

IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: COR 2009 2101

FINDING INTO DEATH WITH INQUEST

Form 37 Rule 60(1)

Section 67 of the Coroners Act 2008

Inquest into the Death of: Baby Chloe Lee KELLETT

Delivered On: 12 June 2015

Delivered At: Coroners Court of Victoria
65 Kavanagh Street
Southbank Victoria 3006

Hearing Dates: 23 and 24 April 2012
8, 9, and 10 October 2012

Findings of: Coroner Paresa Antoniadis SPANOS

Representation: Ms D. FOY of Counsel, instructed by BJT Legal, appeared on behalf of the family of the deceased.
Mr N. MURDOCH of Counsel, instructed by Lander & Rogers Lawyers, appeared on behalf of Dr S. Vashevnik.
Mr D. WALLIS of Counsel, instructed by Minter Ellison Lawyers, appeared on behalf of Ballarat Health Service.
Mr J. GOETZ of Counsel, instructed by TressCox Lawyers, appeared on behalf of Dr Taverna.

Police Coronial Support Unit Senior Constable A. MAYBURY, assisting the Coroner

I, PARESA ANTONIADIS SPANOS, Coroner,
having investigated the death of CHLOE LEE KELLETT
and having held an inquest in relation to this death at Melbourne
on 23 and 24 April, and 8, 9 and 10 October, 2012:
find that the identity of the deceased was CHLOE LEE KELLETT
born on 12 April 2009
and that the death occurred on 17 April 2009
at the Mercy Hospital for Women, Burgundy Street, Heidelberg, Victoria 3084
from:

I (a) CEREBRAL HYPOXIC AND ISCHAEMIC INJURY IN A SETTING OF
CLINICAL BIRTH ASPHYXIA

in the following circumstances:

INTRODUCTION¹

1. Baby Chloe Lee Kellet was the first born child of Belinda Kellet who lived in Beaufort, regional Victoria and was 28 years of age. Ms Kellett's antenatal care was provided by local general practitioner Dr Kimpton in a "shared care" model with the intention that she would ultimately deliver at Ballarat Base Hospital (Ballarat). Ms Kellett's antenatal course was largely uneventful.²
2. At 1600 hours on 11 April 2009, at 39 weeks' gestation, Ms Kellett was admitted to Ballarat following spontaneous rupture of the membranes at around 1430 hours. Ms Kellett was draining copious clear liquor, but was not in labour albeit she was experiencing occasional irregular tightenings. Her temperature, pulse and blood pressure were normal. A cardiotocogram (CTG) as performed to assess the wellbeing of the baby. The CTG was reported as being mildly unreactive, but improved to normal after a drink of cold water. Ms Kellett was reviewed by Hospital Medical Officer (HMO) Dr Sharples, who discussed Ms Kellett with the Obstetric Registrar Dr Vashevnik. As Ms Kellett was *Group B Streptococcus*

¹ This section is a summary of facts that were uncontentious, and provide a context for those circumstances that were contentious and will be discussed in some detail below.

² There was a minor episode of PV bleeding at around 6 weeks' gestation that settled with rest. See Exhibit S, Dr Bernadette White's statement at page 54 of the coronial brief. Also see paragraphs 31 and following below where the clinical management and care provided to Ms Kellett is addressed in more detail.

positive with spontaneous rupture of the membranes, Dr Vashevnik requested an induction of Ms Kellett's labour that evening.³

3. Owing to staff shortages over the Easter weekend, Ms Kellett was not induced until around 11.25am the following morning, 12 April 2009.⁴ The management of Ms Kellett's labour and the delivery of Baby Chloe is the subject of contention and will be discussed in some detail below. Suffice for present purposes to say that the midwives involved in Ms Kellett's care were concerned about Baby Chloe's well-being based on their interpretation of the CTG trace and felt that expedition of her delivery was warranted, while the medical staff involved assessed the CTG trace as having reassuring features overall and supporting their plan to continue with the labour.⁵

BABY CHLOE'S CONDITION AT BIRTH

4. At 2019 hours on 12 April 2009, Baby Chloe was born via forceps delivery in theatre. The cord was tightly wrapped around the neck once. Baby Chloe was received into the care of Consultant Paediatrician Dr Louise Du Plessis⁶ who found her covered in thick meconium, limp apnoeic and pale, with a heart rate of about 100 beats per minute (bpm). Further, meconium was suctioned from her mouth and pharynx. Baby Chloe required intermittent positive pressure ventilation (IPPV) as she made little respiratory effort in the first five minutes.
5. At five minutes of life, there was spontaneous breathing assisted by continuous positive airway pressure (CPAP) for another five minutes. At ten minutes, Baby Chloe was breathing regularly but rapidly, her heart rate was regular and fast with some improvement in tone. She remained pale and had limited reflex response. Her Apgar⁷ scores were documented as 2 at

³ Exhibit P, statement of Dr Stanislav Vashevnik dated 29 April 2011, at page 33 of the coronial brief. At inquest, Dr Vashevnik explained the need for expedition or induction of labour following a spontaneous rupture of the membranes in the presence of meconium (not seen here) and/or a diagnosis of group B streptococcus, which Ms Kellett had. Transcript page 355.

⁴ Ultimately, there was no evidence to support a finding that the delay of some 20 hours between presentation and induction was material to the outcome for Baby Chloe. See Dr White's evidence on this point at transcript page 445.

⁵ As will be seen in paragraphs 31 and following below, this is a generalisation and over-simplification of the situation.

⁶ It is the policy of Ballarat health that a Paediatrician is to attend if a baby requires delivery in theatre, and Dr Du Plessis attended in her capacity as on-call Paediatrician during the relevant shift. Exhibit O at page 44, statement of Dr Du Plessis, at page 44 of the coronial brief.

⁷ Devised by American Anaesthesiologist Virginia Apgar, the Apgar score is an evaluation of an infant's physical condition, usually performed at one minute and again at five minutes after birth, based on a rating of five factors that reflect the infant's ability to adjust to extra-uterine life – heart rate, respiratory effort, muscle tone, reflex irritability and colour. Each factor is rated out of two giving a score out of ten. The score was developed for the rapid identification

one minute, 5 at five minutes and 7 at ten minutes of age. Baby Chloe only started moving and crying intermittently at about 20 minutes of age at which time her Apgar score would have been 8.⁸

6. Baby Chloe was transferred to the special care nursery where initial investigations revealed hypoglycaemia and significant metabolic acidosis, suggesting mild to moderate asphyxia together with possible mild meconium aspiration, but no specific features of hypoxic ischaemic encephalopathy.⁹ Dr Du Plessis first consulted with the Newborn Emergency Transport Service (NETS) about 2130 hours, again at 0259 hours on 13 April 2009 following an apparent seizure and finally at 0724 hours following several seizures associated with apnoea in the preceding hour, at which time the NETS clinician initiated urgent retrieval of Baby Chloe for admission to a tertiary nursery.

TRANSFER TO THE MERCY HOSPITAL FOR WOMEN, HEIDELBERG

7. The retrieval team arrived at Ballarat at 0922, and after stabilising and preparing Baby Chloe for transportation, left Ballarat at 1235 hours, arriving at the Mercy Hospital for Women (the Mercy) at 1415 hours.¹⁰
8. At the Mercy, Baby Chloe had a very difficult clinical course¹¹ with very severe seizure activity and the need for assisted ventilation, inotrope support for poor cardiac function, inoderate renal impairment and persisting elevated lactate that eventually settled with control of ventilation and circulation.
9. Electroencephalogram (EEG) showed status epilepticus for long periods with depression of background electrical activity, evidence of burst suppression between episodes of seizure, and little evidence of cortical activity beyond seizures. Ultrasound examination showed generalised cerebral oedema with hyperechogenicity suggestive of cortical infarction and Doppler flows suggestive of cerebral vasodilation and other findings associated with a very

of infants requiring the immediate intervention of transfer to an intensive care nursery. Mosby's Medical, Nursing and Allied Health Dictionary (Fourth edition) page 111.

⁸ Exhibit O, statement of Dr Louise Du Plessis, at pages 44-45 of the coronial brief.

⁹ This is based on Dr Du Plessis statement but should be compared with the

¹⁰ As Baby Chloe was apnoeic during seizures, she was electively intubated and ventilated. For further management an umbilical line and peripheral arterial catheters were inserted for central venous access and continuous arterial blood pressure monitoring. She was administered clonazepam for seizures (phenobarbitone had been administered for seizures in accordance with Dr Du Plessis' consultations with NETS earlier that morning), inotropes for hypotension and her fluids were further restricted. Exhibit B, statement of Dr Jacobs, at pages 48-49 of the coronial brief.

¹¹ Exhibit N, statement of Dr Andrew Watkins, Clinical Director Paediatrics/The Mercy Hospital for Women, at page 50 of the coronial brief.

high risk of death or neurological disability. Magnetic resonance imaging (MRI) of the brain performed on 15 April 2009 showed catastrophic generalised cortical injury.¹²

10. Treating clinicians at the Mercy discussed Baby Chloe's poor prognosis and the high burden of care with Ms Kellett and her family, and the decision was taken to cease intensive care and to treat her palliatively thereafter. Baby Chloe was extubated on the afternoon of 16 April 2009, cuddled and cared for by her family overnight until she was pronounced deceased at 0745 hours on 17 April 2009.

INVESTIGATION – SOURCES OF EVIDENCE

11. This finding is based on the totality of the material the product of the coronial investigation of Chloe's death. That is the brief of evidence compiled by my assistant Senior Constable Amanda Maybury, from the Police Coronial Support Unit, the statements, reports and testimony of those witnesses who testified at inquest and any documents tendered through them, and the final submissions of Counsel. All of this material, together with the inquest transcript, will remain on the coronial file.¹³ In writing this finding, I do not purport to summarise all the material and evidence, but will refer to it only in such detail as is warranted by its forensic significance and in the interests of narrative clarity.

PURPOSE OF A CORONIAL INVESTIGATION

12. The purpose of a coronial investigation of a *reportable death* is to ascertain, if possible, the identity of the deceased person, the cause of death and the circumstances in which death occurred.¹⁴ The *cause* of death refers to the *medical* cause of death, incorporating where possible the *mode* or *mechanism* of death. For coronial purposes, the *circumstances* in which death occurred refers to the context or background and surrounding circumstances, but is

¹² Dr Watkins' summary of the MRI findings is as follows – "...catastrophic, generalised cortical injury in a watershed pattern parasagittally, with particularly extensive injury in both frontal lobes, insulae and coronae radiatae bilaterally and severe bilateral infarction posteriorly involving occipital and parietal cortex, with also some injury to basal ganglia." Exhibit N at page 52 of the coronial brief. See also the post-mortem findings discussed at paragraphs 15 and following.

¹³ From the commencement of the *Coroners Act 2008* (the Act), that is 1 November 2009, access to documents held by the Coroners Court of Victoria is governed by section 115 of the Act.

¹⁴ Section 67(1) of the *Coroners Act 2008*. All references which follow are to the provisions of this Act, unless otherwise stipulated.

confined to those circumstances sufficiently proximate and causally relevant to the death, and not all those circumstances which might form part of a narrative culminating in death.¹⁵

13. The broader purpose of any coronial investigations is to contribute to the reduction of the number of preventable deaths through the findings of the investigation and the making of recommendations by coroners, generally referred to as the *prevention* role.¹⁶ Coroners are empowered to report to the Attorney-General in relation to a death; to comment on any matter connected with the death they have investigated, including matters of public health or safety and the administration of justice; and to make recommendations to any Minister or public statutory authority on any matter connected with the death, including public health or safety or the administration of justice.¹⁷ These are effectively the vehicles by which the coroner's prevention role can be advanced.¹⁸
14. It is important to stress that coroners are not empowered to determine the civil or criminal liability arising from the investigation of a reportable death, and are specifically prohibited from including in a finding or comment any statement that a person is, or maybe, guilty of an offence.¹⁹

FINDINGS AS TO UNCONTENTIOUS MATTERS

15. In relation to Baby Chloe's death, most of the matters I am required to ascertain, if possible, were uncontentious from the outset. Her identity and the date and place of death were not at issue. I find, as a matter of formality, that Chloe Lee Kellett, born on 12 April 2009, aged 5 days, died at the Mercy Hospital for Women, Burgundy Street, Heidelberg, Victoria 3084, on 17 April 2009.

¹⁵ This is the effect of the authorities – see for example *Harmsworth v The State Coroner* [1989] VR 989; *Clancy v West* (Unreported 17/08/1994, Supreme Court of Victoria, Harper J.)

¹⁶ The 'prevention' role is now explicitly articulated in the Preamble and purposes of the Act, cf: the *Coroners Act 1985* where this role was generally accepted as 'implicit'.

¹⁷ See sections 72(1), 67(3) and 72(2) regarding reports, comments and recommendations respectively.

¹⁸ See also sections 73(1) and 72(5) which requires publication of coronial findings, comments and recommendations and responses respectively; section 72(3) and (4) which oblige the recipient of a coronial recommendation to respond within three months, specifying a statement of action which has or will be taken in relation to the recommendation.

¹⁹ Section 69(1). However, a coroner may include a statement relating to a notification to the Director of Public Prosecutions if they believe an indictable offence may have been committed in connection with the death. See sections 69 (2) and 49(1).

16. While there was contention around the precise cause and/or timing of the insult to Baby Chloe's brain, that will be discussed in some detail below, there was no contention around the medical cause of her death.
17. Associate Professor Dr David Ranson, a Senior Forensic Pathologist and (then) Deputy Head of the Victorian Institute of Forensic Medicine (VIFM) performed an autopsy on Baby Chloe's body and provided a 14 page written report of his findings, as well as documentation of ancillary investigations requested.²⁰ Dr Ranson found no evidence of significant congenital abnormalities that might be expected to have contributed directly or indirectly to death, and no morphological abnormalities suggesting genetic or congenital anomalies.
18. The only traumatic injuries identified by Dr Ranson, were fractures of the second to sixth left ribs at the lateral angles. At inquest, he explained that radiology reports identified fractures to the second to sixth as well as the right fifth and sixth ribs at the lateral angles. These fractures were acute or recent. That is, there was no evidence of periosteal new bone or callus formation, reactive changes that may take days or even weeks to develop. Dr Ranson found no bruising associated with these fractures and could only suggest that they related to the process of delivery or subsequent handling of the baby. In any event, he testified that the fractures were irrelevant to the cause of Baby Chloe's death.²¹
19. Dr Ranson's major findings at autopsy were of a swollen brain, a feature that he advised may be found where there has been cerebral ischaemic or hypoxic damage, consistent with the neuropathology report. Based on his own findings and ancillary investigations, Dr Ranson concluded that the cause of Baby Chloe's death was *cerebral hypoxic and ischaemic injury in a setting of clinical birth asphyxia*.
20. Professor Catriona McLean is a Pathologist, with a special interest in Neuropathology, who performed the examination of Baby Chloe's brain at Dr Ranson's request and provided a report of her findings.²² Prof McLean diagnosed cerebral infarction/hemispheric necrosis of

²⁰ Exhibit A, Assoc Prof Ranson's autopsy report dated 26 March 2010 at pages 1-14 of the coronial brief. The ancillary investigations are at pages 15-18 (toxicology), page 19 (metabolic screening), pages 62-63 (neuropathology), pages 64-65 (skeletal survey), pages 66-92 (virology) and page 93 (microbiology).

²¹ Exhibit A and transcript pages 4-5.

²² Exhibit C, Professor McLean's reported dated 1 June 2009 at pages 62-63 of the coronial brief.

about five days duration involving the frontoparietal (predominantly) and occipital cortex, and minor cerebellar dysplastic changes unlikely to be of any clinical significance.²³

21. Prof McLean also testified at inquest where she explained her report and findings in lay terms.²⁴ While Prof McLean testified that the aetiology or cause of the cerebral infarction/hemispheric necrosis was not identified at autopsy, she noted that as findings were in the distribution of the carotid artery - the main vessel supplying blood and oxygen to the brain – they were clearly related to a critical decrease in that blood supply.²⁵
22. Prof McLean explained that the extent of reactive changes seen within the brain that were part of the body's repair processes, were such that she could date the hypoxic insult or brain injury to about five days prior to Baby Chloe's death.²⁶ When pressed, Prof McLean testified that the hypoxic insult/injury was definitely not less than five days old, that she was comfortable with an estimate of five to seven days as the probable period during which the hypoxic insult occurred, and that ten days was probably too long a period given the extent of reactive changes she saw in Baby Chloe's brain.²⁷
23. Other significant aspects of Prof McLean's evidence were her expert evidence that Baby Chloe's brain was normal with no macroscopic or microscopic evidence of any significant abnormality, and that the extent of her brain injury was such that it was irreparable and incompatible with survival.²⁸
24. Dr Andrew Watkins' evidence is also relevant to the timing of the hypoxic insult or insults. In his statement, Dr Watkins noted that baby Chloe's first full blood examination (FBE) at about one hour of age, showed mild elevation of nucleated red blood cells with a marked elevation of lymphocytes (~13,000), the lymphocyte count falling to low normal levels by the time of her admission to the Mercy at about 19 hours of age. Dr Watkins explained that as severe

²³ Exhibit C.

²⁴ Transcript pages 32-40.

²⁵ Transcript pages 33-35. I note that Prof McLean was careful not to exceed the area of her expertise, deferring to a cardiologist or obstetrician's opinion about the correlation between foetal bradycardia and restriction or cessation of blood supply in utero. However, she agreed with the proposition that *episodes of deceleration in the foetal heart rate, with some recovery and then at a later time decelerations with really no adequate recovery would be consistent with a poor or diminished blood supply to the brain*, describing this as *strongly possible*. See transcript page 36.

²⁶ Transcript page 36.

²⁷ Transcript page 37.

²⁸ Transcript page 38.

hypoxia generally produces an elevation in nucleated red blood cells after about 18-24 hours, the FBE at one hour suggested that this was not a case of longstanding hypoxic injury. Moreover, the lymphocyte count peaks rapidly after an hypoxic insult and then falls to normal levels within 14-18 hours. The fact that Baby Chloe's lymphocyte count peaked at one hour and had normalised by 19 hours, provides further support for the occurrence of a hypoxic insult or insults in the hour or hours leading up to birth.²⁹

25. At inquest, Dr Watkins expanded and clarified his evidence in relation to the timing of the hypoxic insult or insults. Based only on the presence of an elevated lymphocyte count and no elevation in the nucleated red blood cell count, Dr Watkins' opinion was that it was better than probable that the insult/s occurred from six to eight hours before birth.³⁰ At a more general level, he also drew on the presence of a profound metabolic acidosis at birth that resolved over the first twelve hours of life as suggestive that at least a component of the hypoxic insult was ongoing in the period leading up to birth. Similarly, Dr Watkins noted that the diffusion weighted imaging changes on the MRI performed on 15 April 2009, some 72 hours after birth, also suggested that the insult/s occurred within 24 hours of birth and not earlier.³¹
26. Based on all the available evidence, I find that the medical cause of Baby Chloe's death is cerebral hypoxic and ischaemic injury in a setting of clinical birth asphyxia, and that the hypoxic insult or insults occurred in the period of six to eight hours immediately preceding her birth, corresponding broadly with the period between the induction of labour at 1145 hours and her delivery at 2019 hours on 12 April 2009.³²

FOCUS OF THE CORONIAL INVESTIGATION AND INQUEST

27. In common with many other coronial investigations, the primary focus of the coronial investigation and inquest into Baby Chloe's death was on the circumstances in which she died.
28. Ms Kellett's antenatal care was provided through the Ballarat Health Services Antenatal Clinic in a "shared care" arrangement with her general practitioner Dr Nick Kimpton. As a result, Ms Kellett was seen by a number of different doctors and midwives at the Clinic. Ms

²⁹ Exhibit N at page 52 of the coronial brief and transcript page 328.

³⁰ Transcript pages 328-330.

³¹ Transcript pages 330-331, 334. As to the difficulty in determining the cause of Baby Chloe's metabolic acidosis see transcript pages 331-332.

³² See paragraphs 35 and following below.

Kellett had a largely uncomplicated antenatal course³³ and, as no issues about the adequacy of her antenatal care were raised by Ms Kellett or on her behalf during the investigation or inquest, the antenatal period was not the focus of the coronial investigation.

29. Similarly, there were no issues raised with the adequacy of the clinical management and care provided to Baby Chloe at the Mercy between her transfer there on 13 April and her death on 17 April 2009³⁴, and this period was not the focus of the coronial investigation.
30. The primary focus of the coronial investigation and inquest into Baby Chloe's death was on the obstetric management of Ms Kellett during labour and delivery by the medical and nursing staff at Ballarat. A secondary focus was the apparent delay in Baby Chloe's transfer from Ballarat to a tertiary facility in Melbourne, the Mercy Hospital for Women in Heidelberg, via the Newborn Emergency Transport System (NETS).³⁵

OBSTETRIC MANAGEMENT – INDUCTION OF LABOUR

31. Ms Kellett had been admitted to Ballarat on the afternoon of the 11 April 2009, following spontaneous rupture of the membranes (SROM). While she remained well overnight and continued to drain clear liquor, Ms Kellett was not thought to be in labour, experiencing only irregular contractions overnight that ceased by about 0430 hours.³⁶
32. Shortly before 0900 hours on 12 April 2009, Ms Kellett was reviewed by Dr Vashevnik and Dr Cameron Taverna, the Obstetric & Gynaecology Registrar and HMO respectively, for that shift. A vaginal examination confirmed ruptured membranes and cervix 2 cm dilated. As Ms Kellett was not in labour, Dr Vashevnik ordered preparations for induction of labour, a Syntocinon infusion (syntocinon) and, as a matter of routine, cardiotocograph (CTG) to monitor the foetal heart rate.³⁷

³³ A convenient summary of Ms Kellett's antenatal course appears at pages 1-2 of Exhibit S, Dr Bernadette White's expert report.

³⁴ A convenient summary of Baby Chloe's clinical course appears in Exhibit N, Dr Watkins' statement/report to the Coroner.

³⁵ While treating clinicians at the Mercy were prepared to provide a Medical Practitioner's Certificate as to Cause of Death (commonly referred to as a 'death certificate'), Dr Watkins' letter/statement dated 21 April 2009, was effectively treated a "report" of her death to the Coroner. In his letter, Dr Watkins' identified two main issues raised by the family – the adequacy of obstetric management (my paraphrase) and the delay in transferring her to the Mercy. Exhibit N especially at page 53 of the coronial brief.

³⁶ Exhibit T pages 102-103, 106.

³⁷ Exhibit P, page 33 of the coronial brief. I note that in the setting of SROM, Ms Kellett's status as a *group B streptococcus* positive patient, carried an increased risk of foetal infection and made the decision to induce time sensitive to some extent.

33. Registered Nurse & Midwife Ainslee McManus (RNM Manus) was caring for Ms Kellett during the morning shift. When the CTG trace commenced at 0900 hours, she noticed a prolonged foetal deceleration that improved when repositioning Ms Kellett from lying semi-recumbent on her back, to lying on her left side.³⁸ RNM McManus would normally have given a fluid bolus to try to increase the maternal blood flow and the baby's heart rate, but Ms Kellett's IV line was no longer patent. Dr Taverna replaced the IV line and took some bloods at around 1000 hours.
34. As Ms Kellett was apprehensive about labour and requested an epidural, it was decided to have the epidural inserted by an anaesthetist prior to induction of labour.³⁹ A second foetal deceleration of some 30-45 seconds duration was noted after insertion of the epidural at about 1100 hours, when Ms Kellett was lying on her back. This also improved by repositioning Ms Kellett to lying on her right side.⁴⁰
35. At about 1145 hours, induction of labour commenced by syntocinon at a rate of 40 ml/hr in accordance with Dr Vashevnik's orders to follow hospital protocol. Shortly after commencement of the Syntocinon, RNM McManus noted a number of decelerations in the foetal heart rate to 74 beats per minute (bpm) of 30-45 seconds duration that concerned her.⁴¹
36. At inquest, RNM McManus explained that her concerns were not only about how low and for how long the foetal heart rate had dropped, but that the variability in the foetal heart rate was reduced, indeed nearly absent,⁴² in circumstances where the Syntocinon had only been running for about five minutes. RNM McManus had difficulty interpreting the CTG because Ms Kellett's contractions were not being reliably detected and, at times, the CTG was losing contact with the foetus.⁴³ That said, RNM McManus was also palpating Ms Kellett's

³⁸ As explained in her statement, Exhibit D, at page 2021 of the coronial brief. This is documented in the medical records by RNM McManus at page 106 of the coronial brief.

³⁹ The decision to insert the epidural prior to induction of labour appears to have been taken collaboratively between RNM McManus, ANUM Ditchfield and Dr Taverna. See Exhibit D.

⁴⁰ Exhibit D, RNM McManus' statement at page 21 of the coronial brief. Exhibit F, ANUM Ditchfield's statement at page 24 of the coronial brief. According to the latter, it is preferable for two members of the nursing staff to be present when an epidural is being inserted by an anaesthetist. See also transcript pages 124-128 where ANUM Ditchfield describes the interference to the CTG trace to insert the epidural and the possibility that her recollection of this occurrence was based on the CTG monitor visual display, audible foetal heart rate and/or handheld sonicaid.

⁴¹ Exhibit E is a copy of the CTG trace marked by RNM McManus to show the deceleration that occurred at this time (see page 167 of the exhibit) and her evidence about the reason for her concern is at transcript pages 52 and following.

⁴² Transcript page 54.

⁴³ Transcript page 55. An unreliable CTG trace as regards uterine contractions is problematic for correct interpretation in two respects. Firstly, decelerations in the foetal heart rate are characterised by reference to their temporal relationship with uterine contractions in order to inform clinical decision-making, for example early or late by reference to the time of the contraction. In the second place, determination of the foetal heart rate itself requires an average

contractions manually and she (and other clinical staff) were also assisted by the CTG monitor's audible foetal heart rate that allowed ready appreciation of a normal foetal heart rate, compared to a slow foetal heart rate and at times an even slower one.⁴⁴

37. As a result of her concerns, RNM McManus ceased the syntocinon, gave Ms Kellett a fluid bolus⁴⁵ to try to improve the foetal heart rate and alerted the Associate Nurse Unit Manager (ANUM). ANUM Ditchfield shared RNM McManus' concerns about the CTG trace of the foetal heart rate at this time, and also made a connection between the decelerations and the syntocinon running, noting that the trace improved when the syntocinon was ceased, but did not return to a normal or acceptable trace for some time.⁴⁶
38. ANUM Ditchfield notified Dr Taverna who in turn contacted Dr Vashevnik. Dr Vashevnik came in to review Ms Kellett at 1220 hours. He performed a vaginal examination and found that the cervix was fully effaced and still only 2 cms dilated, and the baby was at station -2. He reviewed the CTG trace, noted four minutes of bradycardia⁴⁷ following insertion of an epidural at 1100 hours, another episode of bradycardia at about 1145 hours following commencement of Syntocinon, and recovery of the foetal heart rate after each episode. At that time, Dr Vashevnik believed that the baby was healthy and well, and attributed the appearance of the CTG trace to the cord probably being around the baby's neck and being compressed during contractions, a view shared by RNM McManus and ANUM Ditchfield.⁴⁸
39. As a matter of caution, Dr Vashevnik asked that a foetal scalp electrode be applied so that the foetal heart rate could be monitored more reliably, ordered re-commencement of syntocinon and review of Ms Kellett after four hours of regular contractions at a rate of four in ten

assessment over the time between contractions; a resting foetal heart rate as it were. A foetal heart rate outside the 'normal range' of 110-160 bpm mandates a timely clinical response.

⁴⁴ Transcript page 56. It was common ground at inquest that a "normal" foetal heart rate is between 110-160 bpm.

⁴⁵ It is not entirely clear (nor material) whether RNM McManus gave the fluid bolus on the basis of her own clinical judgement (as she had done earlier) or whether she did so pursuant to an order from Dr Taverna – compare Exhibits D and L at pages 25 and 37 respectively of the coronial brief. The medical records at page 108 of the coronial brief favour the former scenario.

⁴⁶ Transcript pages 99-102. I note that ANUM Ditchfield also raises the possibility of the baby being in a sleep phase, as an explanation for aspects of the trace.

⁴⁷ He was probably using the term loosely to refer to a period of deceleration in the foetal heart rate. According to RANZCOG guidelines, bradycardia refers to a period of 5 minutes or longer in this context.

⁴⁸ Transcript pages 104, 109-110.

minutes.⁴⁹ RNM McManus recollection was that Dr Vashevnik ordered re-commencement of the Syntocinon and asked that they keep a close eye on the CTG trace and keep him informed an any changes.⁵⁰

40. Syntocinon was re-commenced at 1230 hours. At 1237 hours, RNM McManus noted decelerations in the foetal heart rate down to 75-80 bpm and lasting 60 seconds in duration. She was again concerned, stopped the Syntocinon and informed ANUM Ditchfield who called Dr Taverna to review Ms Kellett. Dr Taverna reviewed Ms Kellett at 1245, noted the presence of decelerations with contractions and contacted Dr Vashevnik who returned to review Ms Kellett at this time. He reviewed the CTG trace, told Dr Taverna that the foetal heart rate had a good baseline and good variability and ordered re-commencement of Syntocinon⁵¹ which occurred at 1300 hours.
41. At 1300 hours afternoon shift nursing staff arrived and RNM McManus handed over Ms Kellett's care to RNM Ruth Wise, before taking a half hour lunch break . During the handover, RNM Wise was appraised of RNM McManus' concerns in relation to the CTG trace. At the time, RNM McManus noted decelerations in the foetal heart rate down to 75 to 80 bpm and 30-45 seconds in duration. RNM Wise reviewed the CTG trace over the preceding hour. Her assessment was that at around 1300 hours, decelerations in the foetal heart rate were down to 80 bpm, lasting 30 seconds, with some prolonged decelerations irrespective of whether Ms Kellett was lying on her right or her left side. The two midwives discussed the possibility of decreasing the flow of Syntocinon from 40 ml/hr to 20 ml/hour and RNM Wise requested that Dr Vashevnik review Ms Kellett again.⁵²
42. Likewise, ANUM Ditchfield handed over her duties as senior nurse in charge to ANUM Gabrielle Mary Ratcliffe. These duties included coordinating the labour, special care and post-natal units as well as triage, and undertaking some clinical work if staff needed

⁴⁹ Exhibit P at page 34 of the coronial brief and transcript pages 347-349. Dr Vashevnik's evidence in this regard is consistent with the labour progress notes made by him at 1220 hours on 12 April 2009 – see page 108 of the coronial brief.

⁵⁰ Exhibit D at page 21 of the coronial brief and transcript page 83. At transcript page 386, Dr Vashevnik did not specifically recall the conversation with RNM McManus but conceded that it was probably in these terms. The statements of ANUM Ditchfield and Dr Taverna and their evidence at inquest are all silent on this point. At a more general level, Dr Taverna testified that “...throughout the day certainly there was a high level of concern and knowing that we need to watch this very closely but in terms of where the tipping point came, for me that was later in the day [at 6.30pm]...” Transcript page 277.

⁵¹ This attendance on Ms Kellett is curiously omitted from Dr Vashevnik's statement but mentioned in the statements of RNM McManus, ANUM Ditchfield and Dr Taverna – see Exhibits D, F and L respectively. At inquest, Dr Vashevnik testified that although he did not recall this attendance

⁵² Exhibit H, statement of RNM Ruth Wise dated 12 April 2012, an amended version of her earlier statement of Exhibit I dated 13 April 2011. See also transcript page 141-144.

assistance. During handover, ANUM Ratcliffe was appraised of Ms Kellett's history, including the concerns surrounding the CTG traces.⁵³

43. In response to RNM Wise's concerns about the CTG trace, Dr Vashevnik attended at about 1330 hours to review Ms Kellett, effectively for the fourth time that day.⁵⁴ Dr Vashevnik undertook a vaginal examination and ascertained that Ms Kellett was still only 2 cm dilated. However, as the syntocinon had only been running for about two hours with two breaks, he felt that there had been insufficient time to assess the progress of labour. He reviewed the CTG trace, noted that it showed variable decelerations but was otherwise reassuring with normal baseline and variability, indicating that the baby was well. Dr Vashevnik settled on a diagnosis of cord compression,⁵⁵ ordered continuation of syntocinon at 40 ml/hr, to be increased if contractions decreased to less than five in ten minutes.⁵⁶
44. While they recognised that their place in the hospital hierarchy and that, as a rule, doctors' orders could not be gainsaid, the midwives caring for Ms Kellett and their immediate supervisors, had ongoing concerns throughout her labour. In each case, concerns are articulated in their statements, reiterated in their evidence at inquest, and to some extent implicit in their progress notes.⁵⁷ Apart from ceasing syntocinon and requesting medical review, the concerns of RNM McManus and ANUM Ditchfield also lead them to start preparing for a caesarean section some time before 1300 hours, in anticipation that Ms Kellett may require one, if not then, some time later that afternoon. RNM Wise echoed their belief/expectation that a caesarean section would be required Ms Kellett, and even went so far as to say that, in her view, the decision to deliver by caesarean section should have been made by about 1300 hours.⁵⁸
45. Dr Vashevnik's evidence at inquest was that he could not specifically recall any preparations of paperwork for a caesarean section undertaken by ANUM Ditchfield and RMN McManus

⁵³ Exhibit K, the statement of ANUM Gabrielle Mary Ratcliffe dated 14 April 2011, at pages 27-29 of the coronial brief. While ANUM Ditchfield could not recall what was said during handover, her usual practice is to relay any concerns in relation to patients and she believed that should have outlined her concerns about the prolonged decelerations on Ms Kellett's CTG trace. Exhibit F and transcript page 122.

⁵⁴ According to RNM Wise's statement, Dr Vashevnik attended at 1320 hours whereas he puts the time at 1330 hours with a vaginal examination documented at 1350 hours.

⁵⁵ Exhibit P and transcript page 356 and following.

⁵⁶ Exhibits H, P and pages 107A and 108 of the coronial brief for the relevant labour progress notes.

⁵⁷ Exhibit D and transcript pages 50 and following, esp 50-57, 64-69, 71,75-77 re RNM McManus; Exhibit F and transcript pages 99 and following, esp 99-105, 108, 112-113, 116-119 re ANUM Ditchfield; Exhibit H and transcript pages 141 and following, esp 141-142, 149-154, 183, 190, 212, re RNM Wise; and Exhibit K and transcript pages XX re ANUM Ratcliffe.

⁵⁸ Exhibit H and transcript pages 244-245.

between about 1220 hours and 1300 hours, but that did not mean that such preparations did not take place. Whilst he accepted that such preparations might indicate concern about the progress of labour on the part of nursing staff, he testified that it was not uncommon in a clinical setting to discuss alternative management, nor was it uncommon to prepare for such eventualities as caesarean section. In any event, it was not his view that Ms Kellett's labour required expedition at that time.⁵⁹

OBSTETRIC MANAGEMENT – PROGRESS IN LABOUR & ONGOING DECELERATIONS

46. Following handover and until her departure from the hospital at about 1530 hours, RMN McManus continued to care for Ms Kellett. Her evidence was that at 1420 hours, she noted broader (that is longer) decelerations in the foetal heart rate occurring less frequently with shouldering, indicating that Baby Chloe was tiring and not recovering as well after decelerations. RMN McManus was concerned enough to notify Dr Taverna who came in to review Ms Kellett at 1430 hours but gave no further orders. At 1520 hours, the CTG showed decelerations down to 75 to 80 bpm with only one third of decelerations showing shouldering. RMN McManus was very concerned and notified nursing staff and Dr Taverna accordingly, shortly before the end of her shift at 1530 hours.⁶⁰
47. RMN Wise became the primary midwife caring for Ms Kellett after RMN McManus' departure at 1530 hours. RMN Wise documented a vaginal examination at 1545 hours. She found the baby's head well applied to the cervix, 8cm dilatation of the cervix that was reassuring, although the baby's head was still at station -2.⁶¹ The foetal heart rate was 140 bpm, described by RMN Wise as high but still within the normal range, and Ms Kellett was starting to feel the urge to push with contractions.
48. According to RMN Wise, it was in the course of repositioning Ms Kellett for this examination that the CTG recording function was inadvertently switched off. As a result, there is no recorded CTG trace for the period from 1523 hours to 1613 hours when the recording

⁵⁹ Transcript page 387. It appears that a degree of discord within the clinical team was discerned by Ms Kellett and her family. See Exhibit N the statement of Dr Watkins at page 53 of the coronial brief where he states, *inter alia*, that "The main issues raised by the family in discussion with us have been issues surrounding obstetric management. They had picked up, rightly or wrongly, that the trace was abnormal, that junior staff were concerned and wanting action and were being overruled from above. The maternal grandmother described it as 'doctors fighting about what to do'. Their perception is that the cord was known to be being compressed and that nothing was being done about it."

⁶⁰ Exhibit D at page 22 of the coronial brief and progress note re this review at page 107A of the coronial brief.

⁶¹ That is there had been significant progress in labour from 2 cm to 8 cm dilatation of the cervix but the baby's head was still at the same level as when Dr Vashevnik conducted a vaginal examination at 1350 hours. See progress notes at page 108 of the coronial brief.

- recommenced. During the ensuing period, a level of monitoring was afforded by the audible and visual displays on the CTG that continued despite cessation of the recording function.⁶²
49. At about 1630 hours, RMW Wise noted decelerations in the foetal heart rate to 78 bpm, persisting but with good recovery to 145 bpm.⁶³ She advised ANUM Ratcliffe and Dr Taverna accordingly, and understood that Dr Taverna was aware of her concerns and endeavouring to have Dr Vashevnik return to review Ms Kellett.⁶⁴ In her view, the CTG went from non-reassuring to abnormal from this point in time onwards.⁶⁵
50. While she was at pains to stress that she intended no criticism of or complaint about Dr Taverna,⁶⁶ she stated that it was primarily his role to provide medical input or to call Dr Vashevnik to provide medical input.⁶⁷ Furthermore, Dr Taverna was well aware of her concerns throughout the shift and her repeated requests for Dr Vashevnik to return to review Ms Kellett.⁶⁸ RMW Wise described her conversations with Dr Taverna as *"sounding like a broken record of about every 20 to 30 minutes I was saying to him that we need to do something more than we're doing and I'd like Belinda [Ms Kellett] reviewed by Dr Stas [Vashevnik]."*⁶⁹ RMW Wise testified that at about 1700 hours she was advised of a conversation between ANUM Ratcliffe and Dr Vashevnik, and this reinforced her expectation that he would attend to review Ms Kellett imminently.⁷⁰
51. At inquest, RMW Wise was cross-examined at length, and impressed as an experienced and committed midwife, with her patient's interest at heart. She stated that she felt constrained by a shorter than usual handover from RMW McManus, in the sense that they had less time than usual working together with their patient and felt that there was something she had not been told that put her at a disadvantage in caring for Ms Kellett.⁷¹ When pressed, she denied exaggerating her professed concerns for Ms Kellett with the benefit of hindsight, agreeing that

⁶² Exhibit H and transcript pages 207 and following.

⁶³ Exhibit H page 2.

⁶⁴ Exhibit H page 2, progress notes at page 107A of the coronial brief and transcript pages 153,156-157, 160. ANUM Ratcliffe corroborates this aspect of RMW Wise's evidence – see Exhibit K, her statement dated 14 April 2011.

⁶⁵ Transcript page 157.

⁶⁶ Transcript pages 173,175-176, 183-184.

⁶⁷ Transcript pages 192, 215-216, 219.

⁶⁸ Transcript pages 183-184, 215. This view of Dr Taverna's role was shared by ANUM Ratcliffe.

⁶⁹ Transcript page 153.

⁷⁰ Exhibit H and transcript pages 218 and following.

⁷¹ These are not her precise words but my paraphrase of the gist of her evidence at transcript pages 230-231.

while some parameters indicated progress in labour, she was never happy with the overall clinical picture at the time when events were unfolding.⁷²

52. It is apparent that Dr Cameron Taverna played a pivotal role in the clinical management and care provided to Ms Kellett on 12 April 2009. As a Hospital Medical Officer (HMO) undertaking a rotation in obstetrics, he was at the hospital at all material times and was the first port of call for any medical input sought by midwifery staff. Absent a perceived need for escalation beyond normal channels, he was the conduit through which Dr Vashevnik's medical input was to be accessed.⁷³
53. None of the midwives who testified at inquest made any direct criticism of Dr Taverna and, to the extent that they were asked, they were complimentary, saying he knew of their concerns about the CTG trace, was supportive of their care of Ms Kellett, and was endeavouring to have Dr Vashevnik return to review her.⁷⁴ However, having reviewed his statement and evidence at inquest,⁷⁵ it is apparent that although he heard the midwives' concerns and may have appeared to be sympathetic to their cause (for want of a better expression), he did not share their interpretation of the CTG traces. This sits comfortably with a reluctance or failure on his part to contact Dr Vashevnik after 1400 hours to ask him to review Ms Kellett, at least until he recognised a clinical deterioration in the CTG traces during the second stage of Ms Kellett's labour at about 1800 hours. It is also consistent with his evidence that it would be his practice to contact the registrar if he perceived a clinical deterioration or significant change in the patient's clinical course.
54. It was Dr Taverna's evidence that he was asked to review Ms Kellet at 1420 hours and, when he did, he noted that the CTG showed three broad decelerations that then recovered to the previous pattern. He did not recall notifying Dr Vashevnik of these decelerations but asserted that it was his normal practice to do so if there were changes of clinical significance. Thereafter, he did not recall being requested to review Ms Kellett between 1420 hours and 1730 hours and could not say whether RMW Wise or ANUM Ratcliffe were in direct contact with Dr Vashevnik.⁷⁶

⁷² Transcript page 208, 212.

⁷³ For example see footnote 68 above.

⁷⁴ Paragraphs 49 and 51 above.

⁷⁵ Exhibit L, statement of Dr Cameron Taverna dated 12 April 2012, at pages 37-40 of the coronial brief.

⁷⁶ Exhibit L at page 38 of the coronial brief and transcript pages 288-290.

55. Dr Taverna's evidence was that his next review of Ms Kellett was at 1730 hours, about one hour earlier than planned, a fact that he attributed to being in the ward at the time.⁷⁷ He maintained that although there were some changes in the CTG trace that he reviewed at this time, it still had some reassuring features. He agreed that the trace was "*borderline*" but acceptable once he ascertained that Ms Kellett was full dilated and starting to push.⁷⁸
56. Although it is clear that Dr Vashevnik left the ward at about 1400 hours and did not return to review Ms Kellett until about 1850 hours, there is contradictory evidence about who he spoke to in the ensuing period and, perhaps more crucially, what information was conveyed to him about Ms Kellett's clinical course.
57. Dr Vashevnik's evidence is that he called the "*midwife in charge of the ward*" at about 1630 hours to ask for an update in relation to Ms Kellett. He was informed that she was making good progress in her labour and the CTG was reassuring and had not deteriorated.⁷⁹ ANUM Ratcliffe's evidence was that the call was at 1700 hours, that she told Dr Vashevnik that RMW Wise and she were concerned about the CTG traces, asked him to attend and although he did not respond, presumed he would attend.⁸⁰
58. At inquest, ANUM Ratcliffe's evidence was stronger, to the effect that she asked Dr Vashevnik to come in and "*sort this out*" and had gone "*past being polite*".⁸¹ Dr Vashevnik also entrenched in his position at inquest, testifying that he recalled the phone call, was "*absolutely certain of [his] impression of the content of the phone call*",⁸² denied that she used the words "*you need to come and sort this out*", and maintained that there is absolutely no question that he would attend to review a patient if he were asked.⁸³
59. Whether the conversation took place at 1640 hours or 1700 hours,⁸⁴ the fact that vaginal examination performed by RMW Wise at 1545 hours did substantiate that Ms Kellett had made good progress in labour (from 2cms to 8cms cervical dilatation) gives some credence to Dr Vashevnik's account. On the other hand, the weight of the evidence about the midwives'

⁷⁷ Exhibit L at page 38 of the coronial brief and transcript pages 294 and following.

⁷⁸ Transcript pages 296-298.

⁷⁹ Exhibit K at page 28 of the coronial brief.

⁸⁰ Exhibit P at page 34 of the coronial brief.

⁸¹ Transcript pages 238, 241.

⁸² Transcript pages 362-363

⁸³ Transcript pages 366-367.

⁸⁴ Telephone records produced by Dr Vashevnik suggest that this call was made at 1653 hours – see transcript pages 396 and following.

concerns throughout the day, including RMW Wise's concerns at 1630 hours, make it unlikely that ANUM Ratcliffe would have missed the opportunity to convey or renew those concerns and ask him to review Ms Kellett, let alone given him positive reassurances about the state of the CTG traces.

60. It would be a serious matter to find that Dr Vashevnik understood he was being asked by ANUM Ratcliffe to review Ms Kellett, and failed to do so, given his clear evidence that this was not his understanding of what was being asked of him and that he would never refuse to review a patient if asked. Ultimately, the state of the evidence about this phone call is unsatisfactory, particularly as it is an exchange between professional people who should be working collaboratively in the clinical management and care of a woman in labour. I am not prepared to find anything more adverse against either party to this conversation, than that their communication was flawed and did not enhance Ms Kellett's clinical management and care.

OBSTETRIC MANAGEMENT – SECOND STAGE OF LABOUR

61. When he came to review Ms Kellett at 1730, Dr Taverna performed a vaginal examination and ascertained that she was fully dilated and starting to push. Although he recognised some deterioration in the CTG traces at this time, he thought it was reasonable to allow labour to progress in the expectation that delivery would be imminent. At about 1800 hours, Dr Taverna saw an initial improvement in the CTG trace, and shortly after this, contacted Dr Vashevnik by telephone to update him on Ms Kellett's progress during the second stage of labour.⁸⁵
62. RMW Wise had detected a deterioration in the CTG trace between 1730 hours and 1800 hours with first a reducing baseline and then loss of variability. Ms Kellett was encouraged to push with each contraction but was tiring. When she performed a vaginal examination at 1830, RMW Wise found no obvious descent of the baby and advised Dr Taverna who telephoned Dr Vashevnik again and asked him to come in to review Ms Kellett.⁸⁶
63. Dr Taverna's and RMW Wise's evidence about these telephone calls is different to that of Dr Vashevnik. In his statement, Dr Vashevnik's evidence was that he initiated a telephone call to the "*the midwife looking after Ms Kellett*" and was told that she was fully dilated pushing and

⁸⁵ Exhibit L at pages 38-39 of the coronial brief.

⁸⁶ Exhibit H.

the CTG looked fine.⁸⁷ RMW Wise disputes his account, in part because she recalls Dr Taverna initiating contact at her request, and in part because it would have involved her leaving Ms Kellett to take a telephone call and she denied doing so at this time.

64. At inquest, Dr Vashevnik did not deny but could not recall being telephoned by Dr Taverna at about 1840 but maintained that he recalled speaking to RMW Wise at about 1830 and had already decided to come in to review Ms Kellett as a result of that telephone call. Dr Vashevnik's account of the conversation between them is in the following terms - *"She told me that Ms Kellett was fully dilated and pushing and the CTG looked fine. I asked her what the baseline was and what the variability was. She told me that there are too many decelerations to tell where the baseline was. Her description of the CTG trace was concerning to me so I decided to attend the hospital immediately."* I find Dr Vashevnik's account of this telephone call implausible.⁸⁸
65. When Dr Vashevnik returned to the ward at 1850 hours. On reviewing the CTG trace he noted persistent variable decelerations that were barely returning to the baseline, and variability that was impossible to determine. In his perception (and his alone) the CTG monitor was making strange sounds and raised concerns about the reliability of the trace. Dr Vashevnik wondered if the scalp electrode was defective, ordered cessation of syntocinon, and ascertained by vaginal examination that the baby was not ready for delivery as the head was still high (at the spines). He decided to apply a new scalp electrode and to wait 10-15 minutes after cessation of the syntocinon to see if the trace improved.⁸⁹
66. When by 1920 hours the CTG trace showed no return to baseline and persisting decelerations, Dr Vashevnik decided to expedite delivery by a trial of forceps delivery in theatre, to be followed by caesarean section if necessary. This required a theatre to be prepared and theatre staff to be called in before Baby Chloe could be delivered by forceps at 2019 hours.⁹⁰

⁸⁷ Exhibit P at page 35 of the coronial brief.

⁸⁸ Exhibit P and transcript pages 364 and following.

⁸⁹ See Dr White's evidence about the change of electrode at transcript page 454 - *"Was there anything about the trace that would make you wonder whether it's the electrode malfunctioning, or ---? ---Look, not really. In my experience, when an electrode is malfunctioning, either it's not picking up at all or it picks up intermittently...here there's a pretty continuous recording of the heart beat so not something that would really suggest to me that there was a problem with the scalp electrode."*

⁹⁰ Exhibit S at page 35 of the coronial brief.

EXPERT OBSTETRIC EVIDENCE

67. At my request, Dr Bernadette White, Consultant Obstetrician and Gynaecologist, provided an independent expert assessment of Ms Kellett's obstetric management.⁹¹ In particular, Dr White made a number of comments about the CTG trace (referred to as the fourth CTG in her report) from 1325 to 1947 hours and reiterated these at inquest. In relation to the evidence suggesting that the insult to Baby Chloe's brain most likely occurred six to eight hours prior to birth, Dr White stated that it did not appear from her interpretation of the CTG that there was concern about Baby Chloe's wellbeing that long before birth. That said, Dr White also testified about the limitations of CTG traces and the need to interpret them, not in isolation, but in the context of the overall clinical setting.⁹²
68. Dr White's assessment of the CTG trace from 1325 to 1510 hours was that there was reasonable variability, some accelerations and frequent variable decelerations of up to 30-40 seconds duration. While she did not believe that was an indication for immediate delivery, it was certainly an indication for close monitoring of Ms Kellett's progress in labour and for monitoring the foetal heart rate.⁹³
69. On recommencement of the CTG trace from 1613 hours,⁹⁴ Dr White noted more frequent and prolonged decelerations that are more difficult to classify. However, as a vaginal examination at 1545 hours indicated that the cervix was 8 cm dilated with the baby at station -2, amounting

⁹¹ Exhibit S is Dr White's comprehensive eight page report includes a list of materials on which her assessment was based, a summary of Ms Kellett's antenatal management and timeline of her labour and delivery as well as her interpretation of the CTG traces, and appears at pages 54-61 of the coronial brief.

⁹² Transcript page 435. In particular, she noted that CTG traces monitor the foetal heart rate (FHR), that decelerations indicate a slowing of the FHR and are not necessarily associated with hypoxia or hypoxic insult occurring in the foetus. Moreover, "abnormal" CTG traces are not a reliable indicator that the foetus will be born in a compromised state. In as many as 25% of births, a normal baby is born despite abnormalities in the CTG trace *in utero*.

⁹³ Exhibit S at page 59 of the coronial brief and transcript page 436, 440. Dr White defined "variable decelerations" by reference to the RANZCOG Intrapartum Fetal Surveillance Clinical Guidelines as "*repetitive or intermittent decreasing of the fetal heart rate with rapid onset and recovery. Time relationships with contraction cycle may be variable but most commonly occur simultaneously with contractions... variable decelerations without complicating features are unlikely to be associated with significant fetal compromise when occurring in isolation. The Guidelines also indicate that complicated variable decelerations, where there are additional features such as, a fetal tachycardia; reducing baseline variability; slow return to baseline fetal heart rate at the end of the contraction; large amplitude of long duration, are features that may be associated with significant fetal compromise and require further action.*"

⁹⁴ As discussed above, the recording function on the CTG was inadvertently stopped between 1523 and 163 hours – see paragraph 47.

to rapid progress in labour,⁹⁵ it was reasonable to allow labour to continue at this stage. In any event, from 1630 hours, the decelerations are less frequent with quite marked variability.⁹⁶

70. According to Dr White, the CTG trace had concerning features from 1710 hours with a drop in the foetal heart rate, marked variability and frequent decelerations that are difficult to classify. However, in the setting of significant progress in labour with a vaginal examination at 1745 hours showing full dilatation and the baby's station at the ischial spines, it was reasonable in her view, to plan to commence active pushing with continued close monitoring.⁹⁷
71. The situation changed at about 1800 hours. While she stressed throughout her evidence that the CTG trace alone should not dictate management in isolation but should be seen in the overall clinical context, Dr White's assessment from 1800 hours, was that the CTG trace becomes more difficult to interpret with frequent late decelerations and a loss of variability, and from this point on, warranted expedition of delivery. In Dr White's words, from 1800 hours on "*the trace becomes increasingly abnormal and from 1900 hours on shows a bizarre pattern with no variability at all.*"⁹⁸
72. Dr White also expressed the opinion that it was unclear why Baby Chloe was born in such poor condition. Her birth weight was just below the 10th centile⁹⁹ and this made her a small baby more vulnerable to the stresses of labour and delivery. However, there was no evidence of meconium seen prior to birth to indicate that she was stressed, no evidence of placental abruption and, although the cord was wrapped once around the neck, this is a common finding not normally associated with such a poor condition.¹⁰⁰

⁹⁵ I note that at the vaginal examination at 1350 hours the cervix was still only 2 cms dilated, as it was at the first vaginal examination at 0845 hours that morning. See page 108 of the coronial brief.

⁹⁶ Transcript pages 437-438, 451.

⁹⁷ Exhibit S at page 60 of the coronial brief.

⁹⁸ Exhibit S at page 60 of the coronial brief and transcript pages 441-442, 452-453. According to Dr White, the options at this stage would have been operative vaginal delivery in the labour ward; operative vaginal delivery in the operating theatre; or caesarean section. The decision as to which option to choose would have been based on the level of concern about fetal wellbeing and an expectation of how difficult a vaginal delivery was likely to be.

⁹⁹ Transcript page 443 and Exhibit S at page 60 of the coronial brief. Baby Chloe's birth weight of "2.88kg at 39 weeks gestation is probably just below the 10th centile". This is less than the estimated fetal weight at 36 weeks gestation, but given that everything was normal at the 36 weeks scan, there was no indication that further ultrasounds were necessary."

¹⁰⁰ Exhibit S at page 60 of the coronial brief.

TRANSFER TO MERCY HOSPITAL FOR WOMEN & THE N.E.T.S.

73. The genesis of the concern about delay in transferring Baby Chloe from Ballarat to a tertiary facility in Melbourne, was the fact that Dr Du Plessis, the on-call paediatrician caring for her, first contacted NETS at 2120 hours on 12 April 2009, but Baby Chloe was not admitted to the Mercy Hospital for Women in Heidelberg (the Mercy) until 1415 hours on 13 April 2009.¹⁰¹ That is not to suggest that there was any want of clinical management or care on behalf of Dr Du Plessis and the staff caring for Baby Chloe at Ballarat in the ensuing period.
74. Hospital protocol required a paediatrician to attend the birth of any baby delivered in theatre, and Dr Du Plessis was present to assume care of Baby Chloe who was delivered by forceps in theatre at 2019 hours.¹⁰² As discussed above, Baby Chloe had low Apgar scores and required respiratory support from the outset.¹⁰³
75. Baby Chloe was taken to the special care nursery at 13 minutes of age on facial oxygen. Her oxygen saturation was improving with readings in the mid to high 80s and she was breathing rapidly with mild to moderate respiratory effort. Intravenous access was obtained and blood taken for a full blood examination, CRP (a measure of inflammation/infection), blood cultures, blood gas analysis and blood sugar level. As initial blood sugar levels were low, a bolus of dextrose was administered, followed by a 10% dextrose infusion. Antibiotics were commenced empirically to treat for presumed infection.¹⁰⁴
76. The initial venous blood gas analysis indicated significant metabolic acidosis, suggesting mild to moderate asphyxia and possibly mild meconium aspiration, so a fluid bolus was given to improve perfusion. It was Dr Du Plessis' assessment that Baby Chloe did not have specific features of hypoxic ischaemic encephalopathy (HIE), however she contacted NETS for the first time at about 2120 hours to consult about her condition and management.¹⁰⁵ The NETS consultant was Dr Susan Jacobs who concluded that Baby Chloe was receiving appropriate

¹⁰¹ The fact of the "delay" was uncontroversial. The timelines are most accessible in Exhibit B, the statement of the NETS Consultant Dr Susan Jacobs at pages 47-49 of the coronial brief.

¹⁰² Exhibit O, statement of Dr Louise Du Plessis dated 12 April 2011 at page 44 of the coronial brief.

¹⁰³ See paragraphs 4 & 5 above.

¹⁰⁴ Exhibit O, at pages 44-46 of the coronial brief and transcript pages 340-342.

¹⁰⁵ Exhibit O at page 45 of the coronial brief. When he came to review the circumstances later and in his evidence at inquest, Dr Watkins agreed with this assessment – see transcript pages 334-335.

management at the time and advised Dr Du Plessis to observe her neurological status closely, to monitor her blood sugar levels and to report any changes or concerns to NETS.¹⁰⁶

77. When she reviewed Baby Chloe at 2300 hours, Dr Du Plessis noted she still had mildly increased work of breathing, but was more settled with satisfactory oxygen saturation levels. The fontanelle was normotensive and Baby Chloe responded to stimulation. Arterial blood gases showed marginally improved metabolic acidosis. A repeat fluid bolus was given to improve perfusion. Blood pressure was satisfactory. Dr Du Plessis considered restricting fluids in order to avoid swelling of the brain.¹⁰⁷
78. Dr Du Plessis next reviewed Baby Chloe at 0300 hours on 13 April 2009 when her clinical condition showed some deterioration. Although her metabolic acidosis was improving, she was intermittently irritable, the fontanelle was full and she had intermittent clonic jerking of the right arm, features consistent with evolving HIE. Baby Chloe was still hypoglycaemic despite the dextrose bolus and infusion. Dr Du Plessis consulted Dr Jacobs at NETS for the second time at about 0300 hours on 13 April 2009.¹⁰⁸ As a result, she was advised to manage the blood sugar levels with a bolus of dextrose and an increase in the infusion from 10% to 12.5% dextrose, to administer phenobarbitone (at a dose of 20mg/kg) and to notify NETS if seizures continued or if the phenobarbitone did not cease the current seizure, for subsequent retrieval and transfer.¹⁰⁹
79. According to Dr Du Plessis, after she was commenced on phenobarbitone, Baby Chloe seemed more settled with no further twitching observed. Her clinical impression was that Baby Chloe's metabolic acidosis was improving but the blood sugar levels remained problematic and so took further bloods were taken to investigate possible causes of hypoglycaemia.¹¹⁰
80. At about 0630 hours, events took a turn for the worse as Baby Chloe developed episodes of seizure associated with apnoea, requiring intermittent bag and mask ventilation. Dr Du Plessis was convinced that Baby Chloe was presenting with moderate to severe HIE and contacted NETS for a third time at 0724 hours. The NETS consultant at this time was Dr Phillip Henschke. Dr Du Plessis advised that Baby Chloe had suffered at least four seizures associated

¹⁰⁶ Exhibit B, statement of Dr Susan Jacobs dated 17 January 2011 at pages 47-49 of the coronial brief, and transcript pages 20-21.

¹⁰⁷ Exhibit O at page 45 of the coronial brief.

¹⁰⁸ Exhibit O and transcript page 345.

¹⁰⁹ Exhibit B at page 48 of the coronial brief and transcript pages 20-21.

¹¹⁰ Exhibit O at page 46 of the coronial brief.

with apnoea in the preceding hour. Dr Henschke advised the administration of a further 20mg/kg phenobarbitone, and that urgent NETS retrieval would be initiated.¹¹¹

81. Baby Chloe continued to experience seizures associated with apnoea while the retrieval team was en route to Ballarat, necessitating a fourth consultation between Dr Du Plessis and NETS at 0908 hours. On this occasion, Dr Henschke advised further phenobarbitone boluses and broadening antibiotic and antiviral cover for possible infection and/or meningitis.¹¹²
82. The retrieval team comprising Dr Asiyath Rasheed and transport nurse Kay Downing, arrived at Ballarat at 0922 hours and were assessing Baby Chloe by 0928 hours. Their preparations for transfer included elective intubation, as Baby Chloe was apnoeic during seizures, insertion of umbilical venous and peripheral arterial catheters for central venous access and continuous arterial blood pressure monitoring, clonazepam for seizures, inotropes for hypotension, a bolus of normal saline and further fluid restriction to 50mL/kg/day.¹¹³
83. Dr Susan Jacobs provided a statement outlining the consultation process from the perspective of NETS and testified at inquest.¹¹⁴ Dr Jacobs explained that at the relevant time, NETS was based at the old Royal Women's Hospital site in Carlton and had dedicated mobile intensive care ambulances. Once the decision to retrieve was taken, the rostered driver would have been called in and the retrieval team would have departed as soon as the driver arrived. As regards the three hours time delay between arrival of the retrieval team at Ballarat and their departure, Dr Jacobs explained that this was probably about average, and reflected a philosophy of staying and completely stabilising the neonate before transportation.¹¹⁵ The thrust of Dr Jacobs' evidence was that once in the care of the retrieval team, Baby Chloe was effectively receiving care analogous to that available in a neonatal intensive care unit.¹¹⁶
84. According to Dr Jacobs, Baby Chloe's initial clinical management and care was well within the capabilities of the special care nursery at Ballarat, being a Level 2A nursery. The perinatal history documented by NETS was consistent with mild encephalopathy, rapidly stabilising

¹¹¹ Exhibit B at page 48 of the coronial brief. The other information about Baby Chloe's clinical condition conveyed to NETS was that "*Her respiratory distress had resolved and she was in air with respiratory rate 40-50/minute, mean arterial blood pressure (MAP) 47 mmHg and saturation 95%. Investigations included, blood gas at 0500 pH 7.35, CO2 33, BE -7, Lactate 9, with benign inflammatory markers and normal coagulation (INR 1.6).*"

¹¹² Exhibit O and Exhibit B.

¹¹³ Exhibit B at page 49 of the coronial brief.

¹¹⁴ Apart from being a NETS consultant since 2000, Dr Jacobs was also the Deputy Director (Medical) Neonatal Services, Royal Women's Hospital, Melbourne.

¹¹⁵ Transcript page 8.

¹¹⁶ Transcript page 9.

cardiorespiratory status and resolving perinatal acidosis.¹¹⁷ The single episode of seizure discussed during the second consultation, while technically indicative of moderate encephalopathy appeared to be easily controlled. There were no other indications that Baby Chloe required intensive care management. Moreover, the level of hypoglycaemia was within the scope of capability of a consultant paediatrician in a special care nursery.¹¹⁸

85. It was not until the third consultation when the NETS consultant was advised of ongoing seizures with apnoea that retrieval was initiated, a decision supported by Dr Jacobs.¹¹⁹ Effectively, Baby Chloe required admission to a neonatal intensive care unit thereafter.
86. Hypothermia or cooling, was the only treatment modality for HIE not available at Ballarat in 2009 which could be accessed via a NETS retrieval, and involves the lowering of a baby's body temperature to between 33 and 34 degrees Celsius for 72 hours and then gradually re-warming the baby. Dr Jacobs' evidence was that this was the only treatment shown to reduce brain damage following a hypoxic ischaemic insult, and that it became standard care in Victorian newborn intensive care units, under strict protocols, in 2007.¹²⁰
87. At inquest, Dr Jacobs explained that studies show that more than 95% of babies with mild encephalopathy will have a good outcome. Conversely, more than 90% of babies with severe encephalopathy will die, and the small number of survivors will have major neurological and developmental problems.¹²¹ According to Dr Jacobs, it is in the middle ground occupied by babies like Baby Chloe with moderate encephalopathy, where hypothermia has a role to play. Studies demonstrate a significant improvement in mortality in this group from about 61-62% without hypothermia, to about 46% following hypothermic treatment. The challenge for clinicians is in identifying those babies and initiating hypothermic treatment within six hours of birth, the therapeutic window supported by the same studies.¹²²

¹¹⁷ Transcript page 19-21.

¹¹⁸ Exhibit B and transcript pages 22 and following, including page 24 where Dr Jacobs testified that "...up until the call around 7 am [sic] Chloe was getting exactly the same care, from the information that I have, at Ballarat that she would have received if she was in intensive care at the Mercy."

¹¹⁹ Exhibit B at page 49 of the coronial brief and transcript pages 24 and following.

¹²⁰ Transcript page 10.

¹²¹ Transcript page 12 where Dr Jacobs describes mild encephalopathy and severe encephalopathy respectively as "characteristically hyper alert with increased tone and no seizures" and "comatose, floppy, they do not move, they do not respond to painful stimuli, they don't have any...primitive reflexes; no gag reflex or suck reflex. They tend to have pupils that react poorly to light and these babies generally have such severe brain injury that they don't fit – seizures are uncommon."

¹²² Transcript pages 12-13, 16-18.

88. The protocols for provision of hypothermic treatment in Victoria (and generally throughout the world) require the neonate to be of at least 35 weeks' gestation, with evidence of moderate or severe encephalopathy and evidence that the encephalopathy relates to peri partem events.¹²³ Dr Jacobs testified that Baby Chloe did not satisfy this criteria during the initial consultation at 2120 hours on 12 April. At the second consultation at 0300 hours on 13 April 2009, only mild encephalopathy was suggested by the first documented episode of likely seizure activity at about six hours 40 minutes of age, already beyond the window for therapeutic hypothermia.

CONCLUSIONS

89. The standard of proof for coronial findings of fact is the civil standard of proof, on the balance of probabilities, with the *Briginshaw* gloss or explication.¹²⁴ The effect of the authorities is that Coroners should not make adverse findings against or adverse comments about individuals or institutions, unless the evidence provides a comfortable level of satisfaction that they materially departed from the standards of their profession and in so doing, caused or contributed to the death.
90. It is axiomatic that the assessment of clinical management and care must be undertaken strictly without the benefit of hindsight. The trajectory of a patient's clinical deterioration may well be obvious after the event. Patterns or causal connections that can be traced from the privileged position of knowing the tragic outcome, may not have been obvious or even appreciable before that outcome.
91. In terms of the circumstances in which Baby Chloe died, clinical management and care need to be assessed against what was known, or should reasonably have been known at the material time, that is when the staff at Ballarat and NETS were caring for Ms Kellett, and/or caring for or consulting about Baby Chloe after her birth.
92. Having applied the applicable standard of proof to the available evidence, I find that:

¹²³ Transcript pages 13-14. Dr Jacobs gave evidence that a number of clinical indicators are used to assess whether encephalopathy is peri partem – An Apgar score of less than or equal to 5 at 10 minutes (Chloe's was 7), need for ongoing resuscitation at ten minutes generally in the form of ventilation (Chloe did not need ventilation), acidosis either on cord gas of pH < 7.1 (Chloe's was 6.9), a base excess of > or equal to -12 (Chloe's was -20) "*And it was really only on that criteria, certainly at the initial call, that one – that one might have considered that but we would never cool baby who wasn't encephalopathic.*"

¹²⁴ *Briginshaw v Briginshaw* (1938) 60 C.L.R. 336 esp at 362-363. "The seriousness of an allegation made, the inherent unlikelihood of an occurrence of a given description, or the gravity of the consequences flowing from a particular finding, are considerations which must affect the answer to the question whether the issues had been proved to the reasonable satisfaction of the tribunal. In such matters "reasonable satisfaction" should not be produced by inexact proofs, indefinite testimony, or indirect inferences..."

- The clinical management and care provided by the nursing/midwifery staff at Ballarat, was reasonable and appropriate throughout Ms Kellett's labour and delivery.
- While I cannot entirely exclude the possibility that their recollection has been affected by hindsight bias, to some extent, I am satisfied that RMW McManus and RMW Wise had bona fide concerns for the wellbeing of Ms Kellett and Baby Chloe based on their interpretation of the CTG traces, and they appropriately advised ANUM Ditchfield, ANUM Ratcliffe, who shared their concerns.
- To the extent that they were aware of the midwives' concerns and had the opportunity to review the CTG traces, Drs Taverna and Vashevnik did not share the midwives' concerns. Their interpretations were within a range of reasonable clinical interpretations of the CTG traces until about 1800 hours when an expedited delivery was indicated.
- That said, whether informed by their extensive experience and/or close monitoring of Ms Kellett throughout her labour or otherwise, the evidence supports a finding that all was not well with Baby Chloe from a point in time close to induction of Ms Kellett's labour, and albeit with hindsight, vindicates the midwives' concerns.
- Although not causally related to the hypoxic ischaemic encephalopathy to which Baby Chloe succumbed, there was an unacceptable delay between deterioration in the CTG trace from about 1800 hours (and ongoing), the decision to expedite delivery by forceps in theatre, and Baby Chloe's birth at 2019 hours.
- Although not causally related to Baby Chloe's death, the overall clinical management and care provided to Ms Kellett from 1400 hours, was compromised by dysfunctional communication and poor collaboration within the treating team.

COMMENTS

Pursuant to section 67(3) of the Coroners Act 2008, I make the following comment/s connected with the death:

1. As at the date of the inquest, I was advised that Ballarat Health policies and protocols now allow for direct communication between nursing staff and a consultant where staff are unable to access medical review or unhappy with medical input. Ballarat Health are to be commended for facilitating the escalation of a patient's management and care in appropriate

circumstances. Ms Kellett's labour and delivery may well have been enhanced by escalation in this manner.

2. This case illustrates a kind of tyranny of distance or potential disadvantage for babies born in regional Victoria. Hypothermia is a recognised treatment for babies with moderate to severe hypoxic ischaemic encephalopathy (HIE) and improves mortality rates by about 15%. In regional hospitals where this treatment is not readily available, it is only accessible via a NETS retrieval and transfer to a tertiary hospital. Given the protocols for hypothermic treatment and the narrow therapeutic window within which the treatment must be commenced (within six hours of birth) a case can be made for NETS to preference babies born in regional areas by initiating retrieval at the first sign of even mild encephalopathy, lest it progress to moderate encephalopathy outside the therapeutic window.

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

Ms Belinda Kellett c/o BJT Legal

Dr Stanislav Vashevnik c/o Lander & Rogers Lawyers

Dr Cameron Taverna c/o TressCox Lawyers

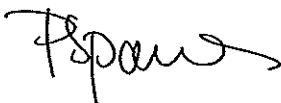
Ballarat Health Service c/o Minter Ellison Lawyers

Dr Susan Jacobs, NETS Consultant, Deputy Clinical Director, Neonatal Services, The Royal Women's Hospital

Dr Andrew Watkins, Clinical Director, Paediatrics, Mercy Hospital for Women

Leading Senior Constable Amanda Maybury, c/o O.I.C. Police Coronial Support Unit

Signature:



PARESA ANTONIADIS SPANOS

Coroner

Date: 12 June 2015

Cc: Manager, Coroners Prevention Unit



