guenette (Norton Rose Fulbright)

Findings:

Identity of deceased: The person who died is Jeremy Webb

Date of death: Jeremy died on 11 June 2022

Place of death: Jeremy died at Gosford Hospital, NSW

Cause of death: Jeremy died as a result of anaphylaxis due to mammalian meat allergy after tick bite, causing an acute exacerbation of asthma, which progressed to status asthmaticus.

Manner of death: Jeremy's fatal anaphylaxis occurred as a result of acute exacerbation of his asthma caused by a severe allergic reaction to mammalian meat.

Recommendations:

To the Chief Executive of the Central Coast Local Health District (CCLHD) NSW I recommend that:

1. CCLHD incorporate into its education program on Management of Allergy and Anaphylaxis, provided every ten weeks to Emergency Department Junior Medical Officers, information regarding MMA as a potential cause of anaphylaxis, including:

   i. referring to MMA as a potential cause of anaphylaxis

   ii. inserting an additional slide concerning the atypical features of the presentation of anaphylaxis in MMA.

2. CCLHD consider amending the 'Alerts' on p. 2 of its Procedure on Paediatric Allergy (including anaphylaxis) Assessment and Management by:

   i. referring to the increasing prevalence of mammalian meat allergy on the east coast of Australia.

   ii. replacing reference to 'Wart Off' with 'Tick Off'.

iii. amending the Alert that reads: 'Ticks should NOT be removed by tweezers OR killed with kerosene or other irritants as this may trigger injection of tick saliva and trigger anaphylaxis' by adding 'or cause, or exacerbate, development of mammalian meat allergy'.

3. CCLHD consider developing a training module for its Emergency Department registrars on MMA specifically, particularly addressing:

i. current research concerning its prevalence in the LHD area.

ii. its cause, including its exacerbation by repeated tick bites and strategies for avoiding further tick bites.

iii. the importance of recording a comprehensive history of the patient's food consumption (particularly considering foods commonly containing meat derivatives) in the hours preceding a reaction.

iv. features of the presentation of an MMA reaction, including variability.

v. triggers, with reference to ASCIA's Mammalian Meat and Tick Allergy materials.

vi. including in discharge summaries a recommendation for referral to an immunologist; follow up investigations; and a comprehensive

history of the patient's food consumption prior to symptoms; and

vii. using the circumstances of Jeremy's case as an illustrative (de-identified) study.

REASONS FOR FINDINGS

INTRODUCTION

1. This is an inquest into the unexpected and tragic death of Jeremy Webb. Jeremy was only 16 years old when he died on 11 June 2022 at Gosford Hospital, NSW. Jeremy suffered from both asthma and tick induced mammalian meat allergy. On a camping trip with friends that night, he ate beef sausages. He had a severe allergic reaction which triggered an acute asthma attack leading to his death.

2. Jeremy's family advocated for an inquest into his death so that the public and medical practitioners might become better educated about mammalian meat allergy. An inquest was directed by the State Coroner pursuant to s.29(1) *Coroner's Act 2009 (NSW).*

3. The role of a Coroner at inquest as set out in s.81 of the *Coroner's Act* is to make findings as to the identity of the deceased and the date and place of the person's death. A coroner must also identify the physical or medical cause of the death and the circumstances surrounding the death.

4. In addition, s.82 of the *Coroner's Act* provides for a Coroner to make recommendations that are considered necessary or desirable in relation to any matter connected with the death that relates to issues of public health and safety.

5. This inquest has considered the role mammalian meat allergy and anaphylaxis played in Jeremy's death and whether there is anything that can be done to prevent a similar death in the future.

JEREMY WEBB

6. Jeremy was born on 8 August 2005 to Dr Myfanwy Webb and Dr Jonathan Webb; he had one older sister. Jeremy was an integral part of this tight family unit. His mother expressed the pain she experiences each and every day in missing her kind and loving son and his father and sister have similarly been left bereft. He was also part of a large extended family, and he had many friends. They all miss him sorely. Three of his mates

have tattoos in remembrance of Jeremy.

7. Jeremy's mother gave a moving description of Jeremy during this inquest. She explained to the court that he was not your average kid. He was an independent thinker who was very self-disciplined.

8. He dedicated himself to years of consistent martial arts training and gained his Black Belt in Karate.

9. He enjoyed fixing engines. The family would hear from the garage; neglected motors change from silence to spluttering to humming. These were motors from lawn mowers, quad bikes, jet skis, outboards, motorbikes, to his final purchase, a run-down van. His mates joined him in these exploits, and they would always be tinkering with things in the garage.

10. Jeremy was also clever with IT, building his own computer from scratch. He was a volunteer support ambassador for Microsoft help.

11. He also had a great sense of fun and adventure and enjoyed life to the brim. He spent a lot of time outdoors surfing, mountain bike riding and camping.

12. Jeremy's mother thinks that he would be well pleased, if his story was told so there would be greater awareness of mammalian meat allergy in the community.

<u>Jeremy's medical history</u>

13. When Jeremy was about 5 years old, he and his family moved to a large block of land on the NSW Central Coast which was surrounded by dense bush. Over the years he experienced a number of tick bites.

14. At around the age of 10, he began to suffer adverse reactions to eating red meat, including nausea and shortness of breath. He and his family concluded that he likely had mammalian meat allergy caused by tick bites.

15. Jeremy also suffered from asthma throughout his life. As a young child, Jeremy often experienced severe asthma symptoms at night, which led his GP, in 2018, to refer

Jeremy for allergy testing. Jeremy was found to be highly allergic to house dust. His parents made changes to reduce his exposure to dust, and, alongside ongoing asthma treatment, this alleviated his condition.[1]

24 April 2019 Hospital Admission

16. On 24 April 2019, when he was 13 years old, Jeremy was on a camping trip with his family when he woke in the middle of the night feeling nauseous. His parents recounted him having eaten some chicken and marshmallows that night. He opened the tent to get some fresh air, breathed in some smoke and then began experiencing shortness of breath. He took several puffs of Ventolin, and his father took him by car to the hospital (an approximately 40-minute trip). By the time he arrived at the hospital his breathing had settled but he had developed an urticarial rash.

17. He was discharged a short time later, with a referral to his GP. The discharge referral notes stated:

> "*Impression…Looks well. Not anaphylaxis…Asthma exacerbation from smoke…Cutaneous skin reaction? `contact dermatitis*"[2]

18. As he planned to return to the campsite, Jeremy was prescribed a steroid, Ventolin (which he was already prescribed for asthma), and an antihistamine; and he was advised to return to the hospital if he required Ventolin more frequently than 3 hourly, or there was any swelling to his lips, airway/voice change, fainting or concern. No allergy tests were conducted, and no referrals were made for investigation of any possible allergy.

3 April 2021 Hospital Admission

19. On 3 April 2021, Jeremy's family attended a birthday lunch. It does not appear that he knowingly consumed any red meat products at this meal, but a few hours later he began

[1] Statement of Myfanwy Webb, 11 March 2025 (Ex 1 Tab 13), at [28]-[29]; Statement of Jonathan Webb, 11 March 2025 (Ex 1 Tab 14), at [4]-[8]; Statement of Dr N Poate, 9 May 2025 (Ex 1 Tab 48), at [25]-[26]; Records of Jeremy Webb, (Ex 1 Tab 49).
[2] Gosford Hospital records 24 April 2019 (Ex 1 Tab 33A).

experiencing significant respiratory symptoms, which did not respond to his asthma medication.[3]

20. An ambulance was called. Ambulance officers noted he had a red meat allergy following a tick bite. On the way to the hospital, ambulance officers administered three doses of adrenaline and his respiratory symptoms improved. Jeremy also began experiencing chest pain. Ambulance officers concluded he was presenting with anaphylaxis.[4]

21. He was admitted to Gosford Hospital, where staff noted his history of red meat allergy, the presence of a cough for the preceding few days, and the dual possibilities of asthma and anaphylaxis. He remained in hospital overnight for observation and further tests, including a chest x-ray. The hospital records noted a history of mammalian meat allergy following a tick bite; no rashes; *"? asthma v anaphylaxis"* and *"Had lunch with parents? out at restaurant…no previous anaphylaxis…get nausea and vomiting post red meat"*.[5]

22. The discharge summary[6] provided to his GP contained a diagnosis of exacerbation of asthma, and an additional diagnosis of pneumomediastinum (air in the space between the heart and lungs), a well-known condition that can occur secondary to asthma or other respiratory illnesses.[7]

23. While the discharge summary mentioned ambulance officers' administration of adrenaline and their 'concerns regarding anaphylaxis', it did not contain any recommendations for investigation or treatment of possible allergy and or anaphylaxis.

<u>11 June 2022</u>

24. At approximately 5:45pm on 10 June 2022, Jeremy's mother dropped him off to go camping with some friends. At approximately 9:00pm he ate beef sausages and marshmallows. Sometime between approximately 9:30pm and 10:50pm he vomited outside his tent. He also began experiencing shortness of breath. He then ran from the campground down a walking track to a nearby road and knocked on the window of a

[3] Statement of Myfanwy Webb, 11 March 2025 (Ex 1 Tab 13), at [32]; Statement of Jonathan Webb, 11 March 2025 (Ex 1 Tab 14), at [18]-[19].
[4] Ambulance electronic medical records (Ex 1 Tab 33C) p46.
[5] Gosford Hospital records (Ex 1 Tab 33C).
[6] Gosford Hospital records (Ex 1 Tab 33C) p37-38.
[7] Associate Professor A Holdgate (Ex 1 Tab 54) Dr Kim (Ex 1 Tab 56).

campervan where he knew the occupants. He asked them to call an ambulance before collapsing.

25. His friends administered CPR until the ambulance officers arrived at 11:26pm. They observed Jeremy to be non-responsive, not breathing, and have no palpable pulse; and they suspected cardiac arrest. The ambulance officers took over CPR and transferred Jeremy to Gosford Hospital under lights and sirens with a Police escort.

26. Resuscitation efforts continued to no avail until 12:29am, when Jeremy was declared life extinct by Dr K Ellis. Dr Ellis completed a Form A report to the coroner, noting the cause of death as "respiratory arrest [secondary to] asthma/anaphylaxis".

ISSUES

1. What was the cause of Jeremy's death?

27. An autopsy was conducted on 16 June 2022. Dr du Toit-Prinsloo, Forensic Pathologist who conducted the autopsy, determined that the cause of Jeremy's death was status asthmaticus, with antecedent causes of asthma. She made a note in the Autopsy Report stating that "it may be necessary to modify this opinion in light of further investigations."[8]

28. During the subsequent coronial investigation, Dr du Toit-Prinsloo indicated that it was outside her area of expertise to opine on whether an allergy may have caused the asthma, and recommended the coroner seek an opinion from a relevant expert. A report was then commissioned from Professor Sheryl van Nunen, Consultant Immunologist and Allergy Physician who first identified the association between the development of mammalian meat allergy after tick bite. She examined all of the records relating to Jeremy's medical history and his death and she determined that the cause of Jeremy's death was anaphylaxis due to mammalian meat allergy following tick bite, triggering asthma which proceeded rapidly to status asthmaticus.[9] Having reviewed her report, and acknowledging Professor van Nunen's specialist expertise, Dr du Toit-

[8] Autopsy report (Ex 1 Tab 7).
[9] Expert report of Professor van Nunen (Ex1Tab 52) p1.

Prinsloo agreed with the cause and mechanism of death determined by Professor van Nunen.[10]

29. The Central Coast Local Health District (CCLHD) do not agree with that description of Jeremy's cause of death. The CCLHD rely on the opinion of Professor Denis Wakefield, Clinical Immunologist and Pathologist who provided an independent expert review of Jeremy's case. In his report dated 31 October 2025, he stated "Asthma and anaphylaxis can occur at the same time and form a life-threatening combination. Subjects with food allergies such as mammalian meat allergy can experience anaphylactic reaction with systemic allergic manifestations as outlined above and have a severe exacerbation of asthma at the same time. It is more likely than not that Jeremy Webb had both asthma (bronchoconstriction) and anaphylactic reaction concurrently leading to his death. This is not unexpected given his history of recurrent episodes of asthma since early childhood, and his family history of atopy and a history of anaphylactic reactions with prominent respiratory symptoms".

30. The CCLHD also rely on the opinion of Dr Kim, Consultant Respiratory and Sleep Physician. Dr Kim also reviewed all the records relating to Jeremy's death and provided a report before the inquest.[11] In that report he formed the opinion that asthma was the primary cause of Jeremy's death and the severe exacerbation of his asthma occurred in a setting of severe allergic reaction. The representative for the CCLHD submits that the most appropriate description of Jeremy's cause death is "asthma caused by anaphylaxis due to mammalian meat allergy after tick bite".[12]

31. I am reliant on the experts in the phrasing to be used to describe Jeremy's cause of death. The experts appear to agree that an acute exacerbation of asthma was the immediate cause of Jeremy's death and that the evidence is consistent that that acute exacerbation occurred because of a severe allergic reaction to mammalian meat. Without the anaphylaxis caused by the allergy Jeremy's asthma would not have caused his death.

[10] Expert statement of Dr du Toit-Prinsloo (Ex 1 Tab 53).
[11] Expert statement of Dr Kim 21 October 2025 (Ex1 Tab 56).
[12] Submissions on behalf of CCLHD, 10 December 2025, at [9].

32. During the inquest, on 19 November 2025, Dr Kim was asked by Counsel Assisting:

Question: …anaphylaxis due to mammalian meat allergy after tick bite causing Jeremy's asthma to progress to status asthmaticus, is an accurate statement from your perspective?

Answer: In this case, it would be a very important plausible hypothesis and a differential diagnosis ... (not transcribable) …--

Question: But in fact, more likely than not, given what you've said about the setting for the severe life-threatening asthma, being the severe allergic reaction. Is that correct?

Answer: Yeah, on the balance of probability, more than likely, yes.

33. Considering all the evidence I accept the wording used by Professor van Nunen and adapted by the Forensic Pathologist and Dr Kim. I am satisfied on the balance of probabilities that Jeremy's cause of death was anaphylaxis due to mammalian meat allergy after tick bite, causing an acute exacerbation of asthma, which progressed to status asthmaticus.

2. What is Mammalian Meat Allergy?

34. Mammalian meat allergy (MMA) is also known as Alpha-Gal Syndrome. In Australia, almost all MMA cases are induced by bites of the eastern paralysis tick (ixodes holocyclus), which is endemic throughout the eastern coastal regions of Australia, from North Queensland to northern Victoria.[13] Australia's eastern seaboard has the highest rate of MMA in the world.[14]

35. Dr Alexander Gofton, Research Scientist at the CSIRO's Vectors and Disease Modelling: Disease Interventions Team, has provided the (not yet peer-reviewed) preliminary findings for the first comprehensive national survey of MMA in Australia, analysing alpha-gal serum IgE test data from commercial pathology providers from 2014 to 2024. This research indicates that three quarters of cases occur in 20 per cent of geographic

[13] Dr Gofton, Preliminary results from research into the distribution and prevalence of mammalian meat allergy in Australia (2025), p 2 (Ex 1 Tab 60).
[14] TiARA Submission to the Senate Standing Committee on Community Affairs: inquiry into access and diagnosis and treatment for people in Australia with tick-borne diseases (Ex 1 Tab 57) p2.

regions, with the highest rates in coastal NSW and Queensland. The three leading areas in terms of suspected cases per 100,000 population are Pittwater in NSW, the Richmond Valley hinterland in NSW and the Gold Coast hinterland in Queensland.

36. Dr Gofton's research indicates that the prevalence of MMA in Australia is rising and that suspected MMA cases have increased by 40% annually since 2020.[15]

37. Professor van Nunen has diagnosed and managed over 800 patients with mammalian meat allergy in the last 20 years. She informed the court that a tick causes the allergy by injecting an allergen into the body which cause the body to manufacture alpha-gal allergy antibody. That antibody causes the body to become sensitised to a molecule known as alpha-gal that is found in most mammals including cows, pigs, sheep and kangaroos.

38. She stated that 50% of individuals will manufacture alpha-gal allergy antibody after two or more tick bites and some individuals will do so after a single nymph stage tick bite. Of those that develop MMA, 80-85% will not clinically react to mammalian meat at all.[16] Of those who do, a person may experience no reaction to eating a meal of meat one day but may react to leftovers of that meal days later. Professor van Nunen stated that even within the same individual who has ingested the same foods on different occasions, MMA is an "any time, but not every time reaction".[17]

39. The symptoms of MMA reaction can be gut based alone such as cramping, diarrhoea, or nausea. It can be welts or hives, red swellings in the skin around the eyes or lips or mucosal tissues or tongue. At its most severe, it can result in anaphylaxis with respiratory or cardiac compromise.

40. Further tick bites recharge the alpha-gal specific IgE level. However, in the absence of further tick bites after developing MMA, the level of alpha-gal specific IgE drops

[15]Dr Gofton, Preliminary results from research into the distribution and prevalence of mammalian meat allergy in Australia (2025), p 2 (Ex 1 Tab 60).
[16] Supplementary Report of Professor van Nunen, 26 August 2025 (Tab 55), p3.
[17] Expert Report of Professor van Nunen, 26 August 2005 (Ex 1 Tab 55) p1.

significantly within 12-18 months. This is the reason that the severity of the clinical symptoms of mammalian meat allergy after tick bite varies over time.[18]

41. There is no simple test that can confirm or eliminate MMA. Professor van Nunen explained that the difficulty in diagnosing MMA is not only a lack of awareness by clinicians but also the difficulty of interpreting the presence of alpha-gal specific immunoglobulin-E. The allergen-specific igE in serum does not equate to a patient being allergic to that allergen, unless it can be clinically established that the allergen is causing the symptoms being established. Alpha-gal sensitisation may be present in the absence of clinical allergy to mammalian meats. The difficulty is further compounded due to the delayed reactions after ingestion of mammalian meat and also the role of factors such as sleep deprivation and exercise that are understood to be influential.

42. In considering a diagnosis of MMA clinicians review the patient's history for a correlation between the onset of symptoms and consumption of mammalian meat products. Patients may not be aware that MMA reactions may be triggered by non-meat products, such as marshmallows that may contain gelatine from beef or pork and desserts containing animal derived gelatine; cheeses; and energy drinks containing taurine.

43. The precise meat product eaten can also alter the severity of the reaction. Alpha-gal is present in higher concentrations in offal, so a meal including offal, such as sausages encased in mammalian intestines, may trigger a more severe reaction. Sausages are also fatty, and fat can decrease the absorption time of the alpha-gal allergen and serve as an amplifying factor.

44. The usual interval from allergen exposure to reaction is 3-6 hours, the outer limits of this interval are 2-10 hours. With offal the usual allergen exposure to reaction interval is 1-2 hours.[19]

[18] Expert Report of Professor van Nunen, 2 May 2023 (Ex 1 Tab 52) p2.
[19] Ibid, p6.

45. Anaphylaxis is the most severe type of allergic reaction. The CCLHD emergency department Junior Medical Officers are trained that anaphylaxis typically manifests as the acute onset of either skin features such as rash or flushing, combined with difficulty in breathing caused by either tightening of the muscles in the lungs or swelling in the mouth or throat obstructing the airway; and/or low blood pressure; and/or nausea, vomiting and abdominal pain. Or difficulty breathing caused by tightening of the muscles in the lungs or swelling or low blood pressure without skin symptoms.[20]

46. The experts agree that diagnosing anaphylaxis is a complex task. Associate Professor Anna Holdgate, Emergency Medicine Specialist, provided an independent expert review of Jeremy's care and treatment in the Emergency Departments. She explained that there is no single test to diagnose anaphylaxis.[21] It requires specialist consideration of a patient's complete clinical picture, including personal and family medical history; blood test results, particularly levels of a serum called 'tryptase'; exposure to allergens in the hours preceding the reaction; timing of the onset of symptoms; and the nature of those symptoms.[22] Exercise can exacerbate anaphylaxis. It is common for patients who experience anaphylaxis to also suffer from asthma. Professor van Nunen gave evidence that 69-90% of patients with severe anaphylaxis also suffer from asthma.[23]

47. Asthma and anaphylaxis have a mutually causal relationship: anaphylaxis may trigger an acute exacerbation in asthma, while inflammation in the lungs caused by poorly controlled asthma increases the severity of anaphylaxis. The life-threatening respiratory symptoms of anaphylaxis will generally respond to the administration of adrenaline. Other treatments administered for anaphylaxis (additional to adrenaline) overlap with those commonly administered for asthma, including steroids and bronchodilators.

[20] CCLHD Paediatric Anaphylaxis Procedure (Ex 1 Tab 47B) p15.
[21] Expert report Associate Professor A Holdgate (Ex 1 Tab 54)
[22] Expert Statement of Dr du Toit-Prinsloo, 9 August 2025 (Ex 1 Tab 53), and Annexures A and B; Expert Report of Professor van Nunen, 2 May 2023 (Ex 1 Tab 52); Expert Report of Dr Kim, 21 October 2025 (Ex 1 Tab 56), at p10-13, and Annexure D; Report of Professor Wakefield, 31 October 2025, (Ex 1 Tab 57A), at p2.
[23] Transcript 17 November 2025 p48.

48. However, asthma and anaphylaxis differ in their scope and severity of illness. In general, the onset and resolution of symptoms of anaphylaxis will be faster than acute asthma exacerbation.

49. Physicians diagnosing anaphylaxis from MMA face diagnostic complications arising from its atypical presentation particularly the timing of the reaction from ingestion of the meat product.

50. Confirmation of the diagnosis of anaphylaxis typically occurs in an outpatient setting after a discharge from an Emergency Department. CCLHD policy provides that patients who present to hospital without an existing anaphylaxis diagnosis, but with symptoms consistent with anaphylaxis, are discharged with a prescription for an adrenaline autoinjector, education on anaphylaxis prevention and use of the autoinjector, and referral (or recommendation to their GP to refer) to a specialist for review/follow up. Once a diagnosis is confirmed by the specialist, patients are then prescribed with two autoinjectors, advised to carry both with them at all times, and educated in their use.[24]

3. Was Jeremy's diagnosis and discharge on 3 April 2021 adequate?

51. The year before Jermey died, Jeremy was taken to hospital by ambulance with severe respiratory distress. It was diagnosed as an asthma attack, there was no differential diagnosis, and he was discharged.

52. Professor van Nunen describes this admission as a 'missed opportunity'.[25] The discharge summary did not mention anaphylaxis as a possible diagnosis and made no referrals or recommendations for further investigation.

53. Associate Professor Holdgate agreed with Professor van Nunen that several features of Jeremy's presentation during his April 2021 hospital admission were unusual for an episode caused primarily by asthma, but consistent with one caused by anaphylaxis.[26] In particular, the sudden and severe onset of his symptoms, his need for multiple doses

[24] Transcript 17 November 2025 p47; Statement of Associate Professor C Trethewy 30 October 2025 (Ex 1 Tab 47).
[25] Expert Report of Professor van Nunen, 2 May 2023 (Ex 1 Tab 52), p4, 13.
[26] Expert Statement of Dr A Holdgate, 14 August 2025 (Ex 1 Tab 54), p6-7.

of adrenaline and his positive response to it, his known meat allergy, and there being no signs of wheeze within two hours. She stated that such a severe exacerbation of asthma without any clear trigger called for a differential diagnosis of anaphylaxis with referrals to a respiratory specialist or immunologist for review.

54. The treating doctor on 3 April 2021 agreed that in hindsight, had she been aware of mammalian meat allergy and anaphylaxis and its atypical presentation, that she would have included anaphylaxis as an appropriate differential diagnosis in the discharge summary with a referral for further investigation.

55. We can only speculate as to whether a relevant specialist would have confirmed an anaphylaxis diagnosis on the information available in April 2021. Certainly, Jeremy, his family and his GP were unaware that his red meat allergy may have carried an attendant risk of life-threatening anaphylaxis.

56. The evidence is that a confirmation of anaphylaxis would have resulted in Jeremy receiving a prescription for two adrenaline autoinjector as well as advice to carry them both with him at all times, and to administer them immediately in the event of symptoms such as those that preceded his death.[27]

57. There is no guarantee that the administration of adrenaline at the onset of Jeremy's symptoms on 10 June 2022 would have changed the outcome. Jeremy did receive numerous doses of adrenaline from ambulance officers, and they were ineffective.[28] However, it also must be born in mind the first of these was administered approximately half an hour after the onset of his symptoms, and a delay in the administration of adrenaline is correlated with fatal outcomes for anaphylaxis patients[29].

[27] Statement of Associate Professor Trethewy, 30 October 2025 (Ex 1 Tab 47), Annexure B; Expert Report of Professor Sheryl van Nunen, 2 May 2023 (Ex 1 Tab 52), p4, 6, 7; Statement of Dr Mark William, 18 June 2025 (Ex 1 Tab 39), at [8]-[9]; Central Coast Local Health District Procedure Paediatric Allergy (including Anaphylaxis assessment and management in a hospital setting, 20 July 2023 (Ex 1 Tab 44), p2, 5.
[28] Expert Report of Dr Kim, 21 October 2025 (Ex 1 Tab 56), p13.
[29] Expert Report of Professor van Nunen, 2 May 2023 (Ex 1 Tab 52), p8; Expert Report of Dr Samuel Kim, 21 October 2025 (Ex 1 Tab 56), Annexure B, p33.

4. Why wasn't the treating doctor aware of mammalian meat allergy?

58. Dr Trethewy, CCLHD Senior Staff Specialist Emergency Physician, provided an executive statement on behalf of CCLHD. He gave evidence that CCLHD did not provide training specific to MMA to hospital clinicians in 2021-2022. He explained that to date, there is no published research available about the prevalence of MMA in CCLHD area and that this it is an emerging area of medical research.

59. He gave evidence that whilst CCLHD does not provide specific training on mammalian meat allergy, there is an awareness among emergency clinicians of mammalian meat allergy and its triggers.

60. Dr Gofton's unpublished research paper (not available in 2021 or 2022) notes that the extreme geographic clustering of MMA cases affords an opportunity for targeted intervention strategies. The experts in this inquest agreed that greater awareness and understanding of MMA on the part of hospital clinicians and general practitioners in CCLHD (and other areas identified as 'hotspots') would assist in identifying and diagnosing MMA, and associated anaphylaxis, going forward.

61. Dr Trethewy is of the opinion that it would be appropriate for specific MMA training resources to be developed in the future. He informed the court that there would be a presentation on MMA at grand rounds following the findings of this inquest. He also agreed with Counsel Assisting's submissions that the following recommendations would be appropriate.

62. Firstly, that CCLHD incorporate into its education program on Management of Allergy and Anaphylaxis, provided every ten weeks to Emergency Department Junior Medical Officers, information regarding MMA as a potential cause of anaphylaxis, including:

    i. referring to MMA as a potential cause of anaphylaxis.

    ii. inserting an additional slide concerning the atypical features of presentation of anaphylaxis in MMA.

63. Secondly, that CCLHD consider amending the 'Alerts' on p. 2 of its Procedure on Paediatric Allergy (including anaphylaxis) Assessment and Management by:

i. referring to the increasing prevalence of mammalian meat allergy on the east coast of Australia.

ii. replacing reference to 'Wart Off' with 'Tick Off'.

iii. amending the Alert that reads: 'Ticks should NOT be removed by tweezers OR killed with kerosene or other irritants as this may trigger injection of tick saliva and trigger anaphylaxis' by adding 'or cause, or exacerbate, development of mammalian meat allergy'.

64. Finally, that CCLHD consider developing a training module for its Emergency Department registrars on MMA specifically, particularly addressing:

i. current research concerning its prevalence in the LHD area.

ii. its cause, including its exacerbation by repeated tick bites and strategies for avoiding further tick bites.

iii. the importance of recording a comprehensive history of the patient's food consumption (particularly considering foods commonly containing meat derivatives) in the hours preceding a reaction.

iv. features of the presentation of an MMA reaction, including variability.

v. triggers, with reference to ASCIA's Mammalian Meat and Tick Allergy materials.

vi. including in discharge summaries a recommendation for referral to an immunologist; follow up investigations; and a comprehensive history of the patient's food consumption prior to symptoms; and

vii. using the circumstances of Jeremy's case as an illustrative (de-identified) study.

5. Should a recommendation be made in relation to Tryptase testing?

65. Professor van Nunen is of the opinion that the approach to tryptase testing by emergency clinicians needs to be addressed. She routinely uses tryptase levels in her practice to discriminate between asthma and anaphylaxis presenting as sudden acute

asthma. She is of the opinion that tryptase levels warrant consideration and that there should be education on when to do the test.

66. The representative for Jeremy's family submits that if tryptase tests results from Jeremy's admissions to the emergency departments in 2019 and 2021 were available they may have proved to be very useful tools to assist the forensic pathologist determine if anaphylaxis was Jeremy's cause of death.

67. Associate Professor Holdgate and Dr Kim made it clear that there is inconsistency in research outcomes determining a 'cut-off' tryptase level for diagnosing anaphylaxis, and it can be an unreliable indicator, needing to be carefully interpreted in the context of the whole clinical picture.[30] Tryptase levels can be affected by genetics, the nature of the allergen, the timing of the sample and that not all allergens elicit tryptase elevations.

68. Associate Professor Holdgate gave evidence that tryptase levels may be helpful in some circumstances in the emergency setting but that it is not done routinely and would not assist a clinician in distinguishing between anaphylaxis and asthma. The results of tryptase tests are not available for days or even weeks, they do not influence the immediate management of a patient in emergency, and as such the results are not included in the discharge summary.

69. Dr Kim said that tryptase testing is not routinely used in his respiratory medicine practice or at public or private asthma clinics. He explained that the results are coloured by longer latency periods and are non-specific.

70. The forensic pathologist Dr du Toit-Prinsloo gave evidence that it was not possible to use a tryptase level alone to diagnose anaphylaxis as a cause of death. She explained that the tryptase levels can increase with lengthy resuscitation or naturally following death. Tryptase levels can also be affected by genetics; the nature of the allergen; the timing of the sample being taken; and other processes that occur after death. She did not give evidence as to whether or not the results of tryptase testing at Jeremy's emergency admissions in 2019 or 2021 might have been useful to her in determining

[30] Expert Statement of Associate Professor A Holdgate, 14 August 2025 (Ex 1 Tab 54); Expert Report of Dr Samuel Kim, 21 October 2025 (Ex 1 Tab 56).

his cause of death. However, she did say that tryptase levels have been documented in non-anaphylactic deaths and are not specific to anaphylaxis.

71. Due to the divergence of opinions of the experts relating to the value of tryptase testing, I am not satisfied that the evidence arising from this inquest is clear that a recommendation in relation to tryptase testing is desirable or necessary.

72. Professor van Nunen also opined that amendments to the CCLHD paediatric allergy procedure concerning the supine positioning of a patient should be considered. Dr Trethewy did not agree. I am of the opinion that there is insufficient evidence on this topic for me to make a finding that such a recommendation would be necessary or appropriate.

CONCLUSION

73. It is agreed on behalf of CCLHD that had it known then what it knows now about mammalian meat allergy Jeremy would have been referred for review and further investigation of his severe respiratory attack in April 2021.

74. In 2021 and 2022 there was no specific training in the hospitals on mammalian meat allergy. As a result of this inquest CCLHD will now implement specific training which will also include a de-identified case study of the circumstances surrounding Jeremy's death.

75. The family statement received in this matter indicated that Jeremy was a remarkable young man, he was intelligent, independent, disciplined, determined with a strong moral code. No doubt that is, in part at least, attributable to his family. I agree with Counsel Assisting's submission that these qualities are reflected in their advocacy in this coronial process and their desire to prevent future deaths by improving education about MMA both amongst health professionals and within the community. The evidence clearly supports a finding that mammalian meat allergy is on the increase in Australia.

Statutory findings required by s81(1) *Coroners Act 2009*

Identity of deceased:

The person who died is Jeremy Webb

Date of death:

Jeremy died on 11 June 2022

Place of death:

Jeremy died at Gosford Hospital, NSW

Cause of death:

Jeremy died as a result of anaphylaxis due to mammalian meat allergy after tick bite, causing an acute exacerbation of asthma, which progressed to status asthmaticus.

Manner of death:

Jeremy's fatal anaphylaxis occurred after he ingested mammalian meat while he was camping.

Recommendations pursuant to s82 *Coroners Act 2009*

I am satisfied that the following recommendations arise out of the evidence and are desirable in accordance with s. 82 *Coroners Act 2009*

To the Chief Executive of the Central Coast Local Health District (CCLHD) NSW

I recommend that:

1. CCLHD incorporate into its education program on Management of Allergy and Anaphylaxis, provided every ten weeks to Emergency Department Junior Medical Officers, information regarding MMA as a potential cause of anaphylaxis, including:

i. referring to MMA as a potential cause of anaphylaxis

ii. inserting an additional slide concerning the atypical features of the presentation of anaphylaxis in MMA.

2. CCLHD consider amending the 'Alerts' on p. 2 of its Procedure on Paediatric Allergy (including anaphylaxis) Assessment and Management by:

i. referring to the increasing prevalence of mammalian meat allergy on the east coast of Australia.

ii. replacing reference to 'Wart Off' with 'Tick Off'.

iii. amending the Alert that reads: 'Ticks should NOT be removed by tweezers OR killed with kerosene or other irritants as this may trigger injection of tick saliva and trigger anaphylaxis' by adding 'or cause, or exacerbate, development of mammalian meat allergy'.

3. CCLHD consider developing a training module for its Emergency Department registrars on MMA specifically, particularly addressing:

i. current research concerning its prevalence in the LHD area.

ii. its cause, including its exacerbation by repeated tick bites and strategies for avoiding further tick bites.

iii. the importance of recording a comprehensive history of the patient's food consumption (particularly considering foods commonly containing meat derivatives) in the hours preceding a reaction.

iv. features of the presentation of an MMA reaction, including variability.

v. triggers, with reference to ASCIA's Mammalian Meat and Tick Allergy materials.

vi. including in discharge summaries a recommendation for referral to an immunologist; follow up investigations; and a comprehensive history of the patient's food consumption prior to symptoms; and

vii. using the circumstances of Jeremy's case as an illustrative (de-identified) study.

Concluding remarks

76. I would like to acknowledge and express my thanks to the Officer in Charge, Senior Constable J Burnes for her very thorough investigation of this matter. Further, I extend my thanks to Counsel Assisting, Ms J Davidson SC and Ms B Kennedy, and their instructing solicitors, Ms H Fordham and Ms A Jeffares, for the work they put into assisting me in this inquest.

77. I close this inquest.

Magistrate Carmel Forbes

Deputy State Coroner

26 February 2026