IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: 2986/08

FINDING INTO DEATH WITH INQUEST
(Amended pursuant to section 76 of the Coroners Act 2008 on 30 December 2011)

Form 37 Rule 60(1)
*Section 67 of the **Coroners Act 2008***

Inquest into the Death of POPPY LOUISE HABGOOD

Delivered On:	14 December 2011
Delivered At:	Coroners Court of Victoria Level 11, 222 Exhibition Street Melbourne Victoria
Hearing Dates:	18, 19, 20, 21, 22 July and 3 August 2011
Findings of:	CORONER K. M. W. PARKINSON
Place of death/ Suspected death:	Royal Women's Hospital, Grattan Street, Parkville, Victoria 3052
Counsel Assisting :	Sergeant Tracy Weir
Appearances:	Ms Fiona Ellis for Royal Women's Hospital Dr Paul Halley for the family of Poppy Habgood

I, K. M. W. PARKINSON Coroner having investigated the death of POPPY HABGOOD

AND having held an inquest in relation to this death on 18, 19, 20, 21, 22 July and 3 August 2011 at Melbourne

find that the identity of the deceased was POPPY LOUISE HABGOOD

born on 10 July 2008

and the death occurred on 10 July 2008

at Royal Women's Hospital, Grattan Street. Parkville, Victoria 3052

from:

1a. PERINATAL ASPHYXIA

in the following circumstances:

1. An inquest was held into the death of Poppy Louise Habgood on 18 to 22 July and 3 August 2011.

2. The following witnesses gave evidence in the proceeding:

   Associate Professor David Ranson, Deputy Director, Victorian Institute of Forensic Medicine;
   Dr Peter Ashton - Consultant Obstetrician;
   Dr Nicola Bryan-Yuen - Consultant Obstetrician
   Dr Penelope Sheehan - Staff Specialist Obstetrician;
   Dr Mark Petris - Obstetrics Registrar;
   Dr Ben Cunningham - Level 3 Obstetrics Trainee;
   Dr Sonja Hemrajani - Senior Obstetrics Registrar;
   Dr Gina Rozen - Junior Obstetrics Registrar;
   Midwife Sophie Gole - Registered Nurse and Midwife;
   Midwife Catheryn Whyte - Registered Nurse and Midwife;
   Clinical Midwife Consultant Karen Moffat - Registered Nurse and Midwife.

3. Poppy was born at 0100 hours on 10 July 2008, to parents, Ms Stacey Barton and Mr Sam Habgood. She was born by emergency caesarean section at 42 weeks and she weighed 3968 grams. At birth she was pale apnoeic and hypotonic. She had an initial heart rate of approximately 60bpm. Despite resuscitation with positive pressure ventilation, her heart rate was undetected after one minute. CPR was commenced and she was intubated and ventilated. Despite prolonged resuscitation, she remained asystolic and resuscitation measures were discontinued at 26 minutes. Poppy died at 0126 hours on 10 July 2008.

4. An autopsy was conducted by Dr Matthew Lynch, Forensic Pathologist with the Victorian Institute of Forensic Medicine. Dr Lynch reported the cause of death as perinatal asphyxia. Associate Professor David Ranson, Deputy Director of the Victorian Institute of Forensic Medicine, stated that there was no evidence at autopsy of congenital abnormality or infective process, which may have caused or contributed to the death.

5. Ms Barton had experienced a pregnancy without incident. Ms Barton had attended the ante natal clinic at the Royal Women's Hospital during the course of her pregnancy. She was post due date and it had been arranged that her labour would be induced on 9 July 2008 at 41 weeks and 5 days. Her amniotic fluid index at this time was 4.9, which was considered to be a low level.

6. On the morning of 9 July 2008, she attended at the pregnancy day centre for induction. One milligram of Prostin gel was applied at 0800 hours and Ms Barton was sent home.

7. At 1300 hours she re-attended at the day clinic for assessment and cardiotocograph ("CTG") monitoring. Shortly after at 1355 hours the CTG monitoring identified an incident of foetal bradycardia, described by expert Dr Peter Ashton, as a marked spontaneous deceleration not associated with a uterine contraction. He described it as a quite dramatic deceleration in depth and also in length with a duration of nearly four minutes. Ms Barton was reviewed by Dr Mark Petris and transferred at his direction to the birth centre at 1400 hours for continuous CTG monitoring and induction of labour. Dr Petris stated that having regard to the length of the pregnancy, the fact that the amniotic fluid was reduced, that there was an incident of bradycardia, he felt that it was appropriate for Ms Barton to be admitted to the birthing suite for close monitoring and with a view to artificial rupture of the membrane.

8. Continuous CTG monitoring commenced at 1415 hours. Dr Ben Cunningham stated that he assessed Ms Barton at 1630 hours and a foetal scalp electrode was attached to allow direct assessment of the foetal heart rate. His evidence was that the CTG trace was a normal trace at that time. At 2030 hours, examination revealed adequate labour progression and that the foetal heart rate was stable with a normal baseline range, with good variability and accelerations. Whilst he noted that the trace identified occasional variable decelerations, the CTG was not concerning. An amniotomy was performed at 1430 hours. The liquor was scant and noted to be meconium stained. After discussion with Dr Petris, Dr Cunningham requested continuous monitoring of the foetal heart rate and a Syntocinon infusion to be administered.

9. The key period in the management of the labour was the period 2200 hours to Poppy's delivery at 0100 hours. The clinicians responsible for Ms Barton's care on the evening were Senior Obstetric Registrar, Dr Sonja Hemrajani; Junior Obstetrics Registrar, Dr Gina Rosen and Midwives, Ms Sophie Gole and Ms Catheryn Whyte. Dr Eliza Eddy, a first year registrar, was also present during the course of the evening, however did not have direct dealings with Ms Barton. The Consultant Obstetrician on-call was Dr Nicola Bryan-Yuen.

10. Ms Whyte was the midwife attending to Ms Barton during the latter period of the labour and when critical events transpired. Ms Gole was present for the earlier stages of the labour.

11. The evidence of all witnesses is that it was a particularly busy evening on the labour ward with every room full. Dr Rosen described that there were 20 to 30 women in labour.

CTG monitoring during the course of the labour

12. There are two significant periods in relation to the labour. The first from admission to the birthing suite until 2200 hours, during which time all witnesses agree, (Dr Ashton with some qualification) that the labour was appropriate to continue without intervention. The second period, after 2200 hours and particularly commencing at 2240 hours, where a number of events occurred which I am satisfied indicated that there was a problem with the labour and the baby and that medical intervention was required.

13. During the initial period Ms Barton was attended by midwife Ms Gole. Midwife Gole's evidence was that during the course of her shift she had difficulty in obtaining a consistent trace from the CTG and despite changing machines, this difficulty continued. The evidence is that Ms Gole notified the medical clinicians of this issue and conveyed relevant clinical information to the attending doctors.

14. At 2000 hours Midwife Whyte took over Ms Barton's care. It became apparent to Midwife Whyte, that there was reason to be concerned with the reading from the CTG trace. Her evidence was that the CTG trace at 2250 hours was exhibiting worrying characteristics. Her evidence was that she paged Dr Hemrajani who attended to review the CTG. Midwife Whtye's evidence was that she expected there would be medical intervention in relation to delivering the baby. With this in mind she changed Ms Barton into a hospital gown.

15. Dr Hemrajani reviewed the CTG at approximately 2300 hours after a request by Midwife Whyte. Dr Hemrajani signed the CTG and Midwife Whyte noted that Dr Hemrajani wanted foetal monitoring and Syntocinon infusion continued at 5ml/hr and the plan was to review the situation in 20 minutes.

16. Dr Hemrajani's evidence was that she recalled when viewing the CTG trace, that she gave instructions that if the CTG did not improve that a Foetal Scalp Lactate test ("FSL") should be performed. The evidence is that her plan was that a FSL should be done within 10 minutes or so and that if the CTG remained abnormal for a period of 40 minutes or so, delivery should have been expedited. Her evidence was this would occur by either instrument delivery or caesarean section. (T585) Dr Hemrajani's evidence was that she informed the midwife of this plan. Dr Hemrajani did not document these instructions, and it appears to be at odds with that which was recorded by the midwife as there is no reference in her notes to the FSL.

17. Dr Rosen did not make mention in her statement of being requested to undertake this test. She stated that at 2310 hours she was asked by Dr Hemrajani to watch the CTG trace and monitor for any persisting or worsening abnormality. In her evidence, (T305.16) Dr Rosen stated that she recalled being given an instruction from Dr Hemrajani, before she left the room to undertake a foetal scalp lactate test, however upon further consideration stated that whilst she was not expressly told to undertake the FSL it was implied that it should be done.

18. The evidence establishes that there was a lack of clarity as to the plan in relation to the labour and that the plan as developed by Dr Hemrajani was not clearly articulated or understood by the junior registrar, Dr Rosen.

19. There was no communication of what has variously been described by witnesses as the 'abnormal' or 'worrying' or 'non reassuring' CTG trace, to the on-call consultant. Nor at any time during the course of the labour was the consultant advised of the developing clinical picture.

20. It is relevant to note that the consultant, Dr Bryan-Yuen, who had overriding responsibility for the patient, gave evidence that at this stage she would not have administered a FSL and that her plan would have been to deliver the baby. In the context of the appropriate clinical steps to be taken, it is not to the point that she would not utilise such a test. The crucial aspect of her evidence is that she would have intervened earlier and in a more pro-active manner than that which transpired. In the face of worrying clinical indications, the consultant's advice as to the appropriate next steps ought to have been obtained.

21. The medical clinicians did not discuss with Ms Barton or Mr Habgood any issues of concern, nor options which may be available in terms of progressing the labour or the delivery.

22. The evidence is that the CTG trace between 2250 hours and 2310 hours was increasingly abnormal. The records establish that the trace continued to exhibit abnormal features after this time.

23. Dr Hemrajani's evidence was that she had expected that the FSL would be taken by or before 2330 hours. The CTG continued to be non reassuring.

24. At 2315 Midwife Whyte paged Dr Hemrajani and Dr Rosen to advise that the CTG required reviewing again as the baseline had increased to 160bpm, variability was reduced and variable decelerations dropped to 80's. The CTG was reviewed at 2320 hours by Dr Rosen. No change in management was ordered at that time. Dr Rosen's evidence was that she decided that a further assessment would be appropriate prior to a FSL and that she intended to undertake that assessment however was called away to another labouring woman.

25. Dr Rosen left the room at 2330 hours to attend to another patient. Her evidence was that she had to assess that patient in order to prioritise the competing requirements in the suite at this time.

26. During this period Dr Hemrajani had also been called away to the Frances Perry House to attend to a non obstetric emergency. Dr Hemrajani accepted that it would have been appropriate as she was leaving the ward to have arranged for the on call consultant Dr Bryan-Yuen to be contacted.

27. At 2340 hours the midwife left the room to again page Dr Rosen as the foetal heart decelerations were recording at 60, persisting for 1 minute before returning to baseline. During that time Mr Habgood attended at the nurses station to advise that the baby's heart rate had dropped with the most recent contraction.

28. The evidence of Dr Rosen is that she returned to Ms Barton at between 2340 hours and 2350 hours and that at this time the trace had not improved and had deteriorated further. She examined Ms Barton because she was considering proceeding to delivery, however as the baby was too high for non surgical delivery she proceeded instead to take a FSL. This was on the basis that she had concluded that although there was an abnormal trace, it did not fit the criteria (set out in the Clinical Practice Guidelines) for a Category 1 code green Caesarean Section and she felt it would be quicker to undertake the lactate.

29. Dr Rosen explained: (Exhibit 15)
"My assessment was that there were 2 options. I could call an emergency (category 2) CS which would take up to 40 minutes to get the patient into the operating theatre, particularly as the staff were tied up with the Code Blue in FPH or to perform a test to determine foetal compromise, the best and only such test being foetal blood sampling which if high would expedite theatre."

30. The reasoning appears to be that in the event the test was abnormal a more urgent delivery (commenced within 10 minutes) would be possible.

False reassurance from the Foetal Scalp Lactate testing

31. The clinical practice guidelines ("CPG") applicable to CTG interpretation, suggested foetal blood sampling in the circumstance of an abnormal CTG. The guidelines also note that the full clinical picture should always be considered when interpreting foetal heart rate patterns on a CTG.

32. Dr Rosen undertook a foetal scalp lactate test at 2400 hours. The result at 0010 hours was 1.3mmol/L and this was interpreted as a normal result and reassuring of the baby's status. Her evidence (T311.11) was that at that point in her experience and in the teaching she had received and the protocols that we had in the hospital, the normal cut off for a lactate is less than or equal to 4.1mmol/L and that there was no guideline to suggest that a low lactate was to be regarded as other than normal.

33. The evidence of Dr Ashton was that the FSL was abnormally low and inappropriately so considering the overall progress of the labour and its stage. All witnesses agreed that the reading obtained on this occasion was unusually low in the context of a labour at the stage to which this labour had progressed. It is possible that there was an error in taking the sample or in the machine in interpreting the sample.

34. There was no guidance in the CPG as to how to understand or respond to an unusually low FSL, however the CPG stated that all lactate estimations should be interpreted taking into account the previous lactate measurement, the rate of progress in labour and the clinical features of the woman and the foetus.

35. Dr Rosen's evidence was that whilst she recognised that this was a low reading, she was reassured by the fact that it was low. Midwife Whyte's evidence was that despite the FSL result she continued to be concerned in relation to the labour and indications that the baby was becoming hypoxic.

36. Dr Rosen stated: (exhibit 15)
"...the lactate was available and was 1.3mmol/L, which is a normal result. Based on this, I felt we could continue expectant management of this labour for at least 20-30 minutes if the CTG trace remained similar, before needing to repeat FBS (as per hospital guidelines). Despite the somewhat unexpected normal lactate, I remained concerned about foetal well being with the combination of very abnormal trace and meconium stained liquor, and called Dr Hemrajani to urgently assess the patient."

37. Dr Rosen and Dr Hemrajani both acknowledge that in retrospect the FSL was not an accurate reflection of the baby's status and that it was not consistent with the results being obtained from the CTG monitoring.

38. At 0018 hours the CTG continued to be abnormal and the midwife again paged the doctors. At 0018 hours Dr Rozen and Dr Hemrajani noted a period of prolonged and rapid deceleration. A Code Green was called and Ms Barton was transferred to the operating theatre for caesarean. As stated earlier, Baby Poppy was born in poor condition and could not be resuscitated and she died at 0126 hours.

The Expert Evidence

39. There is some disagreement about the interpretation of the CTG trace during the course of the labour and in particular as to whether abnormality was apparent on the CTG, which warranted earlier intervention to deliver the baby.

40. Dr Peter Ashton was engaged by the court to provide an independent expert opinion as to the course of the labour. His evidence was that having reviewed the progress of the labour and having regard to the earlier incident of bradycardia and the non reassuring CTG trace over the period 2200 hours to 2250 hours he would have implemented a plan for delivery of the baby immediately. His evidence was that by 2300 hours an urgent delivery was required.

41. His evidence was that the failure to implement and the delay in implementing a delivery plan was a significant matter in the outcome. Dr Ashton's evidence was (T576) that at 1355 hours, the time of the first episode of foetal bradycardia, a case could have been made at that point for having abandoned the labour process and consideration given to the delivery of Poppy by emergency caesarean section. His view was:
"...that this was a large baby, there was evidence of potential placento-foetal compromise as demonstrated by a long and prolonged deceleration, and observation of scant volume of liquor left around the baby and that the liquor was meconium stained points to a very reasonable reason to have recommended a caesarean section at that stage and to have abandoned the induction process." T 576.15

42. Dr Ashton stated that whilst a change in position may have changed the CTG reading, nevertheless the size of the baby and the diminished volume of liquor were significant matters to take into account in assessing the progress of the labour and the state of the baby. However, having considered the CTG and the entire clinical picture he stated that in view of good variability, with limited accelerations, whilst the CTG was not "brilliant" he regarded it was quite safe to proceed with labour at that stage (1355 hours). Prior to page 14 on the CTG trace commencing at 2140 hours he considered that it was still a perfectly reasonable trace for a woman in labour. T579.

43. At page 15 of the trace, (commencing at approximately 2210 hours to 2230 hours) he identified what he described as an early Type 2 dip or late decelerations. His evidence was that this was usually indicative of foetal compromise. The specific feature of a Type 2 dip is that the acme or the very bottom of the dip occurs after the acme of the contractions shown at the bottom of the trace. The contraction is subsiding, but the foetal heart rate is still falling, before it starts to rise again.

44. Dr Ashton's evidence was that the CTG trace from this point on revealed a number of Type 2 or 'late decelerations', which indicated that 'things were about to happen' and which required very careful monitoring from that time. He observed that at page 16 on the trace (2240 hours) those changes are more obvious after nearly every contraction.

45. He agreed with the evidence of consultant obstetrician Dr Bryan-Yuen, that by 2240 hours (page 16 of the CTG) the CTG was increasingly of concern with moderate to severe variables of a complex nature with overshoot.

46. Dr Bryan-Yuen's evidence was that this was a concerning CTG and that she would have expected to have been contacted and advised of the CTG readings and the clinical picture. Dr Bryan-Yuen's evidence was that if she had been contacted at that point of time she would have made a plan for an urgent delivery. Not immediate but urgent, within the hour.

47. Dr Ashton's evidence was that he would have described the clinical picture as more urgent than that described by Dr Bryan-Yuen, and at that time, between 2240 hours and 2300 hours, he would have made immediate and urgent arrangements to proceed to theatre.

48. The consultant obstetrician was not contacted and advised of the concerning CTG or the clinical picture. This may have been because it was not appreciated by either of the medical clinicians that this was a troubling CTG and that this was compounded by the fact that the clinicians were reassured by the FSL, despite it recording what appeared to be a very low reading, which was clinically inconsistent with the stage of the labour reached.

49. Dr Ashton's evidence was that at 2250 hours, having reviewed the CTG trace his advice would have been to urge immediate and urgent delivery by whatever was the most appropriate manner.
"Soon as possible. It meant setting up the operating theatre, getting the patient across there so that it could all be done with proper anaesthetic etc. Have all that in train, but within 10 minutes not -not you seem to be talking about 40 minutes or something. I certainly would be involved in 40 minutes, I wouldn't be interested in foetal lactate measurements. This is a woman who has been in labour for nearly 12 hours. We've had - already had worsening - a worsening picture for the last hour and a bit - time to get this baby delivered pronto while it's still well."

50. Dr Ashton reviewed the CTG trace at page 17 and stated that the trace revealed much the same as the previous page that is late decelerations which were a continuing sign of foetal distress.

51. Dr Ashton's evidence was that earlier delivery by caesarean section could have prevented the death. He stated: (T602)
"I would be moderately confident that if by early, we were talking about page 15 or page 16 on the graph that would be a correct statement. Certainly on page 15 and probably at any time on the first half of page 16. If delivery had been effected there by whatever means, I would regard, foetal death as extremely unlikely."

52. His evidence was that if delivery had occurred within 60 minutes of 2300 hours, that Poppy would have survived, but he did not agree that this would have been the case if the delivery had occurred at or around 2400 hours. By that time his evidence was that it would have been too late to avoid the hypoxic injury.

53. It is submitted on behalf of the hospital, that even had there been an earlier decision to surgically intervene, because of the time it would take to prepare for theatre and deliver, this would not have resulted in any better outcome for Poppy. Counsel makes this submission in reliance upon Dr Ashton's evidence was that it was likely that Poppy was not survivable after 2400 hours. It was submitted that in hindsight a plan for delivery ought to have been made, but that in practical terms the timing of operating would have meant that it would likely have been too late to change the outcome for Poppy.

54. The flaw with this analysis is that it assumes that the actions prior to 2400 hours were a reasonable response to the clinical course and assumes that Dr Ashton's evidence is given in this context. His evidence was not to that effect.

55. Dr Ashton's evidence is that he would have intervened earlier and that earlier intervention in the light of the clinical picture, including the CTG would have resulted in a favourable outcome for Poppy. His criticism is of the failure to intervene by delivering the baby as a matter of urgency or immediately, when it became apparent at 2250 hours that there was foetal distress.

56. He puts the timing of foetal distress becoming inarguably apparent at 2250 hours. His evidence was that intervention at that time would still have allowed for a favourable outcome. His evidence was that having regard to the CTG results and the clinical course, intervention after 2400 hours was unlikely to result in a favourable outcome. It was long after what he stated was the desirable point for intervention.

57. Further, that submission is built upon the assumption that it would take 20 plus minutes for delivery to occur in the event of a transfer at 2400 hours, which was Dr Rosen's evidence in the context of determining to proceed to a FLS. This timing was however dependant upon the category of delivery which was indicated. An immediate delivery or Code Green would require 10 minutes, whilst a less urgent category of delivery would take 20 minutes.

58. Dr Ashton's evidence was that it ought to take 10 minutes for an emergency theatre to be made ready. His evidence was also that at latest 2250 hours, Ms Barton should have been transferred to theatre for immediate delivery by whatever was the appropriate means, including caesarean section. Dr Bryan-Yuen's evidence was for delivery within the hour, referable to the period 2250 hours to 2350 hours.

59. I accept Dr Ashton's evidence as to these matters. Whilst his analysis of how long it ought reasonably have taken to arrange a theatre for emergency caesarean may not be founded in any recent experience by him of the public hospital system, he is however a very experienced obstetrician and provided thoughtful and comprehensive consideration of the circumstances surrounding Poppy's birth. Nor was his evidence contested by Dr Bryan-Yuen, the consultant obstetrician on call to the delivery suite on the evening. It has not been suggested during the course of the evidence that there was no theatre available.

60. Having regard to the evidence of Dr Bryan-Yuen, notification or contact with her, was likely to have resulted in the obstetrician progressing to theatre for delivery as a matter of priority and it was Dr Ashton's evidence, that this is what ought to have occurred.

61. Family submits that if the consultant had been contacted or if Dr Hemrajani's plan had been followed, Poppy would have been delivered by 2330 hours or at the latest at 2340 hours that evening. If she had been delivered at that time, the evidence goes so far as to say that Poppy would have survived. I accept that submission as an accurate statement of the likely outcome.

62. The family submitted Poppy's death occurred in a circumstance where there was failure to recognise significant changes of the CTG scan at and following 2250 hours; and that a cascade of events that compounded that failure including a failure to inform the consultant of the developments and a failure to make a plan to initiate the delivery either immediately or urgently. I am satisfied that is an accurate assessment of the course of the events.

63. The family further submitted that the prelude to the tragic outcome had its genesis in the time before the critical period of 2250 hours. In particular, they refer to the initial clinical assessment and decisions made by Dr Petris and that he assessed Ms Barton and had a plan of referring to birthing suite but made no notes about his plan nor the rationale for his plan. The family submits that it is clear on the evidence that a number of clinicians on the suite were not aware of all the circumstances and all the factors, particularly the low amniotic fluid.

64. As counsel rightly conceded, it is not immediately apparent that the absence of this information contributed to the course of events, which resulted in the death of Poppy. I am satisfied that there was sufficient information available to the birthing suite clinicians to understand the reasoning behind the transfer to the unit.

65. Whilst it is important to document the full clinical picture so it is available to following clinicians, it is not apparent on the evidence, that availability to the clinicians of information as to amniotic fluid levels would have altered their approach to the labour.

66. What is of note is that clinicians were concerned, but nobody told the family of the concerns. That is a matter which was apparent from the evidence. It was conceded by Dr Hemrajani in her evidence and acknowledged by Dr Sheehan, that had they been informed it may have had some impact upon the course of the decision making. The evidence does not however allow for a conclusion that such information would have altered the course of events or that the lack of it contributed to the outcome.

Taking a foetal lactate sample ("FLS")

67. There are apparently differing schools of opinion in relation to the taking of and reliance upon FLS in the course of labour. The issue however in this proceeding is not whether an FSL ought to have been undertaken, but rather the degree of reliance placed on the test, in the face of inconsistent clinical indications, and in the absence of any discussion or notification to the consultant of the clinical course.

68. The CTG Clinical Practice Guidelines ("the guidelines") which also addressed the interpretation of FSL, did not address an unusually low reading and there is no suggestion on the document that any reassessment ought to occur in the context of an unusually low reading. Nor is there any advice as to what is to be regarded as an unusually low reading. The guidelines do however direct that the entirety of the clinical picture ought be taken into account in the application of the guidelines. I conclude that the intent of this statement is to avoid strict adherence to formula when clinical developments suggest that the formula is not appropriate.

Findings as to cause and contribution

69. I find that Baby Poppy Habgood died on 10 July 2008 as a result of perinatal asphyxia.

70. It is not possible to identify with any exactness, the time at which the injury was sustained, however it is likely that it was a cumulative event. Dr Ashton's evidence and that of Dr Bryan-Yuen is that the situation was recoverable at least prior to 2400 hours. I accept that evidence.

71. I find that earlier intervention to deliver the baby was clinically indicated at 2250 hours and that had baby Poppy been delivered during the period 2250 hours to 2400 hours it is likely she would have survived.

72. I find that the death was preventable and that there were a number of aspects of the medical management which contributed to the death and they were:

- The delay in progressing the labour to delivery, including by emergency caesarean intervention after 2250 hours in light of the persistent non-reassuring CTG trace;
- The failure to recognise after 2250 hours that the baby's condition was deteriorating and to take immediate steps to proceed to delivery;
- Insufficient consideration being given by the medical clinicians to the entire clinical picture. Decisions were made on the basis of the CTG trace and the FSL test result, in isolation of the entire clinical picture. This had included an earlier significant incident of bradycardia, low amniotic fluid, meconium stained liquor, persistent Type 2 decelerations, unusually low foetal lactate result, length of labour and size of baby;
- There was a failure to notify the consultant obstetrician at an appropriate time in the labour, at latest 2300 hours, of the developing clinical picture, when it was apparent that the delivery was becoming complex and that the baby was under some stress;
- Instructions in relation to patient management were not conveyed clearly to the junior registrar by the senior registrar;
- The Clinical Practice Guidelines dated 3 January 2008 and relating to CTG interpretation, upon which the hospital obstetricians and trainee obstetric registrars place some import, were applied in a formulaic manner and the guidelines failed to give any guidance as to the appropriate response to a low FSL reading;
- That the birthing suite on the evening was very busy and the Code Blue to Frances Perry House meant that the Senior Obstetric Registrar was not there to make or oversight critical decisions and the significance of the entire clinical picture was not fully appreciated.

Comments:

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

1. As a result of the death of Baby Poppy, the Hospital has instituted a number of changes to its process and procedures. Dr Penelope Sheehan reports (Exhibit 25 paragraph 13) that a new system has been introduced designed to encourage regular communication between on call consultants and junior medical staff. The consultant obstetrician on the day shift is encouraged to attend the hand-over at 0800 and 1700 hours and there is a formal briefing at 2200 hours.

2. A significant factor in this case was the failure to notify the obstetrician of the developing clinical picture. Adopting a system where a formal briefing occurs as a matter of course and without the necessity for it to be initiated by the more junior medical staff may overcome any reluctance which may exist to contact the consultant and would ensure that the consultant is informed of the course of the labour. This would be significant in facilitating timely intervention and oversight by the consultant.

3. The hospital has also introduced a real time CTG viewing capacity to enable the clinicians, both medical and nursing and including on call consultants to view CTG in real time from locations other than at the bedside. Utilisation of this facility, particularly by consultants who are not present at the hospital, will facilitate the provision of up to date clinical information and enables a more accurate and timely understanding of the trace development. It is not however a substitute for oversight and understanding of the entirety of the clinical picture.

4. The hospital has advised the coroner that it has implemented an education program designed to reinforce in junior medical staff their ability to contact the consultant and the desirability that they make that contact for guidance and advice. As counsel for the hospital submitted in relation to junior medical staff "one cannot know what they don't know". This is a compelling reason for mandating contact with the specialist clinician in some circumstances rather than relying upon the more junior clinician to either identify that there is a problem or to initiate the contact.

5. Family have suggested that Poppy's case might usefully be a case study at the Royal Women's Hospital as part of the CTG training to highlight the dangers of rigidly adhering to guidelines and a reminder of the need to look at the full clinical picture and this is something the hospital may wish to consider, although I do not intend to make a formal recommendation.

6. The Hospital has increased the level of support to the junior medical trainees by rostering an additional experienced senior trainee on day and evening shifts. It was submitted by the coroner's assistant and the family, that ideally a consultant obstetrician would be available on site at all times, however it is apparent that this would require significant resource allocation. I am satisfied that the concerns in relation to ensuring consultant oversight may be more readily addressed by facilitating the capacity of all clinicians, medical and nursing to notify of emerging and/or concerning events and by mandating the notification of worrying or abnormal trace results to the consultant.

7. The Hospital has introduced separate clinical practice guidelines in relation to FSL testing addressing the indications for testing, interpretation, requirement to take account of the entire clinical picture and expressly direct notification to the consultant in the event of high or low readings. The FSL guideline states: *"The results need to be interpreted as part of the full clinical picture. If the results seem completely out of keeping with the full clinical pictures (lactate either lower or higher than expected) this needs to be discussed with the consultant obstetrician".*

8. The Hospital has revised the clinical practice guidelines in relation to CTG monitoring to provide greater emphasis upon the entirety of the clinical course. The CTG clinical practice guidelines do not however address the issue of a low FSL reading. Whilst it might appear to be a duplication, the express requirement to notify the consultant in the event of a reading which is out of keeping with the full clinical picture, ought to also be included in these guidelines.

9. The evidence from a number of the witnesses, including Dr Petris, Dr Hemrajani and Dr Rosen, was that it is not uncommon for there to be a high percentage of false positives during the course of CTG monitoring and as consequence there is a reluctance to proceed to intervene in the labour, based purely on the results of the CTG monitoring. That said, the CTG was exhibiting 'worrying' and persisting abnormality. In addition, in this case there were a number of clinical indicators which gave cause for concern during the course of the labour and particularly after 2240 hours. Hence the imperative, noted in the CTG guidelines that the entire clinical picture should be considered.

10. It would be of concern if the propensity for false positives in CTG traces, resulted in assumptions being made that this was what in fact was occurring. Dr Ashton in commenting upon the reliability of CTG trace and its accuracy, observed that whilst there were a number of false positives, in the sense that babies were often born well oxygenated even after contrary CTG indications. He stated: *"The important thing is to have a healthy mother and a healthy baby. And if we accelerate the delivery and it turns out in retrospect it was unnecessarily hurried - as long as mother and child are healthy does it matter?"*

11. As the family submissions noted, the evidence was that a number of the clinicians, both midwives and doctors, were concerned about the CTG, were concerned about the labour progress and had in their consideration, that a caesarean section may be necessary at some point in time. None of those clinicians communicated this concern or this option to the parents. It is understandable that clinicians may not discuss the minutiae of medical management. However, in an era which purports to encourage and recognise the importance of involvement and choice in questions of labouring and delivery, it seems odd that no discussion occurred with Ms Barton or her partner as to the implications of the developments, particularly the CTG trace and options available to them, including a caesarean delivery. This lack of information was acknowledged by Dr Sheehan and her evidence was that without question at the time the CTG became abnormal, that discussion ought to have been held. As I have earlier noted, the evidence does not support a finding that this would have altered the course of events or that it contributed to the outcome, however as family submitted it may have ensured that they were in a position to make an informed decision and inquiry about the various options as the labour progressed and urgent situations emerged.

12. The death of baby Poppy was a tragic event and it has been apparent to all throughout this inquest that her loss is deeply felt by her parents. Her loss has also deeply touched a number of the witnesses who have given evidence in the inquest. As I have noted the hospital has reviewed a number of matters since this tragic event and I have taken those matters into account in determining appropriate recommendations in this case. The family have provided the coroner with a set of nine recommendations for consideration, the rationale for which they have expanded upon in counsel's submissions. Whilst I do not recount each one, they are considered and directed and I have been assisted by them in drawing my recommendations.

Recommendations:

Pursuant to section 72(2) of the Coroners Act 2008, I make the following recommendations connected with the death:

1. That the clinical practice guidelines relating to the interpretation of cardiotocograph (CTG) should include a directive, that if a CTG trace is abnormal or worrying either the 'on site' or the 'on call' obstetric consultant must be notified of the trace results.

2. If foetal lactate sampling is being considered by the attending medical clinician, that the on-site or on-call obstetric consultant must be notified of the intention to conduct the sampling and the clinical indicators for sampling.

3. All clinical staff members on the birthing suite, medical or nursing, should be authorised to contact the on-call consultant in the face of concerning clinical developments and that this authority be documented and re-iterated in all induction programs in the unit and during the course of in service training.

4. Birthing suite patients should be kept informed of the full clinical picture and in circumstances where there are non-reassuring developments, given information regarding birthing options and the options that the clinicians are considering.

5. CTG training should be mandatory at induction for all medical and nursing clinicians working on the birthing suite, with refresher training undertaken annually. That training ought to reiterate that the CTG is to be interpreted in the context of the entire clinical picture.

6. The on-site or on-call obstetric consultant is to be notified in the event that a medical clinician is required to absent themselves from the birthing suite to attend Code green and Code blue calls.

I direct that a copy of these findings be provided to: the Interested Parties; Dr Peter Ashton; and to the Consultative Council on Obstetric and Paediatric Mortality review committee.

Signature:

K. M. W. PARKINSON
CORONER

14 December 2011