FINDINGS INTO THE DEATH OF SUKANYA THURAIRAJAH
[2014] ACTCD 1 (3 March 2014)

CORONERS ACT – no doctor's certificate as to cause of death – hospital treatment

Coroners Act 1997 (ACT) ss13, 52 (1), 52 (1) (4)

No. CD 203 of 2011

Chief Coroner Walker
Coroners Court of the ACT
Date: 3 March 2014

IN THE CORONERS COURT OF THE)
)
) No. CD 203 of 2011
AUSTRALIAN CAPITAL TERRITORY)

In the matter of an inquest into the death of SUKANYA THURAIRAJAH pursuant to section 13 of the *Coroners Act* 1997 (ACT)

F I N D I N G S

Chief Coroner: Lorraine A Walker

Date: 3 March 2014

Place: Canberra

THE COURT FINDS THAT:

1. The deceased was Sukanya Thurairajah, born [redacted], 1955, formerly of Isaacs in the Australian Capital Territory.
2. Mrs Thurairajah died on 8 August, 2011 at the Canberra Hospital in Fadden in the Australian Capital Territory.
3. Mrs Thurairajah died as a result of hypoxic ischaemic encephalopathy. This injury was significantly contributed to by the failure to provide oxygen in a timely manner as a result of inadvertent oesophageal intubation during the provision of emergency life support which was required following an adverse response to haemodialysis.
4. No matter of public safety arises in connection with this inquest.

Scope of the inquest

5. The death of Mrs Sukanya Thurairajah was reported to the Coroner on 9 August 2011. Her death was a reportable death pursuant to section 13 of the *Coroners Act* 1997

("the Act") in that she died without a doctor having given a certificate as to her cause of death.

6. A decision was made to hold a hearing in respect to Mrs Thurairajah's death because of family concerns regarding the treatment she received at hospital on 29 July 2011 prior to her admission to the Intensive Care Unit (ICU) at the Canberra Hospital.

7. Pursuant to section 52(1) of the Act, the Coroner must find, if possible, relevantly:

    (a) the identity of the deceased;

    (b) when and where the death happened;

    (c) the manner and cause of death....

8. Pursuant to subsection (4), the Coroner must also, state, relevantly, whether a matter of public safety is found to arise in connection with the inquest and, if so, comment on the matter.

9. There is provision in the Act for the making of adverse comment. Prior to delivery of these findings, following a consideration of submissions received from all parties, each party was notified that I had formed the view that no adverse comment was warranted.

Summary of events

10. Whilst there is some variance in the evidence in respect to the chronology in this matter, this is understandable in light of the emergency nature of the circumstances, slight variations in recollection and resort to different timepieces. The findings which follow adopt, where possible, timings based on either the MET (Medical Emergency Team) record, or those which are most consistently supported by the evidence.

11. On 29 July 2011 at 10 am, Mrs Thurairajah attended the Canberra Hospital to undergo haemodialysis. She had previously been treated by way of peritoneal dialysis but in consultation with her nephrologist, Dr Singer, the decision had been made to commence haemodialysis. A tunnelled dialysis line was inserted to allow this to take place. Dialysis commenced at about 3:10 pm. She was under the nursing care of Registered Nurse (RN) Tyrell. At about 3:15 pm she first complained of stomach pain and was given Panadol. Soon after, she complained of breathlessness. The Registrar attended at about 3.50pm. At 3:55 pm, Mrs Thurairajah vomited and stated she was having difficulty breathing. Dr Hossain prescribed 100 mg of hydrocortisone for dialysis reaction with no effect. Her blood pressure increased rapidly.

12. At approximately 4.10 pm a Medical Emergency Team (MET) call was activated. MET members were paged at about 4:15 pm. The evidence is that between 12 to 18 people in total attended at Mrs Thurairajah's bedside.

13. RN Aviga-Smith heard the MET call bell and went to Mrs Thurairajah's bedside to offer assistance. RN Tyrell asked her to remain until the MET team arrived.

14. In the meantime, Dr Singer was advised. He formed the view that the problem was more likely paradoxical hypertension as dialyser reactions are very rare and usually resulted in hypotension as opposed to the hypertension Mrs Thurairajah was displaying.

15. Dr D'Souza, ICU registrar, and Dr Bridgart, senior ICU resident, who were dealing with a patient on Ward 10, responded to the call arriving at Ward 8A at about 4:15 pm. At approximately the same time, RN Adeleye, MET nurse, arrived. A wardsman arrived about a minute later with the MET trolley.

16. RN Adeleye tasked RN Aviga-Smith to scribe the MET call. She had not performed this function before though she had seen the form. She said that it was difficult at times to record everything that was being called out or observed as well as recording times according to the clock on the wall. She described the MET call as "hectic".

17. Dr Thomsett, anaesthetic registrar, arrived a few minutes later.

18. Dr Singer attended at Mrs Thurairajah's bedside. He had a brief discussion with those present and advised against administration of adrenaline. As the situation was somewhat chaotic, noisy and crowded, and as appropriate management by way of intubation was underway, he left.

19. Bag mask ventilation commenced at about 4:20 pm. Suxamethonium was given at about 4:25 pm followed by two administrations of Propofol.

20. Dr D'Souza tasked Dr Thomsett to perform an endotracheal intubation. Dr Thomsett purported to do so at about 4:30 pm.

21. Dr Singer re-attended briefly and was advised that Mrs Thurairajah's blood pressure was falling and that she was being ventilated. Being satisfied that this was positive, he left.

22. RN Adeleye took "some minutes" to attach a colour metric carbon dioxide detector. It is not clear on the available evidence when RN Adeleye connected the end tidal carbon dioxide monitor, considered the 'gold standard' in airway function monitoring. His evidence was that he did not do so immediately as he was prioritising continuation of cardiopulmonary resuscitation (CPR) and because intubation had been confirmed by Drs D'Souza and Bridgart based on auscultation.

23. The evidence is that it takes approximately 5 minutes to connect, warm up and allow the end tidal carbon dioxide machine then in use, a function of the Zoll Defibrillator, to self calibrate.[1]

24. Mrs Thurairajah's condition in fact deteriorated. Within three to five minutes following the initial intubation, she entered into bradycardia. Cardiopulmonary resuscitation was commenced at about 4:35 pm.

25. Due to his concern regarding Mrs Thurairajah's condition, RN Adeleye telephoned though to the ICU requesting additional support.

26. Senior Registrar in ICU, Dr Nagaraj, attended at about 4:40 pm. He noted the absence of an oxygen saturation trace and an end tidal carbon dioxide trace on the Zoll Defibrillator machine. He sought confirmation that the endotracheal tube was in the trachea. Dr Thomsett looked and confirmed that it was. Dr Nagaraj requested Dr D'Souza to review the position of the tube. Dr D'Souza confirmed that the tube was misplaced. He then re-intubated Mrs Thurairajah at approximately 4:49 pm. Cardiopulmonary resuscitation stopped at approximately 4:50 pm and spontaneous circulation commenced thereafter.

27. Mrs Thurairajah was relocated to the intensive care unit. It was concluded that she had suffered neurological damage as a result of hypoxia. Following an extensive review of function, by the tenth day after her cardiac arrest she had still made no neurological recovery. Her treating team concluded that she had suffered a very severe cerebral injury from which no meaningful recovery could be expected.

28. Mrs Thurairajah was significantly oxygen deprived for at least eighteen minutes from the time of the incorrect intubation to the time of the re-intubation, and possibly longer noting the difficulties applying bag mask ventilation prior to that time. This period of oxygen deprivation, or hypoxia, is entirely capable of causing the degree of brain injury suffered by Mrs Thurairajah.

29. After close consultation with both the immediate and extended family, a considered decision to withdraw treatment was made.

30. Mrs Thurairajah was extubated on 8 August 2011 and died soon after.

Further detail regarding the intubation

31. Dr D'Souza was employed as a registrar in the ICU at the time of this MET call. He had been working at the Canberra Hospital for about 20 days at the time of the call and had been given some induction to the MET function but not the equipment on the

[1] . Subsequent to this event, a new end tidal carbon dioxide monitor has been installed for use on the trolley. This machine does not require a warm up or calibration period.

MET trolley. He was experienced in emergency calls, having worked as a junior consultant in an intensive care unit in India prior to his employment at the Canberra Hospital. He noted that Mrs Thurairajah was difficult to intubate because of her large jaw and neck.

32. Dr Thomsett, who was at the time a first-year anaesthetics registrar, had never performed an emergency intubation prior to her attendance at this MET call. While she had received training in responding to a medical emergency (code blue), she had not been specifically trained in the MET role. She was aware that an anaesthetic registrar should attend if available to do so.

33. When she attended, she found Dr D'Souza and Dr Bridgart already present, although she did not know them. After some time she "sort of established" in her head that Dr D'Souza was in charge. Dr D'Souza indicated that they were preparing to intubate Mrs Thurairajah. She was asked to assist ventilation and began basic airway manoeuvres, commencing with a bag mask. There was some delay in commencing intubation pending the receipt of blood results which would determine whether the paralysing agent, suxamethonium, could safely be used. That drug is used to relax the airway muscles and vocal cords and make intubation easier. That drug was available but risks increasing potassium which can be a problem with a person with renal problems, given that their potassium is usually elevated anyway. The alternative, rocuronium, was not available on the MET trolley. In Mrs Thurairajah's parlous condition a decision was made to proceed using suxamethonium.

34. Mrs Thurairajah was difficult to intubate because of her body habitus, the fact that she was vomiting, and because with her reduced level of consciousness, her gag reflex was not working efficiently which led to a danger of her inhaling the vomit.

35. The procedure for intubation adopted by Dr Thomsett is summarised in submissions of counsel assisting, and adopted by all other represented parties, as follows:

    - she inserted the laryngoscope but had difficulty viewing the vocal cords;
    - she had a bougie which she put over what she could see;
    - she called for the endotracheal tube to be railroaded over the bougie several times without response;
    - she had to remove the laryngoscope in order to railroad the tube over the bougie herself;
    - she tried to reintroduce the laryngoscope but had trouble finding the view and did not at any point see the endotracheal tube pass over the vocal cords;
    - she did not recall but assumes that the cuff had been inflated, something normally done by an assistant;

- she did not recollect the tube being secured but this was usual practice.

36. There were some reassuring signs that the intubation had in fact been performed correctly. Dr Bridgart and Dr D'Souza confirmed bilateral air entry, however Dr D'Souza stated in evidence that this is not a very sensitive test as sounds might still be heard with the tube in the wrong position. The gold standard for confirmation of correct intubation is the end tidal carbon dioxide monitor. He was not aware that the defibrillator on the MET trolley was also a carbon dioxide monitor as it was not type he was used to. He had no recollection of the use of the colour metric monitor. As well as receiving reassurance of bilateral air entry from Drs D'Souza and Bridgart, Dr Thomsett herself observed that the tube had fogged.

37. There were also signs to the contrary. Dr Thomsett was aware that a colour metric monitor was attached but not that it showed no colour change. She understood that the end tidal carbon dioxide monitor was not available at that time. She was not familiar with the machine on the MET trolley and did not know that it required warming up and calibrating before it started to record. She was not aware of when it was connected. She did not become aware of the lack of a waveform on this machine until Dr Nagaraj from the ICU arrived and pointed that out. She did see vomitus in the tube but, given that Mrs Thurairajah had recently vomited, assumed that it was gastric aspirate in the trachea.

38. RN Tyrell stated that she was concerned that Mrs Thurairajah's abdomen was distended and that a large amount of gas was being expelled. She said that she called this fact out to the team present. She also recalled having an exchange to this effect with a wardsman who was beside her at the scene. Dr D'Souza made a similar observation but considered it difficult to read given Mrs Thurairajah's large form.

39. RN Adeleye, who had connected the colour metric monitor to the tube, noted that there was no distinct colour change. The lack of colour change meant that there was no confirmation that carbon dioxide was being expelled. He stated there might be other reasons for the lack of a colour change though, such as the film getting wet, which may have been caused by vomitus. He could not recollect whether he voiced his concern regarding the lack of colour change. He also noted Mrs Thurairajah's abdomen distending although he could not recollect communicating this to anyone present. He also noted blood stained secretions coming from Mrs Thurairajah's mouth but he did not recall communicating this.

40. At some stage the end tidal carbon dioxide monitor was connected to the tube. The machine then in use required a warm-up and calibration period. He could not recollect the timing of connection of this equipment. He had no recollection of anything being missing from the trolley which prevented its use. He did indicate that he made the decision to call for help from the intensive care unit. He did not recall how long it was between his observation of the lack of colour change on the colour metric monitor and his decision to call the ICU for further assistance.

41. Dr D'Souza also asked Dr Thomsett to reconfirm the position of the tube as Mrs Thurairajah was flatulent, which was something he had not observed in that context before.

42. Whilst RN Tyrell and RN Adeleye both had some concerns about the nature of the intubation, it appears that neither were particularly assertive in making their concerns known to the doctors in attendance.

43. One hypothesis in relation to placement of the tube is that it might have originally been placed correctly but relocated during aggressive cardiopulmonary resuscitation. Whilst this is a known phenomenon, it is an uncommon one.

44. There was some suggestion in the evidence of Dr Thomsett that there had been no end tidal carbon dioxide monitor available on the MET trolley when she first requested that. In her oral evidence she was unable to recollect why she formed this view. Overall the evidence supports that an end-tidal carbon dioxide monitor was on the MET trolley at the time. It was not activated immediately as RN Adeleye attached the colour metric monitored first and then concentrated on continuous CPR before activating the end-tidal carbon dioxide monitor. That monitor was also required to warm-up and calibrate before it commenced showing signal. It was clearly attached and operative before Dr Nagaraj attended. It is not apparent that anyone had observed the lack of a waveform on this machine prior to his attendance, although Dr D'Souza commented on some "weird" forms that he could not interpret.

45. Dr D'Souza expressed the view that an anaesthetic registrar attending MET calls should have at least 2 to 3 years experience in managing airways.

Further detail regarding the nature of a MET call

46. Associate Professor Imogen Mitchell provided a statement explaining the nature of the MET system at the Canberra Hospital. A/Prof Mitchell is the Director of the Intensive Care Unit and Resuscitation at Canberra Hospital and is responsible for the medical emergency team and ICU outreach services. Her evidence was unchallenged. The following is a summary of her explanation of the MET system.

47. In 2002, the Canberra Hospital was one of 23 hospitals that took part in the Australian and New Zealand Intensive Care Society's clinical trials group research study "Medical Early Rapid Intervention Therapy", the purpose of which was to review patient outcomes in those hospitals with and without a medical emergency team system. Prior to that time, there had simply been a cardiac arrest team.

48. In 2005, a hospital-wide project was undertaken to improve the recognition and response to clinical deterioration as there was concern that the MET system did not identify all patients undergoing clinical deterioration. A new scoring system was introduced to assist better utilisation of the MET system. It was designed to assist ward nurses and ward doctors to act upon early signs of clinical deterioration in

patients. Data from this study demonstrated an improvement in the process of recognition of patients' deterioration, an increase in the number of MET calls made and an improvement in patient outcomes.

49. The Outreach Unit was established in March 2011 as a result of an increased number of MET calls. It allowed for MET core responders to come from areas other than those previously, which had been the ICU emergency department and coronary care. The Outreach Unit allows a 24-hour response and identifies specific staff who should respond to MET calls. These include designated nursing staff, including a MET nurse available on a 24-hour 7 day per week basis, and various staff from the ICU. Outside of regular working hours, other staff may also respond to a MET call depending on workloads and availability including anaesthetic registrars, medical registrars, other junior doctors and other nursing staff.

50. In addition to equipment kept on the ward, a dedicated MET trolley is maintained and held in the ICU. The trolley is checked at the start of each shift. At the time of Mrs Thurairajah's death, a checklist was available. In June 2012, completion of a log confirming that the check has been made was instituted.

51. The allocation of roles and responsibilities in the MET call depends on the number and expertise of medical staff in attendance. Generally, the outreach registrar, being ICU staff, would assume the role of team leader and be required to coordinate the MET response and assign tasks and roles amongst those responding. If the anaesthetic registrar is available, they will generally assume the role of airway management given their expertise in that area. The MET nurse is responsible for assisting with maintaining the airway and defibrillation. That responsibility includes setup and assistance with endotracheal intubation if required. At the time of Mrs Thurairajah's death that was practice; in 2012 that practice was formalised into a written policy document entitled "Responders roles and responsibilities".

The issues

52. At the outset of the hearing, the primary issues for consideration were agreed between the coroner and represented parties. A consideration of those issues follows.

Who was responsible for the intubation of Mrs Thurairajah?

53. Dr Thomsett, first year anaesthetic registrar, was allocated the task of airway management by Dr D'Souza, senior intensive care registrar and team leader of the MET call. This included an obligation to intubate, with assistance as required.

Was the endotracheal tube incorrectly inserted in Mrs Thurairajah's oesophagus in lieu of the trachea?

54. It is most likely that the initial intubation was incorrect. It is possible, but unlikely, that the initial intubation was correct but that the endotracheal tube was dislodged as a result of not being taped down or due to vigorous CPR.

If so, why did this happen?

55. A combination of circumstances culminated in Dr Thomsett inadvertently performing an oesophageal rather than a tracheal intubation. Those circumstances include the following.

56. Mrs Thurairajah was difficult to intubate in part because of the size of her jaw and neck but complicated by the fact that she was vomiting.

57. Although Dr Thomsett was an anaesthetic registrar, and had some experience in intubation the theatre environment, she had never previously performed an intubation in an emergency context. Both Dr Bridgart and Dr D'Souza were significantly more experienced in performing emergency intubations. There was no discussion regarding this issue.

58. The environment in which the MET call was being conducted was somewhat chaotic. In part this is no doubt a function of dealing with the medical emergency. However, it appears to have been complicated on this occasion by the number of people present at Mrs Thurairajah's bedside, the noise being produced and the lack of assertive management by Dr D'Souza.

59. I note that Dr D'Souza himself was a recent recruit to the Canberra Hospital and, although both generally experienced and experienced specifically in emergency calls, may not have been sufficiently familiar with the local process to confidently assert a leadership role.

60. The lack of assistance provided to Dr Thomsett no doubt made performing the intubation more difficult, particularly as she was required to remove the laryngoscope in order to railroad the endotracheal along the previously introduced bougie. It is not clear why her request for assistance remained unanswered. It may be that it was simply not heard or comprehended in the chaotic and noisy environment.

61. There was also generally poor communication during this response. This is evidenced by the failure to properly ascertain the experience of those in attendance, to clearly direct what was required, and the lack of confidence of those present to assertively articulate their concerns or, where appropriate, to respond to those concerns. As Mr Thurairajah detailed in his submissions, the Medical Board of Australia's *Code Of Conduct For Doctors In Australia* notes that good medical practice involves "...communicating clearly, effectively, respectfully and promptly with other doctors and health care professionals caring for the patient" and "advocating for a clear delineation of roles and responsibilities, including that there is a recognised team leader or coordinator".

Why was the oesophageal intubation not picked up earlier?

62. The chaotic environment along with the emergency nature of the circumstances no doubt contributed to the failure of any one individual to identify the incorrect intubation. These features are perhaps inherent in most emergency calls although the chaos could have been reduced by clearer direction from the team leader.

63. There is no doubt that poor communication between the MET team members also contributed to in the oesophageal intubation not having been identified earlier.

64. The initial false positive reassurance provided by Dr Thomsett's observation of fogging of the endotracheal tube and confirmation by Drs D'Souza and Bridgart of bilateral air entry most likely distracted medical staff from contrary signs.

65. Difficulties with the Zoll Defibrillator end tidal carbon dioxide monitor function complicated the picture. There appears to have been some delay in connection of this function, although how much is unclear. Even once connected, Dr D'Souza and Dr Thomsett's apparent lack of familiarity with this form of end tidal carbon dioxide monitor may have led to a failure to recognise the warning displayed on it by the absence of a wave form. Greater familiarity by all team members with the equipment available on the MET trolley may have led to earlier identification of the incorrect intubation.

Was there a delay in the end tidal carbon dioxide monitor being available to assist? If so, why was there a delay?

66. It appears most likely that the end tidal carbon dioxide monitor was on the MET trolley from the outset. It is unclear from the evidence available just when the end tidal carbon dioxide monitor was activated. RN Adeleye indicated in his evidence that he prioritised continuation of CPR over connection to this "gold standard" testing device. Whilst it can apparently take up to 4 or 5 minutes to connect this machine to the endotracheal tube, allow it to warm up and then self calibrate, it is unclear just when this was done and, therefore, when the lack of a waveform reading would have been available to inform those present that intubation may have been defective. It is also unclear from his evidence why it would be necessary to interrupt CPR in order to effect the connection. It is not apparent that he was performing CPR personally nor that anything in the process of connection would necessarily disrupt CPR.

67. On balance, it appears that there was some indeterminate delay in connecting the end tidal carbon dioxide monitor. This was further complicated by a failure to observe or recognise the waveform which was apparent on the machine when Dr Nagaraj attended.

What significance attaches to the oesophageal intubation?

68. On the available evidence it appears that Mrs Thurairajah was moribund at the time the MET team attended upon her. In light of her parlous state, it is likely that without corrective medical attention she may well have died at that point. In addition, she had a number of co-morbid medical conditions which rendered her more vulnerable. These included obesity, type II diabetes mellitus, bone fragility, coronary heart disease with past endovascular revascularisation, mildly reduced left ventricular function and metastatic breast cancer in remission. Although she was independent in her daily activities and almost asymptomatic at a clinic appointment in May 2011, the treating nephrologist, Dr Singer, considered her overall prognosis at that time to be "average". The published yearly mortality rate for a lady such as Mrs Thurairajah receiving treatment in 2010 was approximately one in five.

69. By the time of the first intubation, Mrs Thurairajah had already been suffering breathing difficulties for about 45 minutes, considered serious enough to call an emergency team half an hour before. No criticism has been raised regarding this period during which there was limited airway support, nor does there appear to be a basis for such. Nonetheless, it seems reasonable to assume that Mrs Thurairajah's oxygen level would have been to some extent compromised already by this period of oxygen desaturation.

70. However, there is no doubt that the further period of oxygen deprivation which resulted from the misplacement of the endotracheal tube would have significantly contributed to the Mrs Thurairajah's ultimate hypoxic state.

Does an issue of public safety arise?

71. Whilst I am satisfied that the circumstances involving Mrs Thurairajah's death reflect less than perfect practice, and whilst there has been scope for improvement in practices at the Canberra Hospital as a result of the learning's from her death, I do not form a view that there is a broader issue of public safety.

72. Medical emergencies are inherently fraught with risk of death. This system adopted by the Canberra Hospital of the medical emergency team has, on the unchallenged evidence, significantly improved patient outcomes.

73. In addition, I cannot conclude on the evidence before me that a particular failing by one individual resulted in Mrs Thurairajah's death or that there is an ongoing concern for public safety as the result of either a particular individual or an inherent systemic failing.

74. This does not mean there is not some scope for improvement. I note that the Canberra Hospital has itself taken certain measures to address some of the issues that arose in relation to Mrs Thurairajah's death. One of those was the introduction of a new form of end tidal carbon dioxide monitor which does not require a warm-up and self calibration period. In addition, the implementation of a written confirmation of the

MET trolley checklist and a written policy regarding the role of MET team members go some way to addressing the concerns evident as a result of this situation.

Recommendations

75. I make the following recommendations.

76. That the person responsible for the medical emergency team and ICU outreach services at the Canberra Hospital consider implementing the following:

    1. A requirement that all staff who are responsible for MET pagers, or are required or authorised to attended MET calls, be required to complete a document indicating that they have read and are familiar with MET call policies and procedures and have familiarised themselves with the equipment available on the MET trolley, to be completed annually;

    2. Amending paragraph 7 of the " Responders roles and responsibilities" document to incorporate at point 1, under the heading "Key points of communication", the following recommended form of introduction on arrival at a medical emergency:

"my name is.....; I am the (indicate role); I have (x) years/months experience in this role; who is in charge of this response?/I am in charge of this response."

I certify that the preceding 76 numbered paragraphs are a true copy of the Reasons for Judgment herein of Her Honour, Chief Coroner Walker.

Associate: Amy Winner
Date: 5 March 2014

Counsel Assisting:	Ms S McFarland Office of the ACT Director of Public Prosecutions
Counsel for the Territory:	A.Tonkin
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Counsel for Dr D'Souza:	A Freer
Solicitor for Dr D'Souza:	KJB Law
Counsel for Dr Thomsett:	K Burke
Solicitor for Dr Thomsett and Dr Kot:	Avant Mutual Group Limited
Date of hearing:	18 – 20 November 2013
Date of findings:	3 March 2014