Coroners Act 1996
[Section 26(1)]

Western *Australia*

AMENDED RECORD OF INVESTIGATION INTO DEATH

Ref No: 45/16

I, Barry Paul King, Coroner, having investigated the death of ***S T*** *with an inquest held at the* ***Perth Coroner's Court*** *on* ***30 November 2016****, find that the identity of the deceased person was* ***S T*** *and that death occurred on* ***20 November 2014*** *at* ***Armadale Kelmscott Hospital*** *from* ***pneumonia in an infant with a history of surgically repaired congenital heart disease, prematurity and failure to thrive*** *in the following circumstances:*

Counsel Appearing:

Sergeant L Housiaux assisting the Coroner
Ms A Preston-Samson (State Solicitor's Office) appearing for the Department of Child Protection and Family Support

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NON-PUBLICATION ORDER

No report may be published of any part of the proceedings or of the evidence given at this inquest that could lead to the identification of the deceased or her family.

INTRODUCTION

1. S T (**the deceased**) died suddenly on 20 November 2014 at Armadale Kelmscott Hospital. She had been taken there by ambulance after being found unresponsive and not breathing in her cot. She was nine and a half months old.

2. As the deceased was 'a person in the care of the CEO' as defined in section 3 of the *Children and Community Services Act 2004* at the time of her death, she was a 'person held in care' under section 3 of the *Coroners Act 1996*.

3. Section 22 (1)(a) of the *Coroners Act 1996* provides that a coroner who has jurisdiction to investigate a death must hold an inquest if the death appears to be a Western Australian death and the deceased was immediately before death a person held in care.

4. An inquest to investigate the death of the deceased was therefore mandatory. Accordingly, I held an inquest on 30 November 2016 at the Perth Coroners Court.

5. Under s25(3) of the *Coroners Act 1996*, where a death investigated by a coroner is of a person held in care, the coroner must comment on the quality of the supervision, treatment and care of the person while in that care.

6. I have found that those providing care to the deceased acted reasonably and appropriately.

THE DECEASED

7. The deceased was born at King Edward Memorial Hospital (**KEMH**) in Subiaco on 29 January 2014. She was born prematurely at 29 weeks gestation. She had intrauterine growth restriction and her birth weight was only 738 g.

8. The deceased had a very complicated neonatal course. She developed necrotising enterocolitis, a recognised bowel complication of prematurity. She underwent several surgeries, including resections of her bowel, with strictures of her bowel developing, and an ileostomy.

9. The deceased was also born with congenital heart disease, namely an atrio-ventricular septal defect. Before a surgical correction could be undertaken, the deceased had to grow to at least 2 kg. Her weight gain was slow, and at three months of age she was showing signs of excessive blood flow through her lungs due to the heart defect. She was sent to the Mater Hospital in Brisbane for surgery, but the cardiologist there considered that she was too small to repair the defect, so a pulmonary artery band procedure was performed to decrease the blood flow. She was returned to the neonatal intensive care unit at Princess Margaret Hospital (**PMH**) where she continued to gain weight slowly.

10. On 12 August 2014 the deceased underwent surgery to repair the heart defect, but the operation had to be re-done on 28 August 2014 when the repaired mitral valve fell apart. The second attempt also failed within three or four days, so she underwent a risky operation on 9 September 2014 to replace the mitral valve with a Hancock tissue valve. Following that surgery she did well and could be discharged from hospital one month later.

11. The deceased's care during her eight months in hospital was complicated by the need for a pacemaker insertion, numerous respiratory problems and periods of prolonged ventilation. It was further complicated by problems with her mother and father, both of whom were illicit drug users. There were issues of domestic violence and

untreated mental health, and there were concerns about the safety of the deceased's two year old brother, 'D'.

12. On 22 September 2014, D was taken into provisional care and protection of the CEO of the Department of Child Protection and Family Support (**DCPFS**) and placed with his paternal grandparents in Brookdale. The next day, the deceased was also taken into the care of the CEO, but she remained at PMH.

13. On 9 October 2014 the deceased was discharged from PMH and also placed with the deceased's grandparents.

DECEASED'S GRANDPARENTS

14. The deceased's grandparents lived in Brookdale with her grandmother's two teenage sons. They had a turbulent relationship with the deceased's father and mother, as a result of which they were not told of the deceased's birth. They became D's full-time de facto carers over time and set aside a bedroom for him at their house because his parents would drop him off at their home and then disappear.

15. On about 8 September 2014 the deceased's father contacted his father to ask that he take D to PMH because it was unlikely that the deceased would survive the operation the next day. That was the first time that the deceased's grandparents met the deceased. From that time, they had regular contact with the hospital to get updates of her progress, and they began to visit her regularly. When she and D were taken into the care and protection of the CEO, they agreed to be their carers.

16. Prior to the deceased's discharge into their care, the deceased's grandmother spent periods of time at PMH learning how to care for her, including how to use the medical equipment used to feed her and how to care for her stoma. The deceased had day and weekend leave with her grandparents, and nurses from Hospital in the Home

(**HiTH**) attended their home to help set up the medical equipment.

17. For the first four weeks after the deceased had been discharged from PMH, nurses from HiTH attended daily to administer her anticoagulant injections, to change her subcutaneous catheter and to monitor her progress. After 4 November 2014 the nurses visited her weekly and her grandmother gave her the injections. It is apparent from the notes made by HiTH nurses that they did not do observations of vital signs or carry out detailed examinations of the deceased in other ways during their attendances.[1]

18. On 13 November 2014 the deceased was reviewed by a neonatal consultant, Dr Steven Resnick, who noted that she had significant developmental delay but was making steady progress and had gained about 700g in the previous three weeks. She was stable from a cardiology point of view and was starting to eat solid foods. Examination of her chest showed no respiratory distress and she had normal breath sounds bilaterally.[2]

19. Dr Resnick planned to make a repeat referral to surgeons to determine a suitable time to close the deceased's stoma, and he noted that she should continue with early intervention strategies, involving physiotherapy, speech therapy and occupational therapy. He planned to review her in three months' time.[3]

EVENTS LEADING UP TO THE DEATH

20. On 17 November 2014 the deceased's grandmother did not take the deceased to her scheduled appointment with her speech therapist because she was unwell. The family had been suffering from apparent gastroenteritis, which had also affected the deceased and made her irritable.[4]

[1] Exhibit 2
[2] Exhibit 1, Tab 15
[3] Exhibit 1, Tab 15
[4] Exhibit 1, Tab 7A

21. On 18 November 2014 a HiTH nurse attended the deceased at home to weigh her, to change her catheter and to drop off supplies of anticoagulant. The deceased's grandmother requested that the nurse not weigh the deceased because she was restless and had not slept all day.[5]

22. At about 7.30 am on 20 November 2014 the deceased's grandmother woke up and checked on the deceased, who was awake and was 'jabbering away'.[6] She noted that the deceased's stoma bag had burst, so she gave the deceased a sponge bath to clean her. She also gave her 2.5 ml of children's Nurofen (ibuprofen) and set up a feed for her through a nasal gastric tube. She checked on the feed a number of times over the next hour while the feed was taking place, and all appeared well.[7]

23. At about 10.00 am a construction worker from a building site across the road from the deceased's grandparents' house knocked on their front door. Another worker at the building site was unconscious and was not breathing. The deceased's grandmother told her son to keep an eye on D and the deceased while she went across the road and assisted with providing cardiopulmonary resuscitation (**CPR**) to the worker. She stayed there until ambulance officers arrived.[8]

24. As she was returning home about half an hour after she left, the deceased's grandmother met up with one of her friends, with whom she had a brief chat outside her home. She then went in and checked on the deceased at a time estimated to be between 10.30 am and 11.00 am. The deceased appeared to be sleeping, so she did not disturb her. She routinely looked in on the deceased each time she walked past her room, and the deceased always appeared to be asleep.[9]

[5] Exhibit 2
[6] Exhibit 1, Tab 7A
[7] Exhibit 1, Tab 7A
[8] Exhibit 1, Tab 7A
[9] Exhibit 1, Tab 7A

25. At some time that morning, a 16 year old friend of the deceased's grandmother's son arrived at the house to visit. At about 1.15 pm he mentioned to the son that the deceased did not look right. The son checked the deceased and then called the deceased's grandmother, who went into the deceased's room and saw that she was lying on her back in her cot with her eyes open, not breathing.[10]

26. The deceased's grandmother called for an ambulance and administered CPR. Her son called a family friend, who attended promptly and assisted with CPR.[11]

27. Ambulance officers arrived within a short time, took over resuscitation attempts and conveyed the deceased to Armadale Kelmscott Hospital.[12]

28. At the hospital, CPR continued for another 20 minutes, during which time the deceased was asystole. The emergency team decided to stop the resuscitation due to futility. The deceased was pronounced dead at 2.31 pm.

CAUSE OF DEATH AND HOW DEATH OCCURRED

29. On 24 and 25 November 2014, forensic pathologist Dr J White conducted a post mortem examination and found evidence of the recent cardiac surgery, heavy congested lungs with multiple fibrinous adhesions and a chronically congested liver.[13]

30. Post mortem histology showed extensive acute pneumonia in the lungs. The changes in the large bowel were reactive rather that infective. Microbiological studies isolated rhinovirus and *Staphylococcus aureus* from lung tissue and norovirus was detected in the small intestine.[14] Toxicological analysis showed promethazine and

[10] Exhibit 7A
[11] Exhibit 7A
[12] Exhibits 7A and 16
[13] Exhibit 1, Tab 5A
[14] Exhibit 1, Tab 5A

ibuprofen.[15] Neuropathological examination found a reduced brain weight and no other abnormality.[16]

31. Dr White formed the opinion, which I adopt as my finding, that the cause of death was pneumonia in an infant with surgically repaired congenital heart disease, prematurity and failure to thrive.[17]

32. Dr White also noted that the ibuprofen and promethazine detected in the toxicological analysis were not toxic.[18] It seems that the promethazine may have been given to the deceased by D, who may have given her some of his milk which had small doses of that medication in it.[19]

33. Emeritus consultant paediatrician Dr Jacqueline Scurlock reviewed the deceased's case and provided a report[20] in which, among many other things, she stated that promethazine has been shown to depress the arousal and respiratory mechanisms in normal infants in sleep, and that it has been associated with 'sudden infant death syndrome'. However, she stated that she could not comment on the finding of less than 0.03 milligrams per litre of promethazine detected in the toxicological analysis.[21]

34. Dr Scurlock went on to state that the deceased was very vulnerable to sudden death without promethazine. This was so because the deceased was microcephalic so she may have had a poor arousal response to hypoxia. She noted that rhinovirus causes respiratory infection and pneumonia, so she may have been hypoxic, and pneumonia causes apnoea. Dr Scurlock also mentioned that the deceased had some immune problems and may not have been able to mount an appropriate response to infection.[22]

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[15] Exhibit 1, Tab 6
[16] Exhibit 1, Tab 5C
[17] Exhibit 1, Tab 5A
[18] Exhibit 1, Tab 2
[19] Exhibit 1, Tab 5A
[20] Exhibit 1, Tab 14
[21] Exhibit 1, Tab 14
[22] Exhibit 1, Tab 14

35. In oral evidence Dr Scurlock said that *Staphylococcus aureus* causes 'a really nasty pneumonia'[23] and that pneumonia can develop quite quickly.[24] The deceased had been doing really well despite the fact that her gut was not working well, but the two viruses 'get together and then a secondary infection with a staph is really putting the kybosh on things, well and truly'.[25]

36. In the foregoing circumstances, I am satisfied that the deceased developed pneumonia which, in the context of her comorbidities, led to her death. I find that death occurred by way of natural causes.

QUALITY OF SUPERVISION, TREATMENT AND CARE

37. Dr Scurlock's view, which I accept, is that there were no problems with the care that the deceased received at both KEMH and PMH.[26]

38. The evidence clearly establishes that the deceased's grandmother provided loving care to the deceased and that, in particular, the nursing care she provided was of an appropriate standard.

39. I note for completeness that the Executive Director Country Services and Therapeutic Care in the DCPFS had no concerns in relation to the deceased's placement with her grandparents or in relation to the care she received from them.[27]

40. As to the question of whether the deceased's grandmother might have realised earlier that the deceased had developed a serious illness such as pneumonia, Dr Scurlock noted that it may have been difficult for her to realise that the deceased had developed respiratory difficulty.

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[23] ts 19 per Scurlock, J M
[24] ts 16 per Scurlock, J M
[25] ts 15 per Scurlock, J M
[26] Exhibit 14
[27] Exhibit 3

41. Dr Scurlock stated that one usually ascertains this when an infant cannot feed well, but the deceased took very little formula orally and her feeds were mainly through a tube and pump.

42. In addition, Dr Resnick had reviewed the deceased on 13 November 2014 and had been pleased with her weight gain and progress, and a physiotherapist had also been pleased with her developmental progress.[28]

43. Dr Scurlock stated in her report that the HiTH care plan and support was good. However she said that it was a great pity that the HiTH nurse did not examine the deceased on 18 November 2014 when she was unsettled, because the nurse may have picked up a problem that the deceased's grandmother was unaware of.[29]

44. In oral evidence, Dr Scurlock clarified that her comment was by way of observation more than criticism.[30] She said that nurses would be expected to rely on the history supplied by carers, and in this case the nurse would have been reassured by Dr Resnick's comments.[31]

45. Following the hearing of the inquest, the manager of Mediation and Legal Support Services at the Child and Adolescent Health Service provided through Ms Preston-Samson a letter dated 7 March 2017 addressing issues raised by Dr Scurlock and the possibility of my making a recommendation that HiTH nurses should generally conduct a basic general examination of patients, including the taking of observations, in addition to carrying out the tasks on the respective care plan.

46. Ms Bowen stated that the senior clinical nurse who attended the deceased on 18 November 2014 advised that she had no recollection of that visit, but that the notes she made at the time indicate that she replaced the catheter on the deceased's leg, so she would have touched her and would have noticed if she were hot. The nurse advised

[28] Exhibit 1, Tab 14
[29] Exhibit 1, Tab 14
[30] ts 16 per Scurlock, J M
[31] ts 20 per Scurlock, J M

that she would have also noticed an elevation of respiratory rate or lethargy.

47. Ms Bowen said that post-acute care, which the deceased was receiving, can be significant, but that it does not necessarily generate a need for formal observations at each home visit unless there is a clinical indicator. She said that a basic assessment of well-being forms an essential part of every home visit but does not necessarily result in the taking of observations. In the absence of a clinical indicator, unnecessary observations could be undertaken for very little clinical gain.

48. In the light of that evidence, I am satisfied that the care provided by HiTH was appropriate.

CONCLUSION

49. As cardiothoracic surgeon Mr David Andrews wrote, the deceased was born with significant cardiac defect at a very early gestation age and a very small weight, and it was a credit to the neonatologists and other physicians looking after her that she actually managed to get through her long hospital stay and go home.[32] To Mr Andrews' comments regarding medical care, I would add reference to the care provided by HiTH nurses.

50. In addition to the care received through the medical system, it is clear from the evidence that the deceased also received a great deal of love and care from her grandparents, particularly her grandmother. It is also clear that there was little that her grandmother could have done to protect the deceased from the disease that caused her death.

B P King
Coroner
16 June 2017

[32] Exhibit 1, Tab 12