

18 June 2024

Dr Ian Dady (statement), Dr Jonathan Ford (statement), Dr James Smith, Dr Srinivasarao Babarao, Dr Ravi Jayaram

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Tuesday, 18 June 2024

(10.30 am)

(Delay in proceedings)

(10.39 am)

(In the presence of the jury)

MR JUSTICE GOSS: Good morning, members of the jury. Sorry you were kept waiting; there were some issues that had to be dealt with, technical issues.

MR DRIVER: May it please your Lordship, may I begin by reading two statements to the jury.

MR JUSTICE GOSS: Certainly.

MR DRIVER: There is a comprehensive bundle of statements to be read at section O -- the final item of section O in the Digital Case System, and Mr Johnson will send a page direction --

MR JUSTICE GOSS: Yes, I had a bundle of them. Anyway, is that a spare? Could I borrow that? I won't mark it and I will hand it back. Sorry about that. (Handed).

MR DRIVER: This document is at page 16 of the bundle that Mr Johnson's just handed up --

MR JUSTICE GOSS: Thank you very much.

MR DRIVER: -- using the pagination in the right corner.

MR JUSTICE GOSS: I'll say this, members of the jury, when statements are read, as you know, this is agreed evidence for you to consider and to use as you consider appropriate in your decision-making process.

You don't get copies of the witness statements.

I get a copy because it's easier for me because when I come to sum the case up I will refer to and remind you of what may or may not be important parts of the witness statement.

(Pause)

No jury ever gets a copy of a witness whose statement is read, just as you don't get a copy of the evidence of a witness who gives evidence from the jury box, so it is treated in exactly the same way. But it is, I repeat, just as much evidence in the case as any other evidence, but as you know, it's agreed, it's not controversial, what this evidence is. So pay close attention as I know you will. Mr Driver will speak relatively slowly.

Witness statement of DR IAN DADY (read)

MR DRIVER: Thank you. The first statement to be read this morning was made by Dr Ian Dady and it's dated 8 March 2024. It reads as follows:

"I trained at the University College Hospital in Middlesex Hospital Medical Schools between 1982 and 1987 and became a consultant neonatologist at St Mary's Hospital in December 1997.

"I have remained under the employment of St Mary's Hospital, specialising in the care of babies undergoing newborn transport, which is the Connect North-west Neonatal Transport Service.

"I have been asked to explain the process of arranging an in utero transfer from a level 2 unit to a level 3 unit and to specifically comment on the circumstances surrounding [Mother of Baby K] in February 2016.

"In February 2016 I was not responsible for the Cheshire and Mersey Neonatal Transport Service, which was hosted by Liverpool Women's Hospital. However, there were three neonatal transport services in the north-west region at that time. In 2017 these merged into one organisation, Connect North-west, and I became clinical director for this team.

"I was familiar with the Cheshire and Mersey Neonatal Transport Service and familiar with the database system that they used as I wrote and developed that myself, sharing this with the Cheshire and Mersey team.

"The information that I am providing is to the best of my knowledge, but I cannot be specific around policies and protocols and with how they would organise things. I can, however, assume that it would be similar to our processes within Greater Manchester.

"For an in utero transfer, this is for a request to remove a pregnant mother where there is a likelihood of birth occurring at an early gestation or where they may be maternal health issues or where they may be a risk to the baby because of some difficulty with the baby and pregnancy.

"Normally, the midwifery or obstetric team from the referring hospital would ring the cot bureau to make a referral. The cot bureau is a group of administrative or nursing staff and they would need to find the most appropriate nearest neonatal cot for the baby to be moved to.

"Once they have done that, they also need to locate a bed for the mother on the delivery suite. Sometimes it's not possible to get both conditions satisfied and it would be a case of having to try different hospitals to see which ones had a neonatal bed and then which ones also had a maternal bed available.

"Normally, if a baby was predicted to be delivering or likely to deliver at less than 27 weeks this would mean moving to one of the larger neonatal intensive care units that would accept such patients and who have the specialist skills to deal with the baby for prolonged periods.

"There is a national guidance with a recommendation that at a gestation of less than 27 weeks a baby should be born in a level 3 unit. However, we recognise there are situations where there may be a risk to the mother's health or it is not feasible to complete a transfer. Examples could be that the mother is contracting regularly and in advanced stages of labour. However, it is difficult to predict with certainty.

"The next best option would be for the baby to be delivered locally and then the neonatal transport team would organise a transfer after birth. All neonatal units are capable of initiating intensive care support until the transport team arrives. In the Cheshire and Mersey region, that would have been either Liverpool Women's Hospital or Arrowe Park Hospital. If there wasn't a space within one of those two places then we

would try the other networks in the north-west region. In Lancashire, that would have been Burnley or Preston, and in Greater Manchester that would have been Bolton, Oldham or St Mary's Hospital.

"There are seven neonatal intensive care units in the north-west. The referring hospital staff will ring and give the basic demographic information to the person entering the information on to the cot bureau database. They would also take some basic clinical information about the reason for the concern about the pregnancy and how far along in labour the woman was and if there were any foetal issues to be noted.

"That is documented into an electronic database and staff would normally start their search for an appropriate cot, beginning with the nearest hospital that was declaring their neonatal intensive care unit to be open.

"At the end of this process there is often a discussion between the receiving obstetric team and the referring obstetric team to make sure the situation is safe for the mother to be transferred in the ambulance. Once the transfer has been finally agreed, the referring hospital would call an ambulance, so an ambulance crew would arrive and normally a midwife would accompany the woman in the ambulance to the receiving hospital and care would be handed over to them.

"In terms of the initial telephone call from the referring hospital that is quite a quick process and would probably take around 10 to 15 minutes to obtain and record the necessary information.

"But the time taken to locate a bed and a cot could be quite extensive, particularly when the nearest hospital does not have the availability, and so a series of units are required to assess their capacity and this may take 2 to 4 hours to complete.

"There may be a requirement for further discussions between the referring hospital and the allocated hospital if the location is a considerable distance away and sometimes the mother may decline transfer in this situation.

"The Cheshire and Mersey Neonatal Transport team had a database which holds the information relating to each of the individual hospitals in the Cheshire and Mersey region about their ability to accept newborn babies or new cases. Normally there are three calls each day to the hospitals in the Cheshire and Mersey network, along with those in North Wales, to confirm whether they are open or closed or open to certain categories of baby, and this is documented within the database."

If Mr Murphy could put up tile T12, please, there's a document behind that which we looked at yesterday with Dr Brigham.

Returning to Dr Dady's statement, he says:

"I have printed a document which shows on 15 February 2016 it is visible which units are declaring open or closed during the day. There is a separate data system for in utero referrals and another for post-natal referrals. I have printed a document relating to the request for the in utero transfer of a patient named [Mother of Baby K].

"It is documented that she presented at the Countess of Chester Hospital at 24 weeks and 6 days' gestation. She was in threatened preterm labour. The referral was made by Dr Sara Brigham, who was a specialist registrar [in fact we know she was a consultant] in obs at the Countess of Chester Hospital. It is recorded that the documentation was completed electronically at 14.31 hours on 15 February 2016.

"It does not state on the record which hospitals were contacted and what their individual responses were, but it does say that a confirmed hospital of Preston was located for the mother and the baby and that was the plan at that stage, to transfer her there. I cannot confirm at what time the hospital in Preston was allocated or the name of the person that entered the information.

"There is a subsequent note that this transfer was cancelled because the patient was too unstable to transfer, but I do not have any further details. I do not know which member of staff made the cancellation request. Normally, this would be the appropriate person to assess the suitability of the mother for transfer, such as the obstetric or midwifery staff at the referring hospital.

"In my professional experience it is a recognised occurrence to happen and not uncommon at all for a transfer to be cancelled. The responsibility rests with the Chester obstetric team in relation to the transfer.

"I also have the information for the subsequent delivery of [Baby K] and the post-natal transfer. It is recorded that [Baby K] was born at 02.12 hours on 17 February 2016, weighing 692 grams at 25 weeks' gestation by that stage.

"The baby was referred to Dr Jayaram, a consultant paediatrician at Chester, and that referral was made at 06.47 on 17 February. A neonatal intensive care cot was allocated at 15.05 the same day.

"The clinical comments at that stage were that the baby was ventilated and needing further management at Arrowe Park Hospital for neonatal intensive care. The information was taken by a member of the neonatal transport team with the initials LC."

Then he formally produces the documents, some of which are embedded in our carousel.

MR JUSTICE GOSS: Thank you.

Witness statement of DR JONATHAN FORD (read)

MR DRIVER: The next and final statement to be read at this juncture is at page 20 of the bundle, my Lord, a statement from a Dr Jonathan Ford. It is dated 22 August 2018 and you may remember, members of the jury, Dr Ford's name featuring on the presentation that we looked at and on some of the documents that we looked at yesterday with his colleague, Dr Brigham.

He says:

"I am a consultant obstetrician and gynaecologist currently working at Leighton Hospital, Crewe. I have been asked to comment on the birth of [Baby K] on 17 February 2016 at the Countess of Chester Hospital, Chester.

"At this time I was a registrar working within the women and children's division at the Countess of Chester Hospital. [Mother of Baby K] was admitted to the Countess of Chester Hospital on 15 February 2016 at a gestation period of 24 weeks and 6 days, with threatened preterm labour and had been reviewed by the day team of doctors. [Mother of Baby K] had been seen by two consultants during the day.

"I was working nights during this time and at 23.45 hours reviewed [Mother of Baby K]. There was a plan already in place from the day team consultants regarding conservative management of her. I spoke with [Mother of Baby K] regarding the issues of extreme prematurity, including the intrapartum management of her, the surveillance on her baby during labour and the implications for her baby once born.

"I scanned [Mother of Baby K] and noted that her baby was breech presentation and the estimated foetal weight on the scan was approximately 600 grams which is a viable weight. I confirmed with [Mother of Baby K] a plan for delivery and a decision was made for no vaginal examination for progress, which would normally be completed every 4 hours if somebody was in labour. But in view of the extreme prematurity the longer the pregnancy

could be delayed and for [Mother of Baby K] to receive steroids, the better.

"I completed my review of [Mother of Baby K] with Dr Horsted, who is a senior house officer I was working with, and Shift Leader Lee(?) who was the lead midwife in charge of the labour ward that night. Following this examination I had no further dealings with [Mother of Baby K] that night.

"I again reviewed [Mother of Baby K] on 16 February 2016 at 21.00 hours. She had had a settled day. The consultant during the day had stopped her magnesium sulphate and tocolytics, which are medications to slow or stop labour. [Mother of Baby K] was pain-free, so it was agreed that she would receive conservative management and await events.

"I was called back to the labour ward to review [Mother of Baby K] on 17 February 2016 at 01.20 hours. She was now 25 weeks and 1 day's gestation and was in pain, implying that she was in active labour with a sensation of pressure down below.

"I examined [Mother of Baby K] and noted she was fully dilated. I could feel bulging membranes. I scanned [Mother of Baby K] again and noted that the baby was in breech presentation and confirmed the baby's heartbeat was still present. I spoke with Dr Brigham who was the on-duty consultant and we made a plan to not rupture the membranes, for [Mother of Baby K] to not actively push, and for her to not have a repeat dose of magnesium sulphate.

"At 01.52 hours the membranes around the baby ruptured, which meant that birth was inevitable. The paediatricians were called to the birth and [Mother of Baby K] was encouraged to push. There were no contractions at this stage, so [Mother of Baby K] was given medication to encourage contractions, but there was little descent. [Mother of Baby K] was placed into lithotomy, which is a position where her legs are raised. I then delivered [Baby K] who was in breech.

"She was low in the vagina so I grasped the feet, rotated back uppermost and completed a Lovset manoeuvre for the arms. There are three types of breech and one of these is called a footling breech, which is when the feet come out first. Such a birth will require further manoeuvring to deliver the head, which is generally the largest part of the baby.

"With a preterm birth there is a risk the baby can slip through the cervix that is not fully dilated, but [Mother of Baby K] was fully dilated and the head was delivered easily. The birth was an uneventful breech birth and [Baby K] was wrapped in a swab and born at 02.12 hours.

"I immediately clamped the cord and passed [Baby K] to the paediatricians who were present. In view of the prematurity I arranged for the placenta to be sent to Alder Hey Children's Hospital for histological examination. I always send the placenta for histology if there have been complications during a pregnancy, such as extreme prematurity, a mother with severe pre-eclampsia or a growth-restricted baby.

"[Mother of Baby K] was aware of what had happened and we discussed the birth events with her immediately afterwards. I have reviewed the ultrasound reports during [Mother of Baby K]'s pregnancy and note under from the dating scan at 14 weeks that [Baby K] had a cystic hygroma, which is a swelling at the back of the baby's neck, which can be a marker of problems in the pregnancy such as chromosome problems, heart problems or other foetal anomalies. This is why [Mother of Baby K] had an amniocentesis at 15 weeks.

"When [Mother of Baby K] had a detailed scan at week 16 and an anatomy scan at week 20 of her pregnancy, the cystic hygroma was resolving and there were no problems with how [Baby K]'s heart looked. I had no further dealings with [Baby K] after her birth."

That completes Dr Ford's statement.

MR JUSTICE GOSS: Amniocentesis, you probably know, some members of the jury, is a test that's conducted during a pregnancy commonly to detect Down's syndrome.

MR DRIVER: Indeed.

MR JUSTICE GOSS: It's in the glossary.

MR DRIVER: Yes.

MR JUSTICE GOSS: Probably some of you knew about it anyway.

MR DRIVER: I'm grateful. May I call Dr James Smith to give evidence, please?

DR JAMES SMITH (sworn)

Examination-in-chief by MR DRIVER

MR DRIVER: State your full name, please.

SMITH: Dr James Smith.

DRIVER: Could you tell us in a sentence something of your current occupational status?

SMITH: So I'm an associate specialist/locum consultant at Whiston Hospital in Mersey Deanery and it's paediatrics and neonatology, level 2 neonates -- paediatrics and level 2 neonates.

DRIVER: Thank you. What was your optional status back in February 2016?

SMITH: In February 2016 I was a locum registrar at Chester for approximately a month. I was ST5 equivalent, so a mid-level registrar in paediatrics and neonates.

DRIVER: I'm grateful. As you well appreciate, you're going to be asked questions about an infant patient by the name of [Baby K]. Do you have any actual memory of [Baby K] and the surrounding events?

SMITH: Yes, I do.

DRIVER: In addition to those features that you recall, have you had and taken the opportunity to refresh your memory from clinical notes that were written up about [Baby K] at the time of her brief stay at Chester?

SMITH: Yes, I have.

DRIVER: Have you also refreshed your memory from reading witness statements that you made nearer to the time?

SMITH: Yes, I have.

DRIVER: I'm grateful. On 16 February 2016 were you on duty?

SMITH: Yes, I was.

DRIVER: Were you informed by midwives and/or neonatal nurses that an infant of a 25-week gestation might be arriving any time soon?

SMITH: Yes, that's right.

DRIVER: Prior to that, had you had any involvement in the care of the baby's mother?

SMITH: No.

DRIVER: Were you, however, briefed as to the circumstances that were presenting?

SMITH: Yes. From what I can recall from the notes, but basically what you've said to do with -- the 25-weeker was going to deliver and was thought to be delivering that night on the night shift, yes.

DRIVER: Thank you. When an event such as that is anticipated, are doctors and nurses from the neonatal unit and, separately, from the obs department coordinated to all be present for the event?

SMITH: Yes, that's right.

DRIVER: So did there come a time when you were called to the labour suite?

SMITH: Yes. So I mean, I was asked to be notified immediately if the baby was delivering and I would ask my consultant to come in and that's one of the reasons why I wanted to know straightaway so I could ask him to come in as well; which would be standard practice.

DRIVER: And the consultant on the night was Dr Jayaram?

SMITH: That's correct.

DRIVER: So does it follow that soon after you were notified of an anticipated imminent delivery, you caused Dr Jayaram to be informed and he responded?

SMITH: Yes, so I asked one of the nurses, I think, to call him and ask him to come in, yes.

DRIVER: But prior to Dr Jayaram's arrival what would your team, the neonatal team, have consisted of?

SMITH: So every registrar is capable of handling a premature baby, including extreme premature babies, so the registrar, which was me, would have attended the delivery suite. There is the SHO, paediatric SHO, so that's a junior doctor. And there will be the neonatal nurses and it's usually one of the senior neonatal nurses that would come -- or one or two at least would come to the delivery suite as well. So that forms the neonatal team. And then you have the obstetric team, which deal with the mother, which is -- they're separate from the paediatric team but they deal with the mother and delivering the baby.

DRIVER: Thank you. I wonder whether Mr Murphy could put up tile 49, please. Before clicking on, if we look to the left, Dr Smith, you will see a tile that records the time of [Baby K]'s birth and I'm going to invite Mr Murphy to click behind our tile

49. Just for the moment concentrate on the typed version. You, I think, appreciate how this presentation works. Beneath that typed summary, if we need to, we can look at the reproduction of the written clinical notes.

So if we familiarise ourselves with that. Notes about the mother, is that right, the first line or two?

SMITH: Do you want me to read it out?

DRIVER: No.

SMITH: Yes, so it --

DRIVER: But do they refer to the baby's mother?

SMITH: It says:

"25 gestation, mum 33 years. No previous live births. IVF baby. SR0M [that means rupture of the membranes] around 48 hours before birth. Received steroids x2..."

That means antenatal steroids, which is to help the baby's lung development:

"No fevers. Spontaneous labour."

So "footling breech", that means the baby has come out with the feet first basically:

"Delivery at 02.12 hours. BW [that's birth weight] 692 grams. Resus by Dr James Smith (paeds reg)."

The addition just to the team that was there is obviously Dr Jayaram had already arrived before the baby was delivered so he was there as well.

DRIVER: Could we pause there one minute? There are a few things that I would like you to focus upon. The note that records no fevers, what is the significance of that?

SMITH: So with any birth you're looking for risk factors for sepsis, they call it, so a fever in the mother would be a risk factor for sepsis, but there's no fever. SR0M greater than 16 hours in a premature baby is a risk factor, so the waters have broken 48 hours before birth, so that's one risk factor. But no fever means there's not that risk factor for sepsis. And it is a risk factor, it doesn't mean there is sepsis, but it is a risk factor but there is no fever.

DRIVER: The risk that you're assessing there is a risk of sepsis within the baby?

SMITH: That's right. They call it risk factors for sepsis in the baby and there's a number of standard risk factors you would check for any birth. Basically any baby that's born, if they have two or more risk factors or what's known as red flag risk factors, they would get antibiotics automatically as a prophylaxis. This gestation of baby would get antibiotics automatically as a prophylaxis. Because of the gestation of the baby you are going to give antibiotics.

DRIVER: So antibiotics would inevitably be prescribed for a baby of this gestation as a precaution?

SMITH: Yes, by prophylaxis, yes, I mean precaution and antibiotics are always given in this gestation of baby as a precaution, yes.

DRIVER: We'll go to the more detailed notes in a moment but just expand, please, upon the meaning of the note here "Resus by you".

SMITH: So "Resus by Dr James Smith" -- so any baby of this gestation -- well, any baby that's delivered at all you follow the standard neonatal life support protocol. So many babies of term gestation, so full term, will cry spontaneously, they will resuscitate themselves because they're full term. But premature babies, especially premature babies of this gestation, they are going to need standard resuscitation as part of neonatal life support, which is the NLS -- we call it NLS, neonatal life support -- algorithm. So the resuscitation that was done is the standard resuscitation that a baby would have at 25 weeks' gestation.

DRIVER: And in practical terms what does it entail?

SMITH: So the baby's born and then the baby -- you have what's called a Resuscitaire. That's basically like a table with a lamp and also warming equipment. That table incorporates a piece of equipment that enables you to give oxygen and give breaths to the baby.

So the baby will be brought over to the Resuscitaire -- in a baby of this gestation -- in a larger baby you would dry the baby, but in a baby of this gestation you wrap them in plastic, so I believe that's mentioned in the notes, and that's to keep the baby warm.

Then you assess the baby and you're going to give what's called inflation breaths. So you give five inflation breaths and you're

listening to the heart rate, when the baby first comes out, you're looking to see whether the baby is crying themselves, and then you're going to give the baby five inflation breaths and that's basically to get oxygen into the lungs and to increase the heart rate.

DRIVER: Pause there. So inflation refers to inflating the lungs obviously. How?

SMITH: So you have -- there's a pipe that comes out of the Resuscitaire and it's attached to a small mask and you set the pressure on the Resuscitaire. So in this gestation you'd set it to a lower pressure so you're not giving too much pressure. Then you would give five -- so the baby would be there, the head this end, legs there (indicating), you'd wrap the baby in the plastic, you'd have a quick listen to the heart rate when the baby first comes out, you put the mask over the baby's face, and then you give five inflation breaths. You're looking for chest movement and then you're looking for improvement of the heart rate and you reassess, basically. So once you've given your five inflation breaths you reassess.

Often you would need to give two sets of inflation breaths, so that's standard, so that's what that says there, so inflation breaths, two cycles; that's standard neonatal life support protocol. And you're looking for the chest rising and the heart rate improving, so it says there:

"HR [heart rate] greater than 100 at 2 minutes 30 seconds."

So that's again a good sign, that's standard -- good resuscitation is what you're seeing here. So you have given the breaths. Then after you are confident that you've got, like, the inflation breaths in, you'd then proceed to what's called ventilation breaths. So that's again breaths through the mask given one per second and that basically keeps the baby oxygenated until you're going to do intubation.

So this baby at this gestation would need intubation because they're so little.

MR JUSTICE GOSS: When you said giving the puffs, essentially, you demonstrated on both occasions using your thumb to press something. It's done -- it's not the machine that does it, it's the (overspeaking) --

SMITH: That's right. With the Resuscitaire, the mask is held over the baby's face. You sometimes use what's known as a two-person technique, so the nurse or the other doctor would do the two-person technique with the mask and then you would give the breaths. It can be done with one person providing you're getting

a good seal and good chest movement. And then you're putting your thumb over the Neopuff, they call it, and then you're giving the breaths.

So inflation breaths is 2-3 seconds, so 1, 2, 1, 2, or 1, 2, 3, and then you give five of those and then you reassess and then you give another set of inflation breaths. Then, provided things are improving, then you can just move to ventilation breaths after that, which is just one per second, so it's 1, 1, so just 1 second.

MR DRIVER: Thank you. Could you click on to the note itself, please?

SMITH: Just to move back because we might not move back to that slide, just to say another good sign is that you have gasps from 3 minutes. You are looking for the first spontaneous breath that the baby's taken for themselves.

That's at 3 minutes so that's a good sign. Then spontaneous respirations at 4 minutes, that means the baby is breathing for themselves at 4 minutes, which is another good sign.

And sats at are 85% at 6 minutes is another good sign. This is a good resuscitation, it's going well.

Just to add that.

DRIVER: Thank you. Does it follow from that that there was no spontaneous respiration from [Baby K] prior to you providing the inflation breaths as you've described them?

SMITH: So it says:

"Initially dusky, floppy, no respiratory effort."

Yes. So there's no cry. But some babies of this gestation will cry, some won't. The heart rate of 60, around 60, though is a good sign because not all babies at this gestation, when they come out, have a heart rate. So having a heart rate is a good sign. And a heart rate of 60 needs improving, but then that's why you give the inflation breaths and then it's above 100 and that's good.

DRIVER: So at 2.5 minutes of life her heart rate was above 100.

And having needed to be jolted into action, as it were, she did give her first spontaneous gasps at 3 minutes and was breathing for herself at about 4 minutes; is that what the note records?

SMITH: That's right, that's correct.

DRIVER: The final note on this screen:

"[The shorthand for oxygen saturation levels] above 85% at 6 minutes of life."

Is that what it means?

SMITH: Yes, that's right. That's correct. So in this gestation that's a good sign. I mean you'd want to adjust the oxygen and you're going to prepare for intubation, but basically when babies move from being inside the mother to the outside, their foetal circulation needs to adapt, become baby circulation basically to the outside world, so there is a gradual increase in the oxygen saturations of the baby, which is normal, and that's physiological, so that's -- the baby is designed to do that, they're adapting to the outside world, and so their oxygen saturations are gradually increasing.

DRIVER: Is the percentage level of oxygen in the system, the sats, as you noted, is that the key measurement here to gauge the success or otherwise of the resuscitation?

SMITH: And the heart rate. Well, it's an overall -- it's the Apgar system so it's colour, tone, heart rate.

Saturations isn't actually part of the Apgar, but the saturation of 85% at 6 minutes in a 25-weeker is a good saturation.

DRIVER: And do you recall or have you reminded yourself as to [Baby K]'s Apgar scores?

SMITH: So the Apgar scores, I believe there's 4, 9, 9. So that means 4 at 1 minute, which is not unexpected in this gestation. And then you've got 9 at 5 minutes and 9 at 10 minutes. That's a good set of Apgar scores there.

4, 9, 9, is good.

DRIVER: Lest any members of the jury are interested, it says "Initially dusky, floppy". What does that reflect in this context?

SMITH: Any baby of this gestation, a 25-weeker, is going to have reduced tone compared to a term baby and being born floppy at this gestation is not unusual at all. So that's what I would say about the floppy. That's nothing unexpected.

The dusky -- again, nothing unexpected because it's a 25-week baby. They tend to have a higher haematocrit, so that means the concentration of red cells in their body, so that can make them

look more reddy-purple than your average baby. So again "initially dusky" is nothing unexpected and you would need -- at 25 weeks you're going to need resuscitation as a standard, but that's what this baby received and so the initially dusky isn't anything unusual for this gestation. It's normal, I wouldn't be concerned about that.

DRIVER: Thank you. If Mr Murphy could now click on to the handwritten notes. That's not your handwriting, is it?

SMITH: No.

DRIVER: And we can see the time and date, these were written at 04.50, and we know that's some time after the delivery of the baby. So does it follow that they were written retrospectively?

SMITH: Yes, that's correct.

DRIVER: If we scroll up, please. We see information about the mother that we've already looked at. Then the fact it was a footling breech. Then there are the details that we've already seen on the previous screen.

Keep going, please.

The next entry is one I'm interested in. This is as far as we got. We've got the fact that her oxygen saturation levels were greater than 85% at 6 minutes and then beneath this -- could you read that note to us, please? "Successfully" onwards.

SMITH: It says:

"Successfully intubated [and then that says 'approximately' 20 mins] at third attempt by Dr Smith, size 2.0..."

Which means the size of the endotracheal tube, so size 2.0 is the smallest size:

"Secured at 6.5 centimetres at lips. Transferred to NNU [so neonatal unit]."

I just want to point out, I mean, yes, that's correct, it says around 20 'minutes. There is a second documentation in the nursing notes which says intubated at around 12 minutes. But that does say around 20 minutes, yes.

DRIVER: The jury have watched a video presentation of the active intubation or a mock-up intubation, so they'll have an appreciation of that. Could you explain the process of multiple attempts, please?

SMITH: Okay. So when you're intubating a baby -- I mean, this baby is stable before you're going to intubate. So you've got a good resuscitation there, you've got good Apgar scores. You would pre-oxygenate the baby using the mask. So you've got the mask over the baby's face, you're giving breaths and oxygen as necessary, and you want to have the saturations above 90%.

DRIVER: Pause there. That degree of stability, is that a necessary prerequisite before intubation is embarked upon or attempted?

SMITH: It's a good idea to stabilise the baby before you're intubating. You can go straight to intubation if you need to. If the scenario was the baby was not in good condition, the heart rate wasn't improving, you weren't getting good chest movement, then that would be a different situation to what we have here. So that would need you to intubate more -- it's more urgent. In this case you've got a stable baby before you're intubating, you've got the saturations above 90%, and you're going to have an attempt at intubating. So this baby -- any baby of 25 weeks is small, very small, so it's a technically difficult intubation, but the baby is stable, you've got a good heart rate, good oxygen saturations, there's no concern.

So it took three attempts for me to intubate. What I would say is my consultant was there the whole time, there were no concerns, the baby was stable, and he had confidence in me to get the intubation. It's not documented, but what I believe from my memory and also my experience of doing many intubations, what I think probably happened is that I probably tried with a 2.5 size tube first and then that was -- you're basically looking, if the jury's seen a video, looking for the cords and you're looking to put the tube through the cords.

DRIVER: Vocal cords?

SMITH: Yes, that's right. The 2.5 size tube, I may have not been able to get through the cords, so I will have switched to a -- so after doing one attempt you will stabilise the baby again, you get the saturations above 90, you get the heart rate above 100, then you make sure the baby is stable, then you do another attempt. Then the third attempt, the size 2.0 tube has gone in and you're also looking for the colour change on a little -- we call it a capnograph, so you put a capnograph on to the tube. So you've got the tube in, you put the capnograph on, you're looking for it to colour change from purple to yellow so that means you've successfully got the tube in. It's a carbon dioxide, CO₂, detector and on the third attempt it was successful, so we secured the tube at 6.5 centimetres.

DRIVER: In the midst of that description you mentioned making sure the baby was stable between events; how is that measured?

SMITH: So any intubation, you'd want to stabilise the baby before having another attempt. So that means that you would -- so if you've been unsuccessful with the first one, you would take the laryngoscope out -- you would have a tube so you would take the tube out, the laryngoscope out, then you put the mask back on to the baby's face. Then you're going to give ventilation breaths, so one per second, to bring the oxygen saturations of the baby back up and the heart rate back up. And then you're going to want the baby to be above 100 with the heart rate and above 90 with the saturations.

The baby in fact might have -- you have 30 seconds to get the tube in and if there's any sign that the heart rate is falling and the oxygen saturations are falling then you would stop that attempt, you'd re-stabilise the baby and then you would try again.

But this is standard intubation procedure and the other thing that makes me reassured that this was a stable baby is the fact that Dr Jayaram was there the whole time, my consultant, and he didn't feel that he needed to step in and he had confidence that I could get the tube in. That is -- having supervised many registrars with intubation myself since -- that can often be the correct decision because the doctor who's already had a look, in other words, knows where the anatomy is, maybe just needs a smaller tube, which I think is what happened here, and he's been successful on his third attempt. Actually switching to a different doctor might be the wrong decision. So he would have confidence in me and I got the intubation on the third attempt successfully. But the baby will have been stabilised before each attempt and I know that because Dr Jayaram would have stepped in if that hadn't been the case.

DRIVER: So before each attempt you go back to square one effectively?

SMITH: Yes, you stabilise the baby again, as you did with the initial resuscitation, we're putting a mask on the baby's face, you give ventilation breaths, you give oxygen, and you make sure the baby's oxygen saturations are above 90% and the heart rate is above 100.

DRIVER: At this point in the baby's first few minutes of life on the Resuscitaire, knowing that intubation was about to be attempted, would the baby have been given any sedation to reduce discomfort?

SMITH: No. So just to make that clear, when a neonate is resuscitated, when they first come out, you don't give pre-medication. So you wouldn't be wanting -- at that point you don't have intravenous access as a standard, so you just do airway. When a baby's first come out, you do ABC, but you don't give medications before intubation. It's different from adult intubation in that sense because adult intubation or child intubation, you're always going to give pre-medication to relax, like a muscle relaxant or morphine for pain relief. But in an initial resuscitation intubation, you don't give pre-medication, you just intubate.

If you need to re-intubate later then you would give -- you can, not always, but you can give some pre-medication later on in the form of an opioid, so morphine or, for example, fentanyl and/or a muscle relaxant with that. But in an initial resuscitation this is standard neonatal intubation procedure, everything here that happened is standard, you wouldn't give pre-medication.

DRIVER: And you mentioned ABC, which I assume has some special meaning to you in this context?

SMITH: Oh yes, it's airway, breathing, circulation. Basically the standard cornerstone for resuscitation in adults and children is ABC.

DRIVER: So although technically challenging, ultimately the procedure was successful, was it?

SMITH: Yes, that's right. The fact that it took three attempts, it's a 25-week gestation neonate, is not unusual. This is standard and there was no concerns.

DRIVER: Was there any --

SMITH: And I remember, not just from the notes, there was no concerns. I remember in my memory there was no concerns at this resuscitation.

DRIVER: Thank you. From your memory and from your review of the notes, is there any evidence that this procedure, this intubation, caused any trauma or any injury to the baby?

SMITH: No, that's been asked in witness statements that I've been asked to make and I... I mean, the jury has access to those statements, do they, that I've made?

Basically, the best answer --

MR JUSTICE GOSS: The short answer is no, they don't.

SMITH: Right, okay. I don't know if you want to bring up my statement to do with that. It might make it easier to explain. But the thing that I can -- how I can explain that is that at no point did I feel that anything was concerning, anything had gone wrong, I needed to hand over to my consultant to intubate this baby. If I'd seen trauma in the airway, bleeding, I would have done that. I know I would have done that because the level that I was at was ST5, so quite experienced, but if I'd seen bleeding in a 25-week neonate that was concerning I would have handed over to my consultant to intubate.

So the best answer I can give is that, first of all from my memory, I don't recollect any bleeding, any significant bleeding, any bleeding. And second, the resuscitation course doesn't reflect that. So I don't recall any trauma or bleeding or anything. So those two things, not only my memory but the notes and the way the resuscitation course went, it doesn't reflect that. So that's the best answer I can give based on the time frame of how long ago this was, but that is my best answer to the best of my knowledge.

MR DRIVER: And what about the general clinical picture at this juncture?

SMITH: So the general clinical picture is the baby -- this is a good resuscitation. This is a good resuscitation, the baby is stable, the baby's doing well. Apgars of 4, 9, 9 in a 25-week neonate is good. The baby's been intubated. This is a good resuscitation --

DRIVER: Thank you.

SMITH: -- and the baby is stable at this point.

DRIVER: We see the final note at the bottom of page says:

"Transferred to NNU."

Does that indicate that at that point [Baby K] was taken from the labour suite to the neonatal unit and would you have accompanied her?

SMITH: Yes. So the neonatal team will have gone -- and I believe at the Countess of Chester it's on the Resuscitaire, so we'd have gone on the Resuscitaire to the neonatal unit to put the baby into an incubator, so the baby with the -- so the baby is now intubated, but the breaths are still being given manually by a doctor, which will have been me, probably most likely. So you're giving ventilation breaths through the intubation tube and you're giving that with oxygen en route to the neonatal unit.

DRIVER: If Mr Murphy could go to tile 55, please. There's some repetition here inevitably. If we stay with the chronology. This records that on arrival, that is to say on arrival within the neonatal unit, there were the following findings. What do they represent?

SMITH: This represents the ventilator settings. So you've got 21 over 5, means the PIP and the PEEP, which are basically how the ventilator is set up to give breaths.

So that's standard. "T in 0.4" I think is supposed to say "I time", so IT. So IT 0.4 stands for inspiration time, and again 0.4 is standard. That's just standard ventilator settings.

FiO₂, that means the oxygen that you're giving to the baby, so the baby at this point is needing 60%. So that's pretty good so the baby's only needing 60% oxygen. Then you've got good chest wall movement, good air entry, venous gas. So the venous gas -- when the baby arrived on the neonatal unit I put in a cannula; I think the notes say that and I remember that. So I cannulated the baby, so that's putting a little plastic tube in the baby's vein, I collected blood samples, and one of the blood samples that you collect is a blood gas and that's the blood gas. So the blood gas says pH 7.23.

DRIVER: Do you see the white file in front of you? Could you go -- we've got some of the original documents in there.

If you go behind divider 6F, please.

SMITH: The blood gas record?

DRIVER: Yes. Just to familiarise the jury with it, date and time. So the first recorded on this document at least is at 03.03 on the 17th. Then there's a set of data which I'm sure has meaning to you but probably not any great meaning to us laymen.

SMITH: Do you want me to explain?

DRIVER: Really, if you could summarise. What clinical conclusions can be drawn from that data?

SMITH: So you're doing an initial blood gas on the baby and the blood gas is to determine what the level of the baby's pH is and what the level of the carbon dioxide is.

You're also going to look at the base excess, which basically gives you an indication of the metabolic side of the baby. Then you're looking at the glucose in case the baby's blood sugar is low, but that's not the case.

And then you're looking at lactate.

So from this gas pH 7.227 as a first blood gas on a 25-week neonate is a good gas. So pH 7.4 is normal, but pH 7.227 on an initial blood gas on a 25-week neonate is a good blood gas. PCO2 7.84 is good. That means the baby is clearing carbon dioxide, the tube is functioning correctly. That's the other thing you can gauge from this gas: the ventilation of the baby is doing what it's supposed to do, so it's clearing the carbon dioxide and this is why the pH is good because the carbon dioxide is cleared. If the carbon dioxide wasn't being cleared, the pH would be lower, so this is a good gas.

Metabolic-wise the base excess of minus 3.7 is again good, that's a good base excess. Glucose 4.0 is normal.

Lactate 4.5 is expected at this age. When a baby's first been born you do get a mildly raised lactate when the baby's born. That, again, is nothing to be concerned about. The rest of the documentation says SIMV, which is the setting of how the ventilator is set up, so it's basically synchronises with the -- if the baby takes any breaths spontaneously. Then you've got pres, which is pressure, 21/5, which is standard ventilator settings, and FiO2 50%. Like I said, that's means the baby's getting -- needing 50% oxygen, which again is good, it's not a huge amount of oxygen for -- not an unexpected amount of oxygen for this baby. And you've got a rate of 50, which is the number of breaths per minute you have the ventilator set at and 50 is a standard setting.

DRIVER: Taking a step back if you would, Dr Smith, considering all that data collectively, what, if anything, does that inform you of the success or otherwise of the initial resuscitation?

SMITH: So this blood gas means that -- the blood gas was taken at 03.03. This blood gas indicates the resuscitation went well, it was a good resuscitation, you've got a good first blood gas on the baby, and it also indicates that the tube is functioning completely normally, like adequately, it is clearing carbon dioxide, you've got a good first blood gas.

DRIVER: Does it provide the means of measuring the baby's stability?

SMITH: Well, you'd be happy that a baby of 25 weeks has a blood gas like this. This is a good sign. It's a good initial gas. It's not a worrying gas. It implies the baby is stable and everything's gone well with the resuscitation.

DRIVER: Thank you. If Mr Murphy could take us back to tile 55 and the underlying document, please, which begins -- I think you'll find it's Dr Jayaram's handwriting, with the words "on arrival". Then we have data, some of which is in that blood gas record and some of it refers to other features of the baby; is that correct?

SMITH: Yes, that's correct. So it says:

"On arrival [what we talked about before so] ventilator 21/5. I time 0.4. FiO2..."

So that's the oxygen being given to the baby, so not the baby's saturation but the oxygen we're giving to the baby is 60%, so that's fine. Then you have the blood gas as we have described. Then it says:

"Given 120 milligrams surfactant at 02.45."

DRIVER: Pause there, please. What is surfactant and what is it for?

SMITH: So surfactant is -- basically you're giving the baby artificial surfactant. So all babies make their own surfactant when they're full term, but premature babies don't make enough of it and this gestation wouldn't be making it. Surfactant helps the baby's lungs to breathe in and out easier. So it helps with what's called lung compliance. So you're wanting the baby to be able to breathe easier. So you give the surfactant because they can't make enough of their own at this gestation, a 25-weeker. You are giving surfactant down the endotracheal tube, so the tube that you put into the lungs, you're going to give that to them to help them to breathe easier. So that's what we do.

It's like a liquid, you get it out of a vial, you put it into a special syringe and then you put a straw into the endotracheal tube and then you give the medicine down into the lungs and then the lungs -- it's easier for the baby to breathe.

DRIVER: I'm grateful. The next sub-heading is fluids. What does that note tell us happened?

SMITH: So that says:

"IV access obtained."

So that was me cannulating the baby. "BM4", that means blood glucose 4. That's normal. Then:

"Commenced 10% dextrose."

So that's sugar fluid, standard sugar fluid, at 60ml per kg per day. That's the standard rate that you'd give IV fluids for a newborn baby.

DRIVER: You cannulating the baby, remind us, what does that mean?

SMITH: So either in the hand or the arm or the leg, you insert a -- you do it under clean conditions, so aseptic technique, you make sure that the skin is clean and you insert a needle with a plastic tube, which you thread into the vein, you remove the needle and then you take a blood sample from the cannula and standard blood samples for neonates would be full blood count, CRP, which is C-reactive protein, which is a marker of infection, and you would take a blood culture, that's a standard thing you would do in a neonate of this gestation because, like we discussed, you're going to give antibiotics as a precautionary measure. So you're going to take a blood culture as a precautionary measure to make sure nothing grows in the blood culture. And you're going to do a blood gas. So that's where the blood gas has come from.

DRIVER: So that's using the cannula to extract blood from the baby. Is the same portal used to introduce medicines and the like into the baby?

SMITH: Yes. So that's -- once you've secured the cannula that's when you'd connect the 10% dextrose and that's the IV fluids and that's going to maintain the baby's blood sugar.

DRIVER: The next sub-heading is -- does that say -- is it sepsis?

SMITH: It's a sub-heading -- like sepsis, it's like a standard documentation.

DRIVER: Is that the process you have just explained to us, taking blood out for tests?

SMITH: Yes, so that means covering for sepsis, it doesn't mean the baby has sepsis.

DRIVER: No.

SMITH: But it means blood culture sent, so that is that standard stuff you would do to screen for sepsis.

DRIVER: Sorry to leap about but if Mr Murphy could take us to tile 88, we'll see the results of the tests on that blood that you took or was taken in your presence. We won't need to go to the document. This description of it will --

SMITH: It says:

"Blood culture, venous blood: no bacterial growth after 5 days' incubation."

So the blood culture is negative so from the blood culture there is no sign of sepsis, there is no sign of infection.

I also know from the CRP, reviewing the notes, the CRP was -- less than 1 I think is documented. CRP is a marker of infection for neonates and the CRP on that blood sample that I took was less than 1 if memory serves, and that is as low as is it possibly can be. So again from that blood sample there was no -- that I took there was no sign of infection.

DRIVER: Thank you. If Mr Murphy could take us back to tile 55 and the underlying document there. The next sub-heading, is that "Meds"?

SMITH: That is right.

DRIVER: This is medication prescribed at this point; is that right?

SMITH: Yes, it doesn't necessarily say when it was given on these notes, it just says, it says vitamin K IM. So that's -- you give vitamin K to babies to prevent haemorrhagic disease of the newborn and that's again standard care.

"Ben pen" -- that says ben pen and --

MR JUSTICE GOSS: Sorry, IM?

SMITH: IM means intramuscular. That's standard as well. Then it says, I think that says "ben pen and gen" -- that's what it's trying to say.

DRIVER: Is that the antibiotics?

SMITH: The antibiotics, again standard. Then it says...

"Morphine 20 mics per kilo per hour", it says there.

DRIVER: Just so there's no confusion, they're the medicines or substances that are prescribed at this point, that's not to say they are delivered or were delivered into the baby at this point?

SMITH: Well, the documentation, if you go back up, isn't the time that Dr Jayaram has wrote this -- isn't this retrospective at 04.50?

DRIVER: It is, yes.

SMITH: He's wrote this retrospectively. It doesn't give any indication -- it doesn't mean it was given at 04.50 and it doesn't specify any time on this documentation as to when it was given.

DRIVER: And that --

SMITH: It just lists the medications that -- but you can -- him writing this means that at this point you would say that he's wrote that because they have been given by this point in writing 04.50.

DRIVER: There will be other records as to when medicines are delivered to the baby no doubt. But this is in distinction to the surfactant note which does have a time reference within it?

SMITH: Yes. Surfactant, is that on this sheet?

DRIVER: Yes.

SMITH: My memory, it says 02.45. So surfactant was given at 02.45 hours.

DRIVER: So the next sub-heading, is that an examination of the baby?

SMITH: Yes. So this is -- that's examination, that's correct.

It says:

"Pink. Tone good. CVS [that means cardiovascular system]: femorals normal [is what he's wrote there]."

By "refill", he means cap refill. So that means the perfusion of the baby.

DRIVER: Circulation?

SMITH: Circulation, yes. You're looking for how quickly the capillary refill refills. So less than 2 seconds is what he's wrote and that's normal. The next bit of documentation what he's -- that's standard documentation, it means heart sounds normal. So this baby has pink, normal tone, normal femoral pulses, normal perfusion, normal heart rate -- sorry, normal heart sounds.

Then he's put:

"Respiratory: good chest movement [I think he means] left plus right."

So that's good chest movement. And:

"Good air entry left plus right."

So you have got good air entry and good chest movement. Then he has put "abdo soft", so that means abdomen soft and "CNS" is central nervous system. That says "tone good". So again that's normal. So that's -- the examination is normal, that examination is normal.

DRIVER: The air entry left and right, is that both lungs?

SMITH: Yes. That's left and right lungs, yes.

DRIVER: Thank you. So the examination that you've described in a word as normal, having been undertaken, the next note records a conversation or at least a plan to converse with the neonatal transport team?

SMITH: Yes, so it says:

"D/W [which means 'discussed with'] neonatal transport team. Advised that they will transfer to Arrowe Park when..."

I'm trying to read what that says.

DRIVER: I'm sure Dr Jayaram can help us.

SMITH: Oh:

"... when umbilical lines placed and X-rays done."

So basically, they've advised us to insert umbilical lines, which is standard stuff for this gestation. So that means after you have done the cannula, so we already have the cannula which is giving the fluids and the antibiotics, then you're going to put umbilical lines in, which gives an additional secondary venous access and that's what they've advised to do, to get umbilical lines, and the second umbilical line is also an umbilical artery line, a UAC we call it, and that can be useful in measuring the baby's blood pressure.

So standard for this gestation, you would insert umbilical lines and you'd get X-rays -- so the X-ray is to check the position of the lines going in the tummy button, through the cord, and the

X-ray is also to check the tube position, the endotracheal tube going down into the lungs. And then he's put "Parents updated".

DRIVER: Thank you. So the umbilical lines that you referred to, are they sometimes called central lines?

SMITH: They are a central access, yes.

DRIVER: And they go into the baby's -- what remains of the baby's umbilical cord?

SMITH: Yes, so you would -- it's -- I mean this situation, the baby has an IV cannula, the baby has a peripheral venous cannula, which is giving the baby everything they need.

They're getting the fluids through that, they've had the antibiotics through that, so there's no urgency to get the umbilical lines. So in this situation you would do it under sterile conditions, which means full surgical gown, cleaning the umbilical cord very well, cleaning the baby, making sure you're not introducing any infection. So you would set about doing that, but in terms of the medications and the fluids the baby is receiving, the baby's already receiving everything through that peripheral cannula, so the umbilical lines, there's no immediacy to put them in. But it's useful to have them in this gestation of baby and that's the reason for inserting them, because a baby of 25 weeks, it's a secondary line, which is useful to have, and also, later on, the baby, because it's a central line, the baby can be given what they call TPN, so that's total parenteral nutrition, so that's actual -- the baby is getting fluids, which provides the baby sugar, which is all the baby needs at this stage, but if you have an umbilical line later on, like a couple of days or a day down the line we're talking, you can give TPN, so total parenteral nutrition, through that umbilical line.

That's the benefit of having a central access through the umbilical cord.

DRIVER: Thank you.

MR JUSTICE GOSS: That's the additional fat and things like that which Dr Gibbs told us yesterday?

SMITH: Mm-hm.

MR DRIVER: I'm grateful.

So plainly this note indicates that a dialogue had been initiated with Arrowe Park, it being the intention to transfer [Baby K] to a tertiary level hospital, and does it follow that to some extent the clinicians there at Chester were being, from

here on in, to a degree directed by their colleagues at Arrowe Park?

SMITH: Yes. The transport team would be available to give advice over the phone and they would say they're on their way. This again is standard stuff for a baby of this gestation, that the transport team is going to need to come, they've advised us to get umbilical lines in while they're on their way, and they're coming and they would be available to talk to as well, yes.

DRIVER: Thank you. Could we go, please, back to the carousel and tiles 99 and 100, which record the event at 03.50, which is at the foot of the note we were just looking at.

We can see here what's described neutrally as an event. Do you recall, Dr Smith, an event at about this time, which required some clinical intervention to assist [Baby K]?

SMITH: Yes, I remember the event. I was out of the room at the time, but I do remember coming back in and, from my memory, Dr Jayaram was on the right-hand side of the incubator and he was, from my memory, trying to bag the baby through the endotracheal.

DRIVER: By bag, what do you mean?

SMITH: So basically, the endotracheal tube is attached to a ventilator, but if there's been a problem like a sudden desaturation, what is what he's documented, you've got a desaturation, then you want to establish why has the baby desaturated, so what's going on. So you're going to look at the tube that's going down into the lungs and what you get taught is four things you look for -- you call it DOPE as an acronym.

So you have displacement -- so displacement of the tube, so has the tube moved out of position, like it's not going down into the lungs anymore, it's come out of place. That's displacement, D.

Then you have O, obstruction. So could it be a blockage of the tube?

Then you've got P, you've got pneumothorax. So that's why he's mentioned a cold light test, so that's --

DRIVER: What's a pneumothorax?

SMITH: A pneumothorax is -- it's one explanation for a sudden drop in oxygen saturations or a drop in oxygen saturations or increasing oxygen requirement like fairly rapidly. That's because you've basically got air outside of the lung in the space between the lung and the outer wall. So air is not just in

the lungs anymore, it's actually in the space where it shouldn't be. So that's pneumothorax. That's P.

So D-O-P-E, then you've got E, which is equipment failure. So is there a problem with the ventilator itself which has caused the problem? So what you would do first is because the -- so what I saw Dr Jayaram doing, from my memory, is he was trying to bag manually, so he's disconnected the ventilator and he's trying to bag manually through the tube, so he's connected what's called a Neopuff, which we mentioned. So you can give again the thumb breaths through the endotracheal tube, which is still in the baby's mouth, like going down -- at this point you're not sure where it is, but you're trying to basically give the breaths still through the tube, which is the correct thing to do. But that was not successful.

I remember coming in and I was saying, "What's going on, what's happening?" I saw him doing the bagging. So basically, it's not working. So he's then taken out the tube and then from my memory I remember saying, "Do you want in to re-intubate?" So I'd already intubated this baby successfully, so that's why I put myself forward that I can do this again, I can re-intubate. So that's when we would assemble -- so he's taken the tube out, then he's going to put the mask on to the baby's face again to stabilise the baby, give breaths while I'm assembling equipment for a re-intubation, and then I perform the re-intubation according to the notes.

DRIVER: At this point, this second intubation, was [Baby K] provided with a morphine infusion for comfort?

SMITH: So from the documentation, what's wrote is that a morphine bolus was given and before I do a re-intubation -- so this is a re-intubation now, so before doing a re-intubation, to make it more comfortable for the baby, as standard practice you would give a morphine bolus. So the morphine bolus is an injection given over 1 to 2 minutes through the cannula.

That's just given as a -- by bolus we mean a one-off.

So that's a one-off that you give before the intubation.

So according to the documentation in the notes that was given before I did the re-intubation.

As to the morphine infusion, it isn't as clear as when that was commenced. So you might want to pull up the specific tiles because I've been asked about that in the witness statements as to when that was commenced, when it was withdrawn from the -- when the morphine was withdrawn from the cupboard.

DRIVER: I'm grateful. That was my error. But in any event, a bolus, a dose, of morphine was given at or immediately before re-intubation?

SMITH: Yes. So a dose of -- a one-off dose, a bolus, was given through the cannula. The notes say, I believe, 100 micrograms per kilogram. That's a standard dose of morphine just to make the re-intubation easier and for comfort and you re-intubate. That re-intubation did take two attempts but it was with the larger tube size, 2.5, and this time the larger tube went in so we have got the larger tube, so the baby has a size 2.5.

DRIVER: If we go to the original note, please.

SMITH: Just to say, to go back, because what happened was to go through the DOPE causes, the obstruction of the tube, so there's no O, so there was no documentation of the tube being blocked, that's all I can say objectively from the notes. There was no documentation -- I have no memory of the tube being blocked so there's nothing wrote with that. P, there's no pneumothorax because the cold light test is negative, so that's not the cause. And E, equipment failure, that's not the cause because the ventilator was working fine. So that leaves D, displacement of the tube. So the cause appeared to be the tube had moved, displaced.

DRIVER: Thank you. Was re-intubation successful? Scroll down, Mr Murphy.

SMITH: So re-intubation took two attempts this time but it was successful with the size 2.5, I believe. So:

"Re-intubated by Dr Smith after bolus of 100 micrograms per kilo morphine. Size 2.5 ET tube placed 6.5 centimetres at the lips."

So standard. That means the depth of the tube.

That's a standard depth for this size of baby:

"Good air entry, left plus right."

That means left and right sides of the lungs good air entry.
And:

"Vent set up as previously."

So basically we've gone back to the same ventilator settings as before.

DRIVER: Thank you. Tile 144, please. We don't need to go behind it. Does this record that at some point overnight you did manage to secure an umbilical venous catheter?

SMITH: Yes. So it says:

"UVC [so that's umbilical venous catheter] inserted by Dr Smith, 9 centimetres at the cord."

So that basically means how far in you put it. Then it says:

"UAC..."

Which is the second one that I mentioned, the umbilical artery catheter. So the umbilical artery one is for -- a central measurement of baby's blood pressure, but you can still measure it peripherally.

But the UAC wouldn't go in and I believe I asked Dr Jayaram for assistance with trying to get it in, but we couldn't get that one in. That's not always -- that can happen. These are -- basically these lines are the size of a millimetre and you're trying to put it in a hole the size of a millimetre. So it's not always possible to get both in. You'd ideally want the UVC in because then, like I said, you could later on give the total parenteral nutrition. But we get the UVC in but the UAC didn't go in, but you can still measure the blood pressure peripherally so it's not going to cause any bad outcome or anything like that, so there's no problem with that.

DRIVER: This is as per the instruction or request from Arrowe Park, which also requested X-rays be taken?

SMITH: Yes. This is a request of the transport team, but also we would -- you would do this as standard for any gestation of this baby (sic), a 25 weeker would need umbilical lines because that's -- it's useful to have them. And then you do X-rays to check the position later on. So that says:

"UVC IVC."

So that means the position of the UVC is in the inferior vena cava, which is fine. Then it says:

"Left lung hazy" --

DRIVER: Let's go to tile 149 for a little more detail about that X-ray.

MR JUSTICE GOSS: Whilst we are waiting for that, the inferior vena cava may be known to some people but...

SMITH: That's the blood vessel where the line is in. That means it's gone in the right place in terms of the position. So it's gone the track that you want it to go in basically.

MR DRIVER: All of that that you've just described, the position of the UVC and the haziness that we saw referred to on the last tile, what does that mean in this context?

SMITH: Well, I mean, I've reviewed the X-rays myself and what strikes me is there's no mention of surfactant-deficient lung disease on the actual report. Now, any baby of this gestation, a 25-weeker, as I said, they don't make their own surfactant, so they are surfactant deficient.

So a lot of the haziness that you will get on an X-ray of a baby of this gestation reflects surfactant-deficient lung disease, so not infection.

Having looked at the X-rays myself and also looking at the subsequent X-rays, the haziness, it is there on the X-ray, but the haziness that's described that you can see on the X-ray in the subsequent X-rays isn't there. So to me, that reflects -- if it was infection it wouldn't just disappear like that, it would be persistent. So to me, the X-rays reflect surfactant-deficient lung disease rather than any infection.

What they've put there is they've put:

"Hazy increased shadowing is present throughout the left hemithorax compatible with consolidation."

Consolidation is a term they might just mean haziness and trying to explain it or they might mean -- be trying to say that this is infection but, no, I mean, to me the lungs reflect surfactant-deficient lung disease, the bloods don't reflect infection, the fact that the haziness disappeared later on reflects surfactant-deficient lung disease and not infection, being objective.

DRIVER: Thank you. There was a further event at 07.25, which is I think at tile 174. But as far as I'm aware, correct me if I'm wrong, you did not have any direct involvement in the response to this subsequent desaturation?

Is that right?

SMITH: Can we review the notes for that?

MR JUSTICE GOSS: Of course.

MR DRIVER: Next tile, Mr Murphy. Go to the clinical notes themselves, please.

SMITH: Well, I remember now. Isn't this the time when I re-intubated again at some point just after this?

Because there's a third intubation. So I covered the paediatric ward at the same time. As to specifically remembering this re-intubation, I don't remember this one, but...

DRIVER: I think we'll find that Dr Jayaram --

SMITH: Because he's put here given -- scroll up:

"Gas, PCO₂, 12.8."

Is this a follow-on from the first deterioration or is this the next one?

DRIVER: I think this is the third deterioration.

SMITH: What's wrote here is:

"PCO₂ 12.8, pH 7.07."

That's not good. So the pH is too low there. The PCO₂ is too high. The base excess is minus 3. So he's put given 20ml per kilogram saline bolus. So that's a fluid bolus because the mean blood pressure is 20. So the blood pressure is not as good as you want. Then he's put:

"In spite of this, sats to 75%."

So that means the oxygen saturations of the baby.

So what he's done then is he's said:

"Tube pulled back to 6 centimetres."

So he's tried to pull the tube back to see if that improves the oxygenation of the baby. But then he's put:

"Sats dropped further."

So he's done the correct thing there and it's not working what he's doing, you want to do what you can to improve the oxygenation. Well, he has tried to pull the tube back and it's not working so then he's extubated.

So then he will have -- then he's put:

"Responded to bagging."

So he's taken the tube out because it's not working again, the oxygenation is not working with the tube at this point, and then he's been re-bagging the baby, so the Neopuff mask over the face again. Then he's put:

"Responded to bagging."

And then it says:

"Re-intubated with 2.5 endotracheal tube by Dr Smith, 6.5 centimetres at the lips."

So that's the third time I've intubated this baby successfully.

DRIVER: Well, our understanding, Dr Smith, is these notes relate to an event at 06.15, which we've already considered.

Thereafter, at 07.25, there was a third event and that's the one I was directing your attention to. It's our understanding that you had no involvement in the aftermath of the event of 07.25.

SMITH: No, it looks like -- I have no memory and I agree it doesn't look from the documentation that I've been involved in that one and I have no memory of that one.

So that one says:

"07.25, mean BP dropped to 14. Therefore further bolus of 10ml per kilo normal saline."

DRIVER: Yes, we'll deal with that with Dr Jayaram. Sorry, I don't mean to be rude.

SMITH: No, no, no.

DRIVER: I think your final involvement in relation to [Baby K] at the Countess of Chester Hospital was the creation of a letter, a transfer letter, which we have at tile 285. And is it a matter of form that a hospital transferring a patient out to colleagues elsewhere will provide those colleagues with a letter setting out the history for their use?

SMITH: Yes, that's right. So you do what's called a transfer letter and so that's my documentation for the case. It is basically summarising the events and what's happened and the medications and --

DRIVER: If Mr Murphy was to show us the letter. If you scroll to the bottom to see Dr Smith's signature, I think, or at least his

name. It's addressed to the transport team, it gives them a record of the significant events of [Baby K]'s time at the Countess.

SMITH: Yes. That's my name at the bottom. I wrote that letter.

MR DRIVER: Thank you, Dr Smith. They are the only questions I have for you at this stage.

MR JUSTICE GOSS: I'll just check. Does anyone want a break at this stage or not? Happy to continue? It's 12.15, which means we'll go on for about another half an hour or so before we have a break.

MR MYERS: It might be about 40 minutes, my Lord.

MR JUSTICE GOSS: I did say "or so".

Cross-examination by MR MYERS

MR MYERS: Dr Smith, when you began your evidence a while ago you said that every registrar can handle the delivery of a baby, including an extremely preterm baby.

Do you agree? That's your evidence on that?

SMITH: A registrar is trained to be able to handle an extremely premature baby in the event of an emergency. That's why they're on the middle grade rota. They are capable of intubating and managing an extremely premature baby.

However, any extremely premature baby you would want to call your consultant in from home, obviously, if it was a night shift, and you'd want the most senior personnel there available, and if an extremely premature baby delivers you're going to want to call them in as soon as possible if they're not on site. But as a registrar, you are capable of intubating an extremely premature baby if the consultant, for example, is on his way in the car, 20 minutes away, and a baby comes in off the -- a mum comes in off the street about to deliver an extremely premature baby, a registrar should be able to handle the initial emergency resuscitation but you'd want the most experienced personnel there as soon as possible, yes.

MYERS: You required it as necessary to call the consultant, that's Dr Jayaram, for this level of gestation, didn't you?

SMITH: Yes. Any baby of this gestation with any registrar, you would ask for the most senior person to be there as soon as possible because of the gestation of the baby. For any gestation at this level with any registrar. That's standard.

MYERS: So an extremely preterm baby like [Baby K] presents particular potential problems; that's right, isn't it?

SMITH: Yes, that's correct. A baby of this gestation will need assistance at birth and will need assistance afterwards well.

MYERS: That's why ordinarily, ideally, a baby like this would be born at a tertiary unit rather than a level 2?

SMITH: Well, ordinarily, there are many babies of this gestation that are born at level 2 units. So this is not something unusual, that a baby of this gestation is born in a level 2 unit. There are many babies per year -- from my research there are thousands that are actually born of this gestation, that are actually born in level 2 units, but then they get transferred to a level 3 unit after birth. Because the nature of it is that a mother could walk in about to give birth to a 23-weeker, for example, a 23/24-week neonate, they could come in, and a level 2 neonatal unit is fully equipped and fully staffed to be able to handle that gestation of baby, but then you would get the transport team to come to take the baby to a level 3 unit afterwards, after stabilisation, to move them to a level 3 unit.

Because at the level 2 unit you could have a mum walk in at any point and because of that, if it's not safe to transfer the baby, which can be the case, as was in this case -- not safe to transfer the mother, sorry, before the baby delivers, as was the case, then you need to handle that as a level 2 unit and that's what the level 2 units are designed to do and that's what consultants paediatricians are able to handle, like Dr Jayaram, and even registrars like myself. Like I said, I have the training to be able to handle this gestation of neonate.

MYERS: In fact, you were the one who did everything, weren't you?

SMITH: I was the one who intubated the baby, I was the one who cannulated the baby. I was the one who intubated -- re-intubated the baby the second and third time and I was the one who inserted the umbilical venous line but also did get Dr Jayaram's assistance, I think, to try to get in the UAC, but we weren't able to do that. So those were the key procedures that I was involved in with this baby.

What was your question? Did I do everything?

I mean, these are the key procedures that I did.

I think it's a team effort with this kind of baby.

There was a whole neonatal team there and they were doing a lot of things. But those were the key procedures that I performed and my consultant was there to supervise the whole time.

MYERS: Can we put up tile 49, please, Mr Murphy. These are things you looked at today. You've looked at these before, haven't you, these bits of evidence?

SMITH: That's correct.

MYERS: We might come to it. You have given evidence before when we've been dealing with this issue in the first trial, haven't you?

SMITH: That is correct.

MYERS: Tile 49. We can just see the description here and this might be suitable for what I want to ask. You've explained and you've used the expression about how stable [Baby K] was at times or in a good condition or what have you. When you say that you're not suggesting for instance that compared with babies up to a four-week (sic) gestation, compared with them, she is in a good condition --

MR JUSTICE GOSS: Forty.

MR MYERS: Sorry, 40-week gestation. You're not suggesting she's in a good condition compared with that, are you?

SMITH: Well, what I'm saying -- I mean this -- I am not questioning that this is not an extremely premature baby. This is a 25-week gestation baby, this is very premature. However, babies of 23 weeks are resuscitated, babies of 24 weeks' gestation are resuscitated. [Baby K], being 25 weeks, is still very premature, but the resuscitation went very well.

You would expect a baby of this gestation to need resuscitation and, yes, you would not expect a term baby to need resuscitation as a standard. A term baby would not need resuscitation. A 25-weeker as a standard will need help, they're going to need help, but the help that [Baby K] received, the resuscitation that she received, was a good resuscitation and everything went as standard as you would expect for a 25-week gestation baby. And I have dealt with many babies of this gestation, both before and after, and I can say that this resuscitation went well to answer the question fully. This was a standard for this gestation.

MYERS: For a 25-week baby?

SMITH: For a 25-week baby.

MYERS: For instance when we look at what we see and it says, "Heart rate 60", you say that's a good sign, and this is what you said to the jury, "Not all have a heart rate".

SMITH: That's correct. So a 25-week gestation baby may not even have a heart rate when they come out. Having a heartbeat when you're initially resuscitating a baby is the first thing you're going to look for, you are going to look to see whether -- does this baby have a heart rate or not. You do that with any resuscitation, to be honest, with any baby, because you're always going to check the heart rate. But basically the fact that you have a heart rate in this baby is a good sign. If you didn't have a heart rate then that would be a sign, is this baby only going to need ventilation, are they only going to need intubation, are they only going to need airway breathing support, or are they going to need additional circulation support in terms of drugs? That's what you'd be thinking. It wouldn't necessarily mean they would end up needing drugs, but the fact that the baby has a heart rate when the baby first comes out -- in a 25-week baby, as a person called to resuscitate this baby, you take that as a good sign that if I sort the airway out, give the breaths, this baby's heart rate will hopefully improve above 100, which is what you want, which is what happened with [Baby K].

MYERS: Obviously, Dr Smith, 60 is better than no heart rate at all.

SMITH: Mm.

MYERS: But 60 is not a good heart rate for a baby, is it?

SMITH: Sixty is not -- you do not want a heart rate to stay at 60. Sixty when a baby is -- a 25-weeker -- when a baby is born the heart rate may be above 100, it may be 60 to 100, or it may be less than 60 or it may be absent, but in a 25-weeker having a heart rate of 60 when the baby first comes out, as a senior person who has dealt with many resuscitations, I take that as a good sign and I feel encouraged at that point that if I manage airway and breathing correctly this baby is not going to need cardiac medications, this baby's not going to need drugs to improve the heart rate because -- and that's what you're assessing the whole time you're there in resuscitation.

You're looking for signs to anticipate what the baby is going to need next and you would take a heart rate of 60 as, right, I'm not going to -- most likely I'm not going to need medications to get this heart rate up, if I manage airway and breathing correctly, this heart rate is going to improve above 100, which is what happened.

MYERS: I'd like you to answer this question, which is:

"Initially dusky floppy and no respiratory effort."

"Initially dusky floppy no respiratory effort" is not good, is it?

SMITH: To answer that properly, because you've asked me a closed question there, to answer that properly you have to take into account a 25-week gestation baby.

So a 25-week gestation baby having no respiratory effort and being floppy and initially dusky when they're born at 25 weeks' gestation is not something unusual. That's something that would be standard for a baby being born at 25 weeks.

You have to take a 25-weeker as a 25-weeker. To say a term baby is different. So saying that about a 25-weeker is not anything unusual is what I'm trying to say.

MYERS: Requiring ventilation by way of being intubated and then ventilated is not a good condition, is it?

SMITH: Sorry, could you repeat the question?

MR JUSTICE GOSS: I think, Mr Myers, the point is you're at cross-purposes here -- are you saying in respect of any baby that is born, full term, a 35-week baby, a 30-week baby or what? Just asking it in that sort of bland general context is perhaps, I think, what the witness is having difficulty with.

SMITH: I agree. That's the problem. You need to take into account the fact that this baby is a 25-week gestation baby. What I'm trying to convey is that a 25-week gestation baby with this resuscitation, this was a good resuscitation. This went well.

Now, a 25-week baby needs a lot of help compared to a term baby. But for a 25-week gestation baby this was a standard resuscitation that went well, as proven by the blood gases and proven by the Apgar scores of 4, 9, 9. Those are good Apgar scores. So the resuscitation of a 25-week baby, this 25-week baby, this went well.

MR MYERS: Let's be clear then: good Apgar scores for a baby of this gestation?

SMITH: Well, the Apgar scores are applied to any baby. So they are applied to a preterm baby, any gestation, and term babies --

MYERS: That's my point, my Lord. This is not the same as Apgar scores of 9 in a nine-pound/40-week gestation baby and it's very important, as Dr Smith keeps moving between what's good and what he's happy about, that we are quite clear --

SMITH: No, no. That's incorrect --

MR JUSTICE GOSS: Just let me finish, please, to try and resolve this.

I think, Mr Myers, if you ask clear, focused questions, I will ensure that Dr Smith answers the question, and then we'll proceed more effectively.

I'm not being critical of you, it's very difficult, I know this, but keep it as clear as possible. Then I'll ensure that Dr Smith answers the question and doesn't digress, to do what some people do when they're asked questions, which is give an answer which isn't an answer to the question.

MR MYERS: I've endeavoured to be clear. If I wasn't my Lord, I apologise, I will be very clear from (overspeaking) --

MR JUSTICE GOSS: I think it was just the overall context of it that the witness was taking issue with and he couldn't answer it in a yes or no way for the reasons he was giving.

SMITH: Do you want me to elaborate on the Apgar scores? I am happy to do that.

MR MYERS: No, I don't, really.

MR JUSTICE GOSS: No, Mr Myers will ask the questions he wants to ask and if you could, having heard what I have said, simply try and confine your answers to the question. But if you need to explain an answer you may, but try and answer the question in doing that.

MR MYERS: Thank you, my Lord.

Dr Smith, if a baby like [Baby K] is stable, do you agree that there is always the potential that she may deteriorate quite suddenly?

SMITH: Yes, in a 25-week baby, yes.

MYERS: I want to ask you about the intubation. There were three attempts by you on the first occasion to intubate [Baby K], weren't there?

SMITH: Yes.

MYERS: In your experience is that standard for what you would expect for a baby like that?

SMITH: Yes. A baby of 25 weeks' gestation to -- you are basically dealing with a baby that's only 690 grams. So it's a very small baby. It's a technically difficult procedure. The intubation itself can take a few attempts and the -- as I explained, the baby was stabilised between each attempt and the fact that it was on the third attempt is not something that wouldn't happen with a 25-week gestation baby. This is, again something, that can just happen. Sometimes it takes one go, sometimes it takes two. I've successfully intubated 23-week gestation babies on the first attempt.

Sometimes it takes more than two, sometimes it takes three, sometimes it takes a second person to have an attempt. But this -- me successfully intubating on the third attempt is not something that would have compromised a baby or be anything to be concerned about in a baby of this size with the level of technical procedure that you're doing with the baby.

MYERS: Did you first try to intubate [Baby K] with a 2.5mm endotracheal tube?

SMITH: That's not documented in the notes, and I don't have a memory of that specifically, but in terms of the potential reason -- one of the reasons why you might not get the tube in first time is the first size of tube you're trying to intubate the baby won't pass through the vocal cords. So it's logical to think that one of the reasons why it might not have gone in is because a smaller tube at that point was required and a smaller tube would have been easier to get in. So in the end I have gone for a 2.0 and that's the one that's been successful. So that's the reason for thinking that probably a 2.5 was tried first by me and then it needed a 2.0 at that point to get the tube in, yes.

MYERS: I just want to help you with this, Dr Smith, and just looking at the evidence you gave on Day 78 of the last trial, that's 27 February 2023, and the reference is page 75:

"So initially, we tried with the 2.5 tube. That was too large and so we switched to a 2."

Does that make sense?

SMITH: It makes sense, yes.

MYERS: Is there a danger that a 2mm tube might prove in fact to be too small?

SMITH: Elaborate on what you mean by danger.

MYERS: All right. Is it possible that a 2mm tube may be too small? I know these sound tiny amounts, but this is a very tiny baby.

SMITH: Well, when you've intubated a baby you're going -- after you've intubated you're going to listen to the air entry on both sides. You're going to check that you've got equal air entry on both sides. That's to ensure that the amount of -- the correct depth that you've intubated the baby, it is to ensure that you are oxygenating the baby properly, so you're going to be looking at the oxygen saturations, you are going to be looking at the chest movement and listening to the chest sounds.

So I have intubated babies with all different size tubes. I have never -- I'm trying to think of a time when I put a tube down and the tube itself, from the very beginning, has been small, too small. That's a scenario I've never -- never occurred. If you have improvement in your oxygen saturations, good heart rate, good colour change on the capnograph, that means your endotracheal tube is functioning properly. So this tube was functioning properly.

And then when the baby's first blood gas was done the pH 7.223 with PCO₂ 7.84, a good blood gas, and that was done at 03.03, so that's a period of time after you've intubated the baby, that indicates that this tube was working properly, was clearing carbon dioxide, was oxygenating the baby fine. The baby is only needing 50% oxygen at that point, which is satisfactory, that's fine. So you know that this tube is working properly.

And that was a 2.0 tube.

MYERS: Can I ask this: did you start with the 2.5 because you believed that was optimal?

SMITH: What you do is you calculate, based on the baby's estimated weight and the gestation, the size of tube that you might need. For this gestation and estimated weight the range of tubes you're going to use is 2.0 to 2.5. You would try to put in the -- as a standard -- this is standard neonatal resuscitation -- if you're given a range of tubes, which would be one or the other, it's not a huge range, it's just between one size and the next size up, as a standard resuscitation you would try to go for the larger end first and then you would go for the smaller one if you couldn't get the larger one in. That's not to say that the smaller one is not adequate. And in this case the smallest size tube is functioning fine as illustrated by the carbon dioxide and the oxygenation of the baby, so the tube at

2.0 is functioning fine. So that's as complete an answer as I can give.

MYERS: When you came to re-intubate [Baby K] after the first desaturation at that point you changed to a 2.5mm didn't you?

SMITH: So yes, so at that point you've tried again -- so you would re-intubate and, like I said, you have a range of tubes with a baby. So you could try again with the 2.5.

I don't know whether specifically -- I probably will have asked my consultant Dr Jayaram, do you want me to try with the 2.5, because just knowing the level of doctor I was at that time, ST5 equivalent, so I would probably have asked him, do you want me to try this time with a 2,5, and then he -- but this is me remembering from a very long time ago. I think that's probably what I will have done and then he will have said, okay, try a 2.5, and then I would have gone for a 2.5.

MYERS: I'm going to ask you about the event around about 3.45 to 3.50, what's been called the first deterioration, so you know what I'm going to ask about.

SMITH: Yes, you mean the first deterioration, yes.

MYERS: Yes. You have told us about DOPE, displacement, obstruction, pneumothorax or equipment failure.

SMITH: That's correct.

MYERS: Potential causes --

SMITH: Potential causes.

MYERS: -- or explanations. If we look at the notes -- can we look at tile 100, please? If we can go behind that and go to the notes themselves, Mr Murphy. Scroll down to the section that deals with this.

You can see here where it says at, it looks like 3.30 is crossed out and it says 3.50 hours; do you see that?

SMITH: Yes.

MYERS: It describes:

"Sudden deterioration. O2 sats dropped to 40%."

SMITH: Yes.

MYERS: "Bagged via ET tube with Neopuff. CO2 monitor not changing colour. Poor chest movements. Cold light, normal."

Pausing there, cold light is where you shine a light through the lung area, don't you, to see if there's a pneumothorax?

SMITH: That's correct.

MYERS: So you can discount that?

SMITH: Yes.

MYERS: Right. That's the P of dope. Carrying on down the page:

"Tube removed and bagged via face mask. Sats recovered quickly."

Is that "re-intubated"?

SMITH: Yes. It was face mask, and via a face mask and then re-intubated, yes.

MYERS: "... by Dr Smith after bolus of 100ml morphine. Size 2.5 ET tube placed 6.5"; yes?

SMITH: Yes. That's correct.

MYERS: As it happens, no reference there to a dislodgement of the ET. I know you didn't make the notes, but no reference to dislodgement there, is there?

SMITH: Not on those written notes.

MYERS: Displacement. Dealing with O, obstruction, just pausing there, we know in the nursing notes that there is reference to blood in the airway; are you aware of that?

SMITH: I am.

MYERS: You are?

SMITH: I mean I am aware of that being in the notes.

MYERS: Yes, and you mentioned earlier on about being asked -- or maybe mentioning this in your statement about blood -- in fact, it's something you were asked on the last time you gave evidence.

SMITH: That's correct.

MYERS: It's possible, isn't it, for intubation to cause some sort of trauma to a baby like [Baby K]? That's possible, isn't it?

SMITH: It's possible.

MYERS: Your evidence is that, having looked in the area of her throat, inside her throat as you were intubating, you never saw any sign of that?

SMITH: I have no -- my evidence is that I have no memory of seeing any -- because what's documented in the nursing note is "large amount of bloodstained secretions", I believe. I have no memory of seeing -- I have no memory of a large amount of bloodstained secretions being suctioned, which is what you do before you intubate, so you do a direct visual suction. I have no memory of seeing a lot of -- I mean I have no memory of seeing blood in the airway, any sign of trauma, so that's -- so the one side is my memory, I have no memory of that.

The second thing, though, is that looking at the notes, I have re-intubated this baby and it's taken two attempts. I do not believe that at that level that I was, an ST5 equivalent, if I'd seen trauma and if I'd seen blood in that airway, significant, concerning, I do not believe I would have not handed over the intubation to Dr Jayaram at that point, which is -- so those are the two things that make me give evidence in that way to the best of my ability because one is my memory.

And the other is, looking at how the events occurred, in terms of me still feeling I could intubate this baby and not handing it over to Dr Jayaram, who was right there, he was right there, so that's the best evidence I can give.

MYERS: So you conducted the re-intubation, didn't you?

SMITH: I performed the re-intubation and on the second attempt it was successful, yes.

MYERS: And when you did that re-intubation you would have been -- used the laryngoscope to look into [Baby K]'s airway, wouldn't you?

SMITH: That's correct.

MYERS: And you have no recollection of any blood there at all?

SMITH: I have no memory of the specifically -- to be honest, I have no memory of seeing any blood or any trauma and that is the best knowledge that I can give. The large amount of bloodstained

secretions, as documented, again I have no memory of that. That's the best evidence I can give.

The second thing that makes me think that there can't have been trauma, like, concerning trauma there because I've taken two attempts and I would have -- if I'd seen it on the first attempt, I would have handed over to Dr Jayaram, "I can see blood in this airway, would you be able to do this instead?" So those two things lead me to say this is as honestly as I can, because it's so long ago, from my memory, this is the best answer I can give.

MYERS: Can blood in the airway be capable of blocking an ETT?

SMITH: Blood is a secretion and if it coagulates and if it's thick enough it could cause blockage of a tube.

I should emphasise that I'm not a tertiary neonatologist, so I deal with intubation of babies but not long-term ventilated babies. So the best person to answer that might be the tertiary neonatologist later on. His experience of how often it is that tubes get blocked and how often it is that bloodstained secretions are responsible for that, that's probably the best way to get a full answer for that.

But if you're asking me, thinking as a doctor, is it potentially possible, then yes, I would say it's logical to think that, yes, it's possible.

MYERS: The notes don't indicate that is the tube that was removed was checked, do they?

SMITH: I haven't seen any record on the notes that there was any blockage of the tube or checking of the tube.

I haven't seen any reference. What you'd find usually, if there was a tube blocked, it would, in my experience, often be documented. But I haven't seen anything documenting the tube was blocked. But I've seen many -- I've seen a few, not many, I would say I've seen a few occasions when a tube has been blocked and I have seen that documented in the notes by the nurse and the doctors and on this occasion there is no documentation I can see to do with a blockage.

MYERS: And it's important to note clinically significant steps or findings, isn't it, in the notes?

SMITH: Yes.

MYERS: That's, for instance, why we saw a few moments ago that in those medical notes it referred to the cold light test, didn't it?

SMITH: Yes.

MYERS: Because that shows that the checking for pneumothorax part of DOPE has been carried out, doesn't it?

SMITH: Yes. That's what makes me -- I mean -- but because there's documentation of cold light test normal, there's no documentation that the tube is blocked, the equipment itself is working, because the baby was reattached to the ventilator. So that leaves displacement as the cause in terms of it's not been documented tube displaced, but the other cause -- there's no mention of obstruction. There's no pneumothorax. The ventilator is working fine. So displacement would be the other one that you would consider with this documentation and that scenario that --

MYERS: My question is there's no record of the tube actually being checked, is there?

SMITH: There's no record in the notes that says tube checked.

MYERS: Or clear?

SMITH: There's no record in the notes that says tube clear that I can see. You presumably reviewed all the notes.

I can't see that documented anywhere from my memory.

MYERS: With regard to equipment, I would like us to look, please, at tile 86, which is the IC chart. We're going to go into the chart behind that, again documents you will be familiar with, both generally and maybe particularly with this, Dr Smith. We're going to look at the equipment side of the chart.

Ladies and gentlemen, it's easier to follow in the jury bundles in hard copy if you want to, you don't have to go there. You've got this behind divider 6E. We're looking at the left-hand side, at the readings. Start at the top if we could, please, Mr Murphy.

We are looking at the column that says 03.30. That relates -- we can see type of ventilation, SIMV, which is the acronym for being on the ventilator, isn't it, the respirator?

SMITH: Yes. It means the type of ventilation that synchronises with the baby's breaths.

MYERS: Yes. There's a number of readings but I want to go down first of all to where we can see "leak". Eight or so down we can see "leak". At 03.30 it says "leak 94"; do you see that?

SMITH: Yes.

MYERS: By 04.30, which as it happens is after the ET tube has been changed, it says "leak 5", doesn't it?

SMITH: Yes.

MYERS: Where it says "leak 94" does that mean 94% of the air appears to be leaking and not going through?

SMITH: No. I remember -- I mean you asked me that last time but I know this is a retrial. That makes no sense because if you scroll down a little bit, so you've got SaO₂, which is 94. That means the baby's oxygen saturations are 94% and they're on FiO₂, which is 49%.

That means the baby's oxygenation is good. So if 94% of the leak -- I mean basically, the 94, what that means is -- "what does that actually mean" is the question.

Now, the tube is oxygenating the baby, it is functioning. You know that because the saturations are 94% with an FiO₂ of 49.

The other thing that indicates the tube is functioning is the blood gas at 03.03 hours, which is PCO₂, so carbon dioxide, of 7.8. So you've got two measures there: you've got the measure of the oxygen saturations of the baby and you've got the measure of the carbon dioxide. So the baby is getting the oxygen, they are clearing the carbon dioxide, so the tube is functioning.

So even though the leak number says 94, the tube is functioning, it's doing what it is supposed to do, the baby is getting oxygen and clearing carbon dioxide, so the number that's wrote in that box -- I mean the important thing is the oxygen saturations of the baby, the carbon dioxide clearance, the number that's wrote in that box indicates, yes, there is some air leak but it does not mean that only 6% of the oxygen is going to be getting to the baby because that makes no sense according to the other parameters that you're actually looking at with the baby which are the oxygen levels of the baby, the saturations and the blood gas carbon dioxide clearance.

MYERS: I want to leave to one side for a moment whether or not it makes sense. What I asked and what I would like you to help us with is where it says "leak 94", taking that reading for what it says, does that mean 94% of what's going through is leaking?

SMITH: No, I don't believe that.

MYERS: What does 94 mean as opposed to the 5 that follows it?

SMITH: What I can say to you is if this is -- if it's wanting to know exactly what that number means, then the person who built the ventilator and built the ventilator sensors would need to come and try and explain what that actually means. What I think is relevant, what's important, is the oxygen saturations of the baby and the carbon dioxide clearance of the baby. So a sensor that is saying 94 doesn't correlate with how the tube is actually functioning. So the tube is actually functioning. I didn't build the ventilator, obviously, so if you need a specific answer to do with how the leak sensors work in a particular ventilator, then that person would have to be called to give a full answer for that.

But more importantly -- I mean, the relevant issue is the oxygenation of the baby, which is 94, and the carbon dioxide clearance which, according to this blood gas, is PCO2 7.84. That's the important thing to do with the leak, not the number, I would say as a doctor giving you the best answer I can.

MYERS: Right. I just want to be clear about this. I'm asking the question as clearly as I can.

Put to one side what it says about oxygen elsewhere.

The figure of 94 on its own indicates a high leak. It's a high figure for a leak, isn't it?

SMITH: It's a high figure for a leak.

MYERS: Right.

SMITH: I can say that. I have dealt with babies where leak has been occurring with tubes and it's not something -- as long as the tube is functioning correctly, as long as the baby is oxygenated and the carbon dioxide is clear, it is not an emergency situation where you would need to replace the tube immediately because you have a number on a leak sensor. The reason for that is because intubating is technically difficult. If you have a tube that's actually functioning, the baby is stable, the correct decision at that point could be to keep the tube that you have that's working in place rather than take it out and potentially you might not be able to re-intubate the baby if it was a difficult intubation to begin with. So that's again the best answer that I can give to do with what that figure means and the action and course you would take based on seeing a figure of that -- and I do think it is important to take into account the condition of the baby at all times, which,

as I have indicated on the saturations and the carbon dioxide, the tube is functioning.

MYERS: Right. VTE says 0.4; can you see that?

SMITH: Yes.

MYERS: That's to do with the tidal volume in the baby, is it, or working with the respirator. Can you help us?

SMITH: I would prefer you to ask that question to the tertiary neonatologist. Like I said, I deal with ventilated neonates on a short-term basis because they get transferred to tertiary units. Tidal volume basically means the volume of air that is coming in and out in terms of -- so you're looking at oxygenation, which again, as I said, is 94 and you're looking at carbon dioxide clearance which I said is good. So again the VTE number, you could ask the tertiary neonatologist for their opinion on that.

In terms of tidal volume, so the movement of air in and out of lungs of the baby, the other two parameters in terms of 94% oxygen and carbon dioxide clearance indicates to me that the tube was functioning.

As to the VTE, I think I would prefer questions to do with the tidal volume being directed to a tertiary neonatologist.

MYERS: You're the doctor who was dealing with [Baby K] at the time, weren't you? Yes? So I'm asking you: 0.4 is too low for that reading, isn't it? Whatever you else say about oxygen or carbon dioxide, 0.4 is too low, isn't it?

SMITH: What readings do you have as a reference range for what it should be?

MYERS: VTE should be -- we can see the readings that follow.

So 0.4 is too low, isn't it?

SMITH: And what reference ranges are you comparing that to?

MYERS: You're the expert. Tell us, Dr Smith, 0.4 is too low, isn't it?

SMITH: I'm a professional witness, I'm not an expert witness, just to clarify, and what I have done is answered your question to the best of my ability, which is what I'm supposed to do, and I know that the functioning of tidal volume is to measure the oxygenation, so the oxygen being delivered and the carbon dioxide being breathed out, and I know from the two parameters, that I've given I think maybe four or five times now, that the

oxygen is being delivered and the carbon dioxide is being cleared so that's the best answer I can give to the best of my ability as a professional witness.

MYERS: So you cannot answer my question, "Is it too low"?

SMITH: I have not got -- I cannot tell you the reference ranges for what it should be at this time. I would have to go consult -- that's why I've directed you that if you want a specific answer for that, I've directed you for how to obtain that. But as to knowing the reference ranges for what VTE should be off the top of my head, I do not have that information.

MYERS: Was this leak -- were these figures brought to your attention at the time?

SMITH: Were these figures brought to my attention at the time?

MYERS: Yes. Were they?

SMITH: I have no memory of -- I have no memory of the leak being 94, I have no memory of any concern to do with any measurements of that nature. I have no memory of that.

But I believe -- because I still have memories of that time, I believe that if there had been concern about that I would remember and it would be raised unless of course I was out of the room. Dr Jayaram may be able to comment more about those readings that you're looking at, but I have no memory of any concern being expressed as regards those readings and in my own experience, like I've said, leak is not something that -- if the tube is oxygenating fine, clearing carbon dioxide fine, functioning normally, it's not something you'd require an immediate re-intubation, if you see what I mean. You don't need an immediate re-intubation in this situation in my experience.

But I would recommend the question could be asked to Dr Jayaram as to what his memories of these numbers are as well.

MYERS: So we can be clear, to remind you, there is no reference to the leak or anything done about it in the clinical notes. All right? That's just to remind you.

SMITH: That is correct. That fits with what I'm saying to you about the significance of that.

The important thing is the oxygenation of the baby and the clearance of the carbon dioxide and the blood gas. Those are the important things.

MYERS: After that desaturation, [Baby K] was fitted with a 2.5mm ETT, wasn't she?

SMITH: That's correct.

MYERS: You, so far as you can recall, had done nothing with the machine in the meantime, had you, the respirator?

SMITH: No.

MYERS: But when we look at the figures for 4.30, and we looked at this a moment ago, we can see it here, there appear to be the same figures for leak and VTE, the same discrepancy does not apply, does it, when we move to the next set of figures along?

SMITH: No, it does not.

MYERS: You have done nothing to change the respirator?

SMITH: No. And so, as you can see, the leak is now 5 and the VTE is 2.4 and the readings are -- in terms of the oxygen level, well, the oxygen the baby is requiring has actually gone up by 6%, but you can see that the saturations are basically the same, the 94, and then if you go across -- so SaO2 was 94, it's now 93, the next one after that is 92. So they're all similar readings.

The oxygen level that the baby is requiring is 49 and then 56 and 61. So again similar.

So yes, you have changed to a 2.5 size tube, and the leak level, the reading, is less but the actual parameters of the baby are the same or very similar.

Very similar.

MYERS: I'd like to go to tile 154, please. Can we go to the notes behind that, please? Scroll down if you would, please, Mr Murphy.

I want to look at the order in which certain events happened when we're dealing with the period around the second of these desaturations. Can we go back up to the end of the page above? There we are. We know that the second of these desaturations is some time around 6.15 to 6.30. There may be some debate about the time but that's the period we're looking at. When you had inserted, or rather reinserted, a 2.5mm tube you had put it to a depth of 6.5 centimetres, hadn't you?

SMITH: Is that what the notes say?

MYERS: That is what it had been beforehand, yes.

SMITH: Yes, then that's correct.

MYERS: If we scroll up just so we can be quite clear -- let's look at the top of the page, please, Mr Murphy -- you see there:

"Size 2.5 ETT placed 6.5[mm]".

SMITH: Yes. It'd be 6.5 centimetres.

MYERS: Sorry, 6.5 centimetres.

Let's go down. So after that point, the UVC was inserted?

SMITH: Yes.

MYERS: And that will be before the X-ray was taken, obviously?

SMITH: Yes. Yes.

MYERS: And the X-ray was then taken at some point after you had inserted the UVC.

SMITH: Yes. I'd appreciate pulling up the actual X-rays, that will make it easier -- I don't want to give false information, but I believe the first X-ray was taken -- it's just that there is a lot of data for me to remember off the top of my head. I believe that the first X-ray was done after the umbilical line is inserted to check the position of the tube. The X-rays would confirm that though.

MYERS: Yes.

SMITH: I don't know whether an X-ray was done before that that hasn't been documented but I'd need the X-ray.

MYERS: It's all right. It was agreed that the X-ray was taken then.

SMITH: Okay, yes.

MYERS: It says:

"UVC IVC. Left lung hazy."

Can you see where it says that on the notes?

SMITH: Yes.

MYERS: So does that mean that you and/or Dr Jayaram were able to look at the X-ray and then make that note accordingly?

SMITH: So Dr Jayaram's made the documentation, so he will have reviewed the chest X-ray. I probably will have reviewed it as well but he's documented that, yes.

MYERS: When the next desaturation took place we can see it says at 6.15, "Lower sats".

And if we scroll down the page, please, and to the next section of the notes, the gases are recorded and it says:

"Given a 20ml per kilogram saline bolus."

Is that one of the corrective measures that was taken?

SMITH: Yes. That's what that says, yes. It says "as mean BP 20".

MYERS: At this point the tube was pulled back, wasn't it?

SMITH: So it says, "Tube pulled back to 6 centimetres", yes.

MYERS: So that's been pulled back from the position of 6.5?

SMITH: Yes.

MYERS: That's pulling it back from the position in which you had put it; that's right, isn't it?

SMITH: Yes. And the reason why he's done that, I believe -- and you can ask Dr Jayaram, but I believe he's done that to try -- because sometimes if you adjust the position of the tube, if you -- you would pull it back to see whether that actually improves the saturation, so -- I mean, he's the one that's pulled it back, so I think that question should be directed at him. But he's pulled it back to see if that has made any effect on the oxygen saturations.

MYERS: In fact, pulling it back, the sats dropped, didn't they?

SMITH: It says, "Sats dropped further", yes, "therefore extubated", which means he has taken -- so it hasn't worked, him pulling the tube back, so he has taken the tube out and that's what extubated means, he has taken the tube out.

MYERS: Then it was a new tube or a tube was re-intubated, 2.5, back to 6.5 centimetres?

SMITH: Yes. And so then on the re-intubation it's gone back to 6.5. So basically, when you -- to tell how far to insert the

tube, the depth, you compare standard gestation and weight ranges, so that gives you a guide of how far to put the tube in. So I will have put it in at 6.5 because, based on the weight of [Baby K] and the gestation, that's the correct -- the standard anatomical correct depth. So that's why it's been put back in again at 6.5. Then it seems to have worked because then the next documentation is settled for the next 30 minutes.

MR MYERS: Right. Those are my questions. Thank you, Dr Smith.

Re-examination by MR DRIVER

MR DRIVER: Two very brief matters if I may.

MR JUSTICE GOSS: Yes, certainly.

MR DRIVER: Firstly, are Apgar test scores relative to gestational age?

SMITH: Apgar scores are standard across all preterms and term babies, so the Apgar scores are applied -- they are a measure of colour, tone, heart rate, respiratory effort and what we call grimace, so kind of cryability.

So they apply to term babies as well as preterm babies, it's a universal standard. So [Baby K]'s Apgar scores were good. If you're looking at the Apgar scores, the Apgar scores are good in terms of any gestation of baby (overspeaking) --

MR JUSTICE GOSS: So the answer is yes?

SMITH: The answer is yes.

MR JUSTICE GOSS: Any baby, whatever gestation, the same Apgar scores apply?

SMITH: Yes, that's right.

MR DRIVER: Secondly, you were just shown a note a few moments ago that recorded Dr Jayaram pulling back a tube to 6 centimetres and you were invited to confirm that that was the tube being pulled back from 6.5 to 2 centimetres. Do you in fact have any means of knowing the position of the tube immediately before Dr Jayaram withdrawing it?

SMITH: No, I don't have any way of knowing that. All I can know is the depth that I put it in when I intubated. So it'd be the intubation before this one, whatever depth I've documented as at the lips, that's the depth that I was aware of that the tube was put in. As to any change after that, in terms of going deeper or not as deep, I can't -- I wouldn't know that.

MR DRIVER: Thank you. Does your Lordship have any questions for Dr Smith.

MR JUSTICE GOSS: I don't. Thank you very much. Thank you for coming and giving evidence. That completes it and you are free to go. Obviously, don't speak to any who's going to be a witness, in particular Dr Jayaram.

I don't know whether you still see Dr Jayaram or not.

SMITH: I'll just leave.

MR JUSTICE GOSS: Don't speak to him. That's said to every witness who completes their evidence who may come into contact with another witness. I'm not suggesting you would. All right? Thank you very much.

Sorry, we overran a bit there and we didn't have a break, but I wanted to finish Dr Smith's evidence if we could before the break. Could you be ready, please, to continue at 2.15? I'll give you over the hour because we haven't had a break today. Remember your responsibilities as jurors: no communication, no research.

(In the absence of the jury)

MR DRIVER: My Lord, may I just inform the court as to our intentions this afternoon? We hoped to call Dr Smith, Dr Jayaram and Dr Babarao in that order. Dr Babarao cannot return beyond today for some time, so we will reverse the order of witnesses 2 and 3.

MR JUSTICE GOSS: And if you could just explain that to the jury so that they'll appreciate what you were hoping to do and what you have to do, I'm sure they'll understand.

All right, thank you very much.

(1.05 pm)

(The short adjournment)

(2.15 pm)

(In the absence of the jury)

MR JUSTICE GOSS: Just by way of explanation, people present in this courtroom will understand that these proceedings are being watched from other remote locations and the cloud video platform seems to have malfunctioned. I'm reluctant to start.

(Pause)

Jury in, please.

(In the presence of the jury)

My customary apology: there was a technical issue just as you were about to come into court; we were all ready. It was addressed very efficiently and effectively by the clerk of the court, so we're able to proceed now, so I'm sorry you've been kept waiting for about 7 minutes.

Yes, Mr Johnson.

MR JOHNSON: Thank you, my Lord.

As your Lordship knows, in a perfect world we would present the evidence chronologically to make it easier to follow. We've been frustrated in that by the fact that the next witness can't be here tomorrow and we would normally have called Dr Jayaram now, but we don't believe that if we call Dr Jayaram now the next witness will have concluded his evidence by the end of the day, which would put him in an impossible professional position. So we will call Dr Jayaram after this witness and now we will call Dr Srinivasarao Babarao, please.

MR JUSTICE GOSS: Could you just put that in context for the jury before the witness comes into court as to what he is going to address so they know where we're jumping on to?

MR JOHNSON: Certainly.

MR JUSTICE GOSS: Thank you.

MR JOHNSON: He's a doctor from Arrowe Park, which is the hospital to which [Baby K] was taken, so obviously we would have dealt with all the Chester evidence first, but this is the reason, and it's because my learned friend wants to ask him some questions, that we're calling him to give him the opportunity to do that.

MR JUSTICE GOSS: Because he can't be here after tomorrow.

MR JOHNSON: Yes.

MR JUSTICE GOSS: So we're jumping to after the transfer to Arrowe Park.

DR SRINIVASARAO BABARAO (affirmed)

Examination-in-chief by MR JOHNSON

MR JOHNSON: Thank you. Could you keep your voice up nice and loud, please, and would you tell the jury your full name?

BABARAO: My full name is Dr Srinivasarao Babarao.

JOHNSON: Thank you, Dr Babarao. You have made, I think, three witness statements in this case, a couple in June 2019 and one rather more recently on 26 February 2024; is that right?

BABARAO: Yes, that's correct.

JOHNSON: You previously gave evidence in proceedings concerning Lucy Letby on 28 February last year?

BABARAO: Yes.

JOHNSON: Is it right that at the time of the events that the jury are considering, namely February 2016, you were working at Arrowe Park Hospital?

BABARAO: Yes.

JOHNSON: Would you tell the jury, please, your professional qualifications?

BABARAO: I'm a consultant neonatologist, my qualifications are (inaudible) and (inaudible) paediatrics and FRCPCH.

MR JUSTICE GOSS: That was incredibly quick and I couldn't even hear what letters you were articulating, let alone what they stood for. Could you just go a bit more slowly, please?

MR JOHNSON: Starting with your medical degree.

BABARAO: My basic medical degree, MBBS. My postgraduate medical degrees are MD paediatrics and I have done MSc in paediatrics and child health and then FR --

MR JUSTICE GOSS: MSc is master of science, is it?

BABARAO: Yes. Then FRCPCH, which is the Fellow of the Royal College of Paediatrics and Child Health.

MR JOHNSON: I have just said at the time you were working at Arrowe Park; is that right?

BABARAO: Yes.

JOHNSON: More recently I think you've been working at a hospital in Manchester; is that right?

BABARAO: No, I currently work at Liverpool Women's Hospital and Alder Hey Children's Hospital.

JOHNSON: Sorry, my mistake. Thank you. Is it right to say that you had no hands-on contact with [Baby K]?

BABARAO: Yes, I did, but after transfer to Arrowe Park Hospital.

JOHNSON: Yes, sorry, at Chester I should have said. In general terms, what was your contact with [Baby K] after she was transferred to Arrowe Park?

BABARAO: I was the responsible consultant overseeing her care after transfer to Arrowe Park Hospital.

MR JOHNSON: Thank you very much. My learned friend has some questions for you. That's all I want to ask you at this stage. I may have some more questions depending on what he asks you. Thank you very much.

Cross-examination by MR MYERS

MR MYERS: Dr Babarao, good afternoon.

BABARAO: Good afternoon.

MYERS: Could you help the jury by explaining the difference between a consultant neonatologist and a paediatrician?

BABARAO: Consultant neonatologist is the designation you acquire after doing sub-specialty training in neonatology. So neonatology is a sub-specialty in paediatrics; there are about 16 or 17 other sub-specialties in paediatrics. So all trainees or all doctors who enter paediatrics as part of their training, they have to do general paediatrics first for a few years and then, based on their interest, they'll have to apply through a competitive process to go into one of these 17 sub-specialties. So neonatology is one of them. So you'll do specialised training in neonatology and some other very closely allied sub-specialties to gain that neonatal sub-specialty interest and qualification. And then you enter the GMC as a sub-specialty consultant after completion of that sub-specialty training, for example, neonatology training, and that's what I did.

MYERS: Thank you for explaining that. General paediatrics will cover from the time of birth through to maybe 16 years old?

BABARAO: Yes.

MYERS: So it covers quite a wide range of ages, doesn't it?

BABARAO: Yes.

MYERS: Can you help us by explaining what age group a neonatologist is focusing upon?

BABARAO: A neonatologist is responsible for care of babies born from, say, about threshold of viability, like 22 weeks' gestation, until the point we discharge babies from the neonatal unit, so that is very variable. That could be a month, a few months, for a very sick baby. We do follow up babies discharged from the neonatal unit until a specific point, usually up to 2 years, from neurodevelopmental and other perspectives based on the issues they might have had during the neonatal stay.

MYERS: We know that the babies needing the highest level of care and the babies of the lowest level of gestation ideally would go to a tertiary unit; is that correct?

BABARAO: Yes.

MYERS: Why is it a benefit or why should it be that it's better for a baby like that to go to a tertiary unit if possible? Can you explain that, please?

BABARAO: Yes. It's because what we call as level 3 units, those are the specialised neonatal intensive care units who are equipped to take care of babies born at extremes of gestation and also take care of babies who are very sick and need a higher form of intensive care support, whether it be ventilatory support or modalities of treatment, for example active cooling. All these are centralised in these neonatal intensive care units so those units have the experience and the staff, both nursing and medical, who have managed such sort of babies. Pretty much that's their job.

MYERS: So will there be a higher concentration of expertise with the most vulnerable babies in a tertiary unit?

BABARAO: Yes, both nursing and medical.

MYERS: I'm going to ask you some questions about [Baby K] next, please. You are familiar with the clinical notes in the case and you have reviewed them on a number of occasions, haven't you?

BABARAO: Yes.

MYERS: Do you agree that when [Baby K] went to Arrowe Park Hospital she was a very sick little girl?

BABARAO: Yes, she was.

MYERS: Just in terms of her gestation, she was extremely preterm, wasn't she, at 25 weeks?

BABARAO: Yes.

MYERS: An extremely low birth weight at 692 grams?

BABARAO: Yes.

MYERS: And to help everyone understand the type of problems that she had I'm going to go through a number that you identify. But for example, chest X-rays at Arrowe Park show that she had got what's called pulmonary interstitial emphysema, which means a severe lung disease trapping air in the tissue spaces; that's right, isn't it?

BABARAO: Yes.

MYERS: This is on top of the fact that in such a premature baby she had very premature lungs, didn't she?

BABARAO: She did.

MYERS: Her blood pressure was low and difficult to manage?

BABARAO: Yes.

MYERS: In fact, the transport team had to use three different medications to stabilise her, didn't they?

BABARAO: Yes.

MYERS: And you and your team, Dr Babarao, struggled to maintain it once she was at Arrowe Park, didn't you?

BABARAO: Yes. We struggled.

MYERS: You used specialist medications like adrenaline and noradrenaline to try to stabilise her, didn't you?

BABARAO: Yes.

MYERS: And that couldn't be done or you struggled to stabilise it?

BABARAO: Yes.

MYERS: She struggled to saturate effectively, to maintain high oxygen levels, didn't she?

BABARAO: Yes.

MYERS: Her blood sugars were a problem; is that correct?

BABARAO: Yes.

MYERS: She had a low platelet count, and that refers to the blood platelets which means she would have problems with blood clotting; is that correct?

BABARAO: Yes.

MYERS: Did she also have kidney problems associated with her extreme prematurity?

BABARAO: Yes.

MYERS: In your opinion, Dr Babarao, the outcome for her, whatever that would have been, would have been better if she'd been born at a tertiary unit?

BABARAO: I wouldn't be able to say that for sure because if [Baby K] had been born in Arrowe Park, for example, which is a level 3 unit, based on factors at the time, she could have been still unwell.

MYERS: Do you agree that the outcome for [Baby K] may have been better if she'd been born at a tertiary centre?

BABARAO: Yes.

MYERS: I'm going to ask you some questions about intubation next, which -- we're getting familiar with these terms and that's the process of putting the ETT into the baby so that the ventilator can be used.

BABARAO: Yes.

MYERS: If a baby cannot breathe properly, it's important to try to help them to breathe effectively as quickly as possible, isn't it?

BABARAO: Yes.

MYERS: Now, practices may vary, but is there a time when, in terms of best practice, a period within which intubation should be achieved? Is there a period in terms of best practice?

BABARAO: In terms of best practice it's very difficult to say as in 2024 because neonatology as a specialty has evolved a lot. The current practice is for spontaneously breathing preterm babies -- when I say spontaneously when they're breathing on their own, we support their breathing, and as per current neonatal practice there is no necessity or urgency to put a breathing tube down, ie intubate the baby.

But at that time in 2016, for extreme preterm babies the guidance or the good practice, which sometimes varies depending on the country where the baby is born, et cetera, babies do get stabilised with an endotracheal tube, like intubation and, and give surfactant.

MYERS: Is there a time to aim for if that needs to be done?

BABARAO: The time as per good clinical practice and the concept -- I've referred to that in my statement as well as the golden hour concept. So it's a good clinical practice standard where a standardised approach is followed where, if a baby needs breathing support, incubation is done and surfactant is given ideally within the hour.

MYERS: If a baby isn't breathing on birth, there's no respiratory effort, that would indicate a baby who's going to need respiratory support; do you agree?

BABARAO: Yes.

MYERS: I want to ask you a little more about surfactant. We've heard that that can be given, artificial surfactant can be given, to help a baby's lungs work better, to put it simply; is that right?

BABARAO: Yes.

MYERS: It makes the lungs more flexible, more pliable; is that correct?

BABARAO: Yes.

MYERS: It also helps inside the lungs with the process of gas exchange which is the root business of the lungs?

BABARAO: Yes.

MYERS: If a baby is struggling to breathe, obviously every minute counts within which you can support that breathing, doesn't it?

BABARAO: Yes.

MYERS: If a baby has to be intubated, then the surfactant is going to have to usually follow the intubation, isn't it?

BABARAO: Yes.

MYERS: Because it's introduced via the ETT into the lungs, isn't it?

BABARAO: Yes.

MYERS: Ideally, the surfactant should be provided as quickly as possible after the intubation, shouldn't it?

BABARAO: Yes, ideally. At that time. Now things are different, yes.

MYERS: In fact, at that time the aim was to do it within about 5 minutes, wasn't it, of intubation?

BABARAO: There is no aim for it. That was good clinical practice standards, which were sort of devised and agreed at that point of time. As I pointed out earlier as well, during the last hearing and also in my statement, that's variable.

MYERS: Yes. But perhaps do you agree it's common sense as much as clinical practice that if a baby can't breathe properly and a baby needs surfactant, she needs it as quickly as she can be given it?

BABARAO: Yes. So the guidance is if a baby needs to be intubated in that extreme preterm cohort you also follow it on with early surfactant.

MYERS: I just want to be clear about this, Dr Babarao. Once intubation is done, is there any -- should the surfactant not follow within minutes of that?

BABARAO: Ideally, but there's no guidance to say it should be within 10 minutes, et cetera.

MYERS: How quickly would you want to do it once intubation had been done in your practice with the babies you're looking after?

BABARAO: As soon as the tube is in.

MYERS: Yes.

BABARAO: As soon as the tube is stabilised you give surfactant.

MYERS: As soon as the tube is in.

I want to move to a different issue. It's something which you've looked at before and it was to do with the ventilator and the readings on the ventilator.

BABARAO: Okay.

MYERS: So I'm going to ask Mr Murphy if we could put up tile 86, please. Ladies and gentlemen, this is in the intensive care chart we looked at this morning.

Divider 6E. I'm going to ask you together with us, Dr Babarao, to look at the left-hand side of the chart.

I'm going to ask Mr Murphy to take us to the top so we can see. The timing we're looking at is the column that says 03.30, so if we go left, please, Mr Murphy, and just to the top so we're looking down that column.

BABARAO: Yes.

MYERS: That contains the relevant readings for what we're going to look at.

I am not being rude when I ask the next question, Dr Babarao, but do you understand what you're looking at there?

BABARAO: Yes.

MYERS: Again, this isn't meant to be rude, but why do you understand that?

BABARAO: Because I was asked this question during the last trial.

MYERS: But in the course of your work would you see charts like this?

BABARAO: Not exactly like this but some numbers I do see like this, yes.

MYERS: I'll wait for it to come back.

(Pause)

I'm going to go down, if we could, please, first of all to where we see "leak". We'll look at the various readings but I just want your opinion on some of what we're looking at.

BABARAO: Yes.

MYERS: Leak -- it says at 03.30, 94, and then at 04.30, 5, what does "leak" refer to -- assuming things are acting correctly and operating correctly, what does "leak"

refer to?

BABARAO: The leak refers to the percentage of leak of gases which are flowing from the ventilator into the baby's lungs.

MYERS: The tube going from the ventilator into the baby carries the gas with the oxygen into the baby?

BABARAO: Yes.

MYERS: And the air that goes in should go into the baby to ventilate her lungs, shouldn't it?

BABARAO: Yes.

MYERS: If we see, it says "Leak 94". What does the figure of 94 refer to?

BABARAO: It's not an absolute number, it's a percentage. So a leak of 94 means that number is very high.

MYERS: Very high?

BABARAO: Yes.

MYERS: We can see 04.30, leak is down to 5. Is 5 in the right area that it should be for a ventilator that's operating correctly?

BABARAO: I wouldn't say it is the right number, but it is an acceptable number that just indicates that there is minimal leak around the tube.

MYERS: 94, as we see it there, would not be an acceptable number, would it?

BABARAO: No.

MYERS: VTE, which is above leak, that says 0.4 here, doesn't it?

BABARAO: Yes.

MYERS: Is that an acceptable figure for V -- first of all, what is VTE? Could you explain that, please?

BABARAO: VTE is an expired tidal volume, so the volume of gas that the flow sensor in the ventilator circuit measures.

MYERS: Is 0.4 too low?

BABARAO: It is low, yes.

MYERS: It is low? If we look down below the leak it says "resistance"; can you see that?

BABARAO: Yes.

MYERS: It says 624 and then, as we go across to the right, we see the figures are lower than 624. Is there any significance in that figure 624 for resistance?

BABARAO: It's hard to comment on that because resistance is not usually the number we use or I use in my clinical practice and also, without knowing what sort of ventilator they use and the resistance number which is there, I am not sure whether it measures the airway resistance, et cetera. So it's difficult to comment on.

MYERS: But looking at the figures that we have, perhaps particularly VTE and leak, if you saw those figures, that would be a matter of concern as they first present to you, wouldn't it?

BABARAO: Yes. On their own though, but generally I wouldn't be seeing on their own.

MYERS: No. You'd be looking at things like the saturation of the oxygen, wouldn't you, further down?

BABARAO: Yes, and the baby.

MYERS: And the presentation of the baby?

BABARAO: Yes.

MYERS: So the first thing is this: if you're the doctor, the clinician there, would you expect this to be brought to your attention by whoever's dealing with the charts, the nurse dealing with the charts?

BABARAO: Yes.

MYERS: And if you were to look at the charts and see that, it's a matter that would capture your attention to investigate, wouldn't it?

BABARAO: Yes.

MYERS: And once attention has been drawn to it, you would want to check, as a result of it, the condition of the baby, wouldn't you?

BABARAO: Yes.

MYERS: And maybe just check that everything around the area was working and fitted correctly, wouldn't you?

BABARAO: Yes. So I look at the baby to make sure the baby is all right first and the baby looks as I would expect the baby to be and the oxygen levels and the chest is moving.

MYERS: In terms of what we see with a high leak like that -- and it is a high leak, isn't it?

BABARAO: Yes.

MYERS: There are a number of possible cause us for that, aren't there? I'm assisted by your statement --

BABARAO: Yes.

MYERS: -- Dr Babarao. First of all, it could be like this because the tube has been dislodged?

BABARAO: Yes.

MYERS: And that could either be by the baby moving it or someone moving the tube?

BABARAO: Yes.

MYERS: That's the first thing, the tube could be dislodged.

The second reason could be a hardware malfunction, something not right with the system?

BABARAO: Yes, that could involve the flow sensor.

MYERS: The flow sensor. A third reason for this could be that the endotracheal plate isn't sitting properly in the airway or isn't positioned properly?

BABARAO: Yes.

MYERS: And that might be, for instance, because it's at the wrong height within the airway; is that correct?

BABARAO: Yes.

MYERS: Or it might even be because the tube is too narrow?

BABARAO: Yes.

MYERS: Because if the tube is too narrow, then there's a risk of air leaking around that as it's forced down the tube, isn't there?

BABARAO: Yes.

MYERS: So if you were presented with these figures, the sort of things you might do, Dr Babarao, would be first of all to check the tube to make sure it's correctly fitted?

BABARAO: Yes.

MYERS: And that it hadn't been dislodged?

BABARAO: Yes, and I would check the size of the tube, the length of the tube, and to make sure the tube is what it's supposed to be in terms of the length of insertion.

MYERS: We know that when [Baby K] was first intubated she was intubated with a 2mm ETT. We know that later on that was changed to a 2.5mm ETT. These may sound tiny dimensions but even the difference between 2 and 2.5 can be a significant difference for a neonate like [Baby K], can't it?

BABARAO: Yes, it can be. But this information was only available to me recently.

MYERS: Yes. We have the diameters and so on telling you about --

BABARAO: Yes.

MYERS: If you were intubating a baby like [Baby K], is a 2.5 what you may expect to be the optimal size?

BABARAO: Yes.

MYERS: It's a little bit wider, isn't it?

BABARAO: Yes.

MYERS: We know that by 4.30, looking at the figures on this chart, by 04.30 [Baby K] had been intubated with a 2.5mm tube, we know that.

BABARAO: Yes.

MYERS: As it happens, by 4.30 the figures by VTE and leak are in a region that would not cause you that concern, but the earlier figures would; is that correct?

BABARAO: Yes. I should probably mention here even if the size of the endotracheal tube was 2mm, it's still a bit unusual to expect a leak of 94%.

MYERS: Yes. It does require some consideration, doesn't it?

BABARAO: Yes, just on the basis of those numbers alone, and again the timing. As I said earlier as well, if you look at the saturation levels of the baby and the oxygen requirement, at that point of time they are all okay.

MYERS: I'm going to come to that just to ask you about that.

Is it possible that a 2.5mm ETT may have assisted in ventilation for [Baby K]?

BABARAO: It could have been better, but I don't understand your question.

MYERS: Perhaps I can approach it this way. That figure of 94% for oxygen saturation, if there's a leak and there's little air getting in but not enough, may a baby still be breathing herself to try and get air in?

BABARAO: With respect of the tube size, the baby will still be breathing.

MYERS: Yes. So if the tube is a little bit narrow and the baby is trying to breathe the baby may actually be drawing air in herself?

BABARAO: Yes.

MYERS: So even if a baby is not getting all the support from the ventilator that she should be getting, it's possible she could be saturating herself if she's working hard enough to do that?

BABARAO: Yes, it's possible.

MYERS: So if there is a high leak because a tube is too narrow, the oxygen saturations may still remain relatively high if the baby is doing the work herself, mightn't they?

BABARAO: Yes, theoretically possible.

MYERS: Theoretically possible. What we do see is that when the tube was changed to the slightly bigger one, the 2.5 one, you would have gone for --

BABARAO: Yes.

MYERS: -- the oxygen saturations remain at an acceptable level, don't they --

BABARAO: Yes.

MYERS: -- but the leak goes?

BABARAO: Yes. That's what I would have expected. So if you had a bigger size tube, ie the normal expected length, I would have expected the leak to be that number rather than 94.

MYERS: And if the only thing which has changed is the size of the tube that's been used then that may explain why the leak was there?

BABARAO: Not on its own. As I said, a size 2mm ETT, endotracheal tube, wouldn't have caused a leak of 94. There has to be something else.

MYERS: Very well. But as for the oxygen, [Baby K] could be saturating herself, albeit under some effort?

BABARAO: Yes, with significant effort. You did ask me earlier about the number, the resistance number: a smaller ET tube could lead to higher resistance.

MYERS: And this was a smaller ETT, wasn't it?

BABARAO: Yes.

MYERS: And that would be consistent with the high resistance that we see?

BABARAO: Yes.

MYERS: And then that drops when the larger ET tube was put in?

BABARAO: Yes, the resistance would have dropped, assuming that that ventilator was measuring the airway resistance.

MYERS: If surfactant was put down a 2mm tube when the actual better diameter is 2.5 and there is a leak like this, will it be as effective out of interest?

BABARAO: Yes, it'd still be effective because the intention is the surfactant reaches the lungs.

MYERS: And even if it's a baby drawing air in rather than the ventilator, it will still be drawn in, won't it, I suppose?

BABARAO: Yes, because just to point out, current practice is we give surfactant through even thinner catheters, so the intention is to give the surfactant; it doesn't matter the size of the tube.

MYERS: Yes, all right. I'd like to ask you about something different, Dr Babarao. Thank you for answering those questions. One of the procedures that you follow at Arrowe Park Hospital after there's been a death is something called a neonatal mortality review, isn't it?

BABARAO: Yes.

MYERS: I'll just ask you about that. Is the purpose of that, first of all, to learn lessons from what has happened in the care of an infant?

BABARAO: Yes.

MYERS: And also to answer questions, if they can be answered, about whether or not death was avoidable or preventable?

BABARAO: Yes.

MYERS: I'm going to ask you to help us with this because you deal with it in the statement.

BABARAO: Yes.

MYERS: So I'm going to start by asking this: when you conducted this review after [Baby K] had died, there were two conclusions you came to.

BABARAO: Yes.

MYERS: One of them was, given the condition she was in by the time she was presented to Arrowe Park Hospital, death was not avoidable or preventable; is that correct?

BABARAO: Yes.

MYERS: When you then broadened the area of consideration to look at questions like the transfer or, rather, the fact that she wasn't transferred, whatever the reason for that, that she wasn't transferred to a tertiary --

BABARAO: You mean the mother?

MYERS: Yes, the mother prior to birth. Whether the stabilisation after birth had been appropriate, the transport and the inpatient care at Arrowe Park, when you looked at other matters there did you come to the view that death could have been potentially avoidable?

BABARAO: Yes.

MYERS: And I just want to unravel what you mean by that and, please, you explain. That doesn't say that the outcome would have been different but that it might have been different?

BABARAO: Yes.

MYERS: In other words, had there been and had it been possible to do an in utero transfer, had there been better stabilisation after birth, had there then been transport and inpatient care at Arrowe Park Hospital, in other words had this all been at Arrowe Park Hospital, death was potentially avoidable?

BABARAO: Yes. The whole thing together, yes.

MYERS: And you give a grading, didn't you, you gave a grading to the level of care in your opinion, the review team's opinion? I want to ask you about this because it's graded as grade 2, sub-optimal care, wasn't it? That was your conclusion?

BABARAO: Yes.

MYERS: Could you explain to us why did you grade it as grade 2, sub-optimal care for [Baby K]?

BABARAO: Multiple reasons.

MYERS: Take it slowly because I want to follow you.

BABARAO: The panel at the time, when we reviewed the care of [Baby K], we look at the whole picture, so we look at the baby's journey right from before birth until the point of death. So we looked at opportunity for in utero transfer because at the time there was a lot of upcoming evidence which said that babies born at the right place at the right time, ie in specialised centres able to take care of extreme preterm babies, the outcomes are better. So if [Baby K]'s mother or [Baby K] was born in a level 3 neonatal intensive care set-up, the outcomes may have been better. So that's one of the reasons.

The second was delay in getting the baby across to a level 3 centre due to multiple reasons. The baby was stabilised at the local neonatal unit and there were some issues with the stabilisation while in the local neonatal unit which was Chester at the time.

The delays in the golden hour -- because again, as I said, good clinical practice standards say that if you do golden hour well, you can reduce the impact or the adverse impact, long-term impact on preterm babies. So that was one of the contributing factors for grading a sub-optimal care.

As part of the golden hour, when we looked at it specifically, the various components, the delay in getting the IV fluids in, the delay in getting antibiotics in, the delay in getting the umbilical venous catheter in to give fluids and parenteral nutrition, some issues with stabilisation.

Now I know that there were, I think, at least three accidental extubations.

MYERS: That's one of the issues being considered, but yes.

BABARAO: So I was aware at the time there was one accidental extubation. And the need -- yes. Yes, those are the multiple factors we considered when we graded the care as sub-optimal because clearly they were not optimal in other words.

MYERS: As far as transport is concerned, you don't have access to the reasons for why that may or may not have happened, you were just looking at the benefits had [Baby K] been transported to a tertiary unit?

BABARAO: Soon after birth, yes.

MYERS: I make it plain, we've had evidence on this and the question of how that came about or didn't is another matter and I'm not asking you to comment on that.

BABARAO: Yes.

MYERS: And when you looked at this you talked about something you call the golden hour.

BABARAO: Yes.

MYERS: That's a general guide, isn't it, to best practice?

BABARAO: Yes.

MYERS: It may vary from baby to baby and situation to situation as to what is most appropriate, mightn't it --

BABARAO: Yes.

MYERS: -- or what is required? The matters you've identified include when lines were put in, the delay in putting in the central lines, and antibiotics and things related to that?

BABARAO: Yes.

MYERS: You had taken into account at least one desaturation that had taken place at the unit?

BABARAO: One accidental extubation.

MYERS: Yes, as it was put to you.

BABARAO: Yes.

MYERS: That's an issue we are dealing with.

Other matters didn't feature at the time of you doing that review, did they?

BABARAO: No, but, sorry, just to clarify, one accidental extubation which I was aware of at the time of the review was when the transport team was there.

MYERS: That's the one you're aware of?

BABARAO: But for this trial I was provided with a copy of the notes from Chester, which when I looked at it, it looks like there were two further accidental extubations.

MYERS: There's some debate about that, but yes. But this is a finding that you made when you reviewed this back in 2016, of course?

BABARAO: Yes.

MYERS: Grade 2, sub-optimal care, on matters as you understood it then?

BABARAO: Yes.

MR MYERS: Thank you, Dr Babarao.

Re-examination by MR JOHNSON

MR JOHNSON: Given [Baby K]'s position as you now know it to have been, doctor, would deliberately moving her ET tube help her or hinder her?

BABARAO: Sorry, can you repeat the question, please?

JOHNSON: Yes. Given [Baby K]'s overall position, her state of health as a result of her extreme prematurity, would moving her ET tube help her or hinder her?

BABARAO: Moving her ET tube? There was no need to move her ET tube.

JOHNSON: But if someone did it deliberately what sort of effect would that be likely to have on a child like [Baby K]?

BABARAO: I think it's no surprise it is going to create more issues for the baby.

JOHNSON: Yes. I just want to deal with a number of issues that have arisen -- well, dealing with more issues, does that include death?

BABARAO: Yes.

JOHNSON: Dealing with the findings of your review that Mr Myers has just asked you about, okay --

BABARAO: Just to clarify, it's not my review, it's a panel review.

JOHNSON: I beg your pardon, yes, your panel review. You say you looked at the -- in coming to the conclusion that there had been sub-optimal care, you looked at the whole picture?

BABARAO: Yes.

JOHNSON: So this is the picture from before [Baby K] was born?

BABARAO: Yes.

JOHNSON: And would include, presumably, the point at which [Baby K]'s mum presented herself to hospital?

BABARAO: Yes.

JOHNSON: So if [Baby K]'s mum had by chance presented herself to Arrowe Park, that would have solved that issue?

BABARAO: Yes, it would have avoided her delivering in a local neonatal unit, ie not in an ideal set-up for an extreme preterm baby.

JOHNSON: Yes, absolutely. You are not aware, are you, of the precise reasons why [Mother of Baby K] was not moved before she delivered?

BABARAO: At the time -- at that time I had different information, but I was provided with some sight of maternal notes, this time, for this trial. I could see that the in utero transfer was initially arranged and then it was stopped --

JOHNSON: Yes.

BABARAO: -- by the obstetric team. So I didn't know the exact reasons for it and that's not in my remit at all.

JOHNSON: No. Well, this jury has heard that the reason was because [Baby K]'s mum's labour was developing. That was the reason she was kept at Chester. That's a reasonable decision, isn't it?

BABARAO: If it's an obstetric decision, so you look at the timing of labour, the distance between the local neonatal unit and the tertiary neonatal unit and the safety of the mother, because the safety of the mother takes priority in that situation.

JOHNSON: Yes.

BABARAO: And you need to balance that against if the baby is born extremely preterm in a local neonatal unit what are the odds.

JOHNSON: Yes. And also balance those odds against the odds for the baby if the baby's born in the back of an ambulance --

BABARAO: Yes, absolutely. That's what I meant by safety.

JOHNSON: -- on the way from Chester to Preston, as it happens, was the offer in this case; did you know that?

BABARAO: I wasn't aware.

JOHNSON: Well, that makes a big difference, doesn't it?

BABARAO: Yes, absolutely. That's a long way.

JOHNSON: Yes. So far as the golden hour is concerned, is the up-to-date learning that that's not a hard-and-fast rule or have I misunderstood what you said?

BABARAO: It is not a protocol or a mandatory thing that every unit has to follow. It is good clinical practice, guidance or concept, which is shown to improve outcomes in extreme preterm babies, and another way shown to reduce morbidity and mortality in extreme preterm babies.

JOHNSON: Yes. But in terms of what the neonatal team did and when they did it, have you examined all the circumstances of what was going on at the time things were done or not?

BABARAO: I had sight of the Chester notes this time.

JOHNSON: Yes.

BABARAO: So I had some more information as to the care received by [Baby K]. I think she was stabilised by the team very promptly. There was some difficulty in intubation, I believe, and I couldn't really understand the reason for putting a 2mm ET tube, I couldn't understand that.

But intubation was done and surfactant was given a few minutes after.

Just soon after birth, I could see from the notes that the consultant contacted the transport team, so that was just within the hour or just about an hour, which I thought was very quick.

JOHNSON: Yes.

BABARAO: So the local neonatal unit made the right things in terms of transferring [Baby K] out as soon as possible.

JOHNSON: Okay. Let's just deal with the reason for the 2mm tube.

The jury heard evidence this morning from the doctor that did it, Dr Smith, that the reason was because the 2.5mm tube wouldn't pass first time. Is that a reasonable thing to do, to use a 2mm tube in those circumstances?

BABARAO: Yes, at that point in time that's a reasonable and safe thing to do if a 2.5mm tube does not go through, you go through a smaller tube.

MR JUSTICE GOSS: The first time or the second time?

MR JOHNSON: Or the second time.

Can we go back to the chart that you were shown before, please, Dr Babarao. Can we deal with the type of ventilation first? I don't think you were asked a question about that. It says SIMV. What does that mean, please?

BABARAO: That stands for synchronised intermittent mandatory ventilation. So it's synchronised with the baby's breaths. It's intermittent, so it's not always. It's mandatory in the sense that the ventilator mandatorily delivers the breaths.

JOHNSON: It may be obvious, but what does synchronised mean in terms of -- does that override the baby's natural instinct to breathe or is it sympathetic with it?

BABARAO: It's sort of sympathetic with it but it depends on the ventilator they would have used and the sensitivity of the ventilator in identifying the breathing efforts of a baby and then trigger a mandatory ventilatory breath from the ventilator to support the baby's breaths.

JOHNSON: Okay. You were taken to the leak line which reads 94, which by coincidence is exactly the same as the figure further down the column for saturations.

BABARAO: Yes.

JOHNSON: Just as the VTE, 0.4, is by coincidence exactly the same as the inspiratory time. What does inspiratory time mean first of all?

BABARAO: That's the time set on the ventilator, so that's the time the ventilator is designed to deliver oxygen and air into the baby.

JOHNSON: Okay. I didn't quite get your answer in terms of when you were being asked to deal with the leak and in conjunction with the VTE and whether this was optimal or sub-optimal. Did I understand you correctly to say you'd want to look at the whole picture rather than just figures?

BABARAO: Yes, because it's a snapshot in time, at 03.30.

JOHNSON: Yes. Of all the figures in that column, which is the most important?

BABARAO: The most important thing is the baby.

JOHNSON: Yes.

MR JUSTICE GOSS: So none of the figures, just what the baby looks like?

BABARAO: Yes, what is the baby doing and what are the oxygen levels of the baby.

MR JOHNSON: And what are the oxygen levels on the baby.

Now, let's look at the oxygen levels here: 94, is that a percentage?

BABARAO: Yes.

JOHNSON: And is that pretty much optimal?

BABARAO: Yes.

JOHNSON: Would you classify that as very good for a child of this gestation --

BABARAO: Yes.

JOHNSON: -- at an hour or two old?

BABARAO: Yes.

JOHNSON: Did it ever improve? I think once at 10.30 by 1%.

BABARAO: I don't think it improved. I believe from the notes that the baby continued to deteriorate and struggled to saturate.

JOHNSON: Yes. I think if we do maybe deal with this, we can see where the cursor is now, I think there is a 95% saturation level at 10.30; is that right?

BABARAO: Yes.

JOHNSON: But is that such a minimal improvement that it's negligible?

BABARAO: Yes, you can say that, but also to remember that these are snapshot readings at those specified points of time.

JOHNSON: Yes.

BABARAO: So the baby might have had saturations of 97 or even 77 in between those times.

JOHNSON: Sure. Okay. We understand. So this is a chart at that moment in time. Do I take it therefore that what you're saying is you have to look at the holistic picture?

BABARAO: Yes.

JOHNSON: Everything taken together?

BABARAO: Yes --

JOHNSON: Okay.

BABARAO: -- on a continuous mode, in the sense you will be seeing the baby all the time, not at those specific times.

JOHNSON: No, okay. So whilst a photograph may show you exactly what's there at any given time, it's not giving you the whole picture, so to speak?

BABARAO: Yes.

JOHNSON: All right.

BABARAO: Exactly.

JOHNSON: One of the issues you were asked to deal with in interpreting the reasons for that data at 03.30 was possibilities in relation to the tube.

BABARAO: Yes.

JOHNSON: If I understood you correctly, you said where the tube is in the windpipe may affect these figures?

BABARAO: Yes.

JOHNSON: That may be putting it in very simple language, but is that accurate?

BABARAO: For that number?

JOHNSON: Yes.

BABARAO: Yes, one of the reasons.

JOHNSON: One of the reasons, okay. Let's deal with it. One of the things that the jury has heard is that these tubes have measurements on them.

BABARAO: Yes.

JOHNSON: Beginning at 0, at the end that's inside the body or intended to be inside the body, and moving on along in centimetres?

BABARAO: Yes.

JOHNSON: And this particular tube, when it was put in, was 6.5 centimetres at the lips; yes?

BABARAO: Yes.

JOHNSON: Later, a different tube was X-rayed and found to be in a good position, that too was 6.5 centimetres at the lips. Can we take it then that the two tubes, the business end inside the body, was at the same point in the air pipe if they're both 6.5 centimetres at the lips?

BABARAO: Yes, you can say that.

JOHNSON: Yes. On your review of the papers when was the first time [Baby K] actually had a real problem?

BABARAO: In what sense?

JOHNSON: Well, when did you first notice things taking a significant downturn so far as [Baby K] was concerned?

BABARAO: She was very sick from the beginning -- from the point I received [Baby K] at Arrowe Park Hospital, she was already on a significant amount of intensive care.

JOHNSON: I don't want to stop you.

MR JUSTICE GOSS: You should stop. I think you misunderstood the question. Start again, please, Mr Johnson.

MR JOHNSON: It's my fault. When you looked at what had happened at Chester, were you looking at all the medical notes?

BABARAO: Yes.

MR JUSTICE GOSS: Can I just ask a question? It's occurred to me. You referred to the neonatal mortality review that was undertaken by a panel of which you were a member.

BABARAO: Yes.

MR JUSTICE GOSS: Did you have all the notes from Chester when you carried out that review?

BABARAO: No. We don't get the notes from Chester.

MR JUSTICE GOSS: So you didn't have any notes as to what had happened in Chester other than the information was essentially anecdotal and the situation that --

BABARAO: Information that would have been handed over to us by the transport team.

MR JUSTICE GOSS: Right.

MR JOHNSON: So does it come to this then that because data shows that children who are born at tertiary centres do better, when looked at as a whole cohort, as opposed to children born at tier 2 centres, your conclusion was that things might have been different if she was born at a tertiary centre?

BABARAO: Yes.

JOHNSON: And that was not based on specific information as to the quality of the treatment at Chester?

BABARAO: When I said multiple factors, one was if the baby was born in a level 3 centre, the outcome might have been different. But there were also issues that I already pointed out, the stabilisation delays and the issues during stabilisation and the transport delay, et cetera.

These are multiple factors.

JOHNSON: The transport delay is nothing to do with Chester though, is it?

BABARAO: Transport delay has got nothing to do with Chester.

MR JUSTICE GOSS: That's just a fact. In the circumstances, because [Baby K] was born at Chester, that followed then --

BABARAO: Yes.

MR JUSTICE GOSS: -- that she had to be stabilised before she could be transferred.

BABARAO: Yes. As far as my memory goes and the notes, [Baby K] was born at 02.12.

MR JOHNSON: Yes.

BABARAO: I think Chester contacted the transport team at around 03.10 or 03.15, in an hour, and the advice they got was to stabilise the baby, put the lines in and then contact again. I think there was some time there, delay, and they contacted the transport team after 5.45, I would think, and then the transport team took -- reached Chester was 9 o'clock, so all these were delays.

JOHNSON: Sure. It's not a memory test, the jury has this information.

BABARAO: There were delays. That's what I'm getting at.

JOHNSON: Yes, sure, yes. Those delays are not the responsibility of the medics at Chester?

BABARAO: No.

MR JOHNSON: No.

I have no further re-examination. Does your Lordship have any questions?

MR JUSTICE GOSS: No, that was the one question I wanted to ask and I just wanted to ask it then because it seemed most pertinent.

Thank you very much for coming and giving your evidence, doctor. It's complete and you're free to go.

But obviously, don't talk, should the opportunity arise for you to talk, to anyone who's going to be a witness in this case.

BABARAO: Sure.

MR JUSTICE GOSS: Thank you very much.

(The witness withdrew)

MR JOHNSON: We're moving on to Dr Jayaram.

MR JUSTICE GOSS: Yes. I don't know whether it's me or not, but it feels quite hot in this courtroom today.

MR JOHNSON: Yes, it is.

MR MYERS: It's boiling.

MR JUSTICE GOSS: I think we will just have a ten-minute break just for people to stretch their legs. Dr Jayaram is not going to complete his evidence this afternoon?

MR JOHNSON: No, I don't think so.

MR JUSTICE GOSS: The alternative, I suppose, is to sit on now and finish a little bit earlier.

MR JOHNSON: I'm in your Lordship's hands.

MR JUSTICE GOSS: Does anyone want a break now? You don't have to wear what I have to wear in terms of how hot it is, particularly with something on my head, horse hair on my head. If you're content to continue, everyone? All right, yes? We will continue then.

Thank you.

DR RAVI JAYARAM (affirmed)

Examination-in-chief by MR JOHNSON

MR JOHNSON: Could we start with you telling the jury your full name and occupation, please?

JAYARAM: My name is Ravi Jayaram, I'm a consultant paediatrician at the Countess of Chester Hospital.

JOHNSON: Thank you, Dr Jayaram. And your professional qualifications, please, slowly.

JAYARAM: I have a MBBS medical degree from the University of Newcastle-upon-Tyne from 1990. I'm a member of the Royal College of Physicians UK, 1994, and I'm a fellow of the Royal College of Paediatrics and Child Health.

JOHNSON: Thank you. How much experience do you have of working in your present capacity?

JAYARAM: I started in the field of paediatrics in February 1992.

I trained in paediatrics in various specialties and hospitals in the north-east of England, Bristol, New South Wales in Australia, and London, and I have been a consultant paediatrician at the Countess of Chester Hospital since December 2004.

JOHNSON: Thank you. In the course of these proceedings you have made many witness statements but I think five of them relate either entirely or incidentally to [Baby K]; is that right?

JAYARAM: I can't remember the numbers, but it wouldn't surprise me.

JOHNSON: And as part of that process, you were spoken to on several occasions by the police?

JAYARAM: That's correct, yes.

JOHNSON: You have had access to the medical notes that you made at the time of these events; is that right?

JAYARAM: I have yes.

JOHNSON: But independently of those medical records, do you have a memory, a free-standing memory, so to speak, of [Baby K]?

JAYARAM: I have a memory of certain events from that night, yes.

JOHNSON: Just before we start taking you through the notes, could you explain in what capacity you were actually on duty or preparing to be on duty as at the night shift of the 16th into 17 February 2016?

JAYARAM: The system we have as consultants providing emergency cover is that during the weekdays a named consultant is available and would be the person to call. Out of hours, from around 4 o'clock every afternoon and on weekdays until 8.30 the next morning, another consultant from the team will be on call. That means that from the handover time at 4 o'clock you deal with any emergencies, review any sick patients on the children's ward or the neonatal unit, and stay until such time as you're happy that everybody is stable and every patient has a plan. And then, from that time until the following morning, should the junior doctors in the hospital need advice, you are available to be called for advice and, should they feel when they ring for advice that they would need hands-on support with the presence of a consultant or if the consultant feels that the consultant needs to come in, then you will come in to be present to deal with whatever needs a consultant's presence.

JOHNSON: Thank you. From 15 February, some time between then and [Baby K]'s arrival in the early hours of the 17th, were you aware of [Baby K]'s potential impending very, very premature arrival?

JAYARAM: The honest answer is I can't remember. I wasn't the consultant covering the neonatal unit. I would probably have been aware, when I took over being on call on the evening of the 16th, that there was the possibility of [Baby K] being born, but the honest answer is I can't remember entirely whether I was made aware at that time or not.

JOHNSON: Okay. So as you've just explained, the system is that out of hours, in other words after about 5 pm through to the beginning of the day shift, there's no on site consultant cover necessarily for the neonatal unit?

JAYARAM: The consultant isn't always in as a matter of routine but we would be in if needed and we have an obligation to be within half an hour of the hospital. I actually live about ten-minute drive away.

JOHNSON: Okay. So if Mr Murphy would help us by putting up tile 44, please. Here, Dr Jayaram, we see door swipe data that records you coming in through the main entrance of the maternity unit at 2.06 on a Wednesday morning in the middle of February, 17 February.

JAYARAM: Yes.

JOHNSON: Do you remember now being summoned to the hospital?

JAYARAM: Well, I would have been called by the registrar, Dr Smith, because I wouldn't have had any other reason to come in at that time. So I would have been phoned by Dr Smith and he would have explained the imminent delivery of [Baby K]. Because of her degree of prematurity, even though Dr Smith was an experienced registrar, it's entirely appropriate for a consultant to be present as well.

JOHNSON: The next tile, please, Mr Murphy, which is 45, has you passing through another set of doors into the labour ward, I think.

JAYARAM: Yes.

JOHNSON: If we move to tile 49, please, we come to some notes that you made at 04.50 that morning.

JAYARAM: Yes.

JOHNSON: Given that this is your writing, I'd like you to interpret it for us, please, Dr Jayaram. So if we click again. Thank you.

Do you recognise your writing there?

JAYARAM: Yes, that is my writing.

JOHNSON: Thank you. Let's take it very slowly. In the left-hand column do we have, first, the date?

JAYARAM: I put the date and the time that I started making the notes.

JOHNSON: Is it the word "written" in between?

JAYARAM: It says "written", yes.

JOHNSON: Okay. I'm going to ask you to deal with this literally word by word because sometimes if we don't, someone then asks the question "What does that say?"

JAYARAM: Sure.

JOHNSON: You're the only person that can properly answer that.

Can you take us through? You see on the desk in front of you there's an electronic mouse. That should allow you to -- ah.

JAYARAM: It's not...

JOHNSON: I think it has to be switched on and off from -- let's forget about that. If it's not going to work, I don't want it to be a distraction.

There's a squiggle and then what looks almost like a G in the very top.

JAYARAM: I think that's probably my pen slipping. It's not of any meaning at all.

JOHNSON: Okay. So then what is underneath that?

JAYARAM: So 25/40 is shorthand for saying 25 weeks' gestation.

So normal gestation is 40 weeks so it's saying 25 weeks' gestation. We usually then in the notes put a little bit about the maternal history in. So I've said that mum was 33 years old with no previous live births and [Baby K] was an IVF, in vitro fertilisation, baby.

JOHNSON: So "baby" there on that line belongs to "IVF"?

JAYARAM: Yes.

JOHNSON: Okay.

JAYARAM: "SROM" means spontaneous rupture of membranes, so [Baby K]'s mum's membranes would have ruptured 48 hours prior to baby being delivered. So that says "approximately 48" -- the squiggle is an equals sign with curves in, which we use to mean approximately --

"48 hours pre-birth".

JOHNSON: Yes.

JAYARAM: "Received steroids x2."

Mothers, where a premature baby is imminent, are given steroids by the obstetrician in an attempt to help to mature the lungs so

that the degree of immaturity of the lungs is less than it might have been otherwise when the baby is born.

I commented that mum hadn't had any recorded history of any fevers in that period of 48 hours and that's important because if membranes have been ruptured for a longer period of time there's a risk of infection in the baby, and maternal fever can be a risk factor for infection in a baby.

"Spont labour" means spontaneous labour and "footling breech delivery" is the position that [Baby K] came out. So she didn't come out head first, she came out feet first, so breech basically means the bottom end comes out first. Footling means the foot is delivered first.

JOHNSON: The next lines?

JAYARAM: So she was born at 02.12 hours. BW is her birth weight of 692 grams. James Smith, the registrar, led her resuscitation.

When we assess a baby at birth we look at four things: we look at their colour; we look at their muscle tone, so are they floppy, are they moving around; what's their respiratory effort like; and what's their heart rate like. So I've documented there that at the time she was born she had -- was dusky, so she was sort of bluish looking -- poor muscle tone, floppy, no obvious respiratory rate and a heart rate around 60 breaths per minute.

JOHNSON: Okay. Maybe you said it, and if you did I missed it, after "James Smith [comma]", does that say paediatric registrar?

JAYARAM: Yes, "paeds reg".

MR JUSTICE GOSS: You didn't actually say it.

JAYARAM: I didn't say it.

MR JOHNSON: No. The next line, please?

JAYARAM: The next line says:

"Inflation breaths x2 cycles."

So when a baby is born, unlike adult resuscitation, what we're aiming to do is to get gas into the lungs, to get oxygen into the lungs, and then the heart will pick up oxygen, take it back to the heart, and the heart should pick up. So inflation breaths are a way of inflating the lungs. A baby's lungs are full of fluid when they are first born, so inflation breaths are a series of breaths that we give with a bag and mask or T-piece.

And we hold for 3 seconds and we give a cycle of breaths and reassess.

When we reassess we look at the same four things: we look at what their colour's like, what their muscle tone is like, respiratory effort and heart rate. The fact that we gave two cycles means that after the first round of inflation breaths things hadn't picked up. We then gave another round of inflation breaths.

And after inflation -- so the purpose of inflation breaths -- we watch the chest and we have to be sure we can actually see the chest moving. So when we give the inflation breaths, as each breath is going in, if we see the chest move we know that gas is getting into the lungs.

Now with a low heart rate what we're hoping is that by getting oxygen into the lungs, the blood that is flowing to the lungs will pick up oxygen, come back to the heart, and the heart rate will pick up. We knew the chest was moving but the heart rate remained low so we start what's called IPPV, which is intermittent positive pressure ventilation. They are different from inflation breaths, they're given with the same pressure, but they're just 1 second on and 1 second off. We repeat that cycle and if the chest is moving what should happen is the heart rate will pick up. And by 2.5 minutes the heart rate was above 100, which suggests that our intermittent positive pressure ventilation, our breaths, were effective.

JOHNSON: Just pausing there, "HR [heart rate] more than"?

JAYARAM: "... greater than 100 at 2 minutes 30 seconds."

JOHNSON: Thank you very much. What's the next line, please?

JAYARAM: I noted that there was gasping from 3 minutes. So normally when a baby is born, one of the first things they do is take a big gasp. They take that big gasp because the lungs are full of fluid and that first breath is quite difficult to take. It's akin to blowing up a balloon: the lungs are stiff and so they have to take a big gasp. The fact that [Baby K] wasn't gasping at the moment she was born suggested that prior to being born she had perhaps had a period where there wasn't enough blood and oxygen flowing round her system.

Gasping from 3 minutes, the fact that her heart rate picked up and then she started gasping, suggests that she then started doing what you would expect a baby to do when they are born. And gasping in itself initiates respiration.

I have commented there that there was spontaneous breathing from 4 minutes. That means that [Baby K] was breathing for herself at 4 minutes.

JOHNSON: Thank you.

JAYARAM: And up to that point we'd been doing her breathing for her.

JOHNSON: Yes. There is then something -- it says:

"Spontaneous resps from about 4 minutes..."

And you have crossed through something?

JAYARAM: So I had written "oxygen sats", crossed it out, and then written it again. I've said that the oxygen saturations were above 85% at 6 minutes.

Oxygen saturations are a reflection of how much oxygen is in your body. Oxygen is carried by haemoglobin and that percentage saturation is what percentage of your body's circulating haemoglobin has oxygen attached to it. So saturations of 85% at 6 minutes are a good finding. In you or I we'd expect higher oxygen saturations but at 6 minutes and in this situation it means that things are moving in the right direction.

JOHNSON: Thank you. Then after that please?

JAYARAM: So I've written there:

"Successfully intubated [although I haven't crossed the Ts] at 20 minutes at the third attempt by Dr Smith."

JOHNSON: Is that "at 20 minutes" or "about 20 minutes"?

JAYARAM: No, it's:

"... approximately 20 minutes at third attempt by Dr Smith."

I'll just talk through that. So intubation is the process of putting a breathing tube into the baby's airway. So it goes -- with a device called a laryngoscope we visualise the vocal cords and put a tube between the vocal cords.

In this situation the intubation is a less urgent procedure. If we'd been in a situation where giving inflation breaths or giving ventilation breaths we couldn't move the chest or there were no spontaneous respirations, intubation would have been a more urgent procedure.

So in this situation intubation is important. You can manage a baby's airway without intubation for quite a long period of time. Intubation makes the airway more secure and actually frees up hands and it also means down the line you can give a medication called surfactant which helps the lungs -- the immature lungs to open up.

In this situation I think one of the questions could be: should I have intervened and done the intubation sooner as the consultant? And in this situation, it's important with doctors in training, on the one hand, that they get experience, but on the other hand patient safety is paramount. And in this situation, because we had good chest movement, because we could oxygenate [Baby K], because we could ventilate with the T-piece and mask, I felt that it was appropriate for Dr Smith to do the intubation.

Had it been a situation where we were struggling to ventilate [Baby K] and had it been a situation where we really needed to get a secure airway more sooner, I probably would have taken over from Dr Smith after the first or second attempt.

JOHNSON: Right.

JAYARAM: I've written a size 2.0 tube. So that refers to the internal diameter of the tube. The narrower a tube, the potentially more difficult it is to ventilate through.

But if there's difficulty getting a tube in, as long as you can get a secure airway, it doesn't really matter what the size much tube is as long as you can ventilate through it.

I have commented it was secured at 6.5 centimetres at the lips. So the tubes have little marks on every centimetre and the 6.5 centimetre mark was where it was at the lips. There's a formula that helps you know how far the tube goes down. The actual tubes themselves, the endotracheal tubes, have a little black mark on the end and essentially if that black mark is below the vocal cords and not any further, you've probably got the tube in the right place.

JOHNSON: Okay. The jury have seen a presentation, a digital presentation, of an intubation. As part of that it was said, as you look down the laryngoscope, the person doing the intubation can see the vocal cords.

JAYARAM: If you've got the laryngoscope in the right place you should be able to visualise the vocal cords.

And then I have said:

"Transferred to the NNU."

To the neonatal unit.

JOHNSON: And then PTO?

JAYARAM: "Please turn over."

JOHNSON: Right.

JAYARAM: So these were written at 4.50, so on arrival I've said that -- the V is talking about the ventilation setting.

So the ventilator is the machine that --

JOHNSON: Sorry, can I just interrupt you: "on arrival" may be obvious, but on arrival where?

JAYARAM: On the neonatal unit.

JOHNSON: Okay. So up to that point, up to the point at which [Baby K] arrives at the neonatal unit, had she been in an incubator, in a cot or on some other piece of equipment?

JAYARAM: No, we have a piece of equipment, it's a trolley, called a Resuscitaire. So it's a cot with an overhead heater.

It's got all the equipment for suction, for ventilating on as well, and we usually transfer across on the Resuscitaire. I can't remember exactly how we did it but we very rarely would use anything other than the Resuscitaire because it's quite a short distance from the delivery suite across to the neonatal unit.

JOHNSON: Thank you. I interrupted you there. You told us that V stood for ventilation, I think.

JAYARAM: So ventilation settings. Now, I think with these notes the ventilator settings were sort of there on arrival.

The rest is sort of conflated because there's -- I wrote these retrospectively.

Going through, the ventilator was set to pressures of 21/5. So the ventilator has two pressure settings.

There's a background pressure called PEEP, positive end-expiratory pressure. That's just blowing a constant pressure in the background to help to hold the lungs open, to help the alveoli, the little air sacs, open.

And particularly in premature babies that are deficient in a substance called surfactant, which means that the alveoli have a tendency to just collapse down at the end of every breath. So there's a constant breath and that 21 is a pressure measured in centimetres of water of the pressure -- when the ventilator delivers a breath, that's the pressure that was delivered.

Now, what's the right pressure? The right pressure is enough to make sure you can see the chest move and to make sure that you can actually see that you are oxygenating the baby and getting rid of enough of the waste products of breathing, carbon dioxide. "T in"

stands for inspiratory time.

JOHNSON: So the inbreath?

JAYARAM: Yes. That's a T in of 0.4, so inspiratory time of 0.4 seconds.

FiO₂ of 60% means that, rather than ambient air, which has 21%, she was needing 60% oxygen, so she was needing more oxygen than you or I or a healthy term baby would need, which is what one would expect with a baby with immature lungs and surfactant deficiency.

JOHNSON: Is another way -- is that fractional oxygen?

JAYARAM: Yes. It's the fraction of inspired oxygen.

JOHNSON: So the gas that's going in is 60% oxygen rather than the 21% --

JAYARAM: Yes, that's correct.

JOHNSON: -- that's in this room? Well, maybe a bit less with everybody in here breathing.

What does the next bit say?

JAYARAM: That says a venous gas. So we try to look for objective ways of seeing how a baby is --

JOHNSON: Hold on. I think you've missed a line.

JAYARAM: Sorry, I apologise.

JOHNSON: Take it slowly.

JAYARAM: So "good chest wall movement". That means, observing [Baby K], we could see that her chest was moving up and down normally, suggesting her lungs were inflating normally.

JOHNSON: Yes.

JAYARAM: "Good air entry" means that when you listen with a stethoscope you can hear air going in from both sides.

JOHNSON: Do you listen on one side of the chest or both sides?

JAYARAM: You listen on both sides.

JOHNSON: Is there any particular reason for that?

JAYARAM: A couple of reasons. Number 1, if you are not ventilating effectively, so if for example we weren't giving enough pressure of the degree of stiffness of [Baby K]'s lungs, you wouldn't expect to hear air going in and out. At the same time you wouldn't expect to see good chest wall movement either.

The other important thing is to make sure, number 1, that the endotracheal tube is actually in because if an endotracheal tube is not in the breaths won't be going down the windpipe, down the trachea, into the lungs and you won't hear air going in. And sometimes the tube can go down too far. So you've got your trachea, your windpipe, which splits into two, and if a tube goes down too far, it may go down one side or the other. Generally, if it's going to go down one side or the other, it tends to slip down the right side because the right airway is more vertical. So when you can hear good air entry on both sides that usually means that the tube is in a good position.

JOHNSON: Let's just pause there because this may be relevant at a later stage of the factual chronology.

If an ET tube goes in too far, does it have the -- I'm interpreting what you've just said for your comment -- does that mean it could well have the effect of only aerating a single lung rather than both of them?

JAYARAM: Absolutely. If it goes too far, if it went down into the right main bronchus, it means that the breaths you're delivering will only go into that lung and nothing will go into the left lung. So effectively, if a tube is in too far, you're actually not ventilating effectively and that runs the risk of a baby not being oxygenated effectively and retaining the waste product of breathing, carbon dioxide, as well.

JOHNSON: So good ventilation is not simply delivering oxygen, it's allowing the body to expel/excrete CO2?

JAYARAM: Yes. That's what we're aiming to do, really.

JOHNSON: And if you're only ventilating that lung, that is significantly compromised?

JAYARAM: It can be significantly compromised. You may be fine, but the likelihood is over time, if it's down the wrong way, particularly in a premature baby who's deficient in surfactant, where small alveoli have got a tendency to collapse down, if you're not delivering that pressure, then eventually those airways will collapse down if it's down the wrong way. So even if for a short period of time you may stay well, eventually you will decompensate.

JOHNSON: Yes. I'm sure the jury understands but decompensate, what does that mean in this context?

JAYARAM: Well, it means that you'll go backwards, so you'll deteriorate. So essentially if you decompensate eventually your oxygen levels will drop and your carbon dioxide levels will go up and it will compromise other systems.

JOHNSON: Yes. Then I think you had started to read the next line when I interrupted you.

JAYARAM: Venous gas. We look for objective ways of seeing how well ventilation is going. What is important is your body needs to have a pH, an acid level, that's within a certain range, and a normal range would be 7.35 to 7.45. Ideally, we'd measure it from an artery. In adults and in older children we can do that. It is very difficult to do that in babies. We sometimes use what's called a capillary gas where we do a heel prick. In this situation we did a venous gas. Now the pH range in a venous gas, so that's out of a vein, is always lower than an arterial pH because oxygen has already been given up to the tissues and your venous blood is carrying the waste products of respiration back to the heart and lungs.

JOHNSON: Let me pause there for a second because this is all your day-to-day business and you have a tendency to talk slightly quickly, but this isn't a complaint, I just want to make sure people understand.

The venous system is, in effect, the return of blood to the heart; is that right?

JAYARAM: That's correct, yes.

JOHNSON: So the arterial system goes out from the heart with the oxygenated -- through the lungs, out into the body?

JAYARAM: That's correct, yes.

JOHNSON: The oxygen is depleted as the blood goes round the system, to the tissues, and returns through the venous system to the heart again; is that right?

JAYARAM: That's correct.

JOHNSON: So the pH is a measure of alkalinity and acidity; is that right?

JAYARAM: It's a reflection of how much acid there is in the body and the lower the pH, the more acidic you are.

JOHNSON: As you said, a "normal" pH is -- did you say 7.35?

JAYARAM: About 7.35 to 7.45.

JOHNSON: So this pH level you have recorded is slightly more acidic than normally?

JAYARAM: It's slightly more acidic. Even for a venous gas it's more on the acidic side, but for an initial gas, given when [Baby K] was born she was dusky, she was floppy, she had a low heart rate, it's not surprising. It suggests her acid levels on the -- were on the higher side at the time of that initial gas.

JOHNSON: So a high -- we are going to get a lot of these readings, but the higher the acidity the lower the pH number?

JAYARAM: That's correct, yes.

JOHNSON: So that's the pH. What's after that, please?

JAYARAM: When we look at the overall pH, there are two factors to look at that may or may not contribute to that overall low pH. One of those is what's happening with respiration. So carbon dioxide, where it says PCO₂, that's the partial pressure of carbon dioxide, that's the amount of carbon dioxide that's dissolved in the blood. That's a reflection of how well we're ventilating. So the higher your CO₂, the less effective getting gas in and out of lungs is.

JOHNSON: Hold on, hold on. On the measurement in the blood, the more CO₂, that compromises respiration?

JAYARAM: It's more a reflection that if the level of CO₂ is high in the blood, respiration is not as good -- ventilation is not as good as it should be. I suppose an example -- if you held your breath for a long time and checked a blood gas, your carbon

dioxide would be higher than normal, and if you breathed in and out really fast for a long time, your carbon dioxide would be lower than normal. A carbon dioxide of 7 on a venous gas is actually acceptable in a baby this premature, at this stage early on. And 7 actually is, although the normal range for an arterial gas would be around 4.5 to 6.5, a CO₂ of 7 in this situation suggests that ventilation, ie getting gas in and out of the lungs, is adequate.

We also try not to ventilate always to a completely normal carbon dioxide because we know that higher pressure ventilation in itself can potentially cause harm to the lungs. So we have to look at the overall picture. But the carbon dioxide there was in a range I was comfortable with.

The sodium -- where it says HCO₃, that's sodium bicarbonate. That's the sort of main alkali, if you like, in the body.

The lactate -- lactate is a product of anaerobic respiration. So again, when [Baby K] was born, she had a low heart rate, she didn't have any obvious respiratory effort, she was floppy, she was dusky.

That's a reflection of what had happened before she was born. And in that period she would have been relying on anaerobic respiration in order to get energy for her cells to work.

JOHNSON: What's anaerobic respiration?

JAYARAM: Anaerobic respiration is respiration without oxygen.

I suppose the example would be if you do any high-intensity exercise and your legs start burning, you have gone anaerobic.

Babies are -- newborn babies are quite resilient and we all have mechanisms if we have periods where -- if not enough oxygen is getting to the tissues, we have alternative mechanisms and we produce lactate as a waste product.

And a lactate of 4 is on the higher side and is a reflection of probably the condition she was in when she was born. And we look for trends in these things. You can't really make a judgement on a one-off because on a one-off gas I don't know whether those numbers are in the process of getting better from where they may have been or whether they're getting worse. So in a sense you treat a gas as a piece of a jigsaw.

So if I'd seen that gas, say, with the CO₂ of 7 and her chest wasn't moving up and down and I couldn't hear gas going in, I'd have thought we need to do something more with the ventilation and turn the pressures up.

In the context of her chest moving and having good air entry on both sides, I was happy not to adjust the ventilation at that stage.

JOHNSON: Thank you. So then could you carry on interpreting your writing?

JAYARAM: Yes. So given 120 milligrams of surfactant. So surfactant is the substance produced by the lining of the little air sacs, the alveoli, that stop them collapsing down. So in a term baby, when they breathe out or in you or I when we breathe out, at the end of our breath we don't empty our lungs completely, surfactant reduces the surface tension of the alveoli and stops them collapsing down completely. And that means when we take our next breath it's not like blowing up a balloon for the first time, it's relatively easy.

Premature babies can have deficiency in surfactant so that at the end of every breath the alveoli collapse down completely and if you don't do anything about that they struggle to breathe, because they're weaker, their muscles aren't as strong, they have to put more effort into breathing. So one of the purposes of giving steroids to mums before babies are born prematurely is to help to promote surfactant production to mature the cells in the alveoli that produce surfactant. And we give surfactant extraneously, down the endotracheal tube. That was given at 2.45.

So I have said there -- so we calculate -- there's a formula for calculating how much surfactant is given according to a baby's weight. That's administered through the endotracheal tube and I said that was given at 2.45. And I commented that after the surfactant was given the amount of oxygen needing to be given dropped from 60% to 50%.

JOHNSON: Is a drop in the fractional oxygen that's being supplied a good thing or bad thing?

JAYARAM: That's a good thing because it suggests that you're getting better delivery of gas into the lungs and probably better exchange of gas in the alveoli into the bloodstream, so the blood flows through and picks up oxygen from the alveoli.

JOHNSON: Does it support or undermine the fact that the tube is in the right place?

JAYARAM: Well, if the tube is in the wrong place, you will generally get surfactant just going down into one lung and not the other one, and you may not know at the time, but you may see later on when you do X-rays a difference between the appearance

of both lungs. But if prior to giving the surfactant we are confident that we can hear good air entry on both sides and the chest is moving symmetrically left and right, we're fairly happy that the tube is in the correct position.

JOHNSON: Just pausing there for a second. Is there any policy on how soon after birth you can or should X-ray a child?

JAYARAM: We generally, unless there's any other emergencies, don't do X-rays until around 4 hours old. The reason for that is that we are looking for evidence of surfactant deficiency. If you X-ray early a baby's lungs still may not look particularly well inflated and we may not see the changes suggested of surfactant deficiency. We would consider doing an X-ray sooner if we were having a lot of difficulty ventilating. If in spite of us thinking the tube was in a good position, there was a difference in air entry or if one side of the chest was moving less well than the other or if we thought there was anything else going on that needed urgent attention, but we don't routinely do X-rays straightaway unless we think they're going to help us with our management at that point.

JOHNSON: Have you underlined the word "fluids"?

JAYARAM: Yes. So the next is fluids. So I have said intravenous access, IV access, was obtained. We put a cannula into a vein.

BM equals 4. BM is -- it is a trade name, really, but it means blood sugar, BM machines were the original machines that measured blood sugars. And a blood sugar of 4mmol/litre is a good. We want that sugar to be in a good range and that suggests that although [Baby K] had had a difficult delivery, her blood sugar levels were good, she hadn't burnt up energy stores. That's important to look for because if blood sugars are low that can cause potential problems and we need to act and treat those. I said:

"Commenced 10% dextrose at 60ml/kg per day."

10% dextrose is a sugar solution. That's the standard sugar solution we would start as an intravenous fluid on a newborn baby. We decide how much is given according to their weight and we know on the first day of life 60ml per kilogram per day is probably the appropriate volume of fluid. So we take [Baby K]'s weight in kilograms and multiply it by 60 to work out the daily amount, then divide by 24 to set the rate for that to go in.

JOHNSON: For the hourly rate?

JAYARAM: Yes.

JOHNSON: Next line, please.

JAYARAM: That says "sepsis". We always think could there be any potential infection around. We tend to assume there's infection around until proven otherwise. So rather than wait and see, we assume there's infection around.

I've commented that a blood culture was sent.

A blood culture is where we take an amount of blood and put it into a specific bottle that has broth in it that is food for bacteria, for want of a better description. Those bottles then go to the microbiology lab where they are put into an incubator and watched.

Then we start antibiotics.

We use a combination of penicillin and an antibiotic called gentamicin as our standard antibiotic treatment if we don't know for sure that there's a bacteria around and that covers most of the bacteria that are likely to cause infection in any newborn if we're suspecting infection.

JOHNSON: When you say covers what do you mean by that?

JAYARAM: It means it should kill them, basically. We know that most bacteria, if bacteria are around and a baby has an infection, are usually acquired from mum and we know the groups of bacteria, the kinds of bacteria, that generally cause infection commonly. And the antibiotics which are given are chosen really to cover the vast majority of those germs.

If bacteria grow we may adjust antibiotics according to the bacteria and what the laboratory are telling us about antibiotics, but we generally assume infection until we know for sure that there isn't, and that's dependent on knowing that the blood culture isn't growing anything, knowing that other blood tests looking at indirect markers of infection are not suggestive of infection either. So that's kind of routine, really.

We know that with the history of prolonged rupture of membranes that [Baby K]'s mum had and we know that premature delivery itself can happen because of infection, we can't not cover for the possibility of infection.

JOHNSON: So does it come to this then, just drawing the strands of that together, that you were testing for infection but because you physically -- or someone in the lab has to physically wait for 5 days for the results, because that's how

long it takes to grow, literally, you have to presume that there is infection and give the appropriate treatment?

JAYARAM: Yes. And there are other markers. So sometimes there are other indirect markers in the blood, white blood cells, a protein called C-reactive protein. Sometimes even if bacteria don't grow, if those markers suggest infection, we would continue treatment.

Generally, if the indirect markers are negative, if there's nothing growing on the blood culture at 36 hours, and there's nothing else about the baby to suggest infection, we would stop antibiotics but we would never stop them before 36 hours at the earliest.

JOHNSON: Just so that we can stop this hare running, the lab in due course, 5 days later, the results showed that there were no signs of infection. That's a matter of fact.

All right.

So moving on then please what does the next part of the note say?

JAYARAM: It says "meds", so drugs. So we have given vitamin K, intramuscularly. Vitamin K is a substance that is given to all newborn babies. Newborn babies' blood clotting mechanisms are not as good as they should be and there's a condition called haemorrhagic disease of the newborn which presents with catastrophic bleeding in the brain.

Vitamin K reduces the risk of this significantly and it is given routinely to all babies. So vitamin K was given.

I have said -- that squiggle looking thing says -- that's 0.5g.

DC -- sorry, that says D1, day 1. So day 1 of penicillin -- of pen and gent, penicillin and gentamicin.

And I have put there morphine 25 micrograms per kilogram per hour. We give morphine to babies when they're ventilated because, number 1, it's analgesic, it's not particularly nice having a tube down your throat -- obviously we don't know what a baby is feeling -- and we start morphine infusion.

Morphine is, as I say, an analgesic drug and it will keep them calmer and it can make ventilation easier. As will come up later, I put that in -- I wrote this note at 4.50 and I'm sure we'll talk later about when the morphine started, but at the time I wrote the note [Baby K] was on 20 micrograms per kilogram per hour of morphine intravenously as a continuous infusion.

JOHNSON: The next part of your note, please.

JAYARAM: That's examination --

JOHNSON: That's examination of the baby?

JAYARAM: Of the baby, yes. I have said she looks pink. If you're pink, that's -- we have saturation monitors, but if you're pink your oxygen saturations must be in the 90s because you wouldn't look pink. So she's pink.

That's important.

I have said her tone is good. If you recall, she was floppy to start with. So her tone was within normal limits. That means that if I am moving her hands and arms and legs around they are not completely floppy like a rag doll, they have got normal tone, she is not stiff, she is not loose, she is not floppy.

I have said her pulses feel normal. So we feel pulses -- why is it important to feel pulses --

JOHNSON: Sorry, can you tell us what it actually says?

JAYARAM: CVS, that's sort of cardiovascular system --

JOHNSON: And slow down a little bit as well.

JAYARAM: Cardiovascular system.

JOHNSON: So CVS. And?

JAYARAM: So pulses felt normal. So we generally -- if you can feel pulses well, you know that the heart is pumping effectively and you've got a good pulse volume. We feel in babies for the brachial pulse, which is a pulse in the upper arm, and the femoral pulses, which are pulses in the groin.

I have said refill less than 2 seconds. So refill is a really important clinical tool. We basically push on the skin over the breastbone for 5 seconds and take a finger off and the colour should come back within 2 seconds. If the colour comes back within 2 seconds, you know that the tissues are being perfused adequately by blood, so the heart is pumping well enough. It's a piece in a jigsaw. It's not a sign in itself, it has to be put in the context of everything else.

But with good volume pulses and good capillary refill, at this point I was happy with her circulation.

That little sort of line is basically a notation that we use in medicine for the heart sounds. So the first bit of the line is heart sound number 1. The second double line is heart sound number 2 and plus zero. So I'm saying the heart sounds are normal and I couldn't hear any murmurs.

Murmurs are extra sounds that you might hear in between the first and second heart sounds or between the second heart sound and the first heart sound again.

They can mean something, they may not, it may just be the sound of blood flowing. They can sometimes suggest underlying structural heart disease. So the absence of murmurs also was a positive finding in terms of where she sat in terms of the stability of her cardiovascular system and how her heart was pumping blood around the body.

JOHNSON: Thank you.

JAYARAM: Next is RS, so respiratory system:

"Good chest movement left and right and good air entry left and right."

JOHNSON: Thank you.

JAYARAM: I have said her abdomen was soft.

JOHNSON: Is that a positive sign?

JAYARAM: That's a positive sign. If it's tense I'd be concerned.

Is it tense? So if a tube is in the wrong place, for example, if it's gone into the oesophagus rather than the trachea, you can fill the stomach up the air and it can make them tense. If you have got any problem with retention of bowel gas, that can be a worrying sign if the abdomen isn't soft. But if it's, soft that's a positive sign.

And neurologically I have said her tone was good.

JOHNSON: What does that actually say?

JAYARAM: CNS, central nervous system.

JOHNSON: Okay, thank you.

JAYARAM: So my plan --

JOHNSON: Is that a P in --

JAYARAM: That's a P for plan in the circle. That's:

"D/W [discussed with] the neonatal transport team."

So ordinarily, had there been different circumstances, [Baby K] would probably have been born in one of the tertiary centres, but she was born with us and our job is to stabilise babies in this situation, and then arrange for them to be transported to an intensive care centre and there is a dedicated transport team with whom we liaise.

I spoke with them. They advised they would arrange transfer for [Baby K] to Arrowe Park Hospital, which is one of the two tertiary neonatal units.

They wanted us to place umbilical lines first -- so umbilical lines are ways of --

JOHNSON: Sorry to interrupt you, could you just actually read -- it's probably obvious if people are following, but if you could actually read the words.

JAYARAM: "Advised that they will transfer to Arrowe Park when umbilical lines placed and X-rays done."

JOHNSON: Right. Now --

JAYARAM: So umbilical lines. So the umbilical cord has blood vessels in it, there's one vein and two arteries, and in newborns we can use those veins to get secure venous access. We can use the umbilical vein to get a catheter in, a tube in, which allows us to blood sample, it allows us to give other fluids as well, and we can put an umbilical arterial line in, which allows us to measure blood pressure directly and also to get arterial blood gases as well. And when it says "X-rays done"

there are formulae for calculating how far those go in and we X-ray them to make sure they're in the correct positions once they are in, and the transport team --

JOHNSON: Sorry, so these are X-rays of where the lines are?

JAYARAM: Where the tips of the lines are when they're done.

Arrowe Park said, "We will arrange transfer. Please can you put the lines in for us before transfer".

JOHNSON: Is it the fact that the sooner you do that, the easier they are to get in, or does it not make --

JAYARAM: Not really. To be honest, they're not essential, you can manage babies without them. They're very helpful because you get more secure venous access, you can get perhaps more accurate monitoring, but sometimes, if we're having difficulties, they'll put them in when they get to the tertiary centre.

JOHNSON: All right. Does it then say "Parents updated"?

JAYARAM: "And parents updated".

JOHNSON: We're coming now to the critical part, but I just want to pause there, if we can, please. When you wrote this note -- if we just go back to the top of the page, please. The events that are being covered by the note go back to 02.12.

JAYARAM: Yes.

JOHNSON: We just dealt with tile 49. We're going to come back to your note in a moment. We've just ended that part of the note with "discussion with parents". Can we go to tiles 54 and 55, please, to try and time when it was as a matter of fact you spoke to [Parents of Baby K].

If we click on it we'll see exactly what we've just been looking at here. Can we just click on that just to check that I'm right? So this is a different document now, isn't it? So this is a document that relates to the admission of [Baby K] to the unit; is that right?

JAYARAM: Yes. We have a standardised form, electronic now, but it was paper then. So when babies are admitted to the neonatal unit, this is a summary of the admission.

JOHNSON: At what stage would this form be filled?

JAYARAM: It can vary, really, it depends on what you're needing to have to do with the baby. Basically, when things have calmed down there are certain sections on it, so sometimes it's not necessarily filled in in order if that makes sense.

JOHNSON: So it's a single form but parts may be filled in at different times?

JAYARAM: Yes.

JOHNSON: Okay. This again, is this your writing?

JAYARAM: This is my writing, yes.

JOHNSON: So we have the infant on the left-hand side. It says "sticker if possible".

JAYARAM: Yes.

JOHNSON: Obviously it wasn't, but [Baby K] hadn't been named at that stage, or at least you hadn't been --

JAYARAM: No.

JOHNSON: -- told what her name was. "CC number". Is that a hospital number?

JAYARAM: That's a hospital registration number.

JOHNSON: F for female?

JAYARAM: Yes.

JOHNSON: Date of birth, time, birth weight. Reason for admission. What does that say?

JAYARAM: Preterm and RDS, which is respiratory distress syndrome, which is the condition caused by surfactant deficiency in premature babies.

JOHNSON: [Mother of Baby K]'s details, some of which have been obliterated for privacy reasons, [Baby K]'s father's name underneath; is that right?

JAYARAM: That's correct.

JOHNSON: Moving down, please, does some of the material that you have recorded in the clinical notes also appear here?

JAYARAM: Some of it does, so I've said that -- maternal history of baby was in vitro fertilisation, IVF.

JOHNSON: So PMHX?

JAYARAM: Past medical history.

JOHNSON: Past medical history, okay.

JAYARAM: Maternal blood group A positive. Antibodies negative, which means that on mum's blood there's no antibodies that could potentially cause problems with blood group incompatibility in the baby.

Problems in pregnancy. SROM, spontaneous rupture of membranes, at 48 hours. And we look back at antenatal scans. There'd been the suggestion on an antenatal scan, a scan done before being born, at some point of a swelling called a cystic hygroma.

Cystic hygroma is a malformation of lymph vessels that's often seen around the neck. But I documented, having gone back, that subsequent scans had shown that had resolved and disappeared completely.

JOHNSON: So then risk factors for sepsis. There's no case of sepsis here, is there?

JAYARAM: No, but there are risk factors in the sense that early rupture of membranes, preterm birth, and membranes had been ruptured for over 18 hours. This is really a prompt for us to remember that we need to consider infection and have a low threshold for assuming it's there and treating it.

JOHNSON: So is the physical act of filling in this form designed to reinforce with you the issues that you --

JAYARAM: It depends on when the form is filled in because we knew in this situation with the history that we'd give antibiotics. But it is good because, number 1, we've documented the reasons, what the risk factors were, and it can be a prompt, if you haven't given antibiotics, to remember to do them.

JOHNSON: Okay. So the antenatal steroids, which we've already dealt with, and the gestation, weight, mode of delivery.

Meconium, which is a waste product from the baby; is that right?

JAYARAM: Yes. Meconium is basically the baby's first poo.

Sometimes babies, when they are distressed before they are born, will pass meconium before they are born, it's very unusual in premature babies, but there was no evidence of meconium being passed by [Baby K] before she was born.

JOHNSON: Then we have Apgars, which we've heard about from Dr Smith. And without necessarily you having to repeat his explanation of these, are those positive or negative scores?

JAYARAM: They're positive. An Apgar of 1 fits with what she looked like. An Apgar of 9 by 5 essentially means that we have got spontaneous respirations and a heart rate above 100, we've got a situation where the heart is pumping blood around enough to get good saturations and the baby's pink and the baby's tone has picked up as well.

JOHNSON: Yes. Condition at birth is precisely pretty much word for word what --

JAYARAM: Yes.

JOHNSON: -- you recorded in the notes that we've just been through, so perhaps we don't need to repeat that.

Then just on to the second page, Mr Murphy.

Could you just, slowly please, talk us through --

JAYARAM: So I've put the date, 17/2/16. Came to the unit, the neonatal unit, at 02.40. Transferred on the Resuscitaire from the labour ward. Covered with a plastic bag. So we know that small premature babies are very prone to losing heat. So one of the things we do is we actually put them into a plastic bag, feet first, and so rather than fluid radiating away, that evaporates in the bag and actually helps to maintain their temperature. And we always make sure that we put a hat on because a lot of heat is lost through the hat as well.

JOHNSON: Yes. Then her temperature, heart rate on admission.

JAYARAM: So the temperature is 38.5, which is high. Actually, we worry about babies getting cold. That's a possible indicator of infection and we'd covered for -- covered with antibiotics anyway. Heart rate was 150. I've put the respiratory rate as 50, but we were giving the breaths at 50.

JOHNSON: Does it say "bagged" underneath?

JAYARAM: Bagged, yes. So that's -- so although we were using a T-piece it's kind of colloquial because in the old days we'd have a bag that we'd squeeze to give the breaths. So that was a rate of 50, but that was us giving the breaths.

Saturations of 93% on arrival to the unit in 80% oxygen, which came down, and then a blood sugar of 4.

I've written that vitamin K was given intramuscularly.

Nystatin is an antifungal that we give with antibiotics.

I can't remember whether it was prescribed or not; I haven't documented it there. I've documented that surfactant was given at 120 milligrams at 02.45.

JOHNSON: Okay. Perhaps this is the best way to end today, my Lord. Could we show the Resuscitaire video? We've spoken about it several times. We've not actually seen the video. It's 4 minutes long.

MR JUSTICE GOSS: Yes, that's good. That will then be it for today then because the next stage will take some time.

(Video played to the court)

MR JOHNSON: Is that, broadly speaking, the position that obtained back in February, so far as the Resuscitaire was concerned?

JAYARAM: Yes. It's a different model, but the bits on it were pretty much the same.

MR JUSTICE GOSS: I have to say I found the sound quality not very good and I couldn't hear some of what was being said or some of the words being said. At the very beginning I wasn't quite sure whether the nurse, whoever it is, was actually saying it was the same or it wasn't the same as in 2016.

JAYARAM: No, they weren't the same models. We had older versions there.

MR JUSTICE GOSS: Was the equipment basically --

JAYARAM: The essential equipment is pretty much the same.

You know, you have a heater, you have a gas supply, you have -- so pretty much everything's the same. The stuff in the drawer is the same as well.

MR JOHNSON: Yes, and another significant difference in [Baby K]'s case to what's on the video is that she was wrapped in a plastic bag because she was so premature rather than in the towel --

JAYARAM: Yes.

JOHNSON: -- as has been demonstrated by the narrator.

JAYARAM: Yes.

MR JUSTICE GOSS: She did actually say "unless they're in a bag".

MR JOHNSON: She did, but it wasn't easy to pick it out.

Some of us have watched it before. That may be a convenient point, my Lord.

MR JUSTICE GOSS: Yes, certainly. We're going to break off now, Dr Jayaram. Could you please be ready to continue at 10.30 tomorrow morning? You know the rules: no communication with anyone about anything to do with this evidence in this case. Thank you.

All right, members of the jury? You know the rules, your rules: no communication and no research. Thank you very much. 10.30 tomorrow morning.

(In the absence of the jury)

MR JOHNSON: Can I just raise one issue, my Lord, because we're going to come to it fairly soon, and not because I'm inviting an adjudication or a dispute that will need adjudication, but, so your Lordship knows, there is an issue that is going to have to be dealt with, either by consent or with a ruling.

We are proposing to play the video interviews of the defendant in relation to this single case. Before we started the trial, there was a dispute about precisely what was or wasn't admissible and, as we understand the position, that may be contingent on precisely the evidence that's given by Dr Jayaram. I'm reasonably confident that at a convenient point, when Dr Jayaram has finished, we from both sides will be able to sit down and iron this out very quickly, but, if we can't, we will invite a ruling because we're going to come to this material quite quickly. We have put in place the resources to deal with editing very quickly, but inevitably it will take -- it's most likely to take overnight. So it may be that if we can't -- if it looks like we're going to come to them on Thursday and if we can't come to an agreement, say by the end of lunchtime tomorrow, we'll invite a ruling.

MR JUSTICE GOSS: I suppose that depends on how far we've got.

MR JOHNSON: No, of course.

MR JUSTICE GOSS: All right. In principle I understand what the potential issue is.

MR MYERS: Yes.

MR JUSTICE GOSS: We'll factor that in.

MR MYERS: Thank you.

MR JUSTICE GOSS: I understand the difficulties. Thank you very much.

MR JOHNSON: We have got some other fillers that we're holding back if we need to, to use time, so we're dealing with the live evidence expeditiously and, as I say, we have other things that we can deploy to fill court time.

MR JUSTICE GOSS: All right. Thank you very much indeed.

MR MYERS: If we may, my Lord, we'd like to see the defendant before she leaves.

MR JUSTICE GOSS: Yes. Thank you.

(4.21 pm)

(The court adjourned until 10.30 am on Wednesday, 19 June 2024)