IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: COR 2014 004464

FINDING INTO DEATH WITHOUT INQUEST

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

I, PARESA ANTONIADIS SPANOS, Coroner,
having investigated the death of CODY TAULONGO without holding an inquest:
find that the identity of the deceased was CODY TAULONGO
born on 4 March 2014
and that the death occurred on 1 September 2014
at Royal Children's Hospital, 50 Flemington Road, Parkville, Victoria 3052
from:

I (a) KAWASAKI DISEASE

Pursuant to section 67(1) of the **Coroners Act 2008**, I make findings with respect to **the following circumstances**:

1. Baby Cody Taulonga was the five-month old infant son of Amanda and Seleti Atu Tuimana, the couple having adopted him two weeks after his birth.[1] Baby Cody was Mr and Mrs Tuimana's first child and had enjoyed good health, normal growth and development, had no allergies and was fully vaccinated.

2. On 17 August 2014, Baby Cody presented to general practitioner [GP], Dr Muhannad Al-Jaber, with a two-day history of being unwell associated with fever, cough, coryza[2] and a rash over his groin, with some spots on the trunk and face for one day. He was reported to have decreased oral intake. Dr Al-Jaber believed Baby Cody had a viral illness and he prescribed hydrozole cream for the groin rash.[3]

3. On 18 August 2014, Baby Cody returned to Dr Al-Jaber for review as planned. The GP believed Cody to have a respiratory tract infection, and assessed him as being dehydrated.

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1 Baby Cody's biological mother, who is a friend of Ms Tuimana, lives in New Zealand with her six older children.

2 Coryza is irritation and inflammation of the mucous membranes inside the nose.

3 Hydrozole is a cream made up of clotrimazole (an anti-fungal agent) and hydrocortisone (a steroid) that is used to treat thrush.

Baby Cody was referred to the Royal Children's Hospital [RCH] for specialist paediatric opinion and management.

4. At the RCH Emergency Department [ED], blood tests were taken, a chest x-ray was conducted and Baby Cody was commenced on an intravenous [IV] antibiotic benzylpenicillin[4] and IV fluid. He was examined by the Short Stay Unit [SSU] paediatric registrar and found to have extensive red rash over his torso and groin, and reddened conjunctiva, lips and tongue. The differential diagnosis on presentation was erysipelas,[5] Staphylococcal infection, and early Kawasaki Disease.[6]

5. Baby Cody was reviewed that afternoon by the Consultant General Paediatrician, Dr Lisa Barrow. The working diagnosis was eczema and a systemic infection (possibly either Staphylococcal or Streptococcal infection). Antibiotics and IV fluids were continued and creams provided for his rash. Blood tests[7] showed a raised I/T ratio (0.57), raised bands (1.70), decreased lymphocytes (2.74), and raised C-reactive protein, or CRP (268).[8]

6. Overnight on 18-19 August 2014 in the SSU, Baby Cody was reviewed multiple times by the night Junior Resident and the Medical Registrar due to high fever and tachycardia[9]. His fever symptoms improved, and IV fluids continued. A diagnosis of Kawasaki Disease was considered, but institution of management was deferred to the morning, when he was due to be reviewed by the paediatric unit.

7. On the morning of 19 August 2014 Baby Cody was reviewed by the SSU Medical Registrar, Dr Di Marco, and was assessed as clinically improving. Further blood tests were planned along with another medical review. A throat swab[10] was negative for bacteria and an anti-streptolysin antibody test[11] was also negative.

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4 Benzylpenicillin is a penicillin class antibiotic used to primarily treat suspected Streptococcal infection.

5 Erysipelas is a superficial bacterial skin infection that is caused almost exclusively by Streptococcus pyogenes. It is seen in all age groups, but most commonly occurs in infants, young children and older adults.

6 Kawasaki Disease is a type of vasculitis that primarily affects the blood vessels that supply the heart. It presents as an acute febrile illness in children, usually presenting between the ages of 1 and 6 years, although the most frequent presentations are in males under the age of 2 years. See section 2.1 for further information.

7 These abnormal blood tests are all inflammatory markers. Their abnormality is in keeping with an inflammatory process, which includes infection. Whilst a raised CRP above 100 is highly suggestive of bacterial infection, it is a non-specific investigation and can thus also be significantly raised in other inflammatory conditions including juvenile idiopathic arthritis and Kawasaki Disease.

8 Test results indicative of an infection.

9 The heart rate was reported to be 220 beats per minute. The heart rate of a 5-month old infant is normally less than 150 beats per minute.

10 This is a sample that is collected looking for bacteria in the throat.

11 Anti-streptolysin antibodies (ASOT) is a blood test that can help to determine the presence of Streptococcal infection.

8. On the morning of the 20 August 2014, Baby Cody was reviewed by Dr Di Marco and Dr Barrow. Their assessment was that he was continuing to improve clinically. They noted less frequent fevers and improved oral intake. Baby Cody was changed to oral antibiotics (augmentin duo).[12] Overnight Baby Cody was again feverish.

9. On 21 August 2014, Dr Di Marco considered that Baby Cody had improved significantly. The working diagnosis was viral illness associated with a rash, with additional bacterial skin infection. Baby Cody was discharged home later that day with a plan to complete a further five days of oral antibiotics, continue using an antifungal cream for the rash, and attend a GP for follow-up in 48 hours.

10. On Sunday 24 August 2014, when Baby Cody was reviewed by his GP as planned, Dr Al-Jaber had not received any paperwork from the RCH regarding his admission.[13] Mrs Tuimana reported that she believed her son had been diagnosed at RCH with a Streptococcal infection for which he was taking antibiotics. During his clinical assessment, Dr Al-Jaber noted that Baby Cody was febrile, tired and had a congested throat. The plan was to review him again on Wednesday 27 August 2014, to continue the oral antibiotic, and to return earlier to the GP or the RCH if there was concern in the meantime.

11. At about 5.20am on 1 September 2014, Baby Cody was in his cot and crying. His mother went to get a bottle while his father held him in his arms. Baby Cody then went limp, and was noted to have stopped breathing. An ambulance was called at 5.25am.

12. On arrival at 5.32am, paramedics noted that Baby Cody was asystolic and commenced cardiopulmonary resuscitation [CPR]. He remained asystolic during resuscitation and was urgently transferred to the RCH, arriving at 6.23am. There being no change to Baby Cody's condition, CPR was ceased and he was declared deceased at 6.29am.

13. Forensic pathologist, Dr Sarah Parsons of the Victorian Institute of Forensic Medicine, reviewed the circumstances of the death as reported by police to the coroner, post-mortem computer assisted tomography [CT] scans and the e-Medical Deposition provided by the RCH, and performed an autopsy. Among Dr Parsons' anatomical findings were pericardial effusion, myocarditis, pericarditis, coronary artery aneurysms (including one ruptured possibly during

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12 Augmentin duo is the trade name for amoxicillin and clavulanic acid. This is a penicillin class antibiotic that has broad spectrum and can be administered orally.

13 Hospital discharge is an inherently risky transition of care into the community setting, comparable with other contexts where responsibility is handed over from one person to another. A written hospital discharge summary is a method of communication from the hospital to the GP regarding the management plan. Timeliness and quality of hospital discharge summaries are crucial for patient safety and efficient health service provision after discharge.

resuscitation, laminated thrombus within the coronary arteries, and widespread vasculitis consistent with Kawasaki Disease.

14. Dr Parsons noted that there was no evidence of non-accidental injury and that the results of post-mortem metabolic, toxicological and microbiological analyses did not contribute to the formulation of the cause of death. Dr Parsons concluded by attributing Baby Cody's death to Kawasaki disease.

15. At my request, the Health and Medical Investigation Team [HMIT] [14] of the Coroners Prevention Unit reviewed the available medical records and obtained further statements and provided advice about the adequacy of Baby Cody's assessment, care and management by Dr Al-Jaber and his treatment team at the RCH. The HMIT advised:

    a. Kawasaki disease is an inflammatory condition of blood vessels (especially coronary arteries) that is most common among children under five years, notably boys, but is uncommon in infants under six months of age. The most significant complication of the disease is coronary artery aneurysm, with infants younger than one year old and children older than nine years at increased risk (among other risk factors).

    b. Kawasaki disease usually presents as fever associated with other inflammatory changes to the skin and mucous membranes. Thus, its diagnostic criteria are: fever for at least five days and at least four of conjunctivitis, mucositis, rash, changes in the peripheries, and enlarged lymph nodes of the neck. The term "incomplete Kawasaki disease" has been used to describe patients suspected to have the disease but whose presentation does not meet the diagnostic criteria.

    c. There are no tests that are considered diagnostic of Kawasaki disease. Indeed, many investigation findings (raised inflammatory markers and white cell count in the absence of bacterial growth on culture, abnormal lipid levels and liver function) do not help clinicians differentiate between Kawasaki disease and other inflammatory conditions.

    d. The standard, first-line therapy for Kawasaki disease is well known and includes the administration of intravenous immune globulin [IVIG] and oral aspirin. The treatment has been proven to reduce the frequency of coronary artery aneurysm to as

[14] The HMIT is part of the Coroners Prevention Unity [CPU] established in 2008 to strengthen the prevention role of the Coroner. CPU assists the Coroner to formulate prevention recommendations and comments, and monitors and evaluates their effectiveness once published. HMIT is staffed by practising physicians and nurses who are independent of the health professionals or institutions involved. They assist the Coroner's investigation of deaths occurring in a healthcare setting by evaluating the clinical management and care provided and identifying areas of improvement so that similar deaths may be avoided in the future.

low as 4% (compared to 20% in untreated cases). As IVIG is a blood product that is in short supply its clinical use is strictly regulated by the national 'Criteria for the Clinical Use of Intravenous Immunoglobulin in Australia'.

e. Baby Cody's differential diagnoses on presentation at RCH on 18 August 2014 were a bacterial skin infection and Kawasaki disease. Appropriate diagnostic investigations occurred and intravenous antibiotics and fluids were administered. Baby Cody continued to be intermittently feverish but was considered to show signs of continued clinical improvement. During a discussion with family on 19 August 2014, no additional features consistent with Kawasaki disease were evident. Baby Cody tolerated a change to orally administered antibiotics and his improvement was considered to support the working diagnosis of viral infection with secondary skin infection given the timing of antibiotic therapy. Cody was discharged home on 21 August 2014 with a plan to complete a course of oral antibiotics and seek GP review in 48 hours.

f. When Baby Cody presented for GP review on 24 August 2014, Dr Al-Jaber had not received any information from RCH about the admission. Dr Al-Jaber did not seek further information from RCH because it was a Sunday evening and he thought it unlikely he would be able to speak to anyone on Baby Cody's treatment team.

g. Whilst observing that Cody remained feverish on 24 August 2014, the Dr Al-Jaber considered his presentation to have improved compared to presentations before his RCH admission. The GP did not consider Kawasaki disease as a possible differential diagnosis, believing that a bacterial or viral infection was more likely, and so advised continuation of oral antibiotics and further review in 72 hours.

h. Baby Cody did not return for review. Dr Al-Jaber noted that the "walk-in" nature of the clinic meant that patients were usually unable to book an appointment but would be able to be seen on the day they presented, especially if they had been advised to return for review by a GP.

i. RCH formally reviewed its management of Baby Cody's assessment and treatment after his death.[15] Among the findings of the review were:

    i. Although RCH aims to complete 80% of its discharge summaries within 48 hours, Baby Cody's discharge summary was not completed until six weeks

[15] See generally correspondence from RCH's Paediatrician Dr Lisa Barrow dated 11 May 2015 and Dr Tom Connell, Paediatrician and Clinical Director of the Department of General Medicine dated 15 May 2015.

after he had died and so was not available to his GP when he was reviewed (though Baby Cody's RCH doctors did not know this);

ii. Senior medical staff did not consider Baby Cody to have Kawasaki disease;

iii. The Kawasaki Disease Clinical Practice Guideline [Guideline] did not highlight the increased risk of misdiagnosis and death in children under one-year old;

iv. The Guideline has now been updated to emphasise the challenges associated with diagnosing Kawasaki disease in infants and the mortality risks specifically associated with this age group.

j. Diagnosing "incomplete" Kawasaki disease in infants is challenging and so it is difficult to be critical of his RCH treatment team and his GP who were generally thorough and conservative in their assessment and management of him.

k. Better communication between RCH and Baby Cody's GP, particularly when he was reviewed on 24 August 2014, may have provided another opportunity for Kawasaki disease to have been considered as a diagnosis, perhaps prompting therapy.

l. However, given the severity of Baby Cody's disease, it is difficult to know whether treatment with IVIG would have altered his clinical course.

16. I find that Baby Cody, late of Nettlefold Avenue, Hoppers Crossing, died at the Royal Children's Hospital, Parkville, on 1 September 2014 and that the cause of his death was Kawasaki disease.

17. In the coronial jurisdiction, adverse findings are only made against professionals or institutions where they have departed materially from the standards of their profession and in doing so caused or contributed to the death under investigation. The available evidence does not support a finding that there was any want of clinical management or care by staff of the Royal Children's Hospital, or Dr Al-Jaber, that caused or contributed to Baby Cody's death.

18. It is relevant to note in this regard the diagnostic challenges faced by clinicians when presented with "incomplete Kawasaki disease" among infants and the amendment made to the relevant RCH guideline to emphasise the challenges associated with diagnosing Kawasaki disease in infants and the mortality risks specifically associated with this age group.

RECOMMENDATION

Pursuant to section 72(2) of the ***Coroners Act 2008***, I make the following recommendation:

1. That the Victorian Department of Health Director Quality, Safety and Patient Experience consider mandating a formal requirement that when a patient is discharged from hospital with a plan for follow-up within 48 hours by another medical service, a member of the discharging team should personally contact the receiving medical service to effect patient hand-over.

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

Mrs Amanda Tuimana

Medico-legal Administrator, Royal Children's Hospital

Dr Al-Jaber, Werribee Medical and Dental Clinic

Victorian Department of Health and Human Services

Royal Australasian College of Physicians

Royal Australian College of General Practitioners

Victorian Paediatric Network

Consultative Council on Paediatric Morbidity and Mortality

D/S/C Chris Black, Wyndham CIU

Signature:

PARESA ANTONIADIS SPANOS
CORONER
Date: 12 April 2016

Cc: Manager, Coroners Prevention Unit