



**STATE CORONER'S COURT
OF NEW SOUTH WALES**

Inquest: Inquest into the death of Harland Sutton

Hearing dates: 16 – 20 November 2020, 1 December 2020, 1 June 2021

Date of findings: 20 December 2021

Place of findings: NSW State Coroner's Court, Lidcombe

Findings of: Magistrate Harriet Grahame, Deputy State Coroner

Catchwords: CORONIAL LAW – Sudden Unexpected Death in Infancy (SUDI), frusemide,

File number: 2015/368597

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Findings

Identity

The person who died was Harland Sutton

Date of death

He died on 15 December 2015, between 8:25am and 12:10pm.

Place of death

He died at 75A Frederick Street, Sanctuary Point NSW

Cause of death

The exact cause of his death is unascertained. His death can be classified as Sudden Unexpected Death in Infancy (SUDI +0)

Manner of death

Harland's death was sudden and unexpected. Toxicological samples taken during the autopsy process indicated that he had been administered frusemide in the period shortly before or shortly after his death or *peri mortem*. He was asystole at the time ambulance officers arrived and their subsequent resuscitation was unsuccessful.

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Introduction

1. Harland was born to parents, Tracie Sutton and David Robertson, on 30 June 2015 at the Royal Women's Hospital at Randwick. He was the youngest in the family, coming after sisters Nadine and Eva-Marie and brothers Emmeric and Ari.
2. Harland was a well-loved child whose death has caused unspeakable pain and grief. His mother Tracie attended the proceedings on each hearing day, despite the difficult evidence that she was often asked to hear. The terrible memories of that day in December 2015 would have flooded back to her. Tracie told the court that she found it difficult to even articulate the extent of her love for Harland. However, the deep love that she had for Harland, and continues to have for him, was obvious to all who attended this inquest. Tracie conducted herself with grace and dignity throughout the whole proceedings and she generously shared with us photos and stories of Harland.
3. On 30 June 2015, Harland arrived into this world prematurely, and he was subsequently placed in the Neonatal Intensive Care Unit at the Royal Women's Hospital in Sydney before later being transferred to Shoalhaven District Memorial Hospital to be closer to home, where in due course he was discharged. Despite his prematurity, Harland by all accounts progressed well. Mornings were a special time between Tracie, David and Harland as they would all play together and spend time with each other in the morning. Tracie told the court that Harland would excitedly kick his legs around and seemed to love the introduction of solid foods.
4. After the first tranche of hearing days finished in December 2020, Tracie told the court that as she drove away, the presence of the collective voices of those who attended court and who had said Harland's name was so strong, she thought Harland had been left behind.
5. There are no words to describe the loss of a child and there are no words that could comfort such a loss. Each participant in court felt Tracie's pain acutely. Nevertheless, I extend my sincerest condolences to Tracie and recognise that although her grief is ongoing, I hope that in time, this process will have provided a small level of comfort to her.
6. Although Tracie and David are separated, David attended the inquest to give evidence. David struck me as a quiet man. It was obvious that the passage of time did not quell his sadness at losing Harland. I also wish to acknowledge his loss and to extend my condolences to him.

7. Harland's siblings also attended the inquest. Tracie's oldest daughter Nadine provided great comfort to Tracie, and was heavily involved in the inquest proceedings at every juncture, at times relaying information to Tracie, when she was too overcome with grief. Despite Nadine's own grief, she attended court every day to support her mother and her siblings. The special relationship shared between Tracie and Nadine was apparent. It cannot have been easy for such a young woman to have to carry the burden of this tragedy and the grief it has caused. I also extend my sincere condolences to Nadine and wish to thank her in particular for the support she showed Tracie, and Harland.

The role of the coroner

8. The role of the coroner is to make findings as to the identity of the nominated person, and in relation to the date and place of death. The coroner is also to address issues concerning the manner and cause of the person's death.¹ In addition, the coroner may make recommendations, arising from the evidence, in relation to matters that may have the capacity to improve public health and safety in the future.²
9. In this case there is no dispute in relation to Harland's identity, or to the date or place of his death. The medical cause of his death has however been the subject of significant investigation and the circumstances surrounding his death remain puzzling and difficult to understand.
10. The investigation into Harland's death has been lengthy and convoluted. There was considerable delay caused by the need to fully examine the unexpected presence and significance of the drug frusemide in Harland's system at autopsy. More recently listings in this court were impacted by COVID-19. I acknowledge that it is likely that delay has caused additional stress and anxiety to all those involved in these sad proceedings. I also acknowledge that the lack of clear answers, even at the conclusion of these proceedings, is distressing for those involved in the investigation and inquest, particularly for Harland's family.

Scope of the inquest

11. The inquest took place over seven hearing days. A comprehensive police brief was tendered including police statements and photographs. Extensive medical records and expert reports were also tendered. The court heard from family members and from ambulance officers and

¹ Section 81 *Coroners Act 2009* (NSW)

² Section 82 *Coroners Act 2009* (NSW)

doctors involved in Harland's care. The court was greatly assisted by extensive expert evidence.

12. A list of issues was provided to the parties before the proceedings commenced. The issues included:
 - i. the likely time, place and cause of death of Harland, including whether SUDI may have been a contributing factor and whether the drug frusemide (detected as present post mortem) could have had any contribution to baby Harland's death;
 - ii. the manner of death, including:
 - a. The detection of frusemide in Harland's blood post-mortem and possible ways it may have been administered to Harland, including accidental administration by a person or person(s) unknown during the attempted resuscitation process;
 - b. Incidental to (a) above, the storage, replacement, accounting/tracking procedures for drugs retained by the NSW Ambulance Service, Illawarra District, specifically vials of adrenaline and frusemide.
13. While these findings cannot refer in detail to all the material examined, all of the evidence has been carefully reviewed and considered.

Background

14. Harland was born on 30 June 2015. He was premature, having been delivered at just over 30 weeks gestation. He weighed only 1725 g and had reduced Apgar scores. Harland stayed in the neonatal unit for about four weeks before being transferred to Shoalhaven Memorial District Hospital's (**SMDH**) Children's ward. He arrived home on 17 August 2015.
15. Harland was breast fed until eight weeks of age. While it had been initially suspected that Harland may have had congenital abnormality of the spine, imaging of his brain and spinal cord at 2.5 months was unremarkable. Dr Toby Greenacre, Harland's treating paediatrician, reviewed Harland on 7 September 2015 and stated that Harland was progressing well.
16. In the period before his sudden and unexpected death, Harland appeared generally healthy. He was feeding from a bottle and had commenced some solid food. He was yet to have his six month immunisations.
17. Harland appears to have spent all his time with close family members. He did not attend a child care service and the court heard that the family rarely socialised. While workers from Binji & Boori, the local Aboriginal Maternal and Infant health organisation, came from time to

time to check on Harland, there were few other visitors to the house. The court was informed that on the morning of his death Harland was sleeping in his parent's bedroom with the door closed.

A brief review of the evidence relating to events of 14 – 15 December 2015

18. The court heard from Harland's parents about the events leading up to the arrival of the ambulance on 15 December 2015. Their accounts differ in some minor respects, but both record an uneventful evening on 14 December 2015, and that he was placed into his bassinet in the main bedroom. Harland woke at some time around 2:30am on the morning of 15 December 2015 and was given a bottle. He was given two further top-ups or bottles at 5:30am and 7:30am.
19. On the morning of 15 December 2015, Mr Robertson went to work at about 8:30am. It appears that Harland remained on their bed. Mr Robertson described him as asleep, with a pillow on either side of him and a 'V' shaped pillow behind his head. Both parents agreed that they had never seen Harland roll.
20. Ms Sutton told police that once her husband had gone to work at around 8:30am, she left Harland sleeping on top of the doona and spent a couple of hours in the bathroom showering and applying make-up. She told the court that she regularly turned off the water to see if she could hear Harland waking, but she could not. She also told the court that she momentarily stopped at the door of the bedroom when she came out of the shower (to see whether she could hear Harland stirring) but that she did not hear anything. Ms Sutton then fed her other children and exchanged various text messages with her husband. At about 10:55, Ms Sutton sent Mr Robertson a message noting that she thought she had heard Harland waking up. Ms Sutton went into the kitchen and prepared him a bottle.
21. Tragically when she entered the bedroom with that bottle, Ms Sutton found Harland face down on the doona. He was still and unresponsive.
22. It is difficult to establish exactly when Harland was last seen alive, but it is likely to have been at around 8:30am, when Mr Robertson left to go to work and Ms Sutton proceeded to shower and attend to her other children.
23. Ms Sutton told the court that after discovering Harland face down on the bed, she briefly attempted a form of CPR but had not been trained in resuscitation. She breathed into his mouth and began pushing his chest with no response. She moved him closer to the light and pushed on "*his chest and part of [her] hand was on his stomach*". She noticed that "*milk*

came from his nose or eyes or both". Ms Sutton screamed and ran outside, calling for help then ringing 000. The call to 000 is logged at 11:02 am. Ms Sutton's distress is audible in this phone call and it is difficult to comprehend the horror that must have been unfolding in front of her.

24. The court also received evidence from a neighbour, Mr John Smith. He stated that at about 11:00 am he heard "*grief stricken screams from a female voice repeatedly yelling 'my baby's stopped breathing'*". Mr Smith entered her home. It is significant that he observed Harland lying on the bed and that the colouring around Harland's lips was a "*blueish mauve colour*." Mr Smith did not have first aid experience and he immediately returned to his own home to contact 000. He was instructed by the operator to return to the child so that first aid instructions could be given.
25. On his return, Mr Smith observed a woman, now known to be a neighbour, Ms Shannon Holmes, attempting CPR. Ms Holmes told the court that the baby had "*blue lips*" and that his eyes looked "*dull*." She noticed that there was vomit near the baby's mouth, that he smelt of vomit and that his nose appeared to be wet with vomit. The transcript of her call with NSW Ambulance gives a reliable account of her contemporaneous observations. She states that Harland was "*going very blue*" and that he was "*very cold*."
26. The first NSW Ambulance paramedics arrived on scene at 11:13 am and police arrived soon afterwards. Mr Robertson had been contacted by Ms Sutton, and by the time he arrived at the house after leaving his workplace, there were numerous people in attendance and the treatment of Harland was underway.
27. The court heard detailed evidence from each of the attending paramedics about the roles they played in providing Harland with medical care. The team consisted of four paramedics, two of whom were intensive care paramedics (**ICPs**), and an observing paramedic student, who arrived in three vehicles within minutes of each other. These paramedics were ICP Anthony Vance, ICP Andrew Kinross, Matthew Samuel and Nicholas Gibson. Thomas Naylor was the observing paramedic student.
28. While there were some discrepancies in the detail they provided to the court, all agreed that a single intraosseous (**IO**) line was placed into Harland, a defibrillator was set up, Harland's airway was secured and ventilation commenced, and that adrenaline was administered. I note that aside from ICP Mr Anthony Vance, who provided a statement in February 2016, the other paramedics who attended the incident were not asked to provide statements until 2017

and 2018. In these circumstances I accept that some variation in their individual recollections is not in and of itself surprising.

29. Mr Samuel was the first paramedic to arrive at the house. He described the scene on arrival as “*very confronting*” and “*something nothing can prepare you for*”. There was extreme distress and hysterical screaming.
30. Mr Vance told the court that while driving to the scene he was aware that the job involved care for a paediatric cardiac arrest and that a six month old child was receiving CPR from a civilian under telephone instruction. He told the court that he discussed the use of adrenaline and amiodarone, an anti-arrhythmic drug with his colleague ICP Mr Kinross. He stated that he had consulted his NSW Ambulance “pocket protocol book” in relation to appropriate dosing for a paediatric patient, based on the information he had at that stage. Mr Vance told the court he would have written the correct dose on the back of his hand, in accordance with his usual practice. He told the court “*I always write down the dose on the back of my hand*”. Mr Kinross confirmed this conversation in general terms and stated that he and Mr Vance decided that Mr Vance would be the primary (treating) paramedic as he was in the treatment (passenger) seat.
31. Mr Vance described the scene on arrival as “*hectic*” and a “*severe case*”. In his initial statement made in February 2016, Mr Vance recalled Mr Samuel initially assisting Mr Kinross with the defibrillator and then helping Mr Kinross set up airway equipment while Mr Samuel performed chest compressions. Mr Vance stated that he was successful in getting an IO line into Harland’s distal right tibia and then connected a bag of Hartmann’s solution. He described preparing 1:10 000 adrenaline and that a 0.5 mcg dose was given via the IO, without effect. He noted that Mr Gibson had arrived by this point and that they prepared for Harland’s transport (Mr Gibson was not on duty but was called to the scene to assist). Harland was given two further doses of adrenaline while this occurred.
32. Mr Vance told the court that he placed his green ambulance bag on a bookcase or dresser and that Mr Samuel also brought a green bag into the house. He agreed it was possible that the Oxy-Viva (an oxygen resuscitation kit) and the defibrillator may have been placed on the bed. He thought that Mr Samuel took over compressions but could not recall if Mr Kinross may have initially performed compressions while Mr Samuel set up the defibrillator.
33. Mr Vance told the court that he had a clear memory of removing adrenaline from the bag himself and of drawing up the drug from the vial. He specifically and firmly denied that any other person drew up the drug in that room. Mr Kinross noted he was not sure who drew up

the adrenaline, but clarified in oral evidence that it was his memory that he watched Mr Vance hand the checked drug to Mr Samuel or Mr Gibson to draw up, and the drug was then handed back to Mr Vance for administration. Mr Vance thought Mr Kinross must be mistaken to suggest that any other person may have drawn up the drug.

34. Mr Vance gave detailed evidence about drawing up the drug. He outlined the method paramedics follow to ensure correct administration of the correct amount of drug on the correct patient. This process is known as the 'Five Rs': *Right Patient, Right Drug, Right Time, Right Dose and Right Route*. Mr Vance maintained that he had a clear memory of showing the adrenaline vial to two other paramedics and stating aloud that it was 1:10 000 adrenaline, and the vial's use by date. He stated that he had a clear memory of administering the dose and that there were "*a few mls left*" in the vial. He stated that he introduced a second syringe to "push" the adrenaline dose through using 10ml of Hartmann's solution.
35. There were some minor discrepancies about the order of events given in his oral account in 2021 compared to the account he had given to police in February 2016. Given the passage of time, this is unsurprising and of little or no probative value. Mr Vance stated in oral evidence that he must have gone outside at some point to help Mr Gibson with the stretcher, but he rejected the suggestion that someone could have administered frusemide while he was absent.
36. Mr Vance was taken to the Electronic Medical Record (**EMR**) and questioned about the 8 minutes between the second and third doses of adrenaline. He conceded that the times were "*guesstimates*" within a very small range. They reflected a reconstruction rather than an accurate contemporaneous record. There was no firm explanation of this small delay. It could reflect that "*time just got away*" or it could have been caused by concern about movement of the cervical collar. In any event, Mr Vance did not see it as significant.
37. The EMR contained other discrepancies. The recording of "*pulse palpable*" was considered by all of the paramedics who gave evidence to have been a mistake that was likely caused by choosing the wrong entry on a drop-down menu. The court accepts that there is simply no evidence that Harland ever had a pulse in the presence of the paramedics. The EMR notes that on arrival Harland's heart rhythm was asystole. Even prior to their arrival Harland was described as completely unresponsive, "*not breathing*", blue lipped and cold. There is also an entry which refers to a single dose being given "IV" rather than IO. The court accepts that this is inherently implausible and must also be the result of a recording error.

38. Despite extensive questioning on the matter, Mr Vance was “*as sure as he can be*”, “*100% positive*” that 1:10 000 adrenaline was prepared and administered at the house by him and him alone. He told the court that he cross checked the dose in the usual way and placed the adrenaline syringe on a tray for use in the ambulance on the way to SDMH. Mr Vance drove the ambulance to SDMH with Mr Samuel and Mr Kinross in the back. On arrival Mr Kinross informed him that three further doses of 0.5mg of 1:10 000 adrenaline had been administered to Harland en route. Mr Vance entered this information onto the EMR.
39. It should be noted that the EMR records Mr Vance as having administered the first four boluses of adrenaline and Mr Samuel the last two.
40. Mr Kinross told the court that when he arrived at the house with Mr Vance and the paramedic student Mr Naylor, a woman was already performing CPR under instructions given by telephone and Mr Samuel was already in the room with a defibrillator. Mr Samuel prepared the defibrillator and monitor. Mr Kinross checked on Harland and confirmed that he was not breathing. Mr Samuel took over compressions and Mr Kinross secured the airway and began ventilation. Mr Kinross told the court that at some point shortly after arrival he was aware that Mr Vance had gained IO access and was setting up a bag of Hartmann’s.
41. In his first statement in January 2017 Mr Kinross stated that he saw Mr Vance select a large clear ampoule of adrenaline after a discussion about dosage amounts. The ampoule was then handed to either Mr Samuel or Mr Gibson and administered via the IO line. Mr Samuel and Mr Vance crossed checked the ‘Five Rs’. While this was happening, Mr Kinross stated that he continued chest compressions and placed a cervical collar on Harland.
42. In oral evidence Mr Kinross’ account differed to some degree. He recalled Mr Vance holding up a vial of adrenaline 1:10 000 and saying “*I have adrenaline*” and reading out the expiry date, which was repeated by Mr Kinross. Then they dealt with the ‘Five Rs’. He was not sure who drew up the adrenaline, but he thought it was Mr Vance.
43. In oral evidence Mr Kinross clarified that when he said he had “*observed the expiry dates to be in date*” he was describing an auditory rather than a visual observation. He also told the court that he would expect an ICP to want to monitor the patency of the IO line and administer the adrenaline, although he conceded that Mr Samuel administered the adrenaline in the ambulance.
44. During his oral evidence, Mr Kinross appeared to suggest that the original account provided in his first statement that either Mr Samuel or Mr Gibson actually administered the dose of

adrenaline was incorrect and that he was referring to them having drawn up the drug. He initially told the court that he thought Mr Vance had drawn up the drugs, although he was not “100% sure who drew [the adrenaline] up... [he was] pretty sure it was Officer Vance who drew it up”. Later, in his evidence he noted that he believed that Mr Vance handed the adrenaline to either Mr Samuel or Mr Gibson to draw up and that it was then handed back to Mr Vance to administer.

45. Once in the ambulance, Mr Kinross stated that he managed the endotracheal tube (**ETT**) and that Mr Samuel continued compressions and administered the adrenaline, under his instruction. Mr Kinross recalled that the adrenaline given to Harland was drawn up from a clear ampoule.
46. As noted above, Mr Samuel was the first to arrive at the house. Although he could not recall certain events, such as where he put his bag on arrival or whether it was him or Mr Kinross who removed Harland’s singlet; he was certain that the medication would have been checked in the usual way using the ‘Five Rs’.
47. In oral evidence Mr Samuel told the court that he thought there was only one IO attempt but could not specifically remember if it was flushed. In court he recalled Mr Vance holding up a clear ampoule, adrenaline 1:10 000, to which Mr Samuel said “*yeah mate*”. He later recalled it had a white label and that it was bigger than other clear ampoules. During cross-examination he remembered actually hearing the word adrenaline and looking across. These were details he had not initially told police when he provided his initial statement on 21 June 2017.
48. In oral evidence, Mr Samuel had no recollection of a dose for the adrenaline being called out or of the Hartmann’s solution. He told the court that his usual practice was to confirm the doses of adrenaline prior to administration, however he could not remember whether this actually occurred. He was aware that the adrenaline was meant to be administered every four minutes and thought it possible an interval was lengthened while Harland was being loaded into the ambulance.
49. Mr Samuel told the court that despite having been a paramedic for nine years, he had rarely been involved in administering adrenaline on a paediatric patient and had never seen an IO line inserted. It was “*probably only his third paediatric attendance*”. Notwithstanding two ICPs being present and in light of his relative inexperience in relation to paediatric incidents, he was given an active role in Harland’s treatment. Despite Mr Kinross’s evidence that paramedics normally rotate doing CPR (due to fatigue), this task appears to have fallen

exclusively to Mr Samuel. Fatigue may not be a significant factor in infant CPR, Mr Vance noting that *“the physical effort is obviously less with a child”*. Nevertheless, Mr Vance estimated that Mr Samuel had given Harland in excess of 4700 compressions.

50. Mr Samuel stated that as a general duties paramedic, he would be permitted to give adrenaline 1:10 000 if supervised or under the instruction of an ICP paramedic. He was clear that Mr Vance drove the ambulance but in oral evidence could not recall whether he or Mr Kinross actually administered the adrenaline to Harland whilst traveling in the ambulance car to SDMH. In circumstances where there were two ICPs in attendance, Mr Vance was asked why he proceeded to drive the ambulance carrying Harland to SDMH instead of Mr Samuel. Mr Vance noted that Mr Samuel rejected the offer to drive the ambulance, attributing this to Mr Samuel’s emotional connection to this particular job. Mr Vance told the Court he believed Mr Samuel’s wellbeing was *“best served doing what he wanted on the job, and that was to stay with the patient and do compressions”*.
51. This evidence is difficult to reconcile with the situation that was presenting itself to the three paramedics at that time. Harland was unresponsive and the scene was chaotic. Two ICP paramedics were on scene: Mr Vance had inserted the IO line and Mr Kinross the ETT. Despite the evidence provided by Mr Kinross regarding an ICP wanting to monitor the patency of an IO line, Mr Vance proceeded to hand over care and treatment to Mr Samuel and drove the ambulance to SDMH. Although I commend Mr Vance for the consideration of Mr Samuel’s wellbeing, in circumstances where he was the more senior paramedic with vastly more experience, this decision is difficult to understand.
52. Mr Naylor, who was a paramedic student at the time of the incident, took a lesser role than the others. He recalled Mr Samuel undertaking CPR and that Mr Kinross was involved with the valve mask and intubation. He did not see the IO line being placed but assumed that as only Mr Vance or Mr Kinross were qualified to do it, a process of elimination meant it must have been Mr Vance. He did not specifically recall any discussion of the ‘Five Rs’.
53. Mr Naylor stated that he was pretty sure that Mr Vance was responsible for administering the drugs in the house, but he did not recall actually seeing him draw up or administer the drugs. He remembered that during the trip to SDMH, Mr Kinross told Mr Samuel the dosage of the drug to give Harland. He was unsure what the drug was, but assumed it to be adrenaline.
54. As noted above, Mr Gibson arrived after the other paramedics, having been off duty, and was primarily involved in fetching the stretcher and assisting with facilitating Harland’s

transport to SDMH. He also drove the second ambulance car (that Mr Samuel had been driving) to SDMH behind the ambulance vehicle carrying Harland.

55. On arrival at SDMH, Harland's care was handed over to the medical staff in attendance. Harland was formally admitted at 12:02pm. After handing Harland over to the medical staff at SDMH, Mr Vance recalled completing the EMR and together with Mr Kinross and Mr Naylor, attending a medical debrief.
56. Harland was treated by the paediatric team including Dr Greenacre, the on-call paediatrician that day, and Dr Greg Hoskins, a staff specialist, in the resuscitation bay. Dr Hoskins noted that Harland had pale and cold skin, fixed pupils, no heartbeat or pulse, and was possibly showing signs of early rigor mortis. CPR was continued but ceased at 12:04pm when the defibrillator indicated Harland remained asystole.
57. It was confirmed that there was no frusemide on the hospital trolley used for the treatment of Harland. I accept that there is no possibility that frusemide was administered by hospital staff.
58. Harland was tragically declared life extinct by Dr Hoskins shortly after his initial presentation at 12.10pm.
59. Mr Vance later told investigators that together with Mr Kinross and Mr Samuel, he returned to Huskisson at about 1:32 pm "*to restock the ambulance.*" He said that one adrenaline vial was missing from the ambulance bag and that it was replaced. Mr Kinross confirmed that Mr Vance completed the register of non-restricted medication and replenished the ambulance kit.

The post mortem examination

Cause of death

60. Harland was taken to the Department of Forensic Medicine, Sydney and a full autopsy was conducted by Dr Rebecca Irvine on 17 December 2015. Unfortunately the autopsy was not fully reported until December 2016. At that time Dr Irvine noted that a Form A from SHDH and clinical history had not been received in accordance with the applicable NSW Health policy directive PD2008_070 for Sudden Unexpected Death in Infancy.
61. Dr Irvine noted that there were no recent or remote injuries and no significant acute or unexpected underlying conditions. A scant amount of fluid in the peritoneal cavity was likely

associated with non-professional resuscitation attempts. An absence of significant pathological changes for various organisms found was noted. Blood tests did not show elevated blood glucose or sodium and renal tests were within the normal limits. Metabolic screening tests were within normal limits.

62. In short, despite careful examination, Dr Irvine, an experienced and senior forensic pathologist was unable to establish a clear cause of death. In these circumstances she properly recorded Harland's cause of death as "unascertained."
63. I will return to further information received in relation to Harland's cause of death later in these findings.

Other observations made during Harland's post-mortem examination

Puncture marks

64. During autopsy, Dr Irvine also identified a number of puncture marks on Harland's body which she thought were suggestive of injection marks, and which did not seem to correspond with the medical records she had been provided with. She noted the marks were on the left mid-thigh, left knee and right proximal anterior tibia.
65. In a supplementary response dated 2 December 2019, Dr Irvine noted that the puncture marks on the left knee and right proximal anterior tibia were generally locations where an IO line is likely to be placed. She was of the view that the puncture mark on the left mid-thigh was more likely to be the site of an intramuscular injection. Dr Irvine accepted that the EMR clearly states that there was a single attempt at placement of the IO line. However, Dr Irvine also noted that in her experience of reading medical records, particularly results of emergency intervention where paramedics are often unable to make records simultaneous to their actions, sites of failed vascular access attempts are not always documented.
66. In his third statement, Mr Vance clarified that he made only one attempt to gain IO access, which was successful in the distal right tibia. This would explain the puncture mark at that location. A supplementary review by a radiologist of Harland's scans also found "*no evidence of an intraosseous cannular*" at the knee site.
67. Another possibility that was raised in an effort to explain the puncture marks (specifically the thigh puncture marks) was whether Harland had recently been immunised (immunisations are typically due at six weeks, four months and six months). As Dr Irvine noted, the thigh

area is a typical location for an intramuscular injection, however she was unable to say whether the thigh puncture mark was consistent with immunisation, as this was not within her specialisation and she did not know where immunisations are given to infants. The only information she was able to provide in relation to the puncture mark on Harland's thigh is that the marks seemed acute.

68. Ms Sutton gave evidence in this regard noting that Harland had not yet had his four month or six month immunisations, which is consistent with Harland's 'blue book', a copy of which was produced to the Court. The 'blue book', as at the time of Harland's birth, was given to all newborns, as a method for recording significant milestones, health check-ups, including immunisations and other general information.
69. Immunisations were recorded following Harland's birth and at 6 weeks. No further entries were made regarding immunisations after that, including in records held by the general practitioner who administered his last immunisation at 6 weeks.
70. Mr Robertson and Ms Sutton were asked about whether they had any access to needles. They both denied having access to needles. Ms Sutton also noted that she barely gave her children any medication, not even Panadol. The Officer in Charge of the coronial investigation, Detective Senior Constable Jason Klein, was asked about whether any needles or drug paraphernalia were located in the house. None were found. However given the distressing scene that had unfolded, coupled with the fact that the presence of frusemide in Harland's samples was not found until much later, it is likely that he also was not actively looking for such paraphernalia. Counsel for NSW Ambulance asked Detective Senior Constable Klein whether, for example, the bins in the house or the family car were searched, which he told the court, they had not. Yet given the circumstances that presented themselves on that day, there can be no criticism of this.

Placement of the ETT

71. Dr Irvine also raised questions about the position of the ETT, which she found positioned in the oesophagus at the time of autopsy. In this regard, she noted some gaseous distension of Harland's stomach. During evidence she explained various possibilities that could give rise to gaseous distention at autopsy. She noted that oxygen could have been pushed into the stomach through attempted respirations or the distention could be a post-mortem product due to the accumulation of gases.

72. Associate Professor Roberts also noted the wrongful placement of the ETT in his initial report to the court, but was unable to say *“the tube was initially inserted to the incorrect position, or if it was dislodged after movement during the management and transfer”*
73. According to the EMR from 15 December 2015 at 11:34am, an entry was made noting that the *“ETT [endotracheal tube] became dislodged due to movement and ETT repositioned”*. In circumstances where Mr Kinross had placed the ETT, he was asked about this entry. Mr Kinross was adamant that there had been no dislodgement of the ETT and that he had secured the ETT in place with tape. Harland’s medical records from SDMH noted that upon Harland’s admission to SDMH, Harland was intubated and remained as such until he was transferred to the mortuary. There was no notation regarding a wrongful placement of the ETT. In oral evidence, Dr Greenacre accepted that there was a risk of movement of the endotracheal tube during transfer to the mortuary if Harland’s neck had been extended.

Traces of midazolam on bed sheet

74. The bed sheet that Harland had been lying on had several stains on it. One of the stains was found to have traces of midazolam. Midazolam was not found to be present in any of the samples taken from Harland. Associate Professor Roberts noted in evidence that midazolam is not routinely available in the community. None of the paramedics recalled using midazolam, nor was its use clinically indicated in light of Harland’s presentation. According to Mr Kinross and Mr Vance, sedation is not permitted to assist with placement of an endotracheal tube, nor is it practice to sedate a child before insertion of an intraosseous line. Mr Kinross was adamant that midazolam was not brought out for any potential sedation.
75. Associate Professor Roberts was asked whether midazolam could have been transferred from the paramedics onto the bedsheet, thereby explaining its presence. Associate Professor Roberts was of the view that this was possible. The paramedics were not convinced that this could have occurred, in circumstances where midazolam had not been used on other patients on that day.

The discovery of frusemide

76. Although the puncture marks, the placement of the ETT and the presence of midazolam on the bedsheet were somewhat concerning, it was the completely unexpected and troubling toxicological result indicating the (very high) level of the drug frusemide in some of Harland’s samples, that necessitated further medical review and extensive police investigation.

What is frusemide and can it be fatal?

77. Frusemide is a loop diuretic, meaning that it acts within the Loop of Henle in the nephrons of the kidney and acts to increase urine volume and decrease the extent of reabsorption of certain solutes such as sodium, potassium and chloride. This mechanism thus causes increased expulsion of urine. Frusemide is also noted to be used as a masking agent, for example by athletes seeking to mask the presence of banned substances, given it can cause significant dilution of the urine and also encourage greater expulsion of fluids (and therefore traces of any banned substances).
78. Frusemide was detected in Harland's heart blood, cerebrospinal fluid and later, in Harland's bile sample. Frusemide was also detected in Harland's stomach and contents sample. The limit of detection (**LOD**) for frusemide (i.e. the lowest measure at which frusemide can be detected in a sample) is 0.05 mg per litre. The limit of quantitation (i.e. the lowest measure at which frusemide can be quantified in a sample) is 0.1m/L. The amount of frusemide detected in a sample of Harland's heart blood was 38 mg per litre. The amount of frusemide in the cerebrospinal fluid and stomach contents was not quantified. Similarly, the later testing of Harland's bile sample did not provide a quantification of the frusemide detected.
79. Two used baby bottles, two containers of powder (one labelled as infant formula and one unlabelled) and two jars of baby food were taken from the house and later tested for the presence of frusemide or other drugs. No frusemide (or other drugs) was detected. Testing was also conducted on the visible staining on the singlet Harland was wearing at the time the paramedics arrived. No frusemide was detected. Similarly, five stained areas on the bedsheet where Harland had been lying were tested and no frusemide was found. There was also no presence of any illegal or commonly used prescription drugs or alcohol in any of Harland's samples.
80. An error or contamination during toxicological testing was considered to be extremely low, given that frusemide (and later a possible metabolite – saluamine) was found separately in a variety of different biological samples taken from Harland, tested at various points in time. For this reason, the court proceeded on the assumption that the toxicology results were reliable, rather than the result of a potentially contaminated sample.
81. The mysterious presence of frusemide was not the only issue that the court needed to grapple with. It was necessary to investigate whether the drug had a causative role in Harland's death or whether its appearance, while completely mysterious and unexpected, was strictly unconnected with his cause of death either because it was not a lethal dose or because it was administered *after* death.

82. The court heard from the following experts:
- i. Associate Professor Darren Roberts, a medical specialist in clinical pharmacology and nephrology;
 - ii. Dr Rebecca Irvine, a forensic pathologist;
 - iii. Dr Scott Dunlop, consultant paediatrician;
 - iv. Dr John Farrar, consultant forensic pharmacologist;
 - v. Catherine McDonald, forensic toxicologist at the Forensic Analytical Scientific Services laboratory (**FASS**); and
 - vi. Professor Lindsay Brown, a specialist in pharmacy and pharmacology.
83. While the experts may have given different emphasis to particular factors, there was substantial agreement on many of the important issues. Most significantly, none of the experts suggested that the level of frusemide detected in Harland's blood sample indicated that it could have caused his death *even if* it could be adequately established that the drug had been given *ante mortem*. Professor Brown stated that there was no available academic evidence of fatalities due solely to frusemide, notwithstanding that the drug has been used widely around the world for many years.
84. Associate Professor Roberts agreed, noting that he could not recall a case of severe frusemide toxicity that resulted in death, particularly not from a single dose. He advised that frusemide is generally considered a drug of low toxicity. He provided evidence that the likelihood of death after a single overdose is very low unless the patient has other predisposing factors such as other drug exposures. In his clinical practice, he could not recall a case of severe toxicity including death from a single dose of frusemide. Similarly, Professor Brown was not able to find reports of fatalities in humans due to frusemide alone and indicated that the literature did not contain an agreed fatal level for frusemide.
85. Associate Professor Roberts described the level of frusemide detected in Harland's heart blood as exceeding the therapeutic level by more than four-fold. Dr Farrar, an experienced consultant pharmacologist, told the court that although the level of frusemide detected in Harland's heart blood would be considered *toxic*, he agreed that there is no blood level concentration for which frusemide is classified as *lethal*.
86. While there was evidence that chronic dosing of frusemide would tend to produce toxic effects to a greater extent than one large acute dose, no expert suggested that a single measurement could permit a conclusion to be drawn as to whether the dose occurred as a

single event or from chronic or multiple dosing. Having said that, there was no evidence that suggested chronic dosing. Harland was found with a wet nappy and there was clear evidence that he had recently consumed formula milk. Dr Irvine described him at autopsy as well hydrated. Associate Professor Roberts noted that excessive doses of frusemide, "*largely from chronic regular dosing*", would cause dehydration. Given Harland was found hydrated at autopsy, this might suggest that Harland did not have chronic dosing of frusemide, but rather, a single dose, however, it is by no means conclusive in the complex circumstances of this case.

87. Both Associate Professor Roberts and Professor Brown indicated that they thought it unlikely that a single dose of frusemide would be fatal, citing a paucity of cases of clinically significant poisoning. I therefore accept that it is most unlikely that frusemide killed Harland, even if it could be proven to have been administered *ante mortem*.

How was frusemide administered to Harland?

88. The toxicological evidence did assist in determining whether frusemide was administered orally, or by IO or intravenously (**IV**).
89. As noted earlier, traces of frusemide were detected in Harland's stomach and contents. This discovery necessitated the consideration of whether Harland may have been administered frusemide orally. It was striking that none of the food and milk items relating to Harland and which were tested by FASS were found to have any traces of frusemide, nor did Harland's singlet or any of the wet stains from the bedsheet where he was lying when discovered. Given his young age (five months), had Harland been given frusemide orally, one would have expected traces to be found in his milk and/or food.
90. In her report dated 29 August 2019, Dr Irvine provided a detailed overview regarding the difficulties with drawing conclusions about the presence of drugs detected in stomach contents. She noted:

"there is much we do not know regarding distribution of drugs between structures of the body following death. We suspect that drugs in blood vessels (or the gallbladder or stomach) in which bodily fluids have pooled may defuse into adjacent structures. The stomach is quite thin-walled and particularly after death may undergo thinning due to post-mortem changes...."

91. Dr Irvine also explained that the autopsy process itself can contaminate a particular structure, such as the stomach and accordingly, detection of drugs in the stomach may not necessarily be reliable.
92. Associate Professor Roberts noted that frusemide is marketed as an injection under the brand name Lasix, and as tablets under various brand names, including Lasix. Dr Farrar also noted that it is available as a flavoured oral solution.
93. After being notified about the detection of frusemide in Harland's samples, Detective Senior Constable Klein, obtained the Medicare and PBS records for Harland, his siblings and for each of his parents for the period 1 January 2015 to 15 December 2015. The records did not reveal any prescribing of a diuretic drug (including frusemide) nor any suggestion of a consultation which would suggest the need for such a drug.
94. These records are important as they showed that frusemide had not been dispensed to anyone in Harland's family. Further, frusemide was also not detected in any of the food items given to Harland, his clothing or on the bed sheet where he was found, despite there being signs of vomitus and wet patches. Dr Irvine was also of the view that limited weight can be given to the discovery of a drug in the stomach and contents. In consideration of all of the above, I find it unlikely that frusemide would have entered Harland's system orally, and therefore more likely that it was administered either via IO or intramuscular injection.

Timing of the frusemide administration

95. Given the completely unexpected discovery of frusemide, it was necessary to investigate every possibility in relation to how and when it could have been introduced into Harland's system.
96. Consideration had to be given as to whether a family member or visitor to the home, had by accident, or deliberately, given Harland frusemide. It was also necessary to consider whether paramedics had given Harland the drug at any time during the resuscitation process.
97. On 7 and 15 June 2019 respectively, Detective Senior Constable Klein interviewed both parents about their knowledge of the drug frusemide. Ms Sutton gave evidence noting this was the first time she had ever heard the word frusemide. She later told the court that she had no knowledge of any person in the family ever using the drug and that she had certainly never administered it to Harland. In fact, she noted an aversion to using "synthetic"

medicines of any kind and instead indicated a preference to take her children to their GP for advice in case of illness.

98. Mr Robertson also gave evidence that he had never heard of the drug frusemide or Lasix. He stated that he was familiar with the term diuretic and believed he may have seen the word on a billboard for a tea in Sydney "*not long after high school*". He believed he may also have heard the term diuretic on television, while watching a show such as "General Hospital".
99. Both parents denied ever having used needles or syringes to self-administer drugs and no drug paraphernalia was found in the house (notwithstanding that some locations may not have been searched in this regard, such as bins and the family car). Mr Robertson was briefly questioned about his involvement in greyhound racing, given that diuretics can be used to mask performance enhancing drugs in racing animals as well. But his minimal involvement with a greyhound some years earlier indicated that there was little to be gained from that line of inquiry.
100. All the available evidence confirms that Harland's parents appeared extremely upset and in genuine shock at the time first responders were at the house. There is no evidence that any of their reactions were inconsistent with the behaviour of loving parents. As mentioned above, the court also had the opportunity to listen to Ms Sutton's 000 call. Her shock and hysteria are plainly evident in that call. Their demeanour while giving evidence was noticeably distressed. Both Ms Sutton and Mr Robertson appeared genuinely distraught at the death of their much loved child.
101. Nevertheless, the court is tasked to look at all possibilities. This court is aware of tragic accidents caused by parents using adult medication to calm or quieten a child. However, there is no evidence that Harland was unsettled or unusually cranky. It is also important to note that frusemide, unlike some other medications, would not have any positive effect in this regard in any case.
102. Equally, in the unlikely event that a person would have reason or desire to harm a child, it is difficult to see why a diuretic would be chosen, given it is not known to be particularly dangerous, and there are many over-the-counter and easily obtainable medications that are well known to present real danger to children. In any event, there is just no evidence that any person wished to quiet or harm Harland.

103. As for the use of diuretics as masking agents for other drugs, the court heard expert evidence that suggests this is a highly specialised endeavour which would require considerable expertise.
104. Substantial expert evidence was also received (and explored further in oral evidence) in relation to the timing of the administration of the frusemide. In circumstances where Harland was found unresponsive by the paramedics, in asystole and by all accounts cold and blue, it was hoped that narrowing the timing of the administration of frusemide would assist in figuring out who may have accidentally, or deliberately, administered Harland with frusemide.
105. I will review the detail of the expert evidence later in these findings, however for now it is sufficient to say that the evidence did not conclusively establish a firm time frame. On the one hand, the expert evidence suggested that given the presence of the frusemide metabolite saluamine, frusemide was more likely to have been administered to Harland *ante mortem*. On the other hand, given *post mortem* redistribution is poorly understood, it is possible that enough circulation was provided to Harland to allow the breakdown of frusemide and thus the generation of saluamine. There was also some uncertainty over the status of saluamine raised and whether it is a true metabolite of frusemide.
106. The importance of this evidence is obvious. If the expert evidence pointed clearly towards *ante mortem* administration, then it would seem more likely that Harland had been administered frusemide prior to his death. However if the expert evidence pointed clearly towards *post mortem* distribution, then it would seem more likely that Harland had been administered frusemide after his death. Sadly, despite the best efforts of those assisting me and the expert evidence received, I cannot definitively find one way or another when frusemide was administered. I raise the expert evidence at this juncture, as on one view, the presence of the frusemide metabolite saluamine in later testing, may be more suggestive of *ante mortem* administration, however the evidence in this regard is complex and remains unresolved.
107. I have given the matter considerable thought and have carefully weighed the evidence Harland's parents gave in this court in the context of all the available evidence. I had the opportunity to study their demeanour closely and I am of the view that their considerable pain and bewilderment was genuine. I accept that neither Ms Sutton nor Mr Robertson ever knowingly administered frusemide to their son.
108. Further, at the conclusion of these proceedings there was no evidence whatsoever to suggest that Harland's parents had any role in administering frusemide, particularly in

circumstances where it is more likely to have been given either by IO or intramuscular injection. Rather the evidence established that Harland was cared for by pharmacologically unsophisticated, but extremely loving, parents. There was also no suggestion that any other member of the family had access to, or administered, frusemide to Harland. Given the apparent social isolation of the family, there was also no other person identified who may have had unsupervised access to Harland shortly before his death.

109. I make this finding notwithstanding the fact that the expert evidence cannot be easily reconciled as to whether the administration occurred *ante* or *post mortem*. I am of the view that frusemide was not administered to Harland by his parents. In my view, it is a finding which is not inconsistent with the expert evidence currently available.

Paramedic error?

110. Aside from examining the possibility of the parents having accidentally or deliberately administered frusemide to Harland, the Court needed to consider other alternatives as to how frusemide came to be detected in Harland's samples.

111. As part of his investigation, Detective Senior Constable Klein provided the court with evidence that demonstrated that frusemide (in ampoules) was stocked in both the green ambulance or 'kitbag' that paramedics take out of the ambulance car when attending on a patient, as well as in the medication drawer in the ambulance car itself.

112. Given the availability of frusemide to the paramedics, the Court needed to closely examine whether there was a possibility of a paramedic error, particularly in circumstances where the attending paramedics readily had access to frusemide and had the ability to administer it directly into Harland's bloodstream given the treatment he was receiving.

113. The court heard extensive evidence about how frusemide and other drugs were stored by NSW Ambulance. In 2015, adrenaline (1:10 000) was provided in a large, clear ampoule, whereas frusemide was provided in a small, 4ml, amber coloured ampoule. The photos provided by Detective Senior Constables Klein clearly showed that the ampoules of 1:10 000 adrenaline and 4ml frusemide are very distinct in colour and size.

114. The court was informed, and accepts, that the NSW Ambulance paramedics at Huskisson used a green ambulance or 'kitbag' as part of their treatment of patients. The green kitbag contains essential medication and treatment paraphernalia (such as needles, swabs and gauze). Ampoules of adrenaline (1:10 000) were kept in a ready rack attached to the inner side of the green kitbag. The purpose of the ready rack was to ensure quick access to the

medication located there. Inside the green kitbag, was a separate smaller red medication bag. Frusemide was stored in the red medication bag, which sat within the green kitbag. Given that frusemide is not clinically indicated for paediatric patients within NSW Ambulance protocols and is not used in resuscitation, there was seemingly no reason for paramedics to open the smaller red medication bag at any time while attending to Harland.

115. Quite apart from the fact that frusemide had no clinical relevance, each of the paramedics described the unlikelihood of confusing a frusemide ampoule for an adrenaline ampoule. The differences in size and colour were described as “*very obvious.*” It was suggested the use of the ‘Five Rs’ would also have immediately alerted someone to the mistake. Mr Gibson noted that for such an error to occur there “*were so many flags to go through.*”

116. Mr Kinross described the magnitude of such an error in colourful terms. When asked if it could be ruled out completely, he replied:

“...It would be like going to your fridge of a morning to get milk out for your cereal, and pouring Coca-Cola on it and still eating it and not knowing, like – it’s a different colour, it’s a different volume, it’s a different part of the drug kit. It’s not used in cardiac arrest at all, and it is not for paediatric administration at all. It doesn’t even enter your clinical construct that that would be a drug that you would use in an arrested situation, or for a paediatric under any circumstances.”

117. Mr Vance told the court he had tried to “*reverse engineer*” how such a mistake could be made, and he thought “*there are too many other things that make that impossible.*”

118. Despite the inherent unlikelihood of a medication error in these circumstances, it was necessary to examine a number of aspects of the evidence which could potentially affect the reliability of the accounts given by the paramedics. While these aspects of the evidence were given detailed consideration during the proceedings, I intend to refer to them quite briefly in these findings as ultimately they were issues which, while troubling, did not assist in establishing, to the requisite standard, facts in issue in the proceedings. Concerning aspects of the evidence included:

- i. The fact that the non-restricted medication register contained numerous anomalies and gaps. It could not be described as providing a reliable record of the drugs which had been used or re-stocked on any particular occasion. For this reason, the evidence of re-stocking adrenaline, not frusemide after the relevant shift on 15 December 2015 could only be given limited weight.

- ii. That there was some confusion in the account Mr Vance gave about his actions on 15 December 2015, whereby he later agreed that he had mistaken some aspects of his interaction with Harland with another paediatric job he had attended. In this context the court needed to be cautious accepting uncritically his memory of the events of 15 December 2015.
- iii. That there were some discrepancies in the accounts given by Mr Vance and Mr Kinross (and Mr Samuel) as to who had drawn up the adrenaline which was given to Harland. Further there appears to have been several paramedics who administered it.
- iv. There are aspects of what occurred that are inadequately explained or which appeared somewhat irregular. For example (and as raised above), it is difficult to understand why the most senior ICP would leave the treatment area, having administered a drug, to get the stretcher in circumstances where other more junior officers were present to assist (including a trainee paramedic). Similarly, it is difficult to understand why no person assisted Mr Samuel with compressions during the entire resuscitation period or why Mr Vance drove the vehicle to the hospital.
- v. There were some discrepancies in the reasons given by Mr Vance as to why he had personally retained Harland's "Life Pak roll" document, first in his pigeonhole and then in his locker when a copy had apparently already been provided to NSW Ambulance. The Life Pak roll contained a printout of Harland's ECG record during resuscitation and so its importance in assisting in determining Harland's time of death is obvious. Further there was a lack of clarity in his reasons for not producing this important document to police at an earlier time. When asked if he had kept the document because it might provide good evidence that Harland had already passed away prior to having been given the incorrect medicine, he denied that was the reason, offering instead that he was "*pedantic about paperwork*", notwithstanding that the only Life Pak roll he kept was Harland's (although he did from time to time keep other parts of traces for training purposes). Mr Vance was also not aware of any other ambulance officers storing printouts as he did.
- vi. There were some apparent implausibilities in relation to the account given by Mr Vance in relation to him possibly restocking frusemide in car 126 on 8 December 2015. This evidence was examined in the context of exploring whether there could

have been some kind of attempt to conceal a known medication error. The non-restricted medication register showed that on 8 December 2015, one ampoule of frusemide was restocked in car 126. The next entry on the register after that entry was in relation to a bulk receipt of medication received at Huskisson station, which included frusemide, on 15 December 2015. It is unknown when this entry was recorded on 15 December 2015. The possibility therefore arose that after Harland's treatment on the morning of 15 December 2015, a falsified entry could have been created for 8 December 2015, showing that one vial of frusemide was restocked in car 126, when, if falsified it wouldn't have been.

The importance of this entry arises from car 126 being the car that was used by Mr Vance and Mr Kinross on 15 December 2015 during their treatment of Harland. The Court received evidence from Paul Edwards, the zone manager for NSW Ambulance in the Illawarra Shoalhaven Zone. He noted that on 8 December 2015 (in fact for entire period 7-14 December 2015), car 126 was idle and not in use. This was due to a policy of "rotating" ambulance cars so that they all had equal mileage. Initially Mr Edwards told the court that car 126 was parked in Bomaderry between 7-14 December 2015, however later he explained that he was unsure where the ambulance was during this period. The non-restricted medication registers for various drugs tended to support the evidence of the various paramedics that noted that from time to time idle ambulance cars would be parked in the driveway at Huskisson. The records show that several drugs (metoclopramide and salbutamol) were restocked in car 126 on 8 December 2015 by Mr Gibson (who was on shift that morning), suggesting it must have been in Huskisson.

The ambulance records provided to the court also showed that Mr Vance had a series of rostered and on-call shifts in the days preceding 8 December 2015. This documentation indicated that Mr Vance would have had a very narrow window to restock car 126 with one ampoule of frusemide on 8 December 2015, and would have done so after a series of shifts and call-outs, in circumstances where the car he restocked was not in use and another paramedic had already done or was also undertaking medication re-stocking of that car.

- vii. The puncture marks on Harland's body (as outlined above), remained unexplained in the context where I accept Harland's parents did not have access to needles, yet similarly the areas where the puncture marks were found did not correlate to clinical treatment sites.

viii. The mysterious finding of midazolam on the bedsheet remains unresolved and is troubling. It is a restricted medication that would be available to ambulance officers but is not generally available in the community.

119. I have considered these issues carefully and accept that some have the capacity to throw doubt on the reliability of parts of the accounts given by the paramedics. However, none of these issues positively establish that an error in medication administration occurred, or indeed was concealed. The paramedics in question were not shaken in cross-examination, each attesting to the fact that adrenaline was identified, and cross checked before administration. Each attesting, in their own way, that frusemide would not have been considered for Harland's treatment and that it was not actually used. The court had the opportunity to closely observe the demeanour of each ambulance officer and review their evidence carefully.

120. Counsel for Ms Sutton submitted that the court could make a positive finding that a culture of solidarity exists within the ambulance service which would inhibit individuals admitting any mistakes. Although this may well be the case, in my view, this suspicion was not adequately established on the evidence before the court and therefore I cannot make such a finding.

121. Counsel for Ms Sutton also submitted that while the exact circumstances of the administration of frusemide might not be clear, it was nevertheless open to the court to find, on the balance of probabilities, that one or more of the ambulance officers caused frusemide to be administered to Harland on 15 December 2015. This was submitted on the basis that there really was no other reasonable explanation.

122. I will return to this submission after briefly reviewing the available expert evidence as it relates to the timing of frusemide administration.

Was frusemide administered *ante mortem*?

123. As outlined above, the court was assisted by a number of experts who provided reports and oral evidence attempting to narrow down the timing of the frusemide administration. The evidence was detailed and complex. While I do not intend to summarise and re-state it all in these findings, it has been comprehensively reviewed.

124. It is important to state at the outset that in circumstances where a lengthy resuscitation attempt has occurred, there can be a lack of clarity in defining the exact moment of death. During the inquest proceedings Harland's death was variously described as having occurred

prior to the paramedics arriving and also at the moment resuscitation was declared unsuccessful at hospital. While one may with hindsight, characterise a period of attempted resuscitation as *post mortem*, contemporaneously that same period may have been regarded as *ante mortem*; in the sense that it may be difficult to pinpoint the exact moment when the chance of survival was lost. It became clear that the bodily processes which may continue during such a period are not well understood or researched.

125. Professor Brown told the court that while the concept of death might seem simple to the public, it is "*actually a very complex issue*". I accept his view.
126. In trying to grapple with the important question of whether it can be established that frusemide was administered *ante* or *post mortem* the court was assisted by the evidence of Ms McDonald, a forensic toxicologist employed by FASS. She gave evidence (and as was outlined earlier in these findings) that FASS received three biological samples for analysis relating to Harland, namely, 1ml of preserved heart blood (sample number 2015008743), 3g of stomach and contents (2015008744) and less than 1 ml of bile (2015008745). A further biological fluid sample (5mL of cerebral spinal fluid, 2016000481) was also harvested. FASS detected the presence of Frusemide in the heart blood, which was later quantified to be 38 mg/ L. Frusemide was also detected in the CSF, stomach and contents, and bile samples, but no quantification was provided.
127. In his initial report dated 21 August 2019 Associate Professor Roberts noted that the presence of a metabolite of frusemide in Harland's blood may assist the court in determining when frusemide had been administered. To that end he identified two metabolites of frusemide: a glucuronide metabolite and 4-chloro-5-sulfamolyanthanilic acid (saluamine).
128. Subsequently, FASS was asked whether it would be able to test for either of these metabolites. Ms McDonald noted that FASS "*generally do not analyse for metabolites*", however upon the request of the court, FASS reprocessed the raw analytical data it had in relation to Harland. In accordance with this data, saluamine was found to be present in the heart blood, stomach and contents, CSF and bile samples (FASS was unable to test for the glucuronide metabolite). Ms McDonald was unable to determine the quantitative concentration or limits of detection and/or quantitation and linearity, as this would require substantial validation studies, "*including the sourcing of blank matrix (sic) for each of the above sample types*".
129. Ms McDonald noted that:

“the time that has elapsed since the date of death is significant and interpreting the stability of these compounds during storage is complex. With instrument performance changing over time and no sample remaining, it is no longer possible to provide a quantitative concentration”

130. The presence of saluamine in Harland’s heart blood, stomach and bile samples was significant because, as discussed, saluamine is considered in parts of the academic literature, as a metabolite of frusemide and its presence *could* indicate that the frusemide found in Harland’s system was *processed* in some manner by his bodily functions and thus potentially indicate that Harland was alive at the time of administration.
131. However, saluamine can also be produced as an artifact of the analytical or testing process. In this regard the court was referred to an article *“Furosemide (Frusemide) A Pharmacokinetic/Pharmacodynamic Review (Part 1)*. The authors referred to saluamine as a *“highly controversial metabolite”* noting that it could simply be an analytical artefact and not a true metabolite.
132. Ms McDonald considered this matter carefully, noting that she was *“fairly confident”* that the saluamine detected in Harland’s samples was above what she would expect from any artefact created by the analytical processes which had been undertaken. She stated that the laboratory had accounted for the trace amount produced in the analytic process and *“only reported saluamine presence in samples where concentration is above what we would expect as a result of analytical artefact.”* She noted that the analytical techniques in use today are far more sensitive and selective than the methods referenced in the research article to which the court had been referred, which dated back to 1990. That article also referenced an acidic extraction procedure whereas FASS had used a *“neutral protein precipitation salting out”* procedure.
133. Ms McDonald also informed the court that she had recently reviewed the evidence and was confident that the saluamine which was detected in Harland’s relevant samples was *“well above”* that which would have been expected from an analytical artefact. While she was unable to comment on whether the acid extraction method referenced in the article would produce more saluamine than the neutral protein precipitation salting out procedure used by FASS, she remained confident that the peak she had identified, indicated that the saluamine discovered was in fact a metabolite.
134. I accept her evidence in this regard and while some small doubt may remain, I find *on the balance of probabilities* that the saluamine detected indicated a true metabolite and was not merely an analytical artefact. Whether this indicates Harland was “alive” after the

administration of frusemide or whether the joint processes of CPR and *post mortem* redistribution could account for the appearance of saluamine is a more difficult question.

135. Associate Professor Roberts is a qualified physician specialising in clinical pharmacology and nephrology. He has post-fellowship training in clinical toxicology. He was asked to consider, among other issues, the size of the dose that would be needed to return the drug level detected in Harland's sample. In his initial report he stated that the blood concentration level found (38mg/L) in a patient of Harland's weight would require between one and five vials of frusemide 40mg/4ml. However, he conceded that there were a number of unknown variables including the impact of cardiac resuscitation and the effect of post-mortem redistribution. In this regard, Associate Professor Roberts noted that the implications of post-mortem redistribution on frusemide blood concentrations are uncertain due to the lack of data. Nevertheless, it appears *possible* that the level of frusemide found could conceivably have been given by ambulance officers during the window of time they had an opportunity to administer the drug.
136. At the time of Associate Professor Roberts' initial report Harland's bile sample had not been tested. Later, when the presence of saluamine was detected in Harland's bile, Associate Professor Robert commented that while it "*increased the likelihood*" of ante-mortem administration, he still found it difficult to be confident about whether the drug had been administered *ante mortem* or *post mortem*. He noted that at the time of death "*liver function falls rapidly*". Nevertheless, he identified a number of issues which prevented him reaching a definitive conclusion including differences in the way adults and children may process drugs and the role of post-mortem redistribution.
137. In oral evidence Associate Professor Roberts' explained his reservations about making a definitive statement as to whether frusemide was administered *ante* or *post mortem*. He stated:
- "this comes down to definition of ante mortem or post mortem. This was raised by Dr Irvine in terms of the concept of peri mortem."*
138. As noted, Associate Professor Roberts explained that "*the studies...that have been done which look at how long the liver will continue to function...show that at the time of death liver function falls off rapidly.*" However he also stated that it is not at all clear that the liver is the only part of the body that can metabolise frusemide.

139. Other experts also addressed the issue of the presence of saluamine. On the assumption that the saluamine was a metabolite of frusemide, Dr Farrar confirmed that it was indicative of *ante mortem* administration. However he noted that he was not qualified to provide an opinion on hepatic blood perfusion and bile production in the circumstances of Harland's treatment. He also noted that the post-mortem redistribution created further uncertainty.
140. Counsel for NSW Ambulance submitted that a finding that saluamine was a "*true metabolite*" should lead to a finding of *ante mortem* administration which in turn negated the possibility that any of the paramedics were involved in the administration of frusemide to Harland. In my view the issue is by no means clear cut.
141. I accept that Harland was recorded as having been asystole at the time ambulance officers arrived. He had been variously described as "not breathing", "blue lipped" and "cold". Experienced ambulance officers told this court that on arrival Harland did not have a pulse and appeared cool. I note that Dr Dunlop, an experienced paediatrician who later examined the Life Pak roll kept by Mr Vance showing the ECG recordings taken by the attending paramedics. He stated that they were "*not consistent with spontaneous cardiac contractions*". He found that the recordings demonstrated "*disordered and variable electrical activity consistent with CPR*".
142. In my view, on the balance of probabilities, it is established that prior to the paramedics arriving Harland was not breathing and his heart was not beating. However, I was not persuaded that there was sufficient evidence to completely rule out the possibility that the resuscitation and ventilation were incapable of continuing bodily processes to an extent that would result in finding frusemide in the heart and other organs and even to an extent that would produce evidence of saluamine.
143. In my view the evidence of Associate Professor Roberts was compelling on this issue. His expertise as a physician and a pharmacologist gave him a sound basis to express an opinion. He stated that he had experience of the fact that quality CPR can produce excellent blood pressure that would cause adequate mixing of a drug within the blood. He appeared to accept that if large blood vessels were well perfused it is certainly conceivable that a drug could later be found in the heart blood, whether or not resuscitation was ultimately successful. This movement could also occur in the process of post-mortem redistribution where blood may move between different compartments of the body. Whether resuscitation can adequately explain the saluamine is a more difficult question, but he did not rule out that possibility. I accept his opinion on this issue.

What was the cause of Harland death?

144. Having considered all of expert evidence regarding the effect of the administration of frusemide, and as has already been outlined above, I accept that the weight of the expert evidence indicates that it is most unlikely to have caused Harland's death.
145. While I find it most unlikely that Harland died from frusemide poisoning, how it came to be in his system remains an important question and one of considerable concern to his parents.
146. Counsel for Ms Sutton submits that if Harland's parents are ruled out, the only reasonable inference available on the evidence as it stands is that one of the ambulance officers introduced the drug. The submission has some force. In this context I have considered carefully the possibility that one or other of the ambulance officers *must* have administered the drug, in an unfortunate accident, given their access to Harland, the drug frusemide, and an easy method of administration. The question is whether the evidence establishes this possibility to the requisite standard³ in the following circumstances:
- i. There was no eye witness account or admission of frusemide being administered to Harland.
 - ii. The evidence of the ambulance officers was unshaken and they were resolute in their opinion that it was inherently unlikely that such a monumental mistake could have occurred.
 - iii. The expert evidence revealed that while it may be *possible* that saluamine was produced during the resuscitation process, it seems more likely that it was produced while Harland was alive (although the known facts establish that Harland was not breathing when the paramedics arrived).
 - iv. The unexplained appearance and unknown significance of the puncture marks found on Harland's body.
147. At the conclusion of evidence, while acknowledging that suspicions remain, I am unable to make a firm finding as to who administered the frusemide. As I have said, the presence of saluamine, does not in my view make it impossible for administration to have occurred *after*

³ See the *Briginshaw* test, requiring reasonable satisfaction on the balance of probabilities, whilst having regard for (a) the gravity and importance of issues to be determined, and (b) the possible consequences of a finding of guilt (see *Briginshaw v Briginshaw* (1938) 60 CLR 336, 360-363).

the arrival of the ambulance officers in the *peri mortem* period. Too little is known about how the resuscitation process might affect the bodily breakdown of that drug in a child of Harland's age to make a firm negative finding in this regard.

148. I understand that this lack of clarity may seem unsatisfactory to both Harland's parents and the paramedics who attended to his care. I hope that there is some consolation in the finding that *however* the drug was administered, it does not appear to have caused Harland's death.
149. In these circumstances it is necessary for the court to consider any other possible causes of Harland's death, specifically whether Harland's death could be classified as a Sudden Unexplained Death in Infancy (**SUDI**).
150. The court was assisted in this regard by the expertise of Dr Scott Dunlop, consultant paediatrician. In his initial expert report provided to the court, Dr Dunlop indicated that a number of factors may increase the risk of SUDI. These included age (less than 12 months), prematurity, low birth weight, gender (male), neonatal medical conditions, Indigenous heritage, smoking in the house of the infant, sleep position and sleep environment. At this time of providing his initial report, Dr Dunlop was unable to make a positive finding as to whether Harland's death could be classified as a SUDI. Although Harland had many of the risk factors, he concluded it was unknown whether certain other risk factors applied to Harland, such as nicotine exposure, sleep position and sleep environment (particularly relating to how Harland came to be in a prone position, and whether aspiration was a contributory factor in his death).
151. During oral evidence, Mr Robertson confirmed that he was a smoker at the time of Harland's death. Although he told the Court he did not smoke inside the house, he nevertheless did smoke.
152. Ms Sutton provided further detail regarding Harland's sleeping position during her oral evidence. She told the court that during her last feed of Harland she propped him up on a pillow whilst she fed him. He subsequently fell asleep during feeding. She then placed the pillow, together with Harland, onto a V shaped pillow on her bed.
153. In his subsequent report dated 16 May 2021, Dr Dunlop considered the further information provided by both parents in oral evidence. Dr Dunlop indicated that if Harland was propped up on two pillows in an unsafe sleep position, and in an unsafe sleep environment (given the presence of the pillows and doona), it was his opinion that Harland most likely somehow changed his position involuntarily to prone, which is "*a well recognised SUDI scenario*."

Whether that was a rolling manoeuvre, or a sliding manoeuvre from a propped up height, isn't clear."

154. With regard to nicotine exposure, Dr Dunlop noted that although Mr Robertson attempted to avoid Harland's exposure to environmental tobacco smoke by refraining from smoking inside the house, the exposure of nicotine and its metabolites on his person could have played a passive role in increasing SUDI risk.
155. He stated that, having been provided evidence that Mr Robertson was a regular smoker, albeit not inside the home, that he was of the opinion that the exposure to nicotine and its metabolites on Mr Robertson's person could have played a passive role in increasing Harland's SUDI risk. He observed that paternal smoking is an independent additional risk factor for SUDI beyond maternal smoking.
156. In her further report dated 28 April 2021, Dr Irvine also considered the additional information provided by the parents and noted that if frusemide was found not to have substantially contributed to Harland's death, then the cause of death would be classified as SUDI 0+. She noted in relation to Harland:

"[t]he intrinsic risk factors would include low birth weight and preterm birth. The extrinsic (modifiable) risk factors would include soft objects on the bed, possibly covering of the head (unclear in testimony), possible exposure to smoking post-birth, and non-infant specific bedding."

157. Dr Irvine explained that many of these risk factors, sadly, were *"somewhat stereotypical of SUDI cases"*. Of course, most tragically, the causes of SUDI are still not entirely understood. Why the presence of certain SUDI risk factors in one child results in death, whilst in another child they do not, for the large part remains unknown. Despite the gains made in understanding a SUDI, the death of an infant within this context remains largely inexplicable.
158. As Dr Irvine helpfully explained to the court (and I acknowledge that this will be of little comfort to Harland's family), within the context of a SUDI, *"the cause of death by convention would remain unascertained"*. *"SUDI", even with a sub-classification, is not considered a cause of death"*. In this regard, Dr Dunlop agreed with Dr Irvine. He noted that Harland's death should be classified as a SUDI and that therefore the cause of death should remain unascertained.

159. It is important to be clear that characterising Harland's death as a SUDI 0+ is not to blame his sleeping environment or the care he was given. As mentioned above, how the risk factors come together to cause a SUDI is still not well known. However, no loving parent would ever intentionally place their child into a sleeping position that would endanger their child, and there is absolutely no suggestion that Ms Sutton and Ms Robertson were anything but loving parents. No blame should be placed on them. The classification of a child's death as a SUDI, provides little comfort to the parents left behind. It seems particularly cruel to not be able to better explain the circumstances surrounding a beloved child's death in more detail.
160. I find that all the available evidence suggests that Harland's death should be classified as SUDI 0+.

The need for recommendations

161. Counsel assisting submitted that consideration might be given to a recommendation to the NSW Ambulance Service in relation to a review of the operation of the non-restricted medication register to ensure its accuracy and integrity.
162. A review of the non-restricted medication registers throughout the hearing demonstrated that the registers for each medication were not used with any great care. It was quite striking that there were a series of errors throughout the registers, in addition to often illegible recording and incomplete information. Although Ms Clarke (Director of Clinical Governance, NSW Ambulance) noted that there was no statutory obligation to maintain a non-restricted medication register at all, NSW Ambulance accepted that if there is a non-restricted medication register in use, it should be completed properly. NSW Ambulance also accepted that the record keeping at Huskisson in this regard was inadequate.
163. NSW Ambulance submitted that the evidence in this inquest did not establish that there is a material diversion concern with frusemide nor many of the non-restricted medications, nor is this matter a case involving a known diversion issue. With respect, I disagree with that submission. The evidence presented to the court leads me to conclude that NSW Ambulance would not be in a position to determine whether there was a diversion issue in circumstances where there did not appear to be any apparent auditing of those registers.
164. The Huskisson frusemide register had a wrong date on 2 January 2015 and there was a miscalculation on 10 August 2016, which would leave one vial unaccounted for. Of course these errors appear minor. However the Huskisson adrenaline register, as an example, is far more concerning in terms of its errors. So for example on 9 September 2015 a batch of 20 adrenaline vials were topped up. In addition to the nine vials of adrenaline that were still in

the medication cupboard there should have been 29 altogether. Instead the stock level is recorded as 20 (meaning nine ampoules of adrenaline are unaccounted for). On the next entry on 21 September 2015, two vials of adrenaline were removed (restock). Even adopting the erroneous recording of 20 vials of adrenaline, taking two out should have resulted in 18 being left (in fact given the incorrect entry it should have been 27). However the stock is recorded as 13 ampoules being left, which means another five vials of ampoules are unaccounted for.

165. Without further exploring the detail of each register, it is sufficient to observe that there are errors littered throughout the Huskisson non-registered medication registers provided to the court, including in relation to the registers for Droperidol, Amioderone and Naloxone, in addition to others. These errors would not allow NSW Ambulance to form an accurate view on diversion.
166. I am of the view that the community would expect greater accountability of all medication used by ambulance officers. It was concerning that there was no detailed itemisation of the medication that had been discarded.
167. Accordingly, I intend to recommend that the NSW Ambulance Service conduct a complete review of their processes in relation to their local registers of non-registered medications to ensure a greater level of accuracy and accountability is achieved. This would include a review of the method by which the registers are updated and recorded (to differentiate between restocking medication used in clinical treatment, restocking out of date medication which is removed and replacing damaged stock); requiring replaced stock to be handed into the control of the station manager/controller; and review of the way in which, and frequency at which, regular and random audits are made of the registers. Consideration of introducing an electronic recording system (which would record who accessed the register to make an amendment to it and which might also identify and alert discrepancies as they occurred, including resupply of stock) may also be required, although it is noted that Ms Clarke gave evidence that presently budget considerations have restricted consideration of introducing an electronic system for restricted medications only.
168. Counsel for Ms Sutton submitted that there be consideration of reviewing the procedures in place for the maintenance and storage of all records generated by the NSW Ambulance Service. This recommendation arose out of evidence given by Mr Vance of his retention of Harland's "Life Pak roll."

169. Although the evidence given by Mr Vance in relation to his retention of Harland's Life Pak roll was astonishing, and in many respects troubling, the evidence equally suggested this was not a practice adopted at large by various paramedics.
170. Further NSW Ambulance submitted that there are current investigations on foot exploring a method of keeping a copy of a patient identified trace with the EMR. This would permit the transfer of ECG data directly from the defibrillator to the EMR. I am pleased that these changes are being considered in circumstances where the benefits are readily apparent.
171. I therefore am not of the view that a recommendation is necessary to be made in this respect.
172. One final small matter arose in relation to Dr Irvine's evidence that during autopsy she noted that a Form A from SHDH and clinical history had not been received in accordance with the applicable *NSW Health policy directive PD2008_070 for Sudden Unexpected Death in Infancy*.
173. In his initial statement provided to the Court, Dr Greenacre acknowledged that he did not complete the Form A and that it was required. He noted that as a visiting medical officer at the time of Harland's death, there was no mechanism in place at SDMH to ensure individual doctors were informed of new or amended policies. Dr Greenacre had since reviewed the policy directive. He told the court that since that time, a system was subsequently introduced whereby the department head of individual units is emailed a policy, and that generally it is made available at SDMH's monthly paediatric review meetings.
174. Given the importance of capturing important information relating to a SUDI, I am pleased that these changes have been made and I am not of the view that a recommendation is needed.

Formal findings

175. The findings I make under section 81(1) of the Act are:

Identity

The person who died was Harland Sutton

Date of death

He died on 15 December 2015, between 8.25am and 12.10pm

Place of death

He died at 75A Frederick Street, Sanctuary Point NSW

Cause of death

His exact cause of death is unascertained. His death can be classified as Sudden Unexpected Death in Infancy (SUDI +0).

Manner of death

Harland's death was sudden and unexpected. Toxicological samples taken as part of the autopsy process indicated that he had been administered frusemide in the period shortly before or shortly after his death or *peri mortem*. He was asystole at the time ambulance officers arrived and their subsequent resuscitation was unsuccessful.

Recommendations

To the NSW Ambulance Service

That consideration is given to conducting a complete review of the processes involved with local registers of non-registered medications to ensure greater accuracy and accountability.

Conclusion

176. I thank members of family who attended this inquest. I once again offer my sincere condolences and acknowledge their significant loss.

177. I thank those assisting me in the investigation and in preparation of this inquest, in particular counsel assisting, Peter Aitken, and his instructing solicitor, Lena Nash. I also wish to acknowledge the comprehensive investigation undertaken by Detective Senior Constable Klein.

178. Finally, I wish to thank Irene de Raya and Jaqueline Krynda for their assistance in reviewing these findings.

179. I close this inquest.

Magistrate Harriet Grahame
Deputy State Coroner
21 December 2021
NSW State Coroner's Court, Lidcombe