IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: COR 2017 5946

FINDING INTO DEATH WITHOUT INQUEST

Form 38 Rule 63(2)
*Section 67 of the **Coroners Act 2008***

Findings of:	Coroner Jacqui Hawkins
Deceased:	Cai Wheeler-Trow
Date of birth:	23 November 2017
Date of death:	24 November 2017
Cause of death:	I(a) Head injury in the setting of labour
Place of death:	Royal Children's Hospital, 50 Flemington Road, Parkville, Victoria, 3052

SUMMARY

1. Baby Cai Wheeler-Trow (**Baby Cai**) was born on 23 November 2017 at Cabrini Hospital, Malvern to parents Tashi Wheeler and Richard Trow and died just over 24 hours later. He was their first child.

2. Baby Cai was delivered by emergency caesarean section in the context of a failed instrumental delivery. Due to complications associated with the birth, Baby Cai developed a fractured skull and a subgaleal haemorrhage[1]. He was later transferred to the Royal Children's Hospital, Neonatal Intensive Care Unit (**NICU**) and died at 11.42pm on 24 November 2017.

3. Baby Cai's death was reported to the Coroner as it fell within the definition of a reportable death in the *Coroners Act 2008.*

THE PURPOSE OF A CORONIAL INVESTIGATION

4. The role of a coroner is to independently investigate reportable deaths to establish, if possible, identity, medical cause of death and with some exceptions, surrounding circumstances. Surrounding circumstances are limited to events which are sufficiently proximate and causally related to the death. The law is clear that coroners establish facts; they do not lay blame or determine criminal or civil liability.[2]

5. Victoria Police assigned an officer to be the Coroner's Investigator for the investigation into Baby Cai's death. The Coroner's Investigator conducted inquiries on my behalf, including taking statements from witnesses and submitted a coronial brief of evidence.

6. Due to the medical complexities associated with his death, this case was referred to the Coroners Prevention Unit for a comprehensive review and assessment of the medical and management of Baby Cai.

7. All coronial findings must be made based on proof of relevant facts on the balance of probabilities.[3] The strength of evidence necessary to prove relevant facts varies according to the nature of the facts and the circumstances in which they are sought to be proved.[4]

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1 A subgaleal haemorrhage (SGH) occurs when the veins between the scalp and dural sinuses are sheared or severed because of traction on the scalp during delivery.

2 In the coronial jurisdiction facts must be established on the balance of probabilities subject to the principles enunciated in *Briginshaw* v *Briginshaw* (1938) 60 CLR 336. The effect of this and similar authorities is that coroners should not make adverse findings against, or comments about, individuals unless the evidence provides a comfortable level of satisfaction as to those matters taking into account the consequences of such findings or comments.

3 *Re State Coroner; ex parte Minister for Health* (2009) 261 ALR 152.

4 *Qantas Airways Limited v Gama* (2008) 167 FCR 537 at [139] per Branson J (noting that His Honour was referring to the correct approach to the standard of proof in a civil proceeding in the Federal Court with reference

8. In writing this Finding, I do not purport to summarise all the evidence but refer to it only in such detail as appears warranted by its forensic significance and the interests of narrative clarity.

IDENTITY OF THE DECEASED

9. Baby Cai Wheeler-Trow was visually identified by his father Richard Trow, on 23 November 2017. Identity was not in issue and required no further investigation.

BACKGROUND

10. Ms Wheeler was 37 years old and had an uncomplicated pregnancy. Pregnancy care was provided by obstetrician, Dr Dennis Price. The anticipated due date for the birth was 19 December 2017.

11. Dr Price was on leave when Ms Wheeler presented in early labour on 23 November 2017. Consequently, care during labour was provided by his colleague, Dr Tom Manley, Consultant Obstetrician and Gynaecologist.

12. On 22 November 2017 at 36 weeks and two days, Ms Wheeler presented to the Cabrini Hospital at 11.50pm. She was not in active labour but had spontaneously ruptured her membranes. Aside from the rupture of membranes, there appeared to be no other pregnancy complications or factors that would contribute to an increase in labour risk.

13. Labour was not established so an oxytocic syntocinon infusion was commenced to augment mild contractions. Shortly after an epidural was inserted for analgesia and continuous cardiotocographic (**CTG**) monitoring commenced. The fetal heart rate and maternal heart rate were differentiated by use of a saturation probe that continuously recorded the maternal heart rate.

14. During labour, Ms Wheeler received intravenous (**IV**) antibiotics. From 12.45pm the CTG showed periods of variable decelerations. A clinical review was conducted by Dr Manley at 2.35pm on 23 November, which included a vaginal examination and found the cervix 1cm dilated, the fetal head at station -3 and pink liquor draining. There were no signs of fetal distress and she was not in active labour. Later at 5.45pm, a vaginal examination by the midwife found the cervix 6cm dilated, -2 in relation to the ischial spines, and ++ caput succedaneum. At this examination the position of the fetal head was unable to be determined.

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to section 140 of the *Evidence Act 1995* (Cth); *Neat Holdings Pty Ltd v Karajan Holdings Pty Ltd* (1992) 67 ALJR 170 at 170-171 per Mason CJ, Brennan, Deane and Gaudron JJ.

15. The syntocinon was titrated to a maximum rate of 72mls/hour, then reduced to 48mls and switched off at 6.16pm in response to an eight-minute episode of fetal bradycardia. At 6.24pm the syntocinin was turned off due to a prolonged contraction. At 6.34pm Dr Manley reviewed the CTG remotely, noting the fetal heart rate was normal. A retrospective note made by a midwife recorded a vaginal examination at 6.55pm "*VE 8cm dilated, Vx well applied, caput felt, -2/-1 above spines, position OT-OA*".

16. Dr Manley attended the birth suite and performed another vaginal examination at 8.30pm. The second stage of labour was diagnosed with full dilation of the cervix. However, the fetal head remained high at station -2 and in a left occipito-posterior position. Caput succedaneum was evident. Further time was allowed for the fetal head to descend into the pelvis. Around this time there was another eight-minute episode of fetal bradycardia between 8.35-8.43pm.

17. At 8.40pm Ms Wheeler started pushing. A vaginal examination by Dr Manley at 9.10pm found the fetal head position still at left occipito-posterior position and high. Although the fetal head descended slightly to +1 station, labour progressed slowly. This, coupled with persistent decelerations, led Dr Manley to have a discussion with Ms Wheeler and Mr Trow about an assisted vaginal delivery.

18. Dr Manley was initially confident of a vaginal birth, however there were several unsuccessful attempts of an assisted delivery using forceps in the birth room. At 9.45pm he attempted three pulls using rotational Keilland's forceps to correct the posterior position. The fetal head rotated to occipito-anterior easily, but station was lost. This was followed by a change to Neville Barnes forceps with two pulls at 9.51pm and 9.58pm. Although there was some head descent from the first two pulls, after this time there was no further progress in head descent. During the forceps attempt the fetal heart rate on CTG was labile as indicated by a four-minute bradycardic episode at around 9.43pm and tachycardia rising to 200bpm at 9.58pm.

19. Consultant Paediatrician, Dr Joseph Mel attended the birth room at 10.09pm.

20. An episiotomy was cut at 10.13pm, at that stage the head was +2 station and was not descending further. An urgent category one caesarean section was called at 10.18pm. Despite Dr Manley providing an account of a normal fetal heart rate just prior to delivery by caesarean section, the CTG ceased printing at 10.22pm, coinciding with the time of transfer to theatre. At 10.35pm the epidural was topped up, which was the last documented fetal heart rate at 157bpm.

21. At 10.45pm the epidural was topped up by an anaesthetist with the standard combination of narcotics and local anaesthesia to increase the sensory block.

22. No vaginal examination was performed in theatre prior to commencing the caesarean section. According to the operation record the fetal head was not wedged in the pelvis. The caesarean section was uncomplicated and described by Dr Manley as 'straightforward'.

23. Baby Cai was born by a routine lower segment caesarean section at 10.45pm, with a birthweight of 2,450 grams. He was in good condition and transferred to the care of Dr Mel.

CIRCUMSTANCES IN WHICH THE DEATH OCCURRED

24. According to brief notes by Dr Mel and a subsequent statement, Baby Cai was born in good condition with APGAR scores of nine at one minute and nine at five minutes. No resuscitation was required. An umbilical artery cord lactate was 3.9, however, the umbilical venous cord gas was clotted. A vitamin K injection was given at 10.47pm.

25. Baby Cai was admitted to the Special Care Nursery (**SCN**) at 11.05pm for monitoring due to his prematurity. He was placed in an infant isolette. Overnight on 23-24 November 2017 there was only one other baby being cared for in the SCN.

26. Dr Mel's admission notes are brief. He documented his examination findings as a normal male with 'moulding +++' of the head. There was no specific documentation regarding evidence of a subgaleal haemorrhage or birth trauma. Dr Mel ordered oral feeding and monitoring of oxygen saturations and blood glucose monitoring. The first blood sugar level was taken at 11.43pm and Baby Cai received 15mls of infant formula at 11.45pm.

27. Between 11.45pm and 2.45am, Baby Cai was observed hourly. During this time a mildly elevated respiratory rate of 60 to 65 bpm was noted and an initial elevated heart rate of 175bpm normalised to 160bpm by 2.45am. Baby Cai was documented to be sleeping during this time, with normal to pale colour, no increased respiratory effort and normal temperatures.

28. Dr Mel documented threshold ranges for acceptable respiratory and heart rates. A respiratory rate greater than 70 or heart rate greater than 185bpm prompted a clinical review. A respiratory rate greater than 90 or heart rate greater than 200bpm prompted an emergency code. The threshold ranges are valid for a 24 hour period and documented in the recently implemented Victorian Children's Tool for Observation and Response (**ViCTOR**) chart.

29. Retrospective nursing notes describe Baby Cai was turned onto his back at approximately 2.45am for a repeat blood sugar level check. At this time, he was observed to be pale in colour, and mottled in association with minimal respiratory effort. A Code Blue was called at 2.49am. The Cabrini Hospital Emergency Department (**ED**) doctors attended and ran the

neonatal code. Baby Cai was moved to a resuscitaire and intermittent positive pressure ventilation (**IPPV**)[5] was commenced.

30. According to his statement, Dr Mel arrived soon after the Neonatal Code Blue was called at approximately 3.00am to find Baby Cai pale, with poor oxygen saturations and minimal respiratory effort. The observation charts document intubation occurring at 3.00am following a significant bradycardia to 74 bpm. The endotracheal tube (**ETT**) was pulled out at 3.06am and the heart rate improved to 101 bpm. Dr Mel's statement did not provide details on the intubation attempt.

31. Dr Mel noted a 'significant bulky swelling' of Baby Cai's head and immediately inserted an IV catheter through which saline was administered. Baby Cai reportedly responded well to this treatment, becoming pink and spontaneously breathing. Baby Cai was documented to be spontaneously breathing by 3.12am.

32. A chest and skull X-ray at 3.15am showed a non-depressed left parietal skull fracture and normal lungs. Intravenous prophylactic antibiotics were administered at 3.19am, three hours and 45 minutes after birth.

33. Dr Mel made the provisional diagnosis of a subgaleal haemorrhage and contacted Paediatric Infant Perinatal Emergency Retrieval (**PIPER**)[6] at 3.33am. At this time Dr Mel reported normal colour, observations and movement of Baby Cai. Dr Mel noted there was no seizure activity.

34. Between 3.12am and arrival of the PIPER team at 5.10am, Baby Cai was documented to have normal observations, spontaneous breathing and normal blood pressure. However, there was limited documentation on examination findings by either Dr Mel or nursing staff during this time.

35. Dr Mel spoke to Dr Leah Hickey, Consultant Neonatal Paediatrician for PIPER and reported the details of Baby Cai's birth; that he was born in a good condition with good APGARs. Dr Mel advised that significant moulding had been noted after birth. According to Dr Hickey, Dr Mel described Baby Cai as "looking very comfortable", "moving all limbs nicely" and "looking around" with pupils that were equal and reactive to light. His vital signs were described as a heart rate of 144bpm, a respiratory rate of 39 bpm and oxygen saturations of

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5 The terminology used to describe providing ventilation to a patient who is not breathing independently is referred to as intermittent positive pressure ventilation (IPPV). IPPV provides oxygenation and ventilation until a more definitive airway can be established.

6 PIPER is a state-wide service which provides accessible and timely expert advice to health care providers for paediatrics and high-risk obstetric care.

100% while self-ventilating in room air. Capillary refill was described as 'good'. Dr Mel advised there was a possible skull fracture and boggy swelling of the head. His provisional diagnosis was that Baby Cai may have had a bleed secondary to the skull fracture causing his 'hypovolaemic episode'.

36. Dr Hickey's overall impression was that Baby Cai was 'well and stable,' although she was aware that at that time a blood pressure measurement had not yet been done. The referral call concluded with a plan for a prompt retrieval of Baby Cai for review of a possible subgaleal haemorrhage by the Royal Children's Hospital neurosurgical team.

37. There was no report by Dr Hickey of any blood results or blood pressure readings during this call. There was no documentation by Dr Hickey or Dr Mel regarding plans for further investigations or management while awaiting the PIPER team arrival and retrieval. While waiting for the PIPER team, it appeared that the only ongoing management were observations and IV infusions. There were no initial blood tests taken apart from blood cultures done at 10.50pm on 23 November 2017.

38. According to nurse Ms Melinda Cox, a discussion occurred between Dr Mel, Dr Hickey and the PIPER clinical coordinator, Kay Downing that Baby Cai's condition was not 'time critical' and as the team had been out for five hours on a previous retrieval, Dr Hickey was happy to wait for the driver to have a 15 minute rest. Dr Hickey did not consider it was appropriate to call an Ambulance Victoria crew to drive a PIPER vehicle and team, as this can take up to 60 minutes to arrange.

39. The PIPER retrieval team arrived at Cabrini Hospital at 4.58am. The team consisted of Dr Amir Zayegh, the PIPER retrieval doctor and Ms Cox, the PIPER nurse. Dr Mel handed over to the PIPER team at approximately 5.00am and then left the hospital, prior to PIPER completing their initial assessment.

40. At 5.18am, Dr Hickey was contacted by Dr Zayegh. Baby Cai was described as much sicker than expected, had examination findings of a depressed skull fracture, an extensive subgaleal haemorrhage, significant work of breathing and grunting. It was noted Baby Cai had 'a large subgaleal haemorrhage to the point where his ears were deviated anteriorly.'

41. Dr Zayegh also suggested that the episode previously described as a 'respiratory arrest' may have been a seizure. The initial blood tests performed by the PIPER team showed a low haemoglobin of 109g/L and significant metabolic acidosis; consistent with significant blood loss and low perfusion. It was apparent that Baby Cai was very unwell which was likely as a

result of possible brain injury secondary to a depressed skull fracture and a large subgaleal haemorrhage.

42. Dr Zayegh urgently inserted an umbilical venous catheter, commenced a blood transfusion and re-intubated Baby Cai. At 6.40am, Dr Hickey was contacted again by Dr Zayegh. They discussed accessing fresh frozen plasma to treat the deranged coagulation profile but were told by Cabrini Hospital that it would take up to an hour to thaw. To avoid further delays in transfer, Dr Hickey advised Dr Zayegh to administer further fluid boluses and blood transfusions and to depart Cabrini Hospital as soon as possible. Blood tests taken at 7.05am on 24 November 2018 showed a significantly deranged coagulation profile.[7]

43. Baby Cai departed Cabrini Hospital at 7.21am and arrived at the Royal Children's Hospital NICU at 7.45am. On arrival Baby Cai had evidence of hypovolaemic shock due to blood loss, a low platelet count and deranged coagulation profile. He required multiple blood product replacements and neurosurgical management to drain 25mls of blood from the subgaleal haemorrhage.

44. A CT scan and subsequent MRI brain scan on 24 November 2017 showed an extensive brain injury. Due to the high risk of neurodevelopmental impairment and disability, his parents were counselled about his prognosis and a decision was made to redirect care to palliation. Baby Cai died at 11.42pm on 24 November 2017.

45. In the opinion of Professor Rod Hunt, Director of Neonatal Medicine at the Butterfly Ward, Royal Children's Hospital and the treating clinician, Baby Cai's cranial trauma and brain injury were consistent with trauma from a difficult forceps' extraction, causing a parietal skull fracture and compressive injury of underlying brain tissue. His coagulopathy on arrival is almost certainly a consequence of the related haemorrhage, with consumption of both platelets and clotting factors. Professor Hunt said both were corrected following his arrival on the Butterfly Ward.

MEDICAL CAUSE OF DEATH

46. On 29 November 2017, Dr Sarah Parsons, Forensic Pathologist at the Victorian Institute of Forensic Medicine (**VIFM**) performed an autopsy on the body of Baby Cai and reviewed the Form 83 Victoria Police Report of Death, medical notes and MRI of the Royal Children's Hospital, the e-medical deposition and the post mortem computed tomography (**CT**) scan.

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7 Resulting in impaired clotting ability of the blood.

47. Dr Parsons commented that the cause of death was a head injury in the setting of labour and a forceps delivery. At autopsy, Baby Cai was found to have bilateral subdural haematomas, patchy subarachnoid haemorrhages, extradural haemorrhage, a subgaleal haematoma and a linear skull fracture. Along with haemorrhagic necrosis about the left frontal and parietal cortices. Dr Parsons noted that a linear skull fracture along with intracranial haemorrhage is in keeping with birth trauma.

48. Post mortem examination showed no evidence of natural disease processes or significant congenital anomalies.

49. Dr Linda Iles, Head of Forensic Pathology at VIFM provided a neuropathology report and commented that interpretation of cortical dysplasia is difficult in the setting of haemorrhage and disruption of the cortex. However, where sections of the cortex in this region are appropriately oriented and not disrupted, there were no overt dysplastic changes seen. An incidental microscopic focus of leptomeningeal glioneuronal heterotopia was identified, but not widespread. Dr Parsons was unable to determine the significance of this incidental finding.

50. The placenta was not retained and therefore was unable to be examined.

51. Dr Parsons provided an opinion that the medical cause of death was 1(a) head injury in the setting of labour. I accept and adopt this cause of death.

CORONIAL INVESTIGATION

52. As part of my investigation I requested statements from a number of clinicians which have assisted me and have been incorporated into the circumstances detailed above.

Cabrini Health Review

53. Associate Professor Peter Lowthian, Director Medical Services and Clinical Governance at Cabrini Health provided a summary of the Root Cause Analysis (RCA) conducted by Cabrini Health. The issues identified by the Cabrini Health RCA included;

    a. A delay in recognition of excess uterine stimulation;

    b. A lack of recognition of a deteriorating patient;

    c. A need to update the caesarean section policy category one to include the requirement of placentas to be retained for histological examination;

d. A delay in recognition of a deteriorating newborn; and

e. A lack of communication by PIPER to the referring paediatrician in relation to a delay in PIPER's initial estimated time of arrival.

Coroners Prevention Unit review of care and management

54. Given the circumstances of Baby Cai's death, I referred this case to the Coroners Prevention Unit (**CPU)** for a comprehensive review and assessment of his medical care and management.

55. The role of the CPU is to assist coroners investigating deaths, particularly deaths which occur in a healthcare setting. The CPU is staffed by healthcare professionals, including practising physicians and nurses, who are independent of the health professionals and institutions under consideration. The CPU professionals draw on their medical, nursing and research experience to evaluate the clinical management and care provided in particular cases by reviewing the medical records, the autopsy report and any particular concerns which have been raised.

56. The CPU reviewed the medical records of Cabrini Hospital, the Royal Children's Hospital, and obtained a number of statements from clinicians which have assisted with the summary provided above. The CPU also obtained an expert opinion from Dr Simon Fraser, and a summary of the Cabrini Health's Root Cause Analysis.

Expert opinion of Dr Simon Fraser

57. On 13 June 2019, the Court received an expert opinion from Dr Simon Fraser, Consultant Paediatrician. He was critical of the following issues:

a. The subgaleal haemorrhage was not anticipated despite evident risks, in the form of a failed forceps delivery.

b. The severity and seriousness of the subgaleal haemorrhage would appear to have been under-appreciated. Therefore, there were delays in responding to a deterioration in Baby Cai's condition.

c. Lifesaving treatments such as inotropic support and blood products were not instituted whilst awaiting the arrival of the PIPER retrieval team.

d. With early screening, detection and timely management of his subgaleal haemorrhage, Baby Cai would have survived.

e. There does not appear to have been any close observations of Baby Cai's head and scalp (including head circumference).

f. Dr Mel modified the ViCTOR vital sign parameters.

g. There was a delay in recognising that Baby Cai had developed a subgaleal haemorrhage and that there was an ongoing unrecognised deterioration in his condition between the calling of the Code Blue and the arrival of the PIPER team.

h. It appears that the severity of the subgaleal haemorrhage and that Baby Cai had signs of compensated shock was not appreciated nor communicated to PIPER.

i. Dr Mel's documentation was limited and inadequate and he departed the hospital once PIPER arrived.

58. Dr Fraser considered that Baby Cai's death was preventable if there had been prospective screening and earlier recognition and management of the subgaleal haemorrhage.

59. Dr Fraser also considered there were shortcomings in the Cabrini Hospital Review including:

a. There was no comment on the adequacy of Dr Mel's initial management, incomplete assessment and observations of Baby Cai; and

b. It did not address the apparent lack of awareness of Dr Mel of the severity of the clinical situation, nor the apparent non-compliance with the ViCTOR chart modification guidelines and no notation about poor documentation of the evolving events.

CPU review and assessment of contributing factors

Review of obstetric management

60. Dr Manley became a Consultant Obstetrician and Gynaecologist in 2014 after commencing his specialist training in 2008. He is a Practical Obstetric Multi-Professional Training (PrOMPT) trainer at Cabrini Hospital.[8] Dr Manley provided written evidence he was assessed by the Royal Australian and New Zealand College of Obstetricians and

[8] Practical Obstetric Multi-Professional Training (PROMPT) is an evidence based multi-professional training program for obstetric emergencies.

Gynaecologists (RANZCOG)[9] to have a high-level of knowledge and cognitive skills regarding fetal wellbeing assessment.[10]

61. Dr Manley's assessment of the fetal position led to the use of forceps in the birthing room rather than theatre. He considered a trial of forceps in theatre but determined it was not necessary in view of his clinical findings. He was confident in the success of an assisted delivery in the birth room once he corrected the malposition of the fetal head. He said if he felt that it was not going to be successful, he would have taken Ms Wheeler to theatre.

62. Dr Manley was very surprised, given the ease in correcting the malposition of the fetal head that he was unable to deliver by an assisted vaginal birth. He considered the application of the Kielland's was routine. The difficulty he encountered was bringing the head down to the pelvic floor, which was the reason he changed to Neville Barnes forceps that have a pelvic curve. He believed the main contributing factor to this difficulty was cephalo pelvic disproportion caused by a narrow pelvic arch[11] which was not diagnosed because of the malpresentation of the fetal head throughout the labour. He was careful not to apply excessive force on the forceps at any stage.

63. Dr Manley called a category one caesarean section, following several unsuccessful attempts at an assisted vaginal birth. This response was appropriate and in accordance with the assisted vaginal birth clinical practice guideline.[12] Dr Manley stated, even though variable decelerations coinciding with contractions were evident,[13] he considered there was no indication of inadequate fetal oxygenation or fetal distress. Dr Manley believed CTG fetal heart rate monitoring continued from the birthing room to the commencement of the caesarean section in theatre, however the CTG print function was not used.

64. Insertion of a spinal anaesthetic in preparation for a caesarean section causes transient maternal hypotension. Maternal hypotension reduces placental blood flow and fetal perfusion, it is therefore a time of fetal vulnerability.[14]

65. Although there was no printed CTG record after 10.22pm, an umbilical cord lactate collected for analysis was 3.9[15] when processed at 10.52pm, seven minutes after birth.

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9 Fetal Surveillance Education Program (FSEP).
10 Dr Manley attended the required bi annual FSEP workshop and exam in June 2018.
11 This occurs when there is a mismatch between the size of the fetal head and the maternal pelvis causing difficulty in the safe passage of the fetus through the birth canal.
12 Cabrini Health. 'Assisted vaginal birth.' Clinical practice guideline. Dated 28 July 2017.
13 In response to fetal head compression during second stage of labour.
14 Maternal hypotension from a combination of local anaesthetic and opioid drugs.

66. Dr Manley considered there were no indications of fetal distress, but there was a level of urgency for the caesarean section given the unsuccessful attempts at an assisted vaginal birth which included an episiotomy in an attempt to help the downward movement and angle of the forceps to bring the fetal head down. He considered the fetal heart rate to be normal so believed an epidural top up more suitable rather than a general anaesthetic. For similar reasons, Dr Manley considered there was no need for tocolytics to be administered to relax the uterus. A vaginal examination was not performed in theatre. Dr Manley believed such an examination would not impact on the plan for caesarean section following unsuccessful attempts at an assisted vaginal birth.

67. Dr Manley said he was careful not to apply excessive force during the use of forceps. He said the caesarean section was straightforward and Baby Cai was delivered with little effort and in good condition.

Review of neonatal management

68. Dr Mel has been a Consultant Paediatrician since 1994. The initial statement he provided to the Court was lacking in detail and timelines and therefore a further statement was requested. Dr Mel said at the time Baby Cai was admitted to the SCN there was no evidence of a subgaleal haemorrhage and in his view Baby Cai was normal, active, alert and well perfused.

Inappropriate modification of neonatal observation chart

69. The ViCTOR chart was developed by the Victorian Paediatric Clinical Network (**VPCN**) and implemented during 2017 in Victorian hospitals. The chart utilises the most recent evidence in newborn and paediatric vital sign parameters. The chart's design incorporates human factor elements, such as colour, font and layout, to assist clinicians to recognise and respond to clinical deterioration in newborn and paediatric patients. The chart is colour coded to easily identify when observations reach a range where a clinical review by a doctor is recommended (orange zone) or where a mandatory emergency call for assistance is required (purple zone). The ranges for the orange and purple zones can be modified in certain circumstances to allow for a higher or lower threshold to trigger a clinical review or mandatory emergency call.

[15] Likely to be within the normal range given gestation and length of second stage.

70. Dr Mel noted a difficult assisted delivery, moulding and caput. Baby Cai was admitted to the SCN due to his low birth weight and prematurity. Considering the high APGARS at birth, Dr Mel was unconcerned with Baby Cai's condition at the time of birth.

71. Guidelines for the modification of the ViCTOR chart for a newborn baby are according to Cabrini Hospital protocol and can be made after a clinical examination to levels that are deemed reasonable.

72. Dr Mel changed the purple reportable range[16] in the ViCTOR newborn observation chart for both respiratory and heart rates.[17] Dr Mel made the modified criteria valid for 24 hours. He believed 24 hours was a reasonable time given 'there was a slight increase[18] at that stage that was trending downwards, consistent with a child who had caput and may have been in some discomfort.' Dr Mel said that his practice was to review the child within four to eight hours or sooner should nursing staff be concerned.

73. This view was not consistent with observations that showed the heart rate remained in the orange zone until 12.45am and a respiratory rate in the orange zone (clinical review range) between 12.45am to 2.45am.

74. The modified criteria were valid for 24 hours, which implied that Baby Cai could remain in the clinical review criteria for respiratory rate and heart rate for 24 hours without prompting any medical review.

75. The CPU considered that Dr Mel breached the ViCTOR chart modification guidelines in two ways. Firstly, the guideline stipulated purple zones are not to be modified and only one orange zone observation can be modified at a time, that is, either the respiratory or the heart rate can be modified. Secondly, the altered vital sign threshold prompting an emergency code is valid for a maximum of four hours. In addition, in accordance with the chart guideline Dr Mel did not document a rationale for the modified vital sign range in the event/comment section at the bottom of the ViCTOR observation chart.

16 Vital sign observation threshold prompting a mandatory emergency code.
17 The defined vital sign threshold heart rate was changed from greater than 185 to 200 bpm and respiratory rate greater than 75 to 90 breaths per minute to prompt a mandatory emergency code.
18 Presumably the respiratory and heart rates.

Under-recognition of the severity of subgaleal haemorrhage

76. The clinical features of a subgaleal haemorrhage may be insidious in onset. The CPU considered there were several markers to indicate a high index of clinical suspicion was required for Baby Cai which included:

    a. A prolonged or complicated vacuum extraction or instrumental delivery;

    b. APGARS less than 5 at one minute; and

    c. Later signs of tachycardia, tachypnoea, pallor and poor activity.[19]

77. In summary, Baby Cai was at risk of a subgaleal haemorrhage due to multiple failed forceps attempts. Later there were also signs of pallor, varying tachycardia and tachypnoea.

78. A subgaleal haemorrhage was diagnosed following Baby Cai's deterioration that prompted a neonatal Code Blue at 2.49am. Prior to this time there was no documented observations regarding his head size to monitor possible swelling[20]. Despite diagnosing a subgaleal haemorrhage and attending a Code Blue due to respiratory arrest, Dr Mel did not initiate further investigations to assess the subgaleal haemorrhage between 2.49am and 5.00am when PIPER arrived.

79. Dr Mel did not detail examination findings of Baby Cai's head beyond the description of 'skull swelling that was boggy and soft' in the medical records or his statement. He did not detail any change or progression from the initial examination at birth. However in a second statement to the Court he detailed that there was good capillary return, excellent pulses and spontaneous respiration.

80. The CPU considered that there were no further head circumference measurements to assess any progression in bleeding. In addition, no blood tests were done to assess for blood loss or coagulopathy,[21] no blood gases were done to assess for acid base and blood perfusion and only one blood pressure measurement was recorded in that time. The only investigation done in that time was a chest and skull X-ray. Apart from Dr Mel's examination stating, 'the

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19 RANZCOG Guideline 'Prevention, detection and management of subgaleal haemorrhage in the newborn.' July 2009.

20 The initial head circumference was 33.5cm at birth but no repeated head circumference measurements were done at Cabrini.

21 Impaired clotting ability of the blood. Significant coagulopathy was later found on blood tests done by the PIPER team and was likely due to significant bleeding from the SGH.

child's fluid status was excellent', the CPU considered there were inadequate objective measures such as repeat blood pressure checks and blood gas results to support this finding.

81. PIPER was contacted 45 minutes after the emergency code. Dr Mel noted he was under the impression the PIPER team would arrive in 30 minutes. PIPER arrived close to one and a half hours after the initial phone call. Dr Mel confirmed no investigations were performed pending the arrival of PIPER, as he considered Baby Cai to be stable. His opinion was that management during that time was observation and monitoring with ongoing intravenous fluids. He said that on observations there were no seizures and Baby Cai was stable just prior to the arrival of PIPER, when tachycardia returned. Despite the belief PIPER's arrival was imminent, the CPU considered that Dr Mel did not complete an adequate initial assessment or ensure adequate observations and investigations were undertaken for a subgaleal haemorrhage.

Lack of communication between Dr Mel and PIPER team

82. Dr Mel was under the impression that the PIPER team would arrive 30 minutes after his initial call. Despite a delay of more than one and a half hours, Dr Mel did not report contacting the PIPER team again after his initial call to clarify their arrival time.

83. In addition, as stated above, Dr Mel did not initiate any further management or investigation despite the obvious delay when PIPER had not arrived after 30 minutes.

84. PIPER also did not make any further communication with Dr Mel after the initial call. However, the CPU considered the onus needs to be on the referring hospital and doctor to recontact the PIPER team if retrieval needs to be expedited.

<u>Cabrini Health RCA</u>

85. The CPU was critical of the Cabrini Health RCA in that:

    a. it understated the lack of recognition by staff of Baby Cai's deterioration;

    b. it did not comment on any shortfall in Dr Mel's initial management and the lack of a complete assessment and observations, including regular blood pressure checks;

    c. it did not address the apparent lack of awareness by Dr Mel of the severity of the clinical situation or non-compliance with the ViCTOR chart modification guidelines; and

d. it did not comment on the lack of medical documentation by Dr Mel or staff attending the Code Blue.

FURTHER CORONIAL INVESTIGATIONS

86. Due to the criticisms made by the CPU and Dr Fraser, I gave the Cabrini Hospital and clinicians an opportunity to directly respond to these criticisms, to afford the parties natural justice and procedural fairness.

Response of Cabrini Health

87. Cabrini Health made the following submissions in response to the criticisms of Dr Fraser and the CPU.

88. In response to the criticism that the RCA did not consider the issue of screening recognition and management of Baby Cai's subgaleal haemorrhage, Cabrini Health noted that the senior paediatrician involved in the RCA did not consider there were any specific issues surrounding the management of the subgaleal haemorrhage. On that basis the RCA focussed on obstetric management and recognition and escalation of neonatal clinical deterioration more broadly.

89. Cabrini Health have since implemented the following recommendations in relation to the screening, recognition and management of neonate's subgaleal haemorrhage:

a. Cabrini has developed a *Guideline for Subgaleal Haemorrhage management* to guide staff and Visiting Medical Officers. This guideline highlights the requirement to document a neonate's head circumference/scalp observations. It also requires that if the neonate further deteriorates or if there is a failure by the neonate to respond to the treatment plan, it must be escalated to PIPER.

b. As the ViCTOR chart is a pro forma chart used Statewide and cannot be altered, Cabrini has updated the following policies and protocols to highlight to staff when a neonate scalp observation should be performed:

i. *Observation and Response Chart Protocol and Procedure – Paediatric and Neonate* - requires when there is an instrumental birth, neonatal scalp and head circumference observations are to be clearly documented in the "Additional Observations" section of the ViCTOR chart.

ii. *Maternity and Special Care Nursery Admission and Transfer Policy* – has been amended to include a requirement that in the circumstances of a difficult instrumental birth, or where directed by a paediatrician, SCN staff are to

document a neonate's head circumference observations in the "Additional Observations" section of the ViCTOR chart.

iii. *Assisted Vaginal Birth Protocol* –has been amended to include a requirement that a neonate's scalp and head circumference observations are to be clearly documented in 'Additional Observations' section of the ViCTOR chart if the baby is in the SCN. If the baby is on the ward, then the scalp and head circumference is to be documented in the 'Newborn Scalp check' section of ViCTOR.

In addition, there is a now a requirement that mid cavity instrumental births must be trialled in the operating theatre, as opposed to the birth suite.

Staff and clinicians have been advised of the amended protocols and policies.

c. Cabrini Hospital has also contacted Safer Care Victoria and requested that SCV consider the addition of the 'Newborn Scalp check' be included on the ViCTOR chart, which now seems to have occurred.

d. The Cabrini education course is being re-developed to include recognition and management of:

i. Neonatal emergencies, including subgaleal haemorrhage; and

ii. Neonatal head injuries following a traumatic birth.

The course will be mandatory for all staff working in SCN and maternity staff.

e. In 2019, in addition to quarterly perinatal mortality and morbidity meetings with clinicians, Cabrini Health established a fortnightly maternity services clinical governance meeting with appropriate clinicians. All reported maternity incidents are discussed at this meeting including any reviews being undertaken, and any recommendations arising from the reviews.

f. In December 2018, the K2MS Guardian system was implemented at Cabrini Health which allows for the electronic capture of CTG and related intrapartum information. This allows results to be shared and reviewed remotely with the patient and clinical staff.

g. Cabrini Health staff are active members of the SCV Maternity eHandbook Committee and the Neonatal eHandbook Committee. An instrumental birth protocol is currently

being developed by the Maternity eHandbook Committee. Cabrini proposes to align its policy with the SCV policy once it is developed.

90. I am satisfied that Cabrini Health have implemented a number of changes to their policies and procedures particularly in relation to the recognition of head injuries and subgaleal haemorrhages in neonates and commend them for their proactive response to this incident.

Response of Dr Manley

91. Dr Manley provided a written response to the Court on 20 February 2020 together with a medical report he had obtained from Dr Bernadette White, Obstetrician and Gynaecologist.

92. Dr White commented that in her view "*it is difficult to give an accurate assessment of the incidences of depressed skull fractures following forceps delivery".* She considered the evidence suggests it was likely to be in the order of 1:20,000 – 100,000.

93. Dr White stated to reduce the risk of maternal and fetal trauma, the prerequisites for safely proceeding with an operative vaginal birth must be met, as referred to in the RANZCOG guideline.

94. Dr White referred to a study by Dupuis et al[22] which noted that "*if the forceps blades are not applied symmetrically to the sagittal plane, the cephalic curve of the blade does not match the fetal skull, tensile strain increases and a deformation can occur*." Further, she noted that study also suggests that the

> *symmetrical application of forceps blades leads to a compressive force without a shearing stress. When there is an asymmetric application, this creates shearing forces and applied to the neonate's skull, shearing forces might tear bridging cerebral veins and lead to intracranial haemorrhage*.[23]

95. According to Dr White, the study further suggests

> *that asymmetrical application can result either from application of forceps blades on an unengaged head, from misdiagnosis of the baby's position or incorrectly positioned blades if the baby's head is in an oblique position.*
>
> *Therefore, as well as complying with all the general requirements for forceps delivery to reduce the risk of skull fractures, correct, symmetrical application of the blades is likely to be associated with a decreased risk of intracranial injury*. [24]

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22 Dupuis, O, Silveira R, Dupont, G, Mottolese C, Khan P et al (2005) "Comparison of 'instrument associated' and spontaneous obstetric depressed skull fractures in a cohort of 68 neonates" *AM J Obstet Gynecol 192*: 165-170

23 Statement of Dr Bernadette White dated 29 January 2020, p5

24 Statement of Dr Bernadette White dated 29 January 2020, p5

96. In relation to how a skull fracture might occur during the course of an attempted forceps delivery Dr Manley commented: "*it is unknown in this case how the use of forceps contributed to a skull fracture because all clinical criteria were met for their safe use."*

97. According to Dr Manley, the Dupuis et al study reported that the "*majority of fractures occur spontaneously, without the use of forceps, and resolve without any neurological sequelae*." [25] Dr Manley highlighted the RANZCOG guideline on instrumental vaginal birth criteria and commented: "*during this case and each time [he] uses forceps [he is] careful to only proceed after all RANZCOG criteria on instrumental vaginal birth are met*". Further, he is particularly careful to apply the blade symmetrically and not to apply excessive force on the forceps at any stage. He made two statements that he did not apply excessive force in the case of Baby Cai. In the absence of any evidence to the contrary, I accept this evidence.

Response of Dr Mel

98. In relation to the criticism that Dr Mel did not appreciate the seriousness of Baby Cai's condition, he believed that PIPER were contacted promptly and the fact that PIPER were called means that the situation was urgent. Dr Mel was of the belief that PIPER would arrive within 30 minutes. Had he known that PIPER was going to take as long as it did, he said he would have prescribed an additional dose of Vitamin K and blood products.

99. In response to the criticism about the modified ViCTOR vital sign parameters, Dr Mel said with the benefit of hindsight, if he had considered at the time that Baby Cai had a subgaleal haemorrhage, he agreed that alteration of the ViCTOR chart was not appropriate.

100. In relation to the criticism about inadequate documentation, he said in that time he had been concentrating on Baby Cai, communicating with his distraught parents and getting the paperwork in order for the PIPER transfer. He also noted it was approximately 3am. He added that these facts were not an excuse but were offered to provide some context. I accept his explanation as to why the documentation was inadequate however I find it was below the standard expected of someone in his position.

<u>Opinion of Dr Henschke and responses of Dr Fraser</u>

101. Lawyers for Dr Mel provided a medical report from Dr Philip Henschke, Staff Neonatologist for the Mercy Hospital for Women. After reviewing this statement, I requested Dr Fraser to review and provide any additional comments. He subsequently provided me an email response

[25] ibid

on 12 May 2020 and I have added his opinion in response to Dr Henschke's comments where relevant.

102. Dr Henschke suggested that any assessment of Dr Mel's management of Baby Cai needs to be considered in the context of what would be reasonable to expect from a paediatrician who has not undertaken additional sub-speciality neonatal training and whose neonatal practice is based primarily on the management of term and near term infants born following predominantly low risk deliveries.

103. Dr Fraser disagreed. As someone who has had recent experience as a paediatrician in a non-tertiary setting, he considered that paediatricians who are credentialed and appointed to provide care for newborn babies should be capable of providing expectant and ongoing care for sick term and preterm babies until they are transferred out.

104. The Royal Australasian College of Physicians that oversee paediatric training, only requires a trainee to have six months experience in a tertiary referral neonatal intensive care unit. Dr Henschke noted that a majority of trainees obtain their exposure to newborn infants through their general paediatric training in centres with SCNs. According to Dr Henschke, "*it is very unlikely that a trainee would have any exposure to the ongoing management of a newborn with moderate or severe subgaleal haemorrhage beyond initial recognition and transfer to NICU*". Similarly, he said it was unusual for a trainee to have exposure to a newborn with other causes of haemorrhagic shock, as it is a rare condition for a low risk birth.

105. Dr Fraser agreed, however he indicated he would expect a paediatrician (credentialed and appointed to a non-tertiary centre) to maintain their continuing professional development and be up-to-date with emerging issues such as the anticipation, recognition and management of subgaleal haemorrhage. He noted a study by Colditz et al which was published in 2015, two years before Baby Cai's birth, where it was reported: "*to prevent unnecessary deaths, all involved in the care of the baby after birth need to be aware of the importance of prompt diagnosis, monitoring and early treatment of SGH".*[26]

106. Dr Henschke did not consider that it was reasonable to expect a general paediatrician should be well versed in the complexities of management of an evolving significant subgaleal haemorrhage or the subtleties of recognition and management of an evolving haemorrhagic shock in a newborn infant. Based on the handover provided by Dr Manley, there was no indication that Dr Mel "*would have had any specific reason to believe that Baby Cai was at a*

[26] Colditz MJ, Lai MM, Cartwright DW, Colditz PB; "Subgaleal haemorrhage in the newborn: A call for early diagnosis and aggressive management", *J Paediatric Child Health,* 2015:51(2): 140-6

particular risk of subgaleal haemorrhage beyond [an] instrumental delivery…" Further, based on the documentation provided to Dr Henschke, he was of the belief there was very little evidence to suggest that signs of subgaleal haemorrhage were present in the immediate newborn period when Dr Mel assessed Baby Cai. Therefore, he considered that at the time Dr Mel first assessed Baby Cai, there would not have been any specific reason for Dr Mel or Cabrini Hospital nursing staff to institute an escalated level of monitoring to observe for signs of an evolving subgaleal haemorrhage at the time of admission to the SCN.

107. Dr Fraser agreed that it was likely that there was little evidence to suggest signs of a subgaleal haemorrhage in the immediate newborn period but noted this condition usually develops and becomes apparent after birth. Further, additional risk factors included failed forceps delivery and significant moulding of the head were reasons to monitor for signs of a subgaleal haemorrhage following admission to the SCN.

108. Dr Henschke disagrees with Dr Fraser's criticism in relation to the adequacy of Dr Mel's communication to PIPER. Dr Henschke commented that Dr Mel clearly identified to the PIPER Consultant Neonatologist that Baby Cai had suffered from a dramatic acute deterioration which required ventilation support and intravenous administration of normal saline and that this acute deterioration was associated with findings of a skull fracture and probable subgaleal haemorrhage. Further, Dr Mel raised the possibility of an accompanying intracranial injury or bleeding during the phone consultation. In his opinion, he considered the scenario was "*a reasonably accurate assessment of the prevailing circumstances at the time of the phone consultation and was sufficient to warrant a time critical response irrespective of the reported condition of Baby Cai around the time of the phone call*."

109. Dr Fraser agreed but was perplexed as to why further investigations were not suggested.

110. Dr Henschke further stated that "*it does not appear that Dr Mel received any specific instructions about escalating ongoing monitoring of the baby, need for specific investigations or need for blood products of further volume expansion or any specific advice about the potential for ongoing deterioration in the context of the clinical circumstances*." According to Dr Henschke, once PIPER become engaged the specialist neonatologist would be expected to take the responsibility for advising the general paediatrician about the appropriate level of monitoring required, the need for any specific investigation and subsequent ongoing management that may be required pending the arrival of the transport team.

111. Dr Fraser agreed but noted there was no further communication between Dr Mel and PIPER after the initial consultation and request for retrieval.

112. The PIPER nurse, Melinda Cox indicated a decision was made that the transport was not deemed 'time critical' and to delay the departure of the PIPER team from the Royal Children's Hospital due to fatigue management issues. Dr Mel says he was not advised of this. There was no further phone contact between PIPER and Cabrini Hospital following the initial phone consultation.

113. In relation to Dr Fraser's criticism about documentation, Dr Henschke agreed that it was not of a standard that he would expect, particularly the documentation subsequent to the Code Blue event. However, he could find no indication that the standard of Dr Mel's documentation had any impact on the adequacy or timeliness of medical management of Baby Cai.

114. Dr Henschke noted that it is likely that Dr Mel would not have had the training or experience to appreciate the full potential for such a life-threatening deterioration to occur in the circumstances as they unfolded. He did not consider it reasonable that someone with general paediatric training should be expected to independently anticipate the need for an escalated level of vigilance whilst awaiting the expected imminent arrival of the PIPER team.

115. Dr Fraser disagreed. He considered that Dr Mel was responsible for Baby Cai until PIPER arrived and that he would expect general paediatricians to keep up-to-date with emerging trends in the management of neo-natal conditions.

116. Finally, Dr Henschke did not consider that "*the actions and management of Dr Mel were out of keeping with what would have been expected for a general Paediatrician with Dr Mel's scope of practice, training or likely limited past experience in managing infants with such complex medical problems*". In his experience detecting an evolving haemorrhagic shock in newborn infants where the extent of bleeding is not readily apparent can be very difficult because of the propensity of the newborn infant to maintain a misleading appearance of haemodynamic stability until immediately prior to a precipitous deterioration.

117. I accept the opinions and explanations provided by Dr Henshcke in relation to Dr Mel's medical care and management of Baby Cai. Where there is a dispute in opinion, I accept that these things are never straightforward and accept the opinions of both clinicians, taking note of their difference of experience and understanding of those issues.

Response of Royal Children's Hospital

118. Due to a number of comments made by Dr Fraser, Dr Mel and Dr Henschke in relation to the response of PIPER, I sought a statement from the Royal Children's Hospital. I received a response from Associate Professor (**AP**) Michael Stewart, Director of PIPER on 17 June 2020.

119. In response to comments about mobilisation times, AP Stewart noted that PIPER have a procedure that guides mobilisation times according to the acuity of the patient. The target for "time critical" acuity is 15 minutes and for "urgent" acuity is 30 minutes. Baby Cai's referral met the "urgent" criteria. He reported that at the time of the call, the collective view of both PIPER clinicians and Dr Mel was that the baby was stable, therefore PIPER planned to respond without undue delay as opposed to classifying the response as time critical. A

120. After the call, a decision was made by the PIPER team that because they had just performed a five hour retrieval, the driver needed a further 15 minute powernap. Consequently, the team left 43 minutes after the call. AP Stewart stated, "*whilst this was longer than anticipated it would not be considered unusual in the context of balancing fatigue management of the driver with the agreed assessment being that the baby was stable and not at high risk for a major imminent deterioration".*[27] He conceded that it would have been appropriate for the PIPER team to have provided an update to the Cabrini Hospital.

121. In response to comments by Dr Fraser and Dr Henschke about expectations that a PIPER consultant provides instructions to a referring clinician in relation to management and investigations whilst they await retrieval, AP Stewart said in this case, the information provided by Dr Mel on the referral call was that Baby Cai was stable and retrieval was required. No immediate additional treatment was advised based on the information provided.

122. In the circumstances of a complicated instrumental delivery, an acute deterioration event and concern about bleeding associated with a subgaleal or intracranial haemorrhage AP Stewart considered that further investigations would normally be initiated, either at the instigation of the referring specialist or the PIPER consultant. Investigations would include a full blood count, including platelet count, and a clotting profile. He said often this has occurred prior to the referral call, if not the PIPER consultant usually recommends them in some circumstances. AP Stewart said he supported the views expressed by Dr Henschke and Dr Fraser that in the

[27] Statement of Associate Professor Michael Stewart dated 17 June 2020, p3

absence of the referring paediatrician initiating investigations it is reasonable to expect the PIPER Consultant to have done so.

123. Noting the extensive intracranial injury reported on the Royal Children's Hospital MRI brain scan and reported at autopsy, AP Stewart does not support Dr Fraser's opinion that an earlier and more aggressive approach to the management of the subgaleal haemorrhage would have changed the outcome. He reported that "*Baby Cai's brain imaging findings extend well beyond those expected from a subgaleal haemorrhage and do not support the subgaleal haemorrhage as the main pathology determining the outcome*".[28]

124. AP Stewart stated that Baby Cai "*suffered haemorrhagic and ischaemic injury involving multiple areas within and around the brain some of which were directly related to the skull fracture*". He agreed it was important to critically review the management of the subgaleal haemorrhage however he commented that "*to identify the management of the subgaleal haemorrhage as the primary determinant of [Baby] Cai's tragic outcome fails to take account of the multiple other areas of serious brain injury*."

125. The Royal Children's Hospital reviewed this case and other PIPER referrals and identified two areas for development and implementation:

    a. Video conferencing the PIPER referral process – this is currently being developed but its implementation has faced challenges due to the diversity of information technology systems across health services in the State.

    b. Develop a *Guideline for the Management of Subgaleal Haemorrhage in Neonatal Transport* which has been completed. I have reviewed this draft and consider it will be an extremely helpful guide for clinicians.

126. I commend the Royal Children's Hospital for their proactive response to these important issues.

127. Having considered the evidence I am satisfied that no further investigation is required.

[28] Statement of Associate Professor Michael Stewart dated 17 June 2020, p5

FINDINGS

128. Pursuant to section 67(1) of the *Coroners Act 2008*, I make the following findings connected with the death:

(a) the identity of the deceased was Cai Wheeler-Trow, born on 23 November 2017;

(b) Baby Cai died on 24 November 2017 from I(a) Head injury in the setting of labour; and

(c) in the circumstances described above.

129. I accept the evidence of Dr Manley that he did not use excessive force when he applied the forceps to Baby Cai's head during the instrumental birth process. The evidence does not allow me to reach any conclusion as to the mechanism in which Baby Cai obtained his head injury, other than that it occurred at some stage during the birthing process.

130. I acknowledge that Baby Cai was born in a good condition with good APGARs after a failed attempt at an assisted instrumental birth. I am satisfied that at the time of birth there was very little evidence to suggest any signs a skull fracture or subgaleal haemorrhage were present in Baby Cai. Therefore, I accept there would not have been any reason to institute an escalated level of monitoring to observe for signs of an evolving subgaleal haemorrhage at the time of his admission to the SCN, aside from the level 1 surveillance monitoring suggested in the RANZCOG guide. Dr Mel conceded that with the benefit of hindsight had he known that Baby Cai had a subgaleal haemorrhage he agreed it was inappropriate to modify the ViCTOR chart.

131. I have carefully considered all of the evidence in relation to the paediatric management of Baby Cai by Dr Mel. I accept that a general paediatrician with the experience of working with full to near term newborn babies following predominantly low risk deliveries and with no sub-speciality training in neonatology, may not have had the experience or specialist training to have recognised the subgaleal haemorrhage earlier or its potential severity.

132. Four hours after birth, Baby Cai's condition significantly deteriorated, and a Code Blue was called. I am satisfied that Dr Mel made a provisional diagnosis of a fractured skull and a subgaleal haemorrhage and contacted PIPER in a timely manner. I acknowledge that by the time the Code Blue was called, Baby Cai needed urgent neonatal care from the specialists at the Royal Children's Hospital.

133. I accept that after the Code Blue, Dr Mel's attention was distracted by the condition of Baby Cai, assisting the baby's parents and preparing the necessary paperwork for the referral to

PIPER, however I find that Dr Mel's documentation in the medical records was below the standards expected of someone in his position and with his clinical experience. Nevertheless, I accept the inadequacy of the documentation did not contribute to any inadequacy in the medical management by Dr Mel.

134. I acknowledge that subgaleal haemorrhages are rare and often difficult to diagnose. However, I am unable to determine whether Baby Cai's death would have been prevented had the subgaleal haemorrhage been detected and diagnosed earlier, due to the insidious nature of this condition and also due to the other extensive intracranial injury Baby Cai suffered, as noted by AP Stewart, the MRI brain scans and the autopsy findings.

135. I note Dr Fraser's comments that a general paediatrician would be expected to keep informed about emerging issues in paediatrics. I agree and acknowledge the importance of keeping up-to-date with peer-reviewed journal articles, specialist guidelines developed by appropriate colleges, and coronial findings such as this one. These resources provide valuable insight for practitioners into lessons that can be learned from such unfortunate outcomes, such as the tragic death of Baby Cai, in an attempt to prevent similar occurrences.

136. Finally, I wish to express my sincerest condolences to Ms Wheeler and Mr Trow for the loss of their precious Baby Cai.

COMMENTS

137. Pursuant to section 67(3) of the Coroners Act, I make the following comments connected with the death.

138. The death of Baby Cai has highlighted the importance of understanding the risks associated with instrumental births and the potential for the development of subgaleal haemorrhages. Subgaleal haemorrhages in newborns are rare but have a high mortality rate. Dr Fraser noted that risks include a first pregnancy, a prolonged rupture of membranes, malposition of the head, forceps delivery and prematurity. Close vital sign observations are recommended which includes hourly head circumference measurements and scalp observations as well as monitoring for signs of hypoperfusion such as tachycardia, reduced spontaneous activity, pallor, poor capillary refill and mild respiratory distress. Despite the risks, they can be difficult to diagnose due to their insidious nature. Deaths in neonates with this condition are preventable with early detection and appropriate and timely medical treatment.

139. This case has emphasised the significance of assessing and measuring the baby's head circumference and conducting regular scalp observations to assist to identify the development

of a subgaleal haemorrhage after an instrumental birth. My investigation has identified that this issue is not currently referred to in the guideline published by RANZCOG on *Prevention, detection, and management of subgaleal haemorrhage in the newborn,* which is currently under review. Consequently, I have made a recommendation in attempt to bridge that knowledge gap.

140. In my attempt to understand the current state of knowledge of paediatricians in Australia about subgaleal haemorrhages, I contacted the Royal Australasian College of Physicians and requested information about training and resources available to paediatricians about this issue. I was advised that following previous coronial recommendations on this topic an internal communication was sent to paediatricians about the importance of the management of this condition. I was also advised that the publication of the Colditz et al study was determined as the most robust way to raise the level of awareness across multiple disciplines including general practice, midwifery and neonatal nursing. I acknowledge the importance of this article and note that it is now five years old and as a Court we are still seeing a number of neonatal deaths related to subgaleal haemorrhage. Consequently, I have made a recommendation to the College.

141. Baby Cai's death has reiterated the importance of providing an accurate clinical picture when referring a case to PIPER and the fact that this condition can cause a sudden and catastrophic deterioration in a baby. It strikes me that with the widespread use of technology such as mobile phones, laptops and ipads that this process can be enhanced by utilising video conferencing methods to enable the PIPER team to visualise the condition of the baby to assist with their assessment and management plans. I acknowledge that the Royal Children's Hospital are currently in the process of developing such a system but have faced some challenges with variable information technology systems with hospitals throughout the State. Most clinicians are equipped with mobile phones, laptops and/or ipads that have the capacity to video call and I would urge the hospital to consider the use of this technology until other compatible information technology systems can be developed and implemented.

RECOMMENDATIONS

142. Pursuant to section 72(2) of the Coroners Act, I make the following recommendations connected with the death.

Recommendation One

I recommend the Royal Australian and New Zealand College of Obstetricians and Gynaecologists amend the guideline: *Prevention, detection, and management of subgaleal haemorrhage in the newborn,* which is currently under review, to include a section on the importance of assessing head circumference and scalp observations to assist to identify the development of a subgaleal haemorrhage after an instrumental birth.

Recommendation Two

I recommend the Royal Australasian College of Physicians incorporate the current state of knowledge obtained from paediatric clinical practice, peer review studies such as Colditz et al, any other relevant studies and coronial findings and develop a guideline to assist paediatricians with the identification, management and treatment of subgaleal haemorrhages in newborns.

Recommendation Three

I recommend the Royal Children's Hospital PIPER service continue to develop and implement the ability to video conference with a referring hospital to facilitate visualisation of a baby's condition, and to assist with the assessment and management of a baby. Further, in the interim, I would urge the hospital to consider the use of the video capacity of clinician's mobile phones, laptops and/or ipads until other compatible information technology can be developed and implemented.

143. Pursuant to section 73(1) of the Coroners Act, I order that this finding be published on the internet.

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

Ms Tashi Wheeler and Mr Richard Trow

Dr Thomas Manley

Dr Joseph Mel

Associate Professor Peter Lowthian, Cabrini Hospital

Ms Emma Carnovale, The Royal Children's Hospital

Dr Leah Hickey, PIPER, The Royal Children's Hospital

Dr Simon Fraser, Consultant Paediatrician, Latrobe Regional Hospital

Associate Professor Michael Stewart, Director of PIPER, Royal Children's Hospital

Professor Lee Yeung, Chair Women's Health Committee, Royal Australian and New Zealand College of Obstetricians and Gynaecologists

Dr Annie Moulden, Clinical Lead, Victorian Paediatric Clinical Network

Dr Nicola Yuen, Clinical Lead, Victorian Maternity and Newborn Clinical Network

Professor Rod Hunt, Director Neonatal Medicine, Royal Children's Hospital

Professor Euan Wallace, Chief Executive Officer, Safer Care Victoria

Professor Paul Colditz, President, Royal Australasian College of Physicians, Paediatrics and Child Health Division Council

Dr Paula Moir, Prahran East Medical Centre

Adjunct Professor Tanya Farrell, Chair, Consultative Council on Obstetric and Paediatric Mortality and Morbidity,

Information recipients; and

Coroner's Investigator, Victoria Police

Signature:

JACQUI HAWKINS
Coroner
Date: 2 July 2020